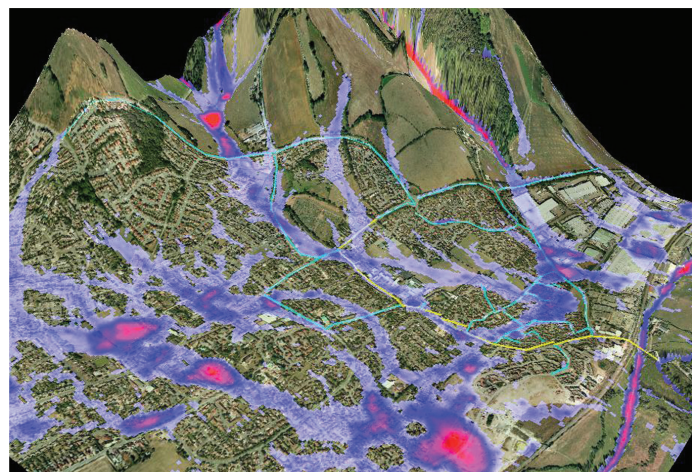


Local Flood Risk Management Strategy

2021–2026



West Berkshire Council
June 2021



West Berkshire
COUNCIL

Revision Schedule

Rev	Date	Details	Prepared by	Reviewed by	Approved by
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Executive Summary

As with many areas of the United Kingdom, West Berkshire has suffered as a result of recent floods. This has provided us with first-hand experience of the consequences of flooding. Owing to the effects of climate change, extreme weather events are predicted to become more likely and consequently this will lead to an increased risk of flooding. Whilst flooding can never be prevented, it can be predicted and the effects forecast; measures can then be put in place to manage the flooding and its consequences.

West Berkshire Council recognises that flooding can have far reaching effects on people's lives: From short duration highway flooding and the flooding of open spaces and river corridors, to the flooding of homes and businesses that leads to damage and loss of personal possessions. There is also displacement during remedial works and environmental impacts from pollution. The effects can also lead to physical and mental health issues causing increased strain on people's lives.

West Berkshire Council is committed to minimising the effects of future flood events on its residents. This first Local Flood Risk Management Strategy (LFRMS) sets out how West Berkshire Council will work with its local flood risk management partners to better understand local flooding, communicate risks and manage unacceptable risks both now and in the future.

Our Objectives

Through the process of producing this LFRMS West Berkshire Council has established the following local flood risk management objectives:

Table 0-1: West Berkshire Council Local Flood Risk Management Objectives 2020

Ref No:	Objective
O1	Maintain and update understanding of flood risk within West Berkshire and increase public awareness.
O2	Develop plans to reduce existing flood risk taking account of people, communities and the environment.
O3	Identify measures that aim to reduce existing flood risk
O4	Ensure that planning decisions take full account of flood risk

Our Measures

To achieve these objectives, West Berkshire Council has identified 16 measures which are presented in the Action Plan associated with this LFRMS. These measures address various aspects of local flood risk management, from improving awareness and communication to implementing measures to reduce unacceptable flood risk. All the measures will be actioned by West Berkshire Council with assistance and support in some cases from its local flood risk management partners.

Funding the implementation of Flood Risk Management Measures

To achieve the implementation of the above measures West Berkshire Council in consultation with its partners in local flood risk management has identified that funding will need to be sought from a variety of sources including:

- Flood & Coastal Erosion Risk Management Grant in Aid (FCRM GiA)
- West Berkshire Council

- Professional partners
- Regional Flood and Coastal Committee Local Levy
- Community Infrastructure Levy (CIL)
- Section 106 contributions
- Local Community contributions

Through the process of developing this LFRMS, West Berkshire Council have assessment flood risk management measures that support the wider objectives of our Environment Strategy, and several other related policies. Whilst carbon neutrality and sustainability are necessary to limit global warming, the measures contained in the LFRMS may be regarded as a planned adaptation and coping response to the changing climate. This reflects the council's resolute commitment to tackling the climate emergency.

1 Introduction

In recent years, West Berkshire along with many other parts of the UK has suffered from a number of flooding events which have directly affected people's lives, homes and businesses. The West Berkshire Local Flood Risk Management Strategy aims to help reduce and manage flood risk. This will be achieved through a better understanding of flood risk within West Berkshire, better co-operation between organisations involved in flood risk management and better communications with the public about the risks and what can be done.

Under the Flood and Water Management Act 2010 (FWMA), West Berkshire Council is designated as a Lead Local Flood Authority and has new statutory powers and responsibilities for co-ordinating flood risk management in partnership with other organisations. A key component of the Act is that West Berkshire Council must 'develop, maintain, apply and monitor a strategy for local flood risk management'. The Strategy establishes a set of objectives and actions (presented as an Action Plan) that will direct the Council towards meeting those objectives. The Strategy therefore provides a single consistent reference against which West Berkshire Council can develop, apply and monitor flood risk management, both now and in the future. In doing so the Strategy will help individuals, communities and businesses understand local flood risk and what actions they can expect to see with regards local flood risk management and what actions they can take to reduce their risk from future flood events.

In accordance with Section 9 of the FWMA, Lead Local Flood Authorities (LLFA) are required to develop, maintain, apply and monitor Local Flood Risk Management Strategies which set out their vision for managing flood risk from surface water, groundwater and ordinary watercourses in their administrative areas.

1.1 What is a Local Flood Risk Management Strategy

The Strategy establishes a set of flood risk management objectives and corresponding measures (presented as an action plan) that will steer West Berkshire Council towards meeting these objectives. The LFRMS provides a single consistent reference point against which West Berkshire Council can develop, apply and monitor flood risk management.

Who is the LFRMS for?

The LFRMS will help individuals, communities and businesses understand local flood risk, what action they can expect to see with regards local flood risk management and what action they can take to reduce their risk from future flood events.

1.2 The Aim of the Strategy

The aim of the Local Flood Risk Management Strategy (LFRMS) is to explain how West Berkshire Council will engage in the management of flood risk from surface water, groundwater and ordinary watercourses within its administrative area, now and in the future.

Principles of the Strategy

The following are guiding principles on which flood risk management in West Berkshire will be based:

- Flooding is a natural process that will occur despite all efforts to prevent it. It is therefore important to focus on reducing the consequence of flooding and the disruption that it causes, as well as on measures to prevent it.
- Improving our knowledge and understanding of flood risk within West Berkshire is essential.
- Decisions on where local resources are focused will be evidence based and proportionate.

- No organisation is able to ensure that householders and businesses are safe from flooding. Householders and businesses have responsibility for protecting their own property,
- No single organisation can effectively manage flood risk across the whole of West Berkshire, so co-operation among public and private sector agencies is essential for the long-term success of flood risk management.
- Proposals to prevent or reduce flooding can sometimes have significant effects on the natural environment. Flood prevention schemes will only be approved if it can be shown by means of an Environmental Assessment, that the environment will not be adversely affected.
- New developments should ensure that there is no increase in flood risk and where possible improve the existing level of flood risk.
- The cumulative impact of small developments on flood risk can be as significant as the impact of major developments, and so both must be managed in order to ensure the risk of flooding does not increase.

In accordance with Section 9 of the FWMA 2010, a LFRMS 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

