



**Herefordshire
Council**

LOCAL FLOOD RISK
MANAGEMENT STRATEGY

MAY 2017

HEREFORDSHIRE COUNCIL

LOCAL FLOOD RISK MANAGEMENT STRATEGY

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Working for Herefordshire

Balfour Beatty Living Places
Unit 3, Thorn Business Park
Rotherwas
Hereford
HR2 6JT
www.balfourbeatty.com

Herefordshire Council
Plough Lane
Hereford
HR4 0LE
www.herefordshire.gov.uk



WSP | Parsons Brinckerhoff
Kings Orchard
1 Queen Street
Bristol BS2 0HQ

Tel: +44 (0) 117 93 6200
www.wspgroup.com
www.pbworld.com

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Prepared by	Joanna Goodwin (WSP-PB)	Richard Perkins (Balfour Beatty)		
Checked by	Claire Storer (WSP-PB) Joel Hockenull (Balfour Beatty)	Joel Hockenull (Balfour Beatty)		
Authorised by	Richard Perkins (Balfour Beatty)	Richard Perkins (Balfour Beatty)		
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1

INTRODUCTION

The Flood and Water Management Act 2010 implemented recommendations from Sir Michael Pitt's Review of the 2007 floods in the UK. Under the Act, Herefordshire Council became a 'Lead Local Flood Authority' (LLFA) and was given a series of new responsibilities to coordinate the management of local flood risk.

As LLFA for the county, Herefordshire Council must 'develop, maintain, apply and monitor' a Local Flood Risk Management Strategy.

The Local Flood Risk Management Strategy is an important document for the on-going management of flood risk throughout the county. The Strategy sets out the framework for how the council will work with other local flood risk management authorities and the general public to better understand and manage existing and future flood risks from all potential sources of flooding.

Consideration will be given to the management of flood risk from all sources of flooding. However, greater focus will be given to those sources of flooding for which the council, as appointed LLFA, are responsible, namely 'local' sources of flooding that comprise:

- Surface water;
- Groundwater; and
- Ordinary watercourses.

There are many other authorities also responsible for the management of flood risk within the county. These include:

- The **Environment Agency** which has a strategic overview of all sources of flooding and is the authority responsible for managing flood risk from rivers designated as 'main rivers', reservoirs and the sea;
- **Welsh Water** which is the authority responsible for managing flood risk from the public sewerage network in the majority of Herefordshire;
- **Severn Trent Water** which is the authority responsible for managing flood risk from the public sewerage network in the north and east of Herefordshire;
- The **River Lugg Internal Drainage Board** who are responsible for water level management with its operational areas, which encompass the low-lying land within the catchments of the Rivers Lugg, Arrow, Frome and Monnow (in England).
- **Lower Severn Internal Drainage Board** who are responsible for the maintenance of the land drainage assets within the low-lying land within the catchment of the River Leadon;
- **Highways England** and **Network Rail** who are responsible for managing flood risks within their trunk road, motorway and railway networks respectively.

→ **The Herefordshire and Gloucestershire Canal Trust** who are a charitable trust responsible for the restoration and management of the Hereford and Gloucester Canal.

As LLFA, the council will work to **ensure coordination between all relevant risk management authorities**.

The overall aim of this Strategy is to:

- Continue to improve understanding of flood risks within the county, both within the council and general public;
- Continue to reduce flood risk to communities and business within the county, through fair and transparent means; and
- Ensure good communication and coordination between the relevant risk management authorities for the management of flood risk.

The Strategy will be reviewed and updated, as necessary, every **six years** to ensure that the Strategy continues to reflect the way in which flood risk is managed within the county.

The Strategy is accompanied by an **Action Plan** that sets out how the council will deliver the Strategy over the next six years. The Action Plan outlines the measures identified through this Strategy and the outcomes of each action are linked to the objectives of the Strategy so that , as appointed LLFA, can monitor how we are delivering our local flood risk management measures.

THE STRUCTURE OF THIS STRATEGY

It is not possible to stop flooding from occurring. However, it is possible to reduce flooding and be better prepared for flooding, including being better prepared for the potential effects of climate change. This Strategy therefore sets out how the council are approaching flood risk management to meet the **five key objectives** (see Section 2) that have been selected by the council to reduce the risk to lives and livelihoods. The objectives by which Herefordshire Council will achieve this vision are set out below and actions and measures that have been developed to achieve these objectives are set out in Section 7 of this Strategy.

The structure of the strategy is set out below, with a summary of what each section of the Strategy aims to achieve.

Aims and Objectives
Legislation
Roles and Responsibilities

The Strategy starts with an overview of what it aims to achieve, why it needs to be prepared, the relevant legislation and the roles and responsibilities of key flood risk management authorities.

Summary of Flood Risk

This is followed by a brief summary of flood risk throughout Herefordshire to provide the context from which the proposed actions and measures have been developed.

Five Key Objectives for Flood Risk Management

This section is structured around the five key objectives that the council have selected to improve the management of flood risk. The Strategy describes the measures that are currently in place and/or the measures that are proposed to meet each of the five key objectives.

Delivery and Funding Mechanisms

The Strategy provides a summary of the key sources of funding that may be available to the council, other relevant authorities and the general public to help with the delivery of schemes and reduction of flood risk within Herefordshire.

Environmental Screening

The Strategy must be accompanied by Environmental Screening to determine whether or not a Strategic Environmental Assessment or a Habitats Regulations Assessment is required. This section provides a brief overview of this process.

Action Plan

The proposed measures are incorporated into an Action Plan that describes the proposed measures and the proposed timeframe for implementation. The Action Plan is a 'live' document that will be updated as measures are progressed and new measures are proposed. A copy of the Action Plan is provided in Appendix A.

2

THE COUNCIL'S OBJECTIVES FOR MANAGING LOCAL FLOOD RISK

Herefordshire Council's strategic objectives are described in our **Corporate Plan (2016-20)**. This sets out how we will ensure we make the best use of resources and deliver services that make a difference to people in Herefordshire. Priority 3: Support the growth of our economy, includes: **ensuring that infrastructure is in place to prevent and improve community resilience to flooding.**

The overarching aim of Herefordshire Council with respect to the management of local flood risk within the county is: **to continually improve the way in which flood risks are managed throughout the county to reduce the impacts of flooding on lives and livelihoods.**

This will be achieved via a range of measures and activities that will be centred around internal council systems and processes, communication and engineering works. All proposed measures and activities will be aligned to one or more of the council's selected objectives that apply to the whole of Herefordshire. These are aligned to the Environment Agency's national objectives (see Section 3) and are summarised below.

STRATEGY OBJECTIVES FOR MANAGING LOCAL FLOOD RISK

- | | |
|---|---|
| <p>Objective 1
Understand flood risks throughout Herefordshire</p> | <p>Continue to develop understanding of flood risk across Herefordshire. This will offer multiple benefits such as enabling the council to identify those areas at greatest risk, prioritising measures to address known risks, validating the accuracy of modelled flood mapping, improving understanding of sewerage flooding and flooding from culverts and drains, raising awareness of risks to communities and developers, assisting with funding applications, and informing emergency response plans.</p> |
| <p>Objective 2
Manage the likelihood and impacts of flooding</p> | <p>As far as is possible, reduce the risk of flooding and the potential damages that can be caused by flooding. This can be through measures such as improving the way in which routine maintenance is undertaken, investigating the causes of flooding in greater detail and undertaking capital engineering works.</p> |
| <p>Objective 3
Help the community help themselves</p> | <p>Provided clarity regarding the responsibilities of local communities and the ways in which local communities can contribute to the management and reduction of flood risk, including the role and support of Community Resilience Groups.</p> |
| <p>Objective 4
Manage flood warning, response and recovery</p> | <p>It is not possible to eliminate all flood risks therefore the Strategy will aim to raise awareness of flood warning and response systems for the benefit of local communities and others involved in the management of flood risks. Existing systems will also be summarised and reviewed to identify any opportunities for betterment.</p> |

Objective 5
Promote sustainable and
appropriate development

This focuses primarily on how flood risks are considered in land use planning and development proposals to manage flood risk through consideration of development vulnerability and predicted flood hazard.

3 LEGISLATION

The need for the Strategy is governed by the **Flood and Water Management Act 2010** which places a statutory duty on LLFA's to develop, maintain, implement and monitor an approach for managing local flood risks in its area. Specifically, Regulation 9 of the Act states:

9. Local flood risk management strategies: England

- (1) A lead local flood authority for an area in England must develop, maintain, apply and monitor a strategy for local flood risk management in its area (a "local flood risk management strategy").
- (2) In subsection (1) "local flood risk" means flood risk from -
 - (a) surface runoff,
 - (b) groundwater, and
 - (c) ordinary watercourses.
- (3) In subsection (2)(c) the reference to an ordinary watercourse includes a reference to a lake, pond or other area of water which flows into an ordinary watercourse.
- (4) The strategy must specify -
 - (a) the risk management authorities in the authority's area,
 - (b) the flood and coastal erosion risk management functions that may be exercised by those authorities in relation to the area,
 - (c) the objectives for managing local flood risk (including any objectives included in the authority's flood risk management plan prepared in accordance with the Flood Risk Regulations 2009),
 - (d) the measures proposed to achieve those objectives,
 - (e) how and when the measures are expected to be implemented,
 - (f) the costs and benefits of those measures, and how they are to be paid for,
 - (g) the assessment of local flood risk for the purpose of the strategy,
 - (h) how and when the strategy is to be reviewed, and
 - (i) how the strategy contributes to the achievement of wider environmental objectives.
- (5) The strategy must be consistent with the national flood and coastal erosion risk management strategy for England under section 7.
- (6) A lead local flood authority must consult the following about its local flood risk management strategy -
 - (a) risk management authorities that may be affected by the strategy (including risk management authorities in Wales), and
 - (b) the public.
- (7) A lead local flood authority must publish a summary of its local flood risk management strategy (including guidance about the availability of relevant information).
- (8) A lead local flood authority may issue guidance about the application of the local flood risk management strategy in its area.
- (9) A lead local flood authority must have regard to any guidance issued by the Secretary of State about -
 - (a) the local flood risk management strategy, and
 - (b) guidance under subsection (8).

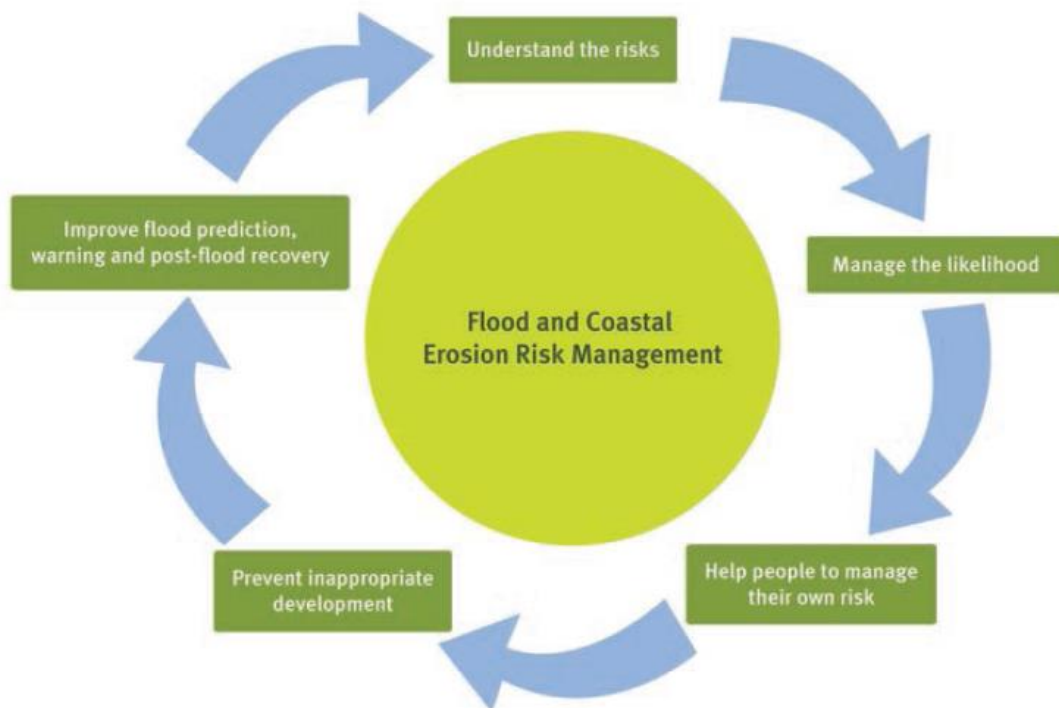
The Flood and Water Management Act 2010 also places additional duties on the Environment Agency to provide a national strategic overview role for flood risk management. The Environment Agency has produced a **National Strategy for Flooding and Coastal Erosion Risk Management** (the National Strategy).

The Environment Agency's National Strategy sets out how the Environment Agency intends to meet their obligations under the Act to 'develop, maintain, apply and monitor a strategy for flood and coastal erosion risk management in England'. It describes what needs to be done by all organisations involved in flood and coastal erosion risk management. These include local authorities, internal drainage boards, water and sewerage companies, highways authorities, and the Environment Agency.

The National Strategy also sets out a statutory framework that will help communities, the public sector and other organisations to work together to manage flood and coastal erosion risk. It will make sure that risks are managed in a co-ordinated way across catchments and along each stretch of coast. This includes the development of local Strategies by LLFAs, as well as their strategic overview of all sources of flooding and coastal erosion.

The measures set out by the Council, as LLFA, within this local Strategy are therefore compatible with the Environment Agency's National Strategy. The strategic aims and objectives of the National Strategy are illustrated in Figure 1.

Figure 1 Strategic aims and objectives of the National Strategy



The National Strategy states that the Government will work with individuals, communities and organisations to reduce the threat of flooding by:

- Understanding the risks of flooding, working together to put in place long-term plans to manage these risks and making sure that other plans take account of them;
- Avoiding inappropriate development in areas of flood risk and being careful to manage land elsewhere to avoid increasing risks;

- Building, maintaining and improving flood management infrastructure and systems to reduce the likelihood of harm to people and damage to the economy, environment and society;
- Increasing public awareness of the risk that remains and engaging with people at risk to encourage them to take action to manage the risks that they face and to make their property more resilient;
- Improving the detection, forecasting and issue of warnings of flooding, planning for and coordinating a rapid response to flood emergencies and promoting faster recovery from flooding.

The National Strategy recommends that any measures put forward to meet local or national objectives for flood risk management should be guided by the following principles:

- Community focus and partnership working;
- A catchment 'cell' based approach;
- Sustainability;
- Proportionate, risk-based approaches;
- Multiple benefits;
- Beneficiaries should be encouraged to invest in flood risk management.

These principles have been adopted in the development of the Herefordshire Local Flood Risk Management Strategy.

The Environment Agency, Herefordshire Council and Internal Drainage Boards (IDBs) also have additional duties and powers associated with the management of flood risk under the Land Drainage Act 1991. As the Land Drainage Authority, the Council must give consent for any permanent or temporary works that could affect the flow within an ordinary watercourse in order to ensure that local flood risk is not increased. The Environment Agency and IDBs have a similar role for any permanent or temporary works that could affect the flow within the watercourses for which they are responsible.

The Land Drainage Act specifies that the following works will require formal consent from the appropriate authority:

- Construction, raising or alteration of any mill dam, weir or other like obstructions to the flow of a watercourse;
- Construction of a new culvert;
- Any alterations to an existing culvert that would affect the flow of water within a watercourse.

The Land Drainage Act also sets out the maintenance responsibilities riparian owners have in order to reduce local flood risks. Riparian owners, who are land owners with a watercourse either running through their land or adjacent to it, have the responsibility to ensure that the free flow of water is not impeded by any obstruction or build-up of material within the watercourse. A riparian owner has the duty to accept the natural flow of water from upstream and has the duty to convey the flows unimpeded downstream.

If any ordinary watercourse is found to be blocked or restricting the flow of water, the council have the enforcement powers to serve notice on the relevant land owner under Section 25 of the Land Drainage Act requiring works to maintain the flow of water to be undertaken. If no action is taken to restore the natural flow of water, the council may carry out the necessary works and recharge the full costs incurred to the relevant land owner.

4

ROLES AND RESPONSIBILITIES

4.1

OVERVIEW

When water is in your home you may not care where it came from, but flooding can come from a variety of sources that may not be obvious, or nearby. The most significant flooding issues in Herefordshire are typically associated with fluvial (river) flooding, either from main rivers or ordinary watercourses. This is closely followed by flooding from surface water runoff, often associated with runoff from agricultural lands, blocked drainage systems and blocked culverts.

A number of key risk management authorities have roles and responsibilities relating to flood risk management. It is important to note that it is the responsibility of householders and businesses to look after their property, including protecting it from flooding.

Table 1: Responsibilities of key flood risk management authorities in Herefordshire

Source of flooding	Environment Agency	Herefordshire Council	Welsh Water and Severn Trent Water	Internal Drainage Boards
Main Rivers	✓			
Ordinary Watercourses		✓		✓*
Surface Water Runoff		✓		
Highway Assets		✓		
Public Sewerage System			✓	
Groundwater		✓		
Reservoirs	✓			

*IDB owned watercourses

A summary of the key risk management authorities is provided below, along with a description of the type of flood risk that each authority is responsible for managing.

4.2 ENVIRONMENT AGENCY

The Environment Agency is responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion throughout England – as set out within the National Flood and Coastal Risk Management Strategy discussed in Section 3. The Environment Agency also has operational responsibility for managing the risk of flooding from **main rivers** and **reservoirs**, and is also responsible for **flood forecasting** and **flood warning**.

The management of flood risks associated with **coastal** and **tidal** sources is also the responsibility of the Environment Agency, but Herefordshire is not considered to be at risk from these sources given its location inland.

The Environment Agency is also responsible for issuing levies to local authorities to support the implementation of flood defence schemes and managing the allocation of funding for flood defence and flood resilience schemes.

The Environment Agency can also use enforcement powers to require landowners to take action to minimise flood risk to others.

FLOODING FROM MAIN RIVERS

Main rivers are typically larger rivers or rivers that are considered critical in terms of flood risk or environmental status. A main river means all watercourses shown as such on the statutory main river maps held by the Environment Agency and the Department of Environment, Food and Rural Affairs (DEFRA). There are a large number of main rivers within Herefordshire, including among others the Rivers Teme, Lugg, Wye, Arrow, Frome, Leadon and Dore.

Fluvial flooding from main rivers can occur when a watercourse has insufficient capacity to contain the river's flow, causing water to burst or overtop the riverbanks. Fluvial flooding can also be as a result of a breach in local formal or informal flood defences, blockage within the river channel or defective outfall structures.

FLOODING FROM RESERVOIRS

Reservoir flooding is rare but could occur following the breach or overtopping of the reservoir embankments. A reservoir under the jurisdiction of the Environment Agency is typically defined as one that holds over 25,000m³ of water.

The likelihood of reservoir failure is low and all large reservoirs are stringently governed under the Reservoirs Act 1975. However, a large volume of water could escape with little or no warning if a failure were to occur. As such, the Environment Agency completed a programme of breach assessments to ascertain the areas at potential risk.

4.3 HEREFORDSHIRE COUNCIL

The council are the designated LLFA in accordance with the Flood and Water Management Act 2010. As LLFA, the council is responsible for managing the risk of flooding from local sources of flood risk, namely **surface water**, **groundwater** and **ordinary watercourses**. As the local highways authority, the council are also responsible for managing flood risk associated with **highway assets** in the council's ownership (excluding any trunk roads managed by Highways England, including the A40T (Ross-on-Wye to Monmouth), A49 and the M50).

The council is also the main Land Drainage Authority and is therefore responsible for issuing consents and for altering, removing or replacing certain structures or features on ordinary watercourses that are not under the responsibility of the relevant IDB (as discussed below).

The council also play a lead role in emergency planning and recovery after a flood event.

FLOODING FROM ORDINARY WATERCOURSES

Any watercourse that is not designated as a main river is classed as an ordinary watercourse. Ordinary watercourses are usually smaller watercourses that are not considered strategic or critical in terms of flood risk and environmental status. However, ordinary watercourses still have the potential to cause significant localised flooding and this has been recognised within the Flood and Water Management Act 2010. Ordinary watercourses can also include smaller lakes, ponds or other areas of water that flow into an ordinary watercourse or are the responsibility of the council.

Similar to main rivers, fluvial flooding from ordinary watercourses can occur when a watercourse has insufficient capacity to contain its flow, causing water to burst or overtop the watercourse's banks. Fluvial flooding can also be as a result of a breach in local formal or informal flood defences, blockage within the watercourse channel and defective outfall structures.

FLOODING FROM SURFACE WATER RUNOFF

Flooding from surface water is typically attributed to surface water runoff that has not entered a watercourse, land drainage system or public sewer. Surface water flooding can also often be attributed to groundwater emergence or sewer flooding (as discussed below) as these sources of flooding also result in the overland flow of water not associated with a watercourse. Similarly, it is common for burst water mains to be incorrectly identified as a surface water flooding incident.

Surface water flooding typically follows the ground's topography, flowing overland from areas of higher ground towards areas of lower ground. Predictive surface water modelling flood maps use this assumption to map areas that are most likely to be susceptible to surface water flooding, i.e. those areas that are located at the lowest elevations or within local 'dips' in topography. Predictive surface water modelling flood maps also take into account barriers to the flow of water, such as elevated railway embankments, although smaller features such as boundary walls are harder to take into account.

FLOODING FROM GROUNDWATER

Groundwater emergence typically occurs after prolonged periods of heavy rainfall, causing the water table to rise. This can cause flooding to underground structures such as basements or services. Groundwater could also rise as far as the ground's surface and be recognised as overland flow. Groundwater flooding usually occurs in catchments which have a high water table, perched water table and/or responsive underlying geology such as chalk or gravels.

Groundwater emergence can also occur as a result of changes in adjacent river levels that may cause a localised rise in hydraulically linked groundwater levels.

Groundwater flooding is often confused or masked by surface water flooding, as discussed above, as well as by burst water mains.

FLOODING FROM HIGHWAY ASSETS

Flooding from highway assets typically includes flooding from the highway's surface water drainage system and structures such as culverts that pass beneath the carriageway. The Council is responsible for managing flood risk from adopted roads and adopted highway assets that are within the council's ownership, which include the majority of highways within Herefordshire.

Flooding from highway assets typically occurs when there is insufficient capacity within the drainage network to cope with unusually high flows, or when drains/culverts become blocked thus reducing capacity to cope with 'normal' flows.

4.4 WELSH WATER AND SEVERN TRENT WATER

The relevant water and sewerage authorities, in this case Welsh Water and Severn Trent Water, are responsible for managing the risks of flooding from surface water, foul or combined **public sewerage systems** that serve more than one property. Where there is frequent and severe sewer flooding (including those sites included on the DG5 Register¹) water and sewerage undertakers are required to address this through their capital investment plans.

FLOODING FROM THE SEWERAGE SYSTEM

Sewers typically flood when there is insufficient capacity within the sewerage network to cope with unusually high flows, or when sewers become blocked thus reducing capacity to cope with 'normal' flows. Flooding from sewers may also occur if their outfall is below the receiving river water level, particularly during times when river levels are unusually high. Water will typically emerge from manholes or gullies, subsequently flowing overland from areas of higher ground towards areas of lower ground. When this occurs from combined sewers (i.e. carrying both foul and surface water flows) this water can often be heavily polluted.

Flooding from sewers can be difficult to predict as it is often dependent on the capacity of the sewers during a rainfall event (i.e. presence of a partial or full blockage). However, if a sewer were to surcharge and cause flooding, the areas at greatest flood risk would most likely be similar to those at risk from surface water flooding as any water that emerges from the sewerage network would respond to surrounding topography in a similar way to rainfall.

Flooding from sewers is often confused or masked by surface water flooding or groundwater emergence, as discussed above. Sewer flooding and surface water flooding is also intrinsically linked, as surface water flooding typically occurs when there is insufficient capacity within the sewerage system (or the sewerage system is overwhelmed by rainfall intensity) for the system to receive surface water runoff.

4.5 INTERNAL DRAINAGE BOARDS

Internal Drainage Boards (IDBs) are independent public bodies responsible for managing water levels in areas of special drainage need. They are made up of elected members, and others nominated by the local authority, who represent land occupiers, the public and other interest groups.

There are two IDB's within Herefordshire: the River Lugg IDB and the Lower Severn IDB. The River Lugg IDB has also taken over the responsibilities of the previous Lower Wye IDB within Herefordshire.

The River Lugg IDB is responsible for the maintenance of the **land drainage assets** within the low-lying land within the catchments of the Rivers Lugg, Arrow, Frome and Worm Brook. The Lower Severn IDB is responsible for the maintenance of the land drainage assets within the low-lying land within the catchment of the River Leadon.

¹ A water-company held register of properties which have experienced sewer flooding due to hydraulic overload, or properties which are 'at risk' of sewer flooding more frequently than once in 20 years.

The primary role of the IDBs is to manage water levels and reduce the risk from flooding within their districts. Much of IDBs' work involves the maintenance and improvement of watercourses and related infrastructure such as weirs, sluices, culverts and embankments within their drainage districts.

The IDBs are the relevant Land Drainage Authority for the catchments that they manage and are therefore responsible for issuing consents for altering, removing or replacing certain structures or features on ordinary watercourses within their districts.

4.6 LANDOWNERS AND DEVELOPERS

Although not classified as a key risk management authority, landowners that own land through which an ordinary watercourse or main river flows are the responsible **riparian owner** for the watercourse. The Environment Agency has developed a guide entitled '[Living on the Edge](#)' that provides specific advice regarding the rights and responsibilities of riparian (riverside) landowners, as well as the Environment Agency and other bodies. Herefordshire Council has also published a useful guide of riparian ownership responsibilities.

Landowners and developers have the primary responsibility for protecting their land and property against the risk of flooding, but must not build defences that have an adverse impact to adjacent properties. They are also responsible for managing the drainage of their land without increasing flood risk elsewhere, and for the management of flood risks from private sewerage systems.

The responsibilities of landowners and developers are discussed in greater detail in Section 8.

4.7 OTHER LOCAL STAKEHOLDERS

Highways England and Network Rail are responsible for managing flood risks that are associated with or may affect their assets. For Highways England this includes their trunk road and motorway network, comprising the A49T, A40T (Ross-on-Wye to Monmouth) and the M50 within Herefordshire. For Network Rail this includes all railways within the county and their associated infrastructure.

There are currently no operational canals within Herefordshire. However, the Herefordshire and Gloucestershire Canal Trust are pursuing the full restoration of approximately 34 miles of canal between Hereford and Gloucester. Works are currently underway and stretches of the canal at Monkhide, Yarkhill and Aylestone have been restored by the Trust and with the help of the Waterways Recovery Group. It is currently the intention that the maintenance and management of flood risk and associated assets related to the canal network within Herefordshire will be the responsibility of the Herefordshire and Gloucestershire Canal Trust.

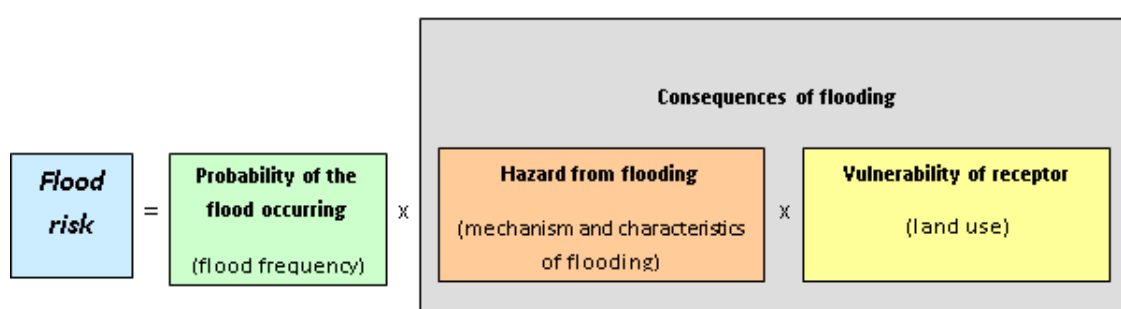
5 SUMMARY OF FLOOD RISK

This section of the Strategy provides an overview of flood risk throughout Herefordshire to provide the context from which the objectives and associated measures will be derived.

5.1 HOW FLOOD RISK IS QUANTIFIED

Flood risk is defined as a combination of the *chance* (or probability) of a particular flood occurring and the *impact* (or consequence) that the flood would cause if it occurred. This is illustrated in Figure 2.

Figure 2 Conceptual definition of flood risk



Assessing risk in quantifiable, financial terms can help prioritise where available funding should be directed, as well as support applications for additional external funding. The likelihood or chance of a flood occurring is often identified in terms of the 'return period' or 'annual probability'. For example, a 1 in 100 year flood event has a 1 in 100 (or 1%) annual probability of occurring. Table 2 provides the conversion between commonly used return periods and annual probabilities.

Table 2 Flood probability conversion table

Return Period (years)	2	5	10	20	50	100	200	1000
Annual Probability (%)	50	20	10	5	2	1	0.5	0.1

Scientific consensus is that the global climate is changing as a result of human activity. While there remain uncertainties in how a changing climate will affect areas already vulnerable to flooding, it is expected to increase risk significantly over time. The impact of climate change must be considered when reviewing the potential risk of flooding in future years within Herefordshire.

The Environment Agency has recently published updated [climate change guidance](#) to be taken into account in the planning and design of new development. In regard to Herefordshire this provides recommended allowances for two different aspects:

- Recommended increase to peak rainfall intensities, which will have the greatest effect on flooding from surface water and drainage systems;
- Recommended increase to peak river flows, which will have the greatest effect on flooding from fluvial sources associated with main rivers and ordinary watercourses.

The implications of these recommendations will be discussed in detail in the Herefordshire Strategic Flood Risk Assessment due to be published shortly. In summary, over the next 100

years climate change is predicted to increase river flow by an average of 25% and rainfall intensity by an average of 20%.

5.2 KEY SOURCES OF INFORMATION

A number of previous studies have been undertaken to assess and map flood risks within Herefordshire. The best and most up to date of these sources are listed below, and all are readily available from the council for use by the general public and risk management authorities:

- [Environment Agency interactive maps](#);
- Strategic Flood Risk Assessment (SFRA), 2009;
- Strategic Flood Risk Assessment Update (SFRA Update), 2015;
- Preliminary Flood Risk Assessment (PFRA), 2011; and
- Preliminary Flood Risk Assessment Update (PFRA Update), 2017

A brief summary of these sources of information is provided below.

Herefordshire Council has also commissioned a number of other site-specific flood studies to better understand flood risks throughout the county and to build on the information provided within the sources listed above. These additional sources of information have not been made publicly available but further information can be requested from the council about their completed, on-going and planned flood analysis works.

ENVIRONMENT AGENCY INDICATIVE FLOOD MAPS

The Environment Agency Indicative Flood Maps provide the most comprehensive and up to date overview of flood risks from fluvial, tidal, surface water and reservoir sources throughout England. The maps are updated regularly following periodic review and/or following changes to flood management infrastructure. The most useful maps in terms of understanding flood risk include:

- Flood Map for Planning (Rivers and Sea);
- Risk of Flooding from Rivers and the Sea;
- Flood Warning Areas;
- Risk of Flooding from Surface Water; and
- Risk of Flooding from Reservoirs.

However, severity and location of flooding can be unpredictable and localised. The Environment Agency Flood Risk Maps do identify surface water flooding but may not be a definitive indicator. For example, there have been incidents of flooding well away from Environment Agency risk areas and even within them flooding has occurred in lower risk locations whilst higher risk locations have not suffered.

FLUVIAL RISK

The Environment Agency's Flood Map for Planning (Rivers and Sea) shows the natural fluvial (river) and tidal (sea) floodplain, ignoring the presence of defences and, therefore, areas potentially at risk of flooding from rivers or the sea. As flooding from tidal sources is not an issue within Herefordshire, no further information regarding this source is provided.

The Flood Map for Planning is principally used to inform land use planning and uses the terminology of high, medium and low probability 'Flood Zones' to align with the terminology of the

National Planning Policy Framework (NPPF)² to indicate the predicted annual probability of flooding from fluvial sources. In summary, for planning purposes, all land within England is indicated to fall within one of the following Flood Zones:

- Flood Zone 1 (low probability) - less than 0.1% annual probability of flooding;
- Flood Zone 2 (medium probability) - between 1% and 0.1% annual probability of flooding; or
- Flood Zone 3 (high probability) - greater than 1% annual probability of flooding.

Table 3 summarises the relationship between Flood Zone category and the identified flood risk.

Table 3 Flood Zones for planning

Flood Risk Area	Identification	Annual Probability of Fluvial Flooding	Equivalent Return Period (years)
Zone 1	Low Probability	<0.1%	<1 in 1000
Zone 2	Medium Probability	1% – 0.1%	1 in 100 – 1 in 1000
Zone 3a	High Probability	>1%	>1 in 100
Zone 3b*	Function Flood Plain	>5%*	>1 in 20*

* The functional floodplain, Flood Zone 3b, is defined as those areas in which 'water has to flow or be stored in times of flood'. Typically this includes areas subject to flooding up to the 1 in 20 year / 5% annual probability flood event, or that are designed to flood up to the extreme 1 in 1000 year / 0.1% annual probability flood event.

The Environment Agency has also published a second set of flood maps called the Risk of Flooding from Rivers and the Sea maps. These illustrate similar extents of fluvial flooding as those illustrated within the Environment Agency's Flood Map for Planning, but delineate the likelihood of flooding from rivers whilst considering the presence and effect of all flood defences and predicted flood levels. They describe the probability of flooding in accordance with one of four categories:

- High - greater than 3.3% annual probability of flooding;
- Medium - less than 3.3% but greater than 1% annual probability of flooding;
- Low - less than 1% but greater than 0.1% annual probability of flooding; or
- Very Low - less than 0.1% annual probability of flooding.

It is important that users of these resources do not confuse the description of risk within the Environment Agency's Risk of Flooding from Rivers and the Sea map with the mapped zones provided within the Environment Agency's Flood Map for Planning.

Flooding from many smaller watercourses is not illustrated within the Flood Map for Planning or the Risk of Flooding from Rivers and the Sea map, usually due to the size of the watercourse

² The National Planning Policy Framework sets out the government's planning policies for England and how these are expected to be applied

catchment. Flood risks associated with these watercourses are usually better defined by the surface water flood risk maps, as discussed below.

FLOOD WARNING

The Environment Agency's Flood Warning map indicates those areas that benefit from its flood warning service. The Environment Agency issues three different kinds of flood warnings:

- Flood Alert: Flooding is possible. Be prepared. *Used two hours to two days in advance of flooding.*
- Flood Warning: Flooding is expected. Immediate action required. *Used half an hour to one day in advance of flooding.*
- Severe Flood Warning: Severe flooding. Danger to life. *Used when flooding poses significant threat to life.*

Flood warnings are provided to the public, professional partners and the media across England to warn of the risk of flooding from rivers, the sea and groundwater. Flood warning and river level information is also available through the [Flood Information Service](#).

SURFACE WATER FLOOD RISK

The Environment Agency's Risk of Flooding from Surface Water map shows the approximate areas that would flood as a result of rainfall being unable to soak into the ground or enter a drainage system, leading to overland flow. As with the Environment Agency's Risk of Flooding from Rivers and the Sea map, the probability of flooding from surface water is defined as being high, medium, low or very low in line with the definitions below:

- High - greater than 3.3% annual probability of flooding;
- Medium - less than 3.3% but greater than 1% annual probability of flooding;
- Low - less than 1% but greater than 0.1% annual probability of flooding; or
- Very Low - less than 0.1% annual probability of flooding.

The maps are very indicative and, depending on the location, may not accurately represent all flow paths, for example pipe drainage systems or small culverts on watercourses may not be included. The purpose of the map is to highlight those areas potentially at risk of flooding.

The Environment Agency's Risk of Flooding from Surface Water map is currently deemed the best available information for flooding from overland flows and smaller watercourses.

RESERVOIR FLOOD RISK

The Environment Agency's Risk of Flooding from Reservoirs map shows the likely extent of flooding in the event of reservoir failure. All large reservoirs are stringently governed under the Reservoirs Act 1975 and therefore the likelihood of such an occurrence is low. However, a large volume of water could escape with little or no warning if a failure were to occur.

STRATEGIC FLOOD RISK ASSESSMENT

The Strategic Flood Risk Assessment (SFRA) is a statutory document required under NPPF that must be prepared by Herefordshire Council as the local planning authority to inform the Local Plan, risk management, and the planning and design of development throughout Herefordshire. An update to the SFRA was prepared by Herefordshire Council in 2015 to specifically assess risks to strategic development sites and inform the updated Local Plan. A full update of the SFRA is currently underway and is due to be completed in 2017.

The SFRA provides a detailed overview of flood risk throughout the county from all sources of flood risk, now and in the future, taking account of the impacts of climate change, and assesses the impact that land use changes and development in the area will have on flood risk.

Specifically the SFRA is used to:

- Determine the variations in risk from all sources of flooding;
- Inform the sustainability appraisal of the Local Plan, so that flood risk is fully taken into account when considering allocation options and in the preparation of plan policies;
- Apply the Sequential Test and, where necessary, the Exception Test in accordance with National Planning Policy Framework (NPPF) when determining land use allocations;
- Identify the requirements for site-specific flood risk assessments in particular locations, including those at risk from sources other than rivers;
- Set out the recommended approach to the management of flood risk that can be applied through the design and planning of development within Herefordshire;
- Determine the acceptability of flood risk in relation to emergency planning capability; and
- Consider opportunities to reduce flood risk to existing communities and developments.

The SFRA is informed by flood data primarily obtained from the Environment Agency and uses the same terminology as that used within their flood maps.

PRELIMINARY FLOOD RISK ASSESSMENT

Herefordshire Council is required to prepare a Preliminary Flood Risk Assessment (PFRA) report every six years. The Herefordshire PFRA was prepared in 2011. The PFRA seeks to provide a high-level overview of flood risk from local flood sources and includes flooding from surface water (i.e. rainfall resulting in overland runoff), groundwater, ordinary watercourses (smaller watercourses and ditches).

The Herefordshire PFRA (2011) estimated that there were 10,357 people, 4,426 residential properties, 5,107 non-residential properties and 241 critical infrastructure sites at risk from surface water flooding across Herefordshire. Whilst this indicates that a large number of people are at risk of flooding within Herefordshire, the location and concentration of people at risk do not qualify as a Flood Risk Area as defined by the Regulations. The PFRA is currently due to be updated in 2017.

5.3 A SUMMARY OF FLOOD RISK WITHIN HEREFORDSHIRE

This section provides an overview of flood risks within Herefordshire. Areas that have been identified to be at risk of flooding have been informed through a mixture of local knowledge, recorded historic flood events and predicted (modelled) flood events. As discussed above, a much more detailed summary of flood risk is available through review of the Environment Agency's Indicative Flood Map and the Council's SFRA and PFRA.

Identification of areas known or predicted to be at risk of flooding will help prioritise the need for further investigation and/or measures to manage or reduce the identified risks. Unfortunately it is not possible to predict all flood scenarios and flooding may still occur in areas that have not been identified to be at risk. Similarly, the unruly nature of the UK's weather can also mean that flooding can occur in a different way than recorded in previous events or than predicted by flooding models. However, by building up an understanding of known flood risks based on historic events and by undertaking more detailed studies into those areas that are predicted to be at significant risk, a greater level of confidence can be achieved.

As highlighted in the sections above, flooding can originate from a number of sources, namely:

- Fluvial flood risks from 'main rivers';
- Fluvial flood risks from 'ordinary watercourses';
- Pluvial flood risks where rainfall causes overland surface water flow;
- Groundwater emergence;
- Emergence from the below ground sewerage system; and/or
- Artificial sources, such as reservoirs.

It is often hard to distinguish the source of a flooding event, principally because flooding does not happen in isolation and is often inter-related. When a flood occurs it often happens from multiple sources at the same time, such as a heavy rainfall event that causes overland flow and surcharging of the public sewerage system.

USE OF HISTORIC AND MODELLED FLOOD DATA

Given the long history of flooding in Herefordshire, evidence of floods which have happened in the past is invaluable when trying to understand flood risk and prioritise the management of flood risk throughout the county. Whilst Herefordshire Council, the Environment Agency, sewerage authorities and IDBs all hold various records of historic flooding, the way in which such events have been recorded has not always been consistent or complete and may not paint a clear picture of historic flooding events.

Furthermore, much information is based on anecdotal records and information provided by local communities. Although this information is invaluable and the council are keen to take local knowledge into account, it must always be treated as anecdotal. This is because it cannot be wholly relied upon due to the potential for householders to understate the extent of flooding, or even not to admit to flooding at all, for fear that it might have an adverse effect on their insurance premiums, their house price and/or their ability to sell their property.

The use of modelling software to 'predict' where flooding may occur is essential in understanding those areas of Herefordshire that are at greatest risk and most vulnerable to flooding from all sources of flood risk. Predictive modelling can provide clarity about those areas that have flooded in the past (i.e. a better understanding of why the flood event occurred and its magnitude) and information about how and where flooding may occur in the future. Predictions of flood risk are produced using combinations of hydrological and hydraulic modelling and analysis of past hydrological records to make future predictions.

A large number of watercourses throughout Herefordshire have been modelled using hydraulic modelling software – principally to inform the Environment Agency's indicative flood maps and site-specific flood studies. These include main rivers such as the Wye, Arrow and Lugg, and ordinary watercourses such as the Yazor Brook and Widemarsh Brook. Nation-wide modelling of surface water flood risks has also been undertaken by the Environment Agency to better understand those areas that are considered to be at greatest risk from overland flow.

A brief summary of flood risk associated with each potential source of flooding is provided below, with information obtained from both historic records and predictive modelling. For a detailed overview, the reader should refer to the Environment Agency's Indicative Flood Map and the Council's SFRA and PFRA.

FLUVIAL FLOOD RISK FROM MAIN RIVERS

There are a number of 'main rivers' throughout Herefordshire that have contributed to significant flood events in the past. The River Wye has contributed to numerous flood incidents causing

internal flooding to hundreds of properties throughout Hereford and Ross-on-Wye, most notably during the July 2007 flooding following exceptionally heavy rainfall. Other main rivers such as the River Lugg in Leominster and the River Leadon in Ledbury have also contributed to major flood events.

FLUVIAL FLOOD RISK FROM ORDINARY WATERCOURSES

The majority of fluvial flood risk across Herefordshire is associated with main rivers as discussed above, however there are numerous ordinary watercourses with a high level of flood risk. Historical flood records highlight Ross-on-Wye as experiencing flooding as a result of ordinary watercourses being overwhelmed on a number of occasions. In particular, the Rudhall Brook has caused internal flooding to commercial properties in the Ashburton Industrial Estate in the past.

SURFACE WATER FLOOD RISK

It can be difficult to determine surface water as being the primary contributor to flooding as it often interacts with other fluvial sources. Widespread surface water flooding was evident during the county wide July 2007 flood event. Flash flooding in Leominster resulting from a lack of drainage capacity to deal with the intense and prolonged rainfall led to significant flooding. Areas in and around Ledbury have also previously suffered from surface water flooding in July 2007 when Church Street, Newbury Park Road and parts of Lower Road and Little Marcle Road flooded.

FLOOD RISK FROM GROUNDWATER EMERGENCE

In comparison to the other sources of flooding, groundwater emergence is the least significant in terms of the number of people affected and how often flood incidents have been recorded, although this may be attributed to how difficult it is to distinguish groundwater flooding from other sources such as surface water flooding. The villages of Combe and Munderfield are recorded as experiencing minor groundwater emergence.

FLOOD RISK FROM SEWERS

Severn Trent Water and Welsh Water have a limited record of properties flooding as a result of sewerage emergence. Hereford has experienced the most significant number of sewerage flooding incidents, in particular postcodes starting with HR1 and HR4 being the most affected. Ross-on-Wye and Leominster are also recorded as having flooding incidents from sewerage. Herefordshire Council are also aware of historic issues where flooding from the combined and surface water sewerage systems has affected the public highway.

6

OBJECTIVE 1: UNDERSTAND FLOOD RISKS IN HEREFORDSHIRE

6.1 OVERVIEW

Identification of areas known or predicted to be at risk of flooding is essential to understanding those areas at greatest risk and will help prioritise the need for further investigation and/or measures to manage or reduce the identified risks.

Unfortunately it is not possible to predict all flood scenarios and flooding may still occur in areas that have not been identified to be at risk. Similarly, the unruly nature of the UK's weather can also mean that flooding can occur in a different way to that recorded in previous events or even predicted by flooding models. However, by building up an understanding of known flood risks based on historic events and by undertaking more detailed studies into those areas that are predicted to be at significant risk, a greater level of confidence can be achieved.

As summarised in Section 5 and within the council's SFRA and PFRA, a significant amount of data is available that identifies the areas within Herefordshire that are at greatest risk of flooding from fluvial, surface water, groundwater, reservoirs and sewers. The best source of data is recorded data of historic flooding events that have occurred within Herefordshire. However, the accuracy and reliability of this data is dependent on the quality of data that has been captured and, as discussed, the way in which historic flooding events have been recorded is not consistent or complete.

Predictive flood modelling has been completed for fluvial and surface water sources. This data provides a good overview of areas within Herefordshire that are likely to flood, but actual flooding may be very different from predicted flooding that can only make assumptions about how certain areas will respond to high rainfall and/or high river flows. It is also difficult for predictive flood modelling to take into account issues such as blockages or reduced capacity.

In order to continue to improve the understanding of flood risk throughout the county, the council will continue to record and investigate flooding events as well as continue to improve understanding of flood risk through the completion of flood management studies. In summary:

Understanding flood risk throughout Herefordshire to achieve the aims of Objective 1 will be met through the following key measures:

- Recording of flood events and maintaining flood records to improve knowledge of flooding;
- Investigation of flood events to improve knowledge of flooding, identify causes of flooding, responsible parties (if appropriate) and recommend required action;
- Strengthening and developing understanding of flood risk issues by all stakeholders through the use, review and completion of flood risk studies;
- Improving understanding and communication of vulnerable land uses and communities/infrastructure at greatest risk.

The activities required to meet this objective comprise a mixture of maintaining current recording and investigation measures and procedures as well as proposed improvements to these existing systems as discussed in greater detail below.

6.2 RECORDING FLOOD EVENTS

Herefordshire Council holds historic flood data for a number of events that have occurred within the county, most notably the 2007 floods which caused significant disruption. However, prior to the Pitt Review and subsequent Flood and Water Management Act 2010, local authorities that are now identified as LLFAs were not required to investigate significant flood events or collate records of flooding within their boundaries and, therefore, the quality and completeness of historic flood records currently held by the council is limited.

HISTORIC FLOOD RECORDS

Much of the historic flood data collated to inform the SFRA in 2009 is held by the council in a Global Information System (GIS) layer. Other flood data, including that associated with events that have occurred since the preparation of the SFRA, is stored predominantly in spread sheet format or within a multi-functional database called Confirm.

An exercise to collate and contrast the respective historic datasets will be undertaken by the council. The council will strive to combine all known historic flood records into a single location or into a format that is compatible with other records. For many of the spread sheet entries there is limited information that will allow an exact location to be determined. Where practical, the council will aim to enhance these entries to allow flood records to be geo-referenced and added to the council's GIS flood data layer. Consideration will also be given to a method of capturing anecdotal evidence that the council may be made aware of during the planning application process that often includes locally-sourced information that may not be captured within the current council flood records.

Herefordshire Council collect data via the [council website](#). The public are encouraged to enter information regarding local flooding events onto this website to help build the council's understanding of flood risks throughout the county and plan future flood responses.

IMPROVED APPROACH FOR RECORDING FLOOD EVENTS

Some improvements to the method of capturing flood data have been implemented by the council in recent years. The council currently records the majority of flooding events that have been reported to the council by the general public or flooding that is attributed to council assets (e.g. highways drainage systems). This data is captured via the council website or by reports that are logged within Confirm. An improved method for recording information will be developed and implemented by the council.

The detail to be recorded for each flood event will be dependent on the nature and significance of the flood event. The system to be developed and implemented by the council will take the characteristics of each flood event into account and will aim to adopt an approach similar to that summarised in Table 4. Of key importance will be ensuring that the 'core' data of each flood event (i.e. that considered a minimum for minor or isolated events) is recorded in a consistent manner regardless of the nature or significance of the flood event.

The council also intends to enable captured flood records to be geo-referenced and added to the GIS flood data layer to allow the graphical visualisation of historic flooding. This will enable the council to gain a better understanding of areas at risk and how these areas may interrelate, as well as inform better decision making with regards to pro-active maintenance regimes and advice for land use planning.

Table 4: Data to be captured commensurate with flood event characteristics

Characteristics of flood event		
Very minor or isolated events that caused no internal property flooding or travel disruption	Minor to major flooding events associated with local sources of flooding that may have caused some internal property flooding or travel disruption, but that are not classified as Section 19 events (see below)	Major flooding events associated with local sources of flooding that warrant a Section 19 Investigation (discussed in Section 6.3)
Type of data to be collected		
Date	Date	Date
Location and extent	Duration	Duration
Primary source and cause of flooding	Location and extent	Location and extent
Affected receptors	Primary and secondary sources and causes of flooding	Primary and secondary sources and cause of flooding
	Description of event	Description of event
	Depth of flooding at key locations	Depth of flooding at key locations
	No. of residential properties internally flooded	Flow paths
	No. of commercial properties internally flooded	Rainfall/river gauge data
	Addresses of flooded properties	No. of residential properties internally flooded
	Roads flooded and depth where known	No. of commercial properties internally flooded
	Photographs	Addresses of flooded properties
		Roads flooded and depth where known
		Name and extent of flooded roads
		Critical infrastructure affected
		Photographs
		Recommended actions

Other key risk management authorities within Herefordshire, most notably the Environment Agency, Welsh Water and Severn Trent Water, maintain their own records of flooding that are attributable to their assets. For all authorities, these records are essential for driving future investment. As per above, the level of detail recorded will depend on the type and consequence of the flooding event, for example all authorities record more information for flooding events that have caused internal property flooding when compared to those events that only caused flooding of external gardens.

Whilst flood records held by Welsh Water are shared with Herefordshire Council on a quarterly basis, routine data sharing arrangements are not currently in place for Severn Trent Water or the Environment Agency. Going forward, the council will look at ways in which periodic sharing of flood data can be undertaken for the mutual benefit of all involved in the management of flooding within the county. This is likely to be associated with flood events that are considered to be 'significant', in accordance with Section 19 of the Act.

In response to this and to meet the aims of Objective 1:

The council proposes to improve the way in which flooding events are recorded to meet the requirements of the Flood and Water Management Act. The consistent recording of flooding events will enable the council to better understand those areas at greatest risk, communicate this risk to the relevant stakeholders, and where necessary inform the need to take mitigating action to reduce the risk of reoccurrence. The council also proposes to improve the sharing of data between key risk management authorities.

Specifically, the council will:

- Collate and contrast the historic datasets and strive to combine all known historic flood records into a single location or into a format that is compatible with other records.
- Review current methods of recording flooding events and develop an improved method of working that reflects the nature and scale of the event, and which will allow graphical visualisation.
- Implement an agreed method of sharing flood event data with other key risk management authorities.

6.3 INVESTIGATING FLOOD EVENTS

Prior to the Pitt Review and subsequent Flood and Water Management Act 2010, local authorities that are now identified as LLFAs were not required to investigate significant flood events. However, Section 19 of the Flood and Water Management Act places a duty on the LLFA to investigate significant flood events within their area. This duty includes identifying which authorities have flood risk management functions with respect to the incident and what they have done or intend to do. LLFAs are required to publish the results of any investigations carried out and notify any relevant risk management authorities.

Specifically, Section 19 of the Act states:

19 Local authorities: investigations

- (1) On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate -
 - (a) which risk management authorities have relevant flood risk management functions, and
 - (b) whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.
- (2) Where an authority carries out an investigation under subsection (1) it must -
 - (a) publish the results of its investigation, and
 - (b) notify any relevant risk management authorities.

Although Herefordshire Council has undertaken a number of investigations following the most severe flooding events (e.g. those that occurred in the summers of 2007 and 2012, and the winter of 2013), the completion of Section 19 flood investigations has only relatively recently formed part of the council's standard practices.

The other key risk management authorities within Herefordshire have their own processes for investigating flooding events that are dependent on the type and consequence of the flooding event. Welsh Water and Severn Trent Water prioritise the investigation of events that have resulted in the internal flooding of one property or more. The findings of these investigations can be made available to the public and, in the case of Welsh Water, are issued to the properties affected. The council also intend to identify flooding 'hot spots' on the council's website to identify those areas that have required the completion of a Section 19 Investigation.

In response to significant flooding events associated with local sources of flooding, the council will continue to investigate these events to meet the requirements of the Act. Only events that have 'significant harmful consequences' require a Section 19 investigation to be completed by the council. There is no national definition of 'significant harmful consequences' as local receptors respond in different ways.

As part of the implementation of this local Strategy, Herefordshire Council will adopt an approach that it is considered necessary or appropriate to the scale of flood risk within the county. The definition of a flooding event that is deemed to have caused significant harmful consequences is summarised in Table 5. This takes into consideration the impacts of flooding to human health, residential properties, critical infrastructure and services, non-residential properties and the economy, the road and rail network, environmental receptors and cultural heritage.

Table 5: Definition of a significant event in Herefordshire

Risk Category	Significant Harmful Consequence
Risk to loss of life	Any flood related fatality or risk to life.
Residential property	Three or more properties flooded internally at ground floor level within same locality
Critical services: → Hospitals, health centres, clinics, surgeries, pharmacies, care homes; → Village and parish halls that were being used as rest centres during an emergency situation; → Schools, colleges, day nurseries; → Police, fire, ambulance stations; → Electricity stations and substations, gas stations, sewerage treatment and pumping stations, water treatment and pumping stations.	One or more properties flooded internally above ground floor level. One or more facilities rendered inoperable due to impassable access. One or more flooded critical installations resulting in loss or potential loss of service or causing or potentially causing flooding to other property.
Non-residential property: → Shops/supermarkets/retail premises; → Agricultural or Manufacturing premises; → Offices.	Three or more non-residential properties flooded internally above ground floor level within same locality.

Risk Category	Significant Harmful Consequence
Road and rail infrastructure: → The county's Strategic Network and any motorway or national rail network → Key access routes for emergency services	Any section that becomes impassable due to flooding Any section of road which provides the sole vehicle access to three or more residential properties or any one or more of the critical services defined above which becomes impassable to the police, fire or ambulance services.
Cultural heritage	Subject to local assessment of impact to national or international cultural heritage sites
Environment	Subject to local assessment of impact to local, national or international designated sites

If the same locality suffers multiple flood events which are considered to have significant harmful consequences, the Council will record the date of each event, but do not propose to investigate each separate event. However, should repeat flooding supplement data that was collected during the initial investigation, this will be added to the initial investigation and taken into consideration.

In response to this requirement and to meet the aims of Objective 1:

The council proposes to investigate all significant flood events that occur within Herefordshire in line with the requirements of the Flood and Water Management Act to better understand the causes and effects of flooding and identify the need for further action. The investigations completed by the council will be made available to other risk management authorities, stakeholders and the public.

6.4 COMPLETION OF FURTHER STUDIES

The council has completed a number of robust studies to better understand flood risks within the county, most notably the SFRA that is due to be updated in 2017 to reflect updates in predicted modelling data, historic flooding incidents and improvements to flood management infrastructure. The council are also in regular communication with the Environment Agency who review their indicative flood maps on a regular basis to ensure that they reflect the best available information.

The council has also undertaken a number of detailed flood assessments for communities that have experienced the most severe flooding in the past and that are attributable to local sources of flooding. For example: Lea, Eardisley, Eardisland, Five Bridges, Brimfield and Hope under Dinmore. These studies are typically informed by a review of historic flood records and detailed hydraulic analysis of the catchment. The purpose of these studies is to gain a better understanding of flood mechanisms (i.e. why these areas are prone to flooding) and assess the feasibility of measures that could be installed to reduce the risk of flooding within these areas. The council intends to continue with these types of further studies to continue to improve their understanding of local flood risk within the most vulnerable of communities.

In summary, to meet the aims of Objective 1:

The council are committed to ensuring that, wherever practicable, the most up to date flood data is made available to all relevant stakeholders and used in the delivery of all flood risk management activities. The council are also committed to the completion of detailed flood studies within those communities deemed to be at greatest risk to better understand flood mechanisms and inform future works.

6.5 UNDERSTANDING OF VULNERABLE LAND USES AND THOSE AT GREATEST RISK

Raising awareness of communities and sites at greatest risk is essential to the management of flooding throughout the county. The council maintain regular contact with Parish Councils and vulnerable sites (such as caravan sites and care homes) to highlight current flood risk issues as well as any schemes that may be planned to reduce flood risks within a certain area.

The council has also created the role of Locality Stewards and promotes the Lengthsman Scheme throughout Herefordshire. The role of these two initiatives is to improve two-way communication between local communities, Parish Councils and Herefordshire Council across a range of services areas, including the maintenance of drainage assets and flood risk management.

The council will continue to develop and maximise opportunities for maintaining communication with local communities, particularly those that are identified to be at greatest risk of flooding. This may include initiatives such as using local media to update communities on local flood risks, better use of the council's website for day-to-day updates, promotion of community resilience groups, strengthening the role of the Parish Council and maintaining the Locality Stewards and Lengthsman Scheme initiative.

In summary, to meet the aims of Objective 1:

The council will maintain regular communication with local communities for the purpose of raising awareness of local flood risks, and look for ways to strengthen current initiatives to improve communication in the future.

7

OBJECTIVE 2: MANAGE THE LIKELIHOOD AND IMPACTS OF FLOODING

7.1 OVERVIEW

It is not possible to eliminate the risk of flooding within Herefordshire. However, the council are committed to managing flood risks as far as practicable whilst taking into consideration factors such as the source of flood risk, frequency, hazard, the vulnerability of the affected communities and infrastructure, available funding and community support.

This section sets out the processes that are currently in place to manage the likelihood and impacts of flooding, and any improvements to these processes that could be explored further. There are a large number of initiatives that are considered within this Objective and in summary these include:

Managing the likelihood and impacts of flooding throughout Herefordshire to achieve the aims of Objective 2. These will be met through the following key measures:

- Communication with relevant council departments and other risk management authorities;
- Maintaining a register of assets that are considered important for flood risk management;
- Undertaking regular maintenance of assets that are considered important for flood risk management; and
- Developing a clear method of prioritising those communities that are considered to be at greatest risk, and prioritising the most appropriate measures for managing flood risks.

The activities required to meet this Objective comprise a mixture of maintaining current asset management practices and flood management works, as well as proposed improvements to these existing systems as discussed in greater detail below.

7.2 COMMUNICATION

Herefordshire Council appreciate the importance of good communication for the coordinated management of flood risks within Herefordshire. For example, the council created a **Flooding Task and Finish Group**, comprising representatives from those departments within the council considered key to flood risk management. The group met regularly to coordinate inter-departmental activities identify key areas of work required and allocate actions to the responsible person(s). Although this group no longer meets, it laid the groundwork for improved inter-departmental communication.

Herefordshire Council also undertake regular communication with the county's other key flood risk management authorities. Given that the source of flooding is often difficult to determine and can sometimes originate from multiple or inter-related sources effective communication is essential.

The key risk management authorities within Herefordshire include Herefordshire Council, the Environment Agency, Welsh Water, Severn Trent Water and the IDBs. Herefordshire Council currently meets with Environment Agency and Welsh Water on a quarterly and bi-annually basis (respectively) to discuss areas within Herefordshire that are at risk of flooding for the purpose of identifying opportunities to reduce flood risk in a collaborative manner. The council intend to implement a similar system with Severn Trent Water and the IDBs, meeting annually and bi-annually respectively. Collaboration between the risk management authorities is often key to the delivery of schemes, particularly those that may offer multiple opportunities and therefore that may secure funding from multiple sources.

An example of collaborative working includes the Sustainable Drainage Plan initiative led by Welsh Water. These plans comprise catchment-wide plans prepared every 5 years (to coincide with the sewerage authority asset management period (AMP) cycle) to identify potential capacity issues within the sewerage network within the next 5 years and within the next 25 years. Herefordshire Council discusses these plans with Welsh Water to identify where growth in Herefordshire may occur, and identify opportunities to reduce future flood risks that may be of benefit to both Welsh Water and Herefordshire Council.

The council also consult with a number of other key stakeholders that play an important part in the management of flood risk, such as the Parish Councils, Community Resilience Groups and Locality Stewards. This consultation is undertaken as-and-when it is necessary, but it is still essential to identifying risks and opportunities.

In summary, to meet the aims of Objective 2:

The council will maintain regular communication with key stakeholders through existing initiatives for the purpose of understanding areas at greatest risk of flooding, exploring opportunities for reducing flood risks, and discussing opportunities for collaboration.

Communication between these key authorities is also essential for the management of risk during and after a flood event. This is discussed in greater detail in Section 9.

7.3 ASSET REGISTER

Within the context of this strategy 'Assets' is defined as a physical structure or feature which affects local flood risk in some way, by either mitigating or increasing that risk.

In his review of the 2007 floods in the UK, Sir Michael Pitt recommended that local authorities should collate and map the main flood risk management and drainage assets (over and underground) including a record of their ownership and condition. He explained that by collating information and mapping these assets, local authorities would be able to:

- Develop more informed maintenance regimes which can take account of assets important for managing flood risk, particularly in high risk areas;
- Establish where all local drainage and watercourse systems are, allowing for quicker identification of the responsible authority in incidences of flooding; and
- Produce and publish a maintenance schedule for their assets as well as providing guidance to riparian owners as to how they should maintain their assets.

It is important to realise the full potential of maintaining a robust asset register. The asset register is not simply a system for recording assets that are likely to have a significant effect on a flood risk. The asset register presents a means of:

- Informing the public of key flood-related assets in their area;
- Understanding how certain assets affect flood risk;
- Understanding how assets assist in the management of flood risk;
- Assisting investigations of significant flood events by linking flood events to assets within the area that could contribute to or alleviate flooding;
- Informing and influencing the proactive inspection and maintenance of assets to reduce and manage flood risk;
- Informing, influencing and prioritising funding requirements to reduce and manage flood risk; and
- Identifying multiple benefits, such as assets important for effective operation of highways as well as for flood risk management.

The Flood and Water Management Act 2010 implements those recommendations made by Sir Michael Pitt including the recommendation for local authorities to establish and maintain a record of assets. Specifically, Section 21 of the Act states:

21. Lead local authorities: duty to maintain a register

- (1) A lead local flood authority must establish and maintain –
 - (a) a register of structures or features which, in the opinion of the authority, are likely to have a significant effect on a flood risk in its area, and
 - (b) a record of information about each of those structures or features, including information about ownership and state of repair.
- (2) The Minister may by regulations make provision about the content of the register and record.
- (3) The lead local flood authority must arrange for the register to be available for inspection at all reasonable times.
- (4) The Minister may by regulations provide for information of a specified description to be excluded from the register or record.
- (5) In this section, “the Minister” means -
 - (a) the Secretary of State in relation to authorities in England, and
 - (b) the Welsh Ministers in relation to authorities in Wales.

The legal characteristics of the asset register and record are outlined in Table 6.

Table 6 Asset register requirements

	Register	Record
a.	Must be made available for inspection at all reasonable times.	Up to the LLFA to decide if they wish to make it available for inspection.
b.	Must contain a list of structures or features which in the opinion of the authority, are likely to have a significant effect on a local flood risk.	For each structure or feature listed on the register, the record must contain information about its ownership and state of repair.
c.	s.21 (2) of the Act allows for further regulations to be made about the content of the register and record. There is currently no plan to provide such regulations therefore their content should be decided on by the LLFA depending on what information will be useful to them.	
d.	There is no legal requirement to have a separate register and record although as indicated above, only the register needs to be made available for public inspection.	

The majority of assets that are under the ownership of Herefordshire Council, most notably assets that are related to the highways network, are recorded within Confirm that enables geo-referencing of recorded assets. However, we appreciate that not all assets considered to have a significant effect on flood risk may be recorded and of those that are, it can be difficult to identify those that have a significant effect on a flood risk.

The council are also responsible for other assets that are not related to the highways network, such as attenuation features within public open space. Records of these assets are currently held by the department responsible for their maintenance.

Assets that are typically included within the asset register comprise both natural and manmade structures and features such as:

- Formal and informal flood defences and embankments
- Flood alleviation schemes
- Sluice gates and penstocks
- Flap valves and other outfall structures
- Open channels and watercourses
- Culverts and culverted watercourses
- Pumping stations
- Drainage ditches and grips
- Highways gullies and piped drainage systems
- Grills and trash screens
- Bridges over watercourses and open drains
- SUDS features, ponds and flood attenuation features

The council will undertake a review of the current methods of recording assets to identify opportunities for improvement. For example, to ensure that all assets considered most important to flood risk management or that could pose greatest risk if they were to fail are included within an appropriate register.

The council also intend to collate information on assets that are in private ownership or fall under riparian ownership responsibilities that could have significant consequences if they were to fail, for example assets such as agricultural reservoirs or private drainage systems.

The council can designate a feature that is located on private land or that it is in private ownership as a 'flood risk management asset'. The council will give notice to the owner of the asset in accordance with Section 30 of Schedule 1 of the Flood and Water Management Act. Features that have been designated as a flood risk management asset cannot be altered, removed or replaced without the consent of the council.

Enhancing the asset database held by the council will be an on-going process as existing or new assets are added and opportunities to improve existing information are identified. The council therefore propose to utilise the following approach to enhance their asset register and to meet the requirements of the Flood and Water Management Act 2010:

1. Quick wins – add data that is easily available from existing records or that is associated with new assets;
2. High risk – add assets that are located in known high risk areas or that could result in a high risk scenario should the asset fail;
3. Flood incidents – add assets that are identified through undertaking flood investigations;
4. Inspection and maintenance activities – add assets identified through planned or reactive inspection and maintenance works; and
5. All other assets – add all other known assets not identified through the means listed above.

Comprehensive asset registers are also held by the other key risk management authorities, namely the Environmental Agency, Welsh Water, Severn Trent Water and the IDBs. Given the extensive size of Herefordshire and the number of assets that will be important for flood risk management, it is not intended to combine all assets into a single register. However, the council will maintain communication with the other risk management authorities to ensure that the data captured with each register is in accordance with the requirements of the Flood and Water Management Act 2010.

In summary, to meet the aims of Objective 2:

The council will maintain a register of assets that are within the council's ownership and for which the council are responsible, and strive to include assets that are within private ownership that are considered likely to have a significant effect on a flood risk.

The council will also ensure that the register of assets held by other key risk management authorities is appropriate to meet the requirements of the Flood and Water Management Act.

7.4 MAINTENANCE

Many local flooding incidents within Herefordshire have been as a result of temporary blockages that have reduced the capacity of a feature or prevented the feature from operating as it should. Both proactive and reactive maintenance is therefore essential for flood risk management. Implementing a proactive inspection and maintenance regime will not eliminate the need for reactive maintenance, but it will reduce the number of reactive maintenance activities and reduce the impacts caused by defective assets.

The asset register as discussed above is intended to inform and influence the proactive inspection and maintenance of assets to reduce and manage flood risk. This is based upon an assessment of asset condition and consequence of failure, which then informs prioritisation of maintenance activities. This approach enables those assets that are either in poor condition and/or that can be attributed to past flooding within the county to be prioritised above those in good condition and/or have not been known to contribute to actual flooding.

Herefordshire Council currently carries out both proactive and reactive maintenance of assets throughout the county, predominantly for highways and drainage assets.

The proactive maintenance of highways and drainage assets is in accordance with the Highways Maintenance Plan and the annual programme of planned highway maintenance. This is informed through a review of the consequences of failure (e.g. if flooding would affect agricultural land or property within urban areas) and the condition of the asset. The most common issues are associated with blocked screens, root ingress and sediment build up that reduces the capacity of watercourses and culverts. The council intend to undertake a review of the current system of prioritising proactive maintenance to identify any opportunities for improvement, most notably further opportunities to link the need for proactive maintenance with the likelihood and impact of flooding for those assets that are considered likely to have a significant effect on a flood risk, building on the current methods for planning cyclical maintenance activities.

Reactive maintenance is regularly undertaken by the council. The response time for addressing issues as they arise is dependent on the risk category that is assigned to the issue and this prioritises the order in which defects are addressed (e.g. emergency works that are allocated Category 1 status will normally be addressed within 24 hours). Whilst the council's ability to address all identified defects is dependent upon available funding, the council will strive to set an appropriate budget.

In summary, to meet the aims of Objective 2:

The council will continue to undertake both proactive and reactive maintenance of assets that are considered likely to have a significant effect on a flood risk, informed by review of the consequences of failure and the condition of the asset.

7.5 PRIORITISATION

Given the size of the county, the extent of local flood risk and our limited budgets, it is not practical to attempt to implement all the required works or studies across the whole of Herefordshire in the short-term. It is therefore necessary for the council to implement a clear and transparent system that prioritises the potential actions and targets resources towards the most significant risks and where interventions can offer the best value for money. When working with communities, the council will provide feedback on their prioritisation status within this system.

The measures that have already been discussed above, most notably the regular maintenance of assets, will provide significant benefit to the reduction of flood risks, often with no need for further action. However, if further measures are deemed necessary, a clear and transparent method is required to prioritise those areas that are considered to be in greatest need. The method promoted by Herefordshire Council aims to guide investment and subsequent action towards those people deemed to be at greatest risk and therefore with the greatest need.

PRINCIPLES OF PRIORITISATION

The council's investment of funding and resources in the mitigation of flood risk will be based on a set criteria designed to identify the greatest need. Mitigation schemes will be assessed against these principles to create a priority 'shortlist'.

Whilst we appreciate that flood events that are not deemed significant (in terms of the criteria below) may still cause considerable stress, damage and inconvenience, our limited budgets mean that studies and schemes must be prioritised according to those people considered to be in greatest need.

Figure 3 Criteria to guide the prioritisation of receptors for flood alleviation

The priorities in Herefordshire are to reduce:

1	Risk to loss of life	Did flooding cause risk to human life? Is it likely to do so in future flooding?
2	Receptor impact	Did properties flood internally? Were important roads impassable or dangerous?
3	Flood frequency	Has flooding occurred before? If so how often? How likely it is that flooding will occur again?
4	Depth and/or velocity	Was the flood water deep or fast flowing? Or both?

These priorities outlined in Figure 3 are not intended to capture every important feature of every flood event but rather to highlight the most significant events that pose greatest risk or cause greatest impact to those affected. The priorities aim to provide structure to a method which will alert decision makers to receptors and/or communities that may require the most immediate action to reduce flooding or reduce the effects of flooding.

OTHER INFLUENCING FACTORS

It is important that this prioritisation remains flexible to account for emerging opportunities and local and wider priorities. The final decision of where action will be taken to reduce flooding will be decided by the relevant risk management authorities and will consider other factors that must be taken into account. This will include looking in greater detail at the other characteristics of the flood event, such as:

- The number of properties that flooded or are at risk;
- The historical or cultural importance of the affected property(s);
- The ability of those affected to protect themselves;
- The severity of health or pollution risks associated with the flood event;
- The duration and extent of the flood event;
- The scale of damage caused, associated costs and disruption, and the ability to recover;

- The impact to other receptors, such as land of important archaeological, environmental, economic or agricultural importance; and
- The support given by the communities that are affected by flooding, for example through Parish Councils, Flood Community Groups, or local funding opportunities.

It is also important for the council to consider flood risks at an individual property level scale and a community level scale. Consideration of individual properties is important to ensure that a single property is not viewed as being low priority simply due to its individual susceptibility to flooding or rural isolation. That said, consideration of larger communities is also extremely important as this will highlight those communities where multiple properties are at risk and therefore where multiple benefits can be achieved by taking action.

The same principles will be applied to individual and multiple properties at risk of flooding, although priority may have to be first given to actions that can address multiple properties if this is where the greatest reduction in flood risk can be achieved.

METHODOLOGIES

Data used to inform the prioritisation process will be obtained from three key sources:

1. Records of historical flood events and anecdotal evidence;
2. Predictions of future flood events based on modelled outputs; and
3. New records of flood events that will be collated by the council as and when flooding occurs.

Wherever possible, priority will be given to those areas that are known to have experienced significant flood risk in the past. The quality and quantity of recorded flood data will improve in the future as the council implement the new method of flood recording (as discussed in Section 6.2).

Modelled flood data is useful to predict areas that are at a high risk of flooding within Herefordshire but which may not have flooded yet and also to supplement data on historical flood events, particularly for those areas of Herefordshire that may not have recorded many historical flood events. Modelled data is also a useful validation tool to allow better understanding of historical flood events and how they may have occurred.

PRIORITISATION OF MEASURES

After consideration has been given to those areas of Herefordshire that are deemed to be at greatest risk, thought must be given to the type of measures that can be implemented and the standard of protection that can be provided. No matter how much planning and work we do, there will still be a risk of flooding and communities will need to be involved in what we do and guide our approach.

The prioritisation of measures needs to take into account a number of considerations as summarised in Table 7.

Table 7 Method of prioritisation of flood management measures

Criteria	Commentary
Committed measures	Certain measures may have already been committed as part of another scheme or plan, for example improvements to existing flood defences or cyclical maintenance works.
The time scale and timing of the measures	Measures could be quick win solutions that can be implemented quickly to provide an immediate solution to a problem. Measures may be given priority depending on available funding opportunities at the time of assessing the problem.
Strategic or non-strategic	Some measures may only address flooding in a small area (such as property level protection) whilst other measures may offer benefit to a much wider area (such as an upstream storage pond).
Cross-boundary	Some measures may require and/or benefit from input from multiple risk management authorities, either due to geographical location (e.g. to address flooding that extends beyond Herefordshire) or due to the nature of the flood risk (e.g. combined fluvial and surface water flooding) which can bring benefit (e.g. additional funding) or cause delay (e.g. due to additional coordination requirements).
Multiple benefits	Measures may offer multiple benefits beyond the management of flood risk, such as improvements in water quality, biodiversity or open space. These measures may also meet the objectives of other Council departments and legislation, such as the Water Framework Directive.
Cost and funding	This not only applies to the capital cost of the proposed measures, but also on-going maintenance requirements and deciding who would be best placed to take responsibility for this. Consideration must also be given to available funding opportunities and the criteria that need to be met to secure funding from the identified source(s).
Legislation	Certain measures may be required to meet legislative requirements, such as completing an asset register or reducing pollution risks to river catchment.

Settlements are prioritised based on an initial review which first involves establishing and validating the flooding mechanism and the number of affected properties. Herefordshire Council engage with the respective Flood Risk Management Authorities and stakeholder groups to prompt subsequent studies and alleviation schemes.

There is an on-going process to establish potential methods to mitigate flood risk at affected settlements. The ultimate goal is to create and update a county wide appraisal that can identify realistic costs to deliver studies and schemes. Where easy wins can be identified, delivery of feasibility studies are prioritised. In other cases, cost estimates for feasibility studies are prepared based on a balance between the likelihood of obtaining grant funding and the task in hand.

Quarterly meetings are held with the Environment Agency to discuss funding mechanisms and to establish projects that may attract grant funding. Meetings are also held with the Regional Flood & Coastal Committee, with the intent of steering funding towards schemes in Herefordshire.

As new flood sites are identified, the Council seeks funding from external sources such as DEFRA grant to complete investigations. Where external funding cannot be secured, internal funding may be available to allow completion of the initial review. Where alleviation schemes have been identified, external sources of funding via Community Infrastructure Levy or S106 (known in grant terminology as 'private contributions') are sought because this increases the likelihood of winning grant.

OTHER RISK MANAGEMENT AUTHORITIES

The other key risk management authorities, most notably the Environment Agency and sewerage authorities, also have their own methods of prioritisation. These will vary from the criteria used by the council, but the overall principles will be similar – most notably that priority will nearly always be given to those properties that are at greatest risk in terms of flood damages, hazard, frequency and past flood history.

The Environment Agency's 'Communities at Risk' initiative is intended to help them prioritise schemes throughout England, focussing more on the use of proactive measures rather than just reactive measures (i.e. predicting those areas that are at greatest risk rather than addressing issues after a flooding event has occurred). Herefordshire Council and the Environment Agency will share information about where flooding is occurring and work together on schemes to address flooding issues.

In summary, to meet the aims of Objective 2:

The council will implement a clear and transparent system for the prioritisation of areas that are considered to be at greatest risk of flooding or that may experience the greatest consequences should a flood event occur. This will take into consideration the vulnerability of those at risk, multifaceted opportunities to coordinate with other risk management authorities, and the support of the local community.

8

OBJECTIVE 3: HELP THE COMMUNITY HELP THEMSELVES

8.1 OVERVIEW

Local communities play an essential role in the management of flood risk. Raising awareness of community responsibilities and opportunities is an important part of the council's strategy for flood risk management throughout Herefordshire.

Local communities have an opportunity to assist in achieving every objective that is proposed within the Local Flood Risk Management Strategy and community support is essential to their success. The financial pressures that are faced by local councils are well understood and the council must therefore look to local communities for support in providing places that are safe for all to live and work.

As discussed in Section 7, Herefordshire Council will implement a clear and transparent system for the prioritisation of areas that are considered to be at greatest risk of flooding or that may experience the greatest consequences should a flood event occur. One of the factors that will be taken into consideration by the council when selecting schemes to be taken forward will be the support that is provided by the local community. In these times of austerity it is essential that all those involved in the management of flood risks join together to provide a partnership approach to flood risk management.

To provide an on-the-ground presence within local communities, the council has created the role of the **Locality Steward** and, since the launch of this initiative in 2014, has appointed 12 Locality Stewards who look after nine areas throughout Herefordshire: Bromyard, Kington, Mortimer, Golden Valley, Ledbury, Ross-on-Wye, Hereford, Leominster and Weobley. The council also promotes the **Lengthsman Scheme** by which participating Parish Councils can take on additional responsibilities for the maintenance of drainage and other highway assets within the local community. The role of the Locality Steward and Lengthsman Scheme can also provide a valuable link between local communities, Parish Councils and Herefordshire Council for any aspects relating to asset management and, therefore, flood risk management.

Some of the key responsibilities and opportunities for local communities are discussed in this section. These include legal responsibilities such as riparian ownership, assisting the council by reporting issues, being part of a local flood group, and managing risks at a local level.

Local communities play an essential role in the management of flood risk. Responsibilities and opportunities that can be explored to achieve the aims of Objective 3 will include:

- Raising awareness of riparian ownership responsibilities and taking action to enforce this within Herefordshire;
- Encouraging local communities that are at risk of flooding to form, join or support a local Community Resilience Group;
- Raising awareness of what to do in the event of a flood and how local communities should report flooding issues; and
- Raising awareness of action that can be taken by local communities to better protect their properties.

8.2 RIPARIAN OWNERSHIP RESPONSIBILITIES

If a main river, ordinary watercourse, ditch, drainage feature or other form of flood defence asset is located within or bordering privately owned land, it is the responsibility of the land owner unless specific arrangements have been made with another risk management authority. This responsibility is known as 'riparian ownership' and is a requirement in accordance with the Land Drainage Act as discussed in Section 3.

Herefordshire Council has prepared two useful guidance documents to inform and assist riparian owners with their duties, both of which are available on the council's website³:

- Guidance on Landowner Responsibilities; and
- Ditch Clearance Guidelines.

The Environment Agency has also developed a guide entitled 'Living on the Edge' that provides advice regarding the rights and responsibilities of riparian owners.

Key points of relevance to this Strategy include but are not limited to:

- If you own land that has a watercourse running through or underneath it (i.e. within a culvert) it is assumed that you own the stretch of watercourse that runs through your land;
- If your land boundary is next to a watercourse it is assumed that you own the land up to the centre of the watercourse, unless it is clearly stated otherwise;
- You must let water, including flood waters, flow through your land without any obstruction or diversion that may negatively affect others. Natural Flood attenuation measures, as described in Section 10.3, would benefit those downstream so are permitted; and
- You are responsible for the maintenance of the watercourse and any associated features within your land, including keeping the banks and channel clear of anything that could cause

³ <https://www.herefordshire.gov.uk/transport-and-highways/maintenance/roads-maintenance/riparian-owners-responsibilities>

obstruction and increase flood risk, and clearing debris from structures such as culverts, trash screens, weirs and mill gates.

Riparian owners have the right to protect their property from flooding or land from erosion. However, all works to a watercourse (and within c.9 metres of the channel edge) must be agreed with the relevant risk management authority – for example the Environment Agency for main rivers or Herefordshire Council / IDB for ordinary watercourses.

Whilst clearance of vegetation and debris has traditionally been seen as a key element of flood risk management, alternative methods of managing flood risk particularly around natural management processes are being explored. Through this work, there is increasing evidence that debris and vegetation can have a positive influence in slowing the flow of water, thereby providing a small scale natural measure to assist with flood management, which at the same time serves to hold back sediments and improve water quality.

As discussed in Section 7.3, under Section 30 of Schedule 1 of the Flood and Water Management Act 2010 the Council can designate a feature that is located on private land or that is in private ownership as a 'flood risk management asset'. **Features that have been designated as a flood risk management asset cannot be altered, removed or replaced without the consent of the council.** However, the council will give the riparian owner at least 28 days' notice if they decide to make such a designation and the riparian owner has a right to challenge any designation if they do not agree with what is proposed.

If a watercourse or its associated infrastructure is not adequately maintained by the riparian owner, this can cause flooding of properties, the highway and surrounding land. The relevant risk management authority, namely the Environment Agency for main rivers and Herefordshire Council for ordinary watercourses, can take enforcement action against riparian owners if they do not believe that the required maintenance activities are being undertaken and/or if the riparian owner has undertaken works that have increased the risk of flooding.

In summary, to meet the aims of Objective 3:

The council will continue to raise awareness of riparian ownership responsibilities and, where necessary, take enforcement action to ensure riparian owners undertake the necessary maintenance of their assets and do not undertake works that may increase flood risk to properties, the highway or surrounding land.

8.3 COMMUNITY RESILIENCE WORKING GROUPS

Herefordshire Council fully support the role of **Community Resilience Working Groups**. These groups can support individuals within their community to be prepared for a wide range of emergencies and promote an all-hazard approach. This can include flooding, both in terms of understanding local flood risks and helping communities to respond to and recover from a flooding event.

A Community Resilience Working Group can be formed by anyone within the community and it is recommended that this is undertaken with the support of the local Parish Council and Locality Steward. Community Resilience Groups can help the Council fulfil its central role within the county in a number of other ways, such as providing real time information about the extent and effect of local flooding for posting on the council's 'Roads Closed' website and taking active measures on behalf of the council, such as the putting out, and (equally important) the taking back in, of flood warning signage during flood events. Groups can also utilise the resources

mentioned above to help them spread understanding within the community of riparian duties and flood risk issues.

The council is supportive of communities preparing a **Community Resilience Plan**, particularly in areas identified as having high risk from local sources of flooding. A similar initiative, known as Community Flood Plans, is promoted by the Environment Agency. A Community Resilience Plan will summarise where flooding is likely to occur, the 'triggers' that will indicate when the Plan should be implemented, and the actions that should be taken to implement the Plan. The Plan should be prepared by the Community Resilience Working Group and involve the Parish Council and relevant Locality Steward.

It is also recommended that property owners who are aware that they are in an area at risk of flooding should also prepare their own **Personal Flood Plan** setting out the actions they need to take in an emergency. It should include who does what when flooding is forecast and emergency contact numbers. A [Personal Flood Plan template](#) has been prepared by the Environment Agency.

The Herefordshire Council Emergencies and Resilience Team can provide advice and guidance for communities and individuals wishing to prepare Community Resilience Plans or Personal Flood Plans.

In summary, to meet the aims of Objective 3:

The council encourages communities at risk of flooding to form a Community Resilience Working Group and, if necessary, prepare and implement a Community Resilience Plan and/or Personal Flood Plans in consultation with Herefordshire Council, Parish Council and relevant Locality Steward.

8.4 ACTION TO TAKE IN THE EVENT OF A FLOOD

The action to take in the event of a flood is dependent upon the severity of the event and the source of the flooding. In an emergency situation, local communities at risk should always contact the emergency services.

Floodwater can be very dangerous. While the Council endeavours to provide assistance wherever possible, **it is an individual responsibility to protect your person and your property.**

If you are located within a Flood Warning Area as defined by the Environment Agency, it is strongly recommended that you sign up to receive alerts from the Environment Agency. These will provide early warning that a fluvial flooding event may occur.

Whilst there are no flood warning services available for flooding from ordinary watercourses, surface water or groundwater, Herefordshire Council will endeavour to provide real-time road closure information associated with significant flood events on the council website and via local radio. The council propose to investigate and, where practicable, implement opportunities to improve communication with local communities during a flood event, particularly those deemed to be at greatest risk of flooding. This may include initiatives such as better use of the council's website and linking with national websites to highlight road closures that may also be linked to satellite navigation systems. Locality Stewards will also act as a key link with their respective communities.

If you become aware of a flooding issue such as a blocked culvert or flooding of a highway, you are advised to contact Herefordshire Council to report the issue.

Reporting incidents of flooding to the council helps improve its understanding of flood risks throughout the county, as well as build evidence for action to be taken. Such information should include details such as the date, location, duration, source of flooding, if internal property flooding was experienced, how many properties were affected, and if there were any other hazards such as impassable roads. Herefordshire Council primarily capture data via its website.

If you become aware of a flooding issue associated with a main river or the public sewerage network, you are advised to contact the Environmental Agency or your sewerage authority (Welsh Water or Severn Trent Water). If you are unsure of the source of flooding, contact Herefordshire Council for advice.

In summary, to meet the aims of Objective 3:

The council will continue to raise awareness of flood events and the actions to take during a flood event through information provided via the council website and by Locality Stewards. The council will look for opportunities to improve communication of flooding events via locally available media.

The council will continue to emphasise the individual's responsibility to protect themselves and their property during a flood event.

The Herefordshire Council Emergencies and Resilience Team can provide further advice and guidance on what action to take in the event of a flood.

8.5 COMMUNITY-LED INITIATIVES

Herefordshire Council are keen to promote individual and community responsibility for managing local flood risks, thereby promoting ownership of the actions that are taken and the measures that may be implemented.

Community-led initiatives could include:

- Creating or joining a Community Resilience Group, as discussed above;
- Preparing and implementing a Community Resilience Plan or Personal Flood Plan, as discussed above;
- Installing Property Level Protection measures;
- Undertaking maintenance of assets, such as ordinary watercourses, within the community;
- Investigating options and discussing opportunities for improved flood management with the Parish Council and Locality Steward;
- Applying for, securing and contributing towards the funding required to deliver flood management schemes;
- Providing a social network to help those who have been flooded recover from the trauma; and/or
- Helping other communities with advice and with assistance in setting up their own community resilience group.

PROPERTY LEVEL RESILIENCE

It is the responsibility of all homeowners to protect their property against flooding. Property Level Resilience (PLR) measures can provide temporary or permanent protection against flood risk, depending on the nature of flood risk to the affected property. It is advised that people who live in areas at risk of flooding investigate the options that may be available to them and the benefits that they could offer.

Some PLR measures aim to keep flood waters out of a property, for example the use of flood-proof doors and flood-proof air bricks. Other PLR measures will allow flood waters to enter a property, but will minimise the risk of damage to facilitate a quick recovery. Some PLR measures can protect more than one property and it is recommended that the need for PLR is discussed as part of a Community Resilience Working Group.

A lot of good information about PLR is available through websites such as [Blue Pages](#) and [Property Care Association](#).

PLR measures are typically paid for by the property owner. However, if a community and/or individual property is considered to be at significant and/or repeated risk of flooding it will be assessed as part of the council's prioritisation process as set out in Section 7.5. If, after undertaking an assessment of the risk, the use of PLR measures are considered to be the most appropriate then the council may assist in the funding of these measures.

MAINTAINING ASSETS

As discussed in Section 7.4, the maintenance of assets such as watercourses and ditches can be extremely effective in managing flood risks. Whilst the council do not advise local communities to undertake works that would put people in danger, the council are in full support of local communities undertaking relatively minor works that could have a big impact in reducing local flood risk. This could include activities such as maintaining the banks of a channel and any vegetation so they remain clear of debris. The council are willing to support local initiatives by providing advice and promoting the Lengthsman Scheme within participating parishes.

The council encourage the discussion and agreement of such community initiatives within Community Resilience Working Groups with the involvement of their Parish Council, Locality Steward and, where available, their Lengthsman

The council also encourage local communities to contact the council if they notice any other maintenance works that are required to prevent or alleviate flood risk – especially any works that would put members of the community at risk.

FLOOD MANAGEMENT SCHEMES

We recognise the importance of community involvement in managing the impacts of flooding and the need for collective understanding of both the risk and potential solutions. Local communities are often best placed to understand the causes and effects of flooding within their local area. As discussed in Section 7.5, the council may also be able to give preference to those communities which are actively supporting a flood management scheme.

As part of a Community Resilience Working Group, the council encourage local communities to investigate and present opportunities for managing flood risks within their area. The council will look to assist with the funding of these schemes if they are consistent with the council's prioritisation hierarchy, or if the schemes offer multiple benefits or partnership funding opportunities (i.e. if the scheme can offer other benefits such as improved biodiversity, or if the scheme can be part funded by another organisation or the community itself, or both).

Herefordshire Council also encourage local communities to engage with the Neighbourhood Development Plan initiative. This a key part of the Localism Act that can offer communities opportunities for improved flood management through land use allocation, policy development and implementation, and schemes that may reduce flood risks to facilitate development or reduce the risk to existing development.

FUNDING OPPORTUNITIES

Given the extent of local flood risk within the county, Herefordshire Council's budget for maintaining flood assets, implementing required works or studies is limited and must be carefully planned each year. It is often very difficult for the council to fully fund flood management schemes and so potential actions need to be prioritised and resources targeted accordingly.

The council encourages local communities to research and apply for other sources of funding that may be available for flood risk management initiatives (e.g. government and National Lottery funded regeneration grants).

Further information regarding potential sources of funding is provided within Section 11.

In summary, to meet the aims of Objective 3:

The council encourages local communities to propose and implement local initiatives for managing local flood risk, and where appropriate we will support these initiatives in the council's role as Lead Local Flood Authority.

9

OBJECTIVE 4: MANAGE FLOOD WARNING, RESPONSE AND RECOVERY

9.1 OVERVIEW

Herefordshire Council is part of the West Mercia Local Resilience Forum (LRF) that encompasses Herefordshire, Worcestershire, Shropshire, Telford and Wrekin. LRFs are multi-agency partnerships made up of representatives from local public services, including the emergency services, local authorities, the NHS, the Environment Agency and others. These agencies are known as Category 1 Responders, as defined by the Civil Contingencies Act.

The West Mercia LRF aims to plan and prepare for localised incidents and catastrophic emergencies. It works to identify potential risks and produce emergency plans to either prevent or mitigate the impact of any incident on their local communities. These can range from localised flooding to a terrorist attack.

The council and its partners have a robust system in place to warn communities of severe flood events, to help the most vulnerable of communities during a flood event, and to assist with post-event recovery.

9.2 EXISTING AND PROPOSED ACTIVITIES

FLOOD WARNING

As discussed in Section 8.4, the Environment Agency operates a flood warning service for properties that are located within their Flood Warning Areas. These provide early warning that a fluvial flooding event may occur. If someone is located within a Flood Warning Area, it is strongly recommended that they sign up to receive these alerts from the Environment Agency.

The Environment Agency also operates the Partners Advisory Service by which the Environment Agency will contact the council's Emergencies and Resilience Team to raise awareness of potential flood events. Throughout the event, the Environment Agency will keep the council up to date with key information such as flood levels and heightened risks etc. Herefordshire Council will share these warnings, as well as Severe Weather Warnings that may be raised by the Met Office, with the most vulnerable of people at risk, such as people within elderly care homes and schools.

Flood warning services for flooding from ordinary watercourses, surface water or groundwater sources are only available at a limited number of locations, for example Bodenham. However, Herefordshire Council endeavour to provide real-time information of significant flood events on the Herefordshire Council website and via local radio and social media. This will include sustained road closures.

The council are actively looking at ways to improve their flood warning services, in particular within those areas that are not located within an Environment Agency flood warning area but that may experience significant damage or disruption in the event of flooding from local sources. Community Resilience Working Groups can play a major role by supporting the work of agencies (i.e. establishing their own flood wardens to monitor watercourses and report blockages in time for these to be cleared, warn of rising water levels, etc.). This applies more particularly where there is a threat of flash flooding from minor watercourses/ surface run-off, rather than where the threat is from river (fluvial) flooding since the latter is usually adequately covered by the Environment Agency's warning system.

As discussed in Section 8.4, the council propose to investigate and, where practicable, implement opportunities to improve communication with local communities during a flood event, particularly those that are identified to be at greatest risk of flooding. This may include initiatives such as better use of the council's website and social media, and linking with national websites to highlight road closures that may also be linked with satellite navigation systems. The council also proposes to investigate opportunities to compare river gauge data with anecdotal evidence collected during a flood event to better predict when local communities may be at risk of flooding from local sources and when road closures may need to be enforced.

Local communities can also include 'triggers' within their Community Resilience Plans. This could include monitoring river levels against a local marker, monitoring river level information on the [Gauge Map website](#) or monitoring the [Environment Agency's Live Flood Warning Map](#).

If a flooding event is considered likely, local communities should implement their Community Resilience Plan; affected individuals should use their Personal Flood Plans, and provide assistance to the most vulnerable people within the community.

FLOOD RESPONSE

The scale of response by each organisation is proportionate to the scale of the flood event. For example, where a flooding event is associated with a main river the council will work closely with the Environment Agency to provide assistance. In the most extreme of events, the emergency services will also be deployed to provide assistance. It is recommended that the actions to be taken by the local community during a flood event are included within a Community Resilience Plan and issued to all members of the community that are likely to be at risk.

Herefordshire Council will activate the internal Flood Response Group that is established in the event of a major flood. Its aim is to provide assistance to those at greatest risk, such as the elderly or infirm. Whilst we do not provide sandbags for individual domestic use, some Parish Councils may have a limited supply of sandbags for the use of residents in a flooding emergency and it is recommended that the processes for their use are set out within the Community Resilience Plan. If you wish to keep a stock of sandbags, your local builders merchants should be able to help you. However, we may provide sandbags for strategic deployment during flooding; for the protection of essential services (i.e. electricity or water supplies). Sandbags when used correctly can provide some protection from flood waters.

Herefordshire Council are committed to housing people that are displaced during a flood event and who are unable to stay with nearby friends and family. Community rest centres are typically set up within buildings such as leisure centres and parish halls following an acute flood, as outlined in Community Resilience Plans. Information will be disseminated to communities through local media and on-the-ground staff such as the Emergency Services, Environment Agency, Parish Councils and Locality Stewards.

FLOOD RECOVERY

Herefordshire Council has prepared a multi-agency Recovery Plan that provides a framework to facilitate the rebuilding, restoration and rehabilitation of communities following a flood event. The Plan summarises the key roles and responsibilities of the key risk management authorities, such as the Environment Agency and Herefordshire Council, and also sets out the activities that are expected of local communities.

Short term housing of displaced people may be available by the council for the most vulnerable who are unable to stay with nearby friends and family. The council will provide advice to those that are likely to be displaced for a longer period of time, although it is ultimately the responsibility of individuals to arrange longer term accommodation in consultation with their insurance companies.

Capturing data for the purpose of understanding the causes, extent, duration and damages of a flood event will also form an important part of the flood recovery process. This is closely linked to Objective 1, as understanding flooding events will assist in being better prepared for future events and, where possible, reducing the likelihood of reoccurrence. For significant events, the council or the relevant risk management authority will undertake an investigation in accordance with Section 19 of the Flood and Water Management Act 2010 (as discussed in Section 6.3). The council also capture data via its [website](#). The public are encouraged to enter information regarding local flooding events onto this website to help build the council's understanding of flood risks throughout the county and plan future flood responses.

In summary, to meet the aims of Objective 4:

Herefordshire Council will continue to implement existing processes for flood warning, response and recovery in collaboration with other relevant organisations and authorities.

The council will also seek ways to improve their own activities prior to, during and after a flood event to reduce the risk to Herefordshire communities both now and in the future. This will include investigation of initiatives such as improved communication during a flood event through better use of the council and national websites, and comparing river gauge data with anecdotal evidence to better predict local issues.

10 OBJECTIVE 5: PROMOTE SUSTAINABLE AND APPROPRIATE DEVELOPMENT

10.1 OVERVIEW

Avoiding development within areas that are identified to be at risk of flooding is often the best way to reduce the number of people and properties at risk. This is, however, often difficult to achieve due to increased land use pressure, the redevelopment of sites that are identified to be at flood risk, the location of existing urban centres within areas at flood risk, and many other factors that influence site selection.

A risk-based approach must be taken when selecting sites for development and deciding on the type of development that would be considered acceptable. This must take into account the type of flooding that is predicted, the likely consequences of flooding and any measures that can be included to improve the resistance or resilience of the development to flooding.

All development can assist in the reduction of flood risk, either to the development itself or to people and property elsewhere. The council encourage all new development to go beyond what is considered 'minimum requirements' and instead explore opportunities for 'best practice'.

The tools used by the council that are considered key in the promotion of sustainable and appropriate development include:

- The preparation of an appropriate Local Plan and Neighbourhood Development Plans;
- Ensuring that local and national policies are taken into account within the planning application and approval process;
- The promotion of best practice techniques, including the use of sustainable drainage systems, targeted woodland creation to help mitigate water issues and enhancing biodiversity and habitat creation as part of flood risk management activities, e.g. multifunction green spaces that deliver amenity, flood risk management and environmental benefits.

Herefordshire Council recognises how changes to both land use and land management affect flood risk.

Changes in agricultural land management practices can increase rates of surface water runoff. Typical issues that can have a significant impact include crop selection, removal of hedges and ditches (the removal of ditches requires consent) and soil compaction from grazing. Flood risk management benefits can be also delivered through particular land uses, such as the creation of holding areas on agricultural land to enhance the natural role of floodplains, providing areas which can temporarily fill and drop their water over time.

Agriculture is a major industry throughout the county and in view of this, Herefordshire Council will work with landowners, Parish Councils, the National Farmers Union (NFU), Country Land and Business Association (CLA) and other similar organisations to promote changes in agricultural

land management practices which can reduce the impact of flooding and provide opportunities to incorporate ecological benefits. At the same time there will not be an automatic presumption that agricultural land is sacrificed for flood storage when developing flood alleviation schemes

The farming community is already working closely with others, including Natural England, the Environment Agency and the Wye and Usk Foundation on land management practices to improve water quality and quantity through the Wye Nutrient Management Plan (NMP). This will bring multiple benefits to the environment including reducing flood risk and enhancing biodiversity. To support the Wye NMP, the emerging integrated Natural Flood Management Partnership for the River Lugg and Wye seeks to reduce flood risk and enhance water quality through targeted land use solutions. It focuses on slowing the flow of water in tributary catchments of the river Wye in Herefordshire to reduce risk to communities through in stream features, rural SuDS, woodland planting and innovation interventions on agricultural land to increase infiltration and reduce overland flow into rivers.

Herefordshire Council will:

- Work collaboratively through the Natural Flood Management Partnership for the River Lugg and Wye to deliver the Wye Nutrient Management Plan and influence land use and management practices to reduce the risk of flooding and deliver wider environmental benefits; and
- Work with landowners, communities, Town and Parish Councils, NFU, CLA and other similar organisations to promote changes in agricultural land management practices, which can reduce the impact of flooding and provide opportunities to incorporate wider benefits.

10.2 EXISTING AND PROPOSED ACTIVITIES

THE LOCAL PLAN

Herefordshire Council is currently preparing their updated Local Plan to guide development in the county up to 2031. The Local Plan will be made up of a number of documents including the Core Strategy that sets the overall strategic planning framework. The Core Strategy was adopted in October 2015 and is in support of the approach to flood risk management as set out within the NPPF and its supporting Planning Practice Guidance 'Flood Risk and Coastal Change'.

Herefordshire Council do not allocate specific sites for development within the county, but propose broad strategic directions for growth that can be taken into account within the Hereford Area Plan (prepared by the council) and Neighbourhood Development Plans (prepared by Parish Councils).

Neighbourhood Development Plans are a key part of the Localism Act that aims to give local communities greater power to shape development in their area by having a direct role in the development of planning policies at a local level. These include policies that take local flooding risks into account, and can also identify opportunities for community-wide initiatives to reduce flood risks to facilitate development or reduce the risk to existing development.

The council is currently updating their Strategic Flood Risk Assessment (SFRA) that forms part of the evidence base for the Local Plan and Neighbourhood Development Plans. The SFRA provides a detailed overview of flood risk throughout the county from all sources of flood risk, now and in the future, taking account of the impacts of climate change, and assesses the impact that land use changes and development in the area will have on flood risk.

THE PLANNING APPLICATION PROCESS

The planning application process is essential in ensuring that new development is not at unacceptable risk of flooding and that new development does not increase flood risk elsewhere. All applications for development within Herefordshire must take into account the planning policies set out within the relevant Neighbourhood Development Plan, Local Plan and NPPF. All applications for new development must also take into consideration any additional recommendations made within the SFRA, as well as other documents such as the Herefordshire Highways Design Guide and Local SUDS Handbook.

Herefordshire Council promotes early discussions with developers through the pre-application advice service. This aims to advise developers on the likely flood risk within their area and the measures that may be required to adequately protect against flooding. Through consideration of the Sequential and Exception Tests in accordance with NPPF, this service may also identify that the proposed development is not considered suitable within an area identified to be at risk and is therefore likely to be refused planning permission.

The council will expect all developers to demonstrate that a sequential approach has been taken in the selection of development sites and in the proposed layout of development. This requires flood risks to be taken into account by directing the most vulnerable aspects of a development towards areas at lowest risk. If a development needs to be located within an area at risk of flooding, the council will require the developer to demonstrate how the development will be made safe. This could include flood resistance measures such as raising internal floor levels, or it could include flood resilience measures such as providing a safe means of escape. For vulnerable developments within areas identified to be at risk, a Flood Management and Evacuation Plan may be required.

For all new developments, the developer will be required to demonstrate that the development will not cause any notable increase in flood risk to people, property or infrastructure elsewhere.

BEST PRACTICE DESIGN TECHNIQUES

Wherever possible, the council will promote opportunities for new development to lessen the risk of flooding to the development site or to people, property or infrastructure elsewhere. This is most likely to be associated with opportunities for the sustainable management of surface water runoff, particularly within areas of Herefordshire that are known to experience flooding from surface water runoff or from small watercourses that receive runoff from adjacent land.

At minimum, developers will be required to ensure that new developments do not increase the rate or volume of surface water runoff when compared to the current situation. Furthermore, for previously developed sites and for larger strategic development sites, the council expect developers to be demonstrating betterment over current conditions, particularly if there are known local flooding issues. The Herefordshire Local SUDS Handbook sets out the council's requirements for the management of surface water runoff and use of SUDS features.

Developers should also be looking for opportunities to contribute to other flood management schemes, particularly in communities that have established flooding problems. Providing betterment to local communities is also likely to gain more local support for new developments.

Case Study: Stroud Rural Sustainable Drainage Project

Implementation of a wide range of measures design to slow peak flows, attenuate high flows to reduce flood risk whilst at the same time taking steps to improve water quality and restore biodiversity. The aim was to create a river catchment where water management is fully integrated into land management practices. Where public bodies, private companies and local communities work together to manage water within the landscape, creating valuable habitat for wildlife, and people and limiting flood risk downstream.

Ref: <http://ecosystemsknowledge.net/stroud-rural-sustainable-drainage-project-0>

Case Study: The Case for Trees in development and the urban environment – Forestry Commission

A rich resource of research and practical examples of how trees can be included in new development and existing communities to enrich the environment and also reduce the risk of flooding by attenuating water flows.

Ref: [http://www.forestry.gov.uk/pdf/eng-casefortrees.pdf/\\$FILE/eng-casefortrees.pdf](http://www.forestry.gov.uk/pdf/eng-casefortrees.pdf/$FILE/eng-casefortrees.pdf)

WELSH WATER RAINSCAPE INITIATIVE

The Welsh Water initiative RainScape aims to manage the volume of surface water entering the sewerage system by investing approximately £80 million up to 2020 on various RainScape projects. Reducing the volume of surface water entering the sewerage system will reduce the risk of sewerage flooding; reduce the likelihood of a pollution incident occurring, support future developments and increase resilience against climate change. The RainScape solutions can be incorporated into new developments or installed into the existing sewer system. Welsh Water does not currently have any schemes planned within Herefordshire; however landowners are being encouraged to consider implementing RainScape solutions on their land.

Examples of RainScape solutions:

- Swales – Shallow vegetated channels which store surface water before promoting infiltration into the soil, reducing the speed of surface water;
- Porous paving – Allows surface water to infiltrate through the material into the underlying soil instead of into the sewerage system;
- Rain gardens – Vegetated areas where roof water or a disconnected downpipe can be directed to, to reduce the time it takes for surface water to enter the sewerage system; and
- Rainwater harvesting – Water butts collect water from rainfall which can then be used to water gardens, this will also reduce the volume of water each house consumes.

In summary, to meet the aims of Objective 5:

Herefordshire Council will continue to promote sustainable and appropriate development through the Local Plan, its flood risk management role and the planning approval process. The council will also work closely with developers to identify opportunities for new development to lessen the risk of flooding to the development site or to people, property or infrastructure elsewhere.

11 DELIVERY AND FUNDING MECHANISMS

INTRODUCTION

Sir Michael Pitt's Review of the 2007 floods in the UK recommended that 'Government should develop a scheme that allows and encourages local communities to invest in flood risk management measures'. This recommendation has been realised through the Government policy of Flood and Coastal Resilience Partnership Funding ('partnership funding') that came into force in April 2012.

There is a large number of National and Local funding streams available to contribute towards the funding of flood risk management schemes and activities, commonly referred to as Flood & Coastal Erosion Risk Management (FCERM) schemes and activities.

The majority of funding is provided by Central Government via DEFRA and passed down to the Environment Agency as Flood Defence Grant-in-Aid (FDGiA). The Environment Agency spends this funding directly on FCERM, but also passes some on as grants to local authorities, such as Herefordshire Council, or IDBs. DEFRA also transfers some of its FCERM funding to Herefordshire Council (as LLFA) via the Department for Communities and Local Government (DCLG) to fund local FCERM schemes and activities. Other secondary sources of funding that can supplement these key sources of funding include the Local Levy, Community Infrastructure Levy and Partnership Funding schemes.

Delivery of flood risk management measures will always be dependent on sufficient funding being available. The funding available for any measure will be linked to the outcomes it will provide. Measures that deliver benefits beyond flood risk management, such as enhanced ecosystems, public amenity, economic growth or cultural heritage, are likely to attract funding from alternative sources beyond those typically used to support flood risk management.

This section of the document provides further information regarding potential funding opportunities for FCERM schemes and activities.

FCERM GRANT IN AID FUNDING

The majority of funds available from DEFRA are given to the Environment Agency as Flood Defence Grant-in-Aid (FDGiA). Local authorities, such as Herefordshire Council, can apply to the Environment Agency for grants to assist with the delivery of FCERM schemes and activities.

The FDGiA financing model supports a new partnership funding approach. The amount of funding that will be provided for each scheme that the Council are requesting funding for is calculated based on the number of households protected by the scheme, the damages that will be prevented, and any other benefits to the environment, amenity, agricultural productivity or economy.

Every worthwhile project has the potential to be supported by national FDGiA funding based on the benefits that a scheme provides. The amount of FDGiA funding available may be sufficient to fully fund schemes that have a high benefit to cost ratio. However, any outstanding costs must be met through other funding streams that are available to Herefordshire Council, Parish Councils, other stakeholders or local communities. This partnership funding approach allows Central Government to contribute to a wider range of schemes rather than meeting the full costs of a limited number of schemes.

FDGiA funding will be closely aligned to local flood risk management strategies and development plans produced by local authorities, in consultation with communities or local flood action groups. As long as minimum criteria are met, all new defences and capital maintenance projects are eligible for partnership funding, as are those protecting individual properties and managing risk from surface water and groundwater.

If a FCERM scheme or activity qualifies for partial funding of the total costs, then local partners including local authorities or IDBs can decide what to do. For example, a project qualifying for 90% FDGiA funding can still go ahead if costs are reduced by 10%, or a 10% contribution is found, or a combination of the two.

The FDGiA system aims to improve the transparency of funding and to provide greater certainty to communities over the prospect of national funding for a flood management scheme.

The value of available funding that can be obtained through the FDGiA considers three aspects of a project:

- The value of benefits for householders as a result of flood risks being managed, especially in deprived areas and where risks are significant;
- The value of other benefits achieved, such as the benefits to businesses, agricultural productivity and protection for national and local infrastructure, across the lifespan of the scheme; and
- The environmental benefits of the scheme, needed to maintain healthy ecosystems as well as offset any habitats lost when defences are built to protect people and property.

The maximum amount of funding for a project will be based on multiplying each of the aspects above by a set of payment rates, which are fixed amounts of national funding per unit of outcome or benefit achieved. Payment rates for protecting households will be higher in deprived areas, so that schemes in these areas are more likely to be fully funded by Government.

The share of funding for a project that can be obtained through the FDGiA is therefore equal to:

$$\text{Share of costs funded by FDGiA} = \frac{\text{Household benefits} + \text{other whole life benefits} + \text{environmental outcomes} \times \text{Fixed payment rates}}{\text{Amount of funding required}}$$

This shows that the percentage of FDGiA funding increases in line with the benefits being delivered.

Funding is also available for the design stages of a project to develop suitable measures for flood risk management. Herefordshire Council would need to bear the cost of the first stages of the business case to identify areas at greatest risk of flooding, prioritise those areas, initially assess the flood management solutions in terms of costs and benefits and identify suitable funding partners. However, FDGiA funding can be applied for to continue the development of the scheme through detailed studies and design works. Funding for these early stages does not guarantee that the project will be funded for the remaining appraisal, design, construction and maintenance phases of the scheme.

LOCAL LEVY

Local levy funding is an additional locally-raised source of income, gathered by way of a levy on Local Authorities and collected via the council tax. The levy is administered by the relevant Regional Flood and Coastal Committee (RFCC) and the RFCC is responsible for deciding how the levy is spent within the region each year.

The RFCC initiative aims to bring together several LLFAs within a particular catchment to discuss and develop appropriate catchment-wide plans for managing flood risks; encourage efficient, targeted and risk-based investment in FCERM; and provide a link between the Environment Agency, LLFAs, and other relevant bodies to build understanding of flood risks.

Herefordshire sits within the English Severn and Wye RFCC. The levy that can be granted by the RFCC can be used to support flood risk management projects that are not considered to be national priorities and hence do not attract national funding through FDGiA. Alternatively, local levy funding can be applied to FDGiA projects, at the discretion of the RFCC, to meet the partnership funding requirements.

FUNDING FROM DEVELOPMENT

The council has powers to secure contributions to infrastructure of community benefit from developers.

Section 106 of the Town and Country Planning Act allows a local planning authority to enter into a voluntary agreement with a landowner or developer in association with the granting of planning permission. A Section 106 agreement is used to address issues that are necessary to make a development acceptable to the local planning authority, such as supporting the provision of services and infrastructure.

One of the recommendations of DEFRA's 'Making Space for Water' (2014) was that local planning authorities should make more use of Section 106 agreements to ensure that there is a strong planning policy to manage flood risk. This means that any flood risk which is caused by, or increased by, new development should be resolved and funded by the developer.

Where possible, Herefordshire Council will seek to use Section 106 agreements to obtain funding to deliver flood risk management schemes that are required to facilitate the new development. Currently the number of separate Section 106 contributions that can be pooled to deliver larger flood risk reduction schemes is capped at four. Any contributions sought must meet the statutory legal tests set out in regulation 122 and 123 of the Community Infrastructure Levy Regulations 2010 as amended.

The tests are that the contribution must be:

1. necessary to make the development acceptable in planning terms;
2. directly related to the development; and
3. fairly and reasonably related in scale and kind to the development.

FUNDING PARTNERSHIPS

As discussed above, the Environment Agency will often only allocate FDGiA to fund a project if the lead authority can secure additional contributions to help fund the project – although 100% FDGiA project funding is possible for some projects that are considered eligible (typically projects that would offer significant risk reduction as well as other amenity, biodiversity and/or economic benefits).

Implementing schemes that offer multiple benefits are therefore more likely to secure the necessary funding and therefore more likely to be implemented. For schemes that offer multiple benefits, it is expected that the key stakeholders that are associated with the scheme and/or that will benefit from the scheme will also contribute in some part towards the required funding.

Organisations that may contribute towards flood risk management projects are typically those that would benefit from the scheme and/or those with a vested interest in flood risk management. This could include organisations such as:

- Relevant departments within Herefordshire Council, such as the Property Services and Highways Department;
- The Environment Agency, especially for projects that contribute to combined flood risk management from local sources and main rivers (for example);
- Welsh Water and Severn Trent Water;
- The River Lugg IDB and Lower Severn IDB;
- Highways England and Network Rail;
- Community Resilience Groups;
- Natural England or local wildlife groups;
- English Heritage or local archaeological groups;
- Riparian owners;
- Developers;
- Parish and Town Councils; or
- The local community and local businesses.

OTHER SOURCES OF FUNDING

The council encourages local communities to research and apply for other sources of funding that may be available for flood risk management initiatives (e.g. government and National Lottery funded regeneration grants). Herefordshire Council will continue to let communities know about any help or assistance that may be available following a flooding event. Communities may also wish to explore opportunities for local fundraising.

For further information regarding available funding, communities are advised to refer to information on www.herefordshire.gov.uk or www.gov.uk websites. As regards alternative funding streams that may be available to support community-led initiatives, visit the [Hereford funding update website](#).

12 ENVIRONMENTAL SCREENING

12.1 STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)

The SEA is a systemic process designed to evaluate the environmental and socio-economic effects of plans and programmes to ensure that environmental and sustainability issues are assessed and integrated at the earliest opportunity in the decision-making process, and that sustainable development is at the heart of the plan-making process.

Article 1 on the SEA Directive states that the aim is to:

‘provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development’

Local Government Association guidance states that LFRMS is subject to the requirements of SEA and a screening decision should be made on whether further SEA is required⁴. A separate document has been prepared to support SEA screening.

The SEA screening has been undertaken in order to determine whether an SEA of Herefordshire LFRMS is required.

The key issues which are likely to be determinative are the extent to which the LFRMS sets a framework for the future development consent of projects, and/or is likely to give rise to significant environmental effects. Given the nature of the LFRMS objectives, actions and outcomes (e.g. collection, & dissemination of information small scale resilience measures), ‘no’ to both criteria have been determined. It is therefore concluded that an SEA is not required for Herefordshire LFRMS.

However, it is recognised that a precautionary approach should be applied to future flood risk management activities. If actions in the Strategy are further developed and could lead to additional maintenance works in sensitive areas or development of infrastructure, then the LFRMS should include provisions for safeguarding the environment. These would include project level applications such as:

- Environmental risk assessments (alongside for instance health and safety) for any maintenance works such as clearance of watercourses to ensure sensitivities such as potential for breeding birds or protected species are identified.
- Where any activities such as watercourse maintenance may affect a European site, HRA screening should be repeated to ensure that there are no likely significant effects (see 2.1 below).

⁴ Local Government Association, November 2011, Framework to Assist the Development of the Local Strategy for Flood Risk Management, pgs. 19, 49.

- Where any activities such as watercourse maintenance are undertaken, good environmental management practices such as avoiding silty run-off and prevention of diesel spills are applied,

Communicating awareness of these measures alongside the LFRMS is equally important so that riparian responsibilities are understood.

12.2 HABITATS REGULATIONS ASSESSMENT (HRA)

- 12.2.1** Under Article 6 of the Habitats Directive an 'appropriate assessment' is required where a plan or project, not directly connected with or necessary to the management of a Natura 2000 site, either individually or in combination with other plans or projects, is likely to have a significant effect upon that site. Natura 2000 is a network of areas designated to conserve natural habitats and species that are rare, endangered, vulnerable or endemic within the European Community.
- 12.2.2** The first stage of the HRA process, screening, initially identifies the likely impacts upon a European site of a plan or project, either alone or in combination with other plans or projects, and considers whether these impacts are likely to be significant.
- 12.2.3** The HRA of the LFRMS has assessed the potential for Likely Significant Effects on European site and concluded these can be screened out.
- 12.2.4** However, it should be noted that where further flood risk management actions are to be undertaken (beyond the existing Strategy) then they should be screened for likely significant effects on European sites as part of the HRA process. This is particularly important for objectives or actions which may then lead to flood defence infrastructure or changes in water levels/ drainage.

Appendix A

ACTION PLAN 2016 - 2022

APPENDIX A-1

ACTION PLAN 2016 - 2022

Action ID	Strategy Objective	Proposed Action	Details of Action	Outcome	Timeframe for Implementation
001	Objective 1: Understand flood risks throughout Herefordshire.	Collate and analyse existing historic flood records held by Herefordshire Council.	Review historic flood records by the Council. Combine multiple data sources into a single location or into a single format that is compatible with other flood records. Analyse flood records to illustrate properties and communities at greatest risk. Produce mapped outputs of analysis.	To collate existing data into a format that can be used to gain improved understanding of flood risk.	December 2017
002		Review, develop and implement a comprehensive system to record future flood events that occur throughout Herefordshire.	Evaluate the methods by which flood events are currently recorded. Develop a comprehensive, appropriate and consistent system for the recording of future flood events. Agree and implement minimum 'core' information required for all flood events, and additional data that should be collected for more significant flood events.	To have a consistent and user-friendly method for the recording and review of flooding events.	December 2017 Review annually
003		Review and, where necessary, improve the sharing of flood event data between the key risk management authorities.	Review current data sharing arrangements and, where appropriate, improve the sharing of flood event data associated with Section 19 flood events with the Environment Agency, Welsh Water and Severn Trent Water to develop and agree a standardised approach.	To improve awareness of significant flooding events from non-local sources of flooding and to help to identify opportunities for collaborative working.	December 2017 Review annually
004		Continue to investigate significant flooding events in accordance with Section 19 of the Act	Ensure 'significant' flood events are investigated in accordance with Section 19 of the Act using the standardised investigation template developed by the Council.	To improve understanding and awareness of significant flooding events from local sources of flooding, and to better inform the decision making process.	On-going throughout delivery of Strategy
005		Publish Section 19 Investigations in accordance with Section 19 of the Act.	Make the key findings of Section 19 Investigations available to other risk management authorities, stakeholders and the public. Develop an appropriate process to implement this to protect potentially sensitive information.	To improve understanding and awareness of significant flooding events from local sources of flooding, and to better inform the decision making process.	On-going throughout delivery of Strategy
006		Use Section 19 Investigations to improve understanding of flood risk and prioritisation process	Link Section 19 Investigations to historic flood records for the purpose of highlighting the location of events considered to be 'significant', identifying those communities at greatest risk of flooding and informing the prioritisation process.	To identify communities likely to be at greatest risk of flooding.	On-going throughout delivery of Strategy

007		Continue to improve and share understanding of flood characteristics and mechanisms.	Update and publish the Herefordshire SFRA.	To ensure the most up to date flood data is made available to all relevant stakeholders and used in the delivery of all flood risk management activities	June 2017
008		Investigate and implement improved methods of communication.	Review the Council's website and, where appropriate, implement initiatives to raise awareness of flooding within communities at greatest risk, such as promotion of community resilience groups, strengthening the role of the Parish Council and maintaining the Locality Stewards and Lengthsman Scheme initiative.	To ensure that the most vulnerable of communities are aware of the risks of flooding within their locality.	April 2018 Review annually
009		Ensure consistency in communication	Review the Council's website and, where necessary, ensure that the website is aligned with the current processes and procedures as set out within the LFRMS.	To ensure consistency in the management of flood risk.	June 2017
010	Objective 2: Manage the likelihood and impacts of flooding.	Maintain and improve communication with key risk management authorities	Maintain regular communication with the Environment Agency (quarterly) and Welsh Water (bi-annually), and implement similar systems of communication with Severn Trent Water (annually) and the IDBs (bi-annually).	To improve communication and collaboration between risk management authorities.	underway: Review annually
011		Develop a register of assets that are considered to have a significant effect on a flood risk	Review and, where necessary, enhance the Council's existing register of assets for which the Council are responsible. Where assets are recorded elsewhere, ensure that the information held within alternative records is appropriate. Ensure key assets are included within the register(s), most notably those assets that are considered most important to flood risk management or that could pose greatest risk of they were to fail.	To identify those assets which are considered to have a significant effect on flood risk, and to inform proactive maintenance of these assets.	Completed, reviewed annually
012		Maintain a register of assets that are considered to have a significant effect on a flood risk	Continue to add assets that are considered important for flood risk management to the asset register. Review and, where appropriate, include assets that are within the ownership of other Council departments or in private ownership but that are considered likely to have a significant effect on flood risk.	To identify those assets which are considered to have a significant effect on flood risk, and to inform proactive maintenance of these assets.	On-going throughout delivery of Strategy
013		Ensure other risk management authorities are maintaining a register of assets that are considered to have a significant effect on flood risk	Ensure that the register of assets held by other key risk management authorities is appropriate to meet the requirements of the Flood and Water Management Act.	To identify those assets which are considered to have a significant effect on flood risk, and to inform proactive maintenance of these assets.	Reviewed annually

014		Continue to undertake proactive maintenance of assets that are considered to have a significant effect on a flood risk	Continue to undertake maintenance activities and, where appropriate, review the current system of prioritising proactive maintenance to identify any opportunities for improvement, building on the current methods of planning cyclical maintenance activities.	To continually improve the planning of maintenance works for the benefit of improved flood risk management.	On-going
015		Implement a clear and transparent system for the prioritisation of communities and infrastructure at risk of flooding.	Undertake a review of available flood risk data sources. Implement the proposed principles of prioritisation to identify those communities considered to be at greatest risk of flooding or that may experience the greatest consequences should a flood event occur, and to inform the selection of appropriate measures.	To ensure a fair and transparent process for the assessment and implementation of flood management measures.	On-going throughout delivery of Strategy
016	Objective 3: Help the community help themselves.	Raise awareness and enforce riparian ownership responsibilities.	Continue to raise awareness of riparian ownership responsibilities and, where necessary, take enforcement action to ensure riparian owners undertake the necessary maintenance of their assets and do not undertake works that may increase flood risk to properties, the highway or surrounding land.	To ensure that local communities take responsibility for managing flood risk.	On-going throughout delivery of Strategy
017		Promote the role of Community Resilience Groups.	Continue to actively promote communities at risk of flooding to form a Community Resilience Group and, if necessary, prepare and implement a Community Resilience Plan and/or Personal Flood Plan in consultation with the Parish Council and relevant Locality Steward.	To raise awareness of flooding within local communities and encourage communities to be better prepared.	On-going throughout delivery of Strategy
018		Investigate and implement improved methods of communication.	Investigate and, where appropriate, implement initiatives to improve communication during a flooding event such as using local media, better use of the Council's website and linking with national websites.	To improve knowledge of flooding throughout Herefordshire and thus reduce the risks associated with flooding.	December 2017 Review annually
019	Objective 4: Manage flood warning, response and recovery.	Improve local flood warning systems and road closure information.	Investigate opportunities to compare river gauge data with anecdotal evidence to better predict when local communities may be at risk of flooding from local sources and when road closures may need to be enforced.	To ensure that communities can be better informed of flood risks and local road closures.	December 2017
020	Objective 5: Promote sustainable and	Improve the management of surface water runoff.	Implement the newly published Local SUDS Handbook to promote the appropriate management of surface water runoff through the planning approval process.	To identify and encourage opportunities to manage runoff to prevent increased flood risk and reduce existing flood risk.	On-going throughout delivery of Strategy

021	appropriate development.	Implement robust and appropriate planning policy.	Complete the Herefordshire SFRA and implement appropriate policies in the Local Plan, Neighbourhood Plans and NPPF.	To encourage a best practice approach for land use planning and development design.	June 2017
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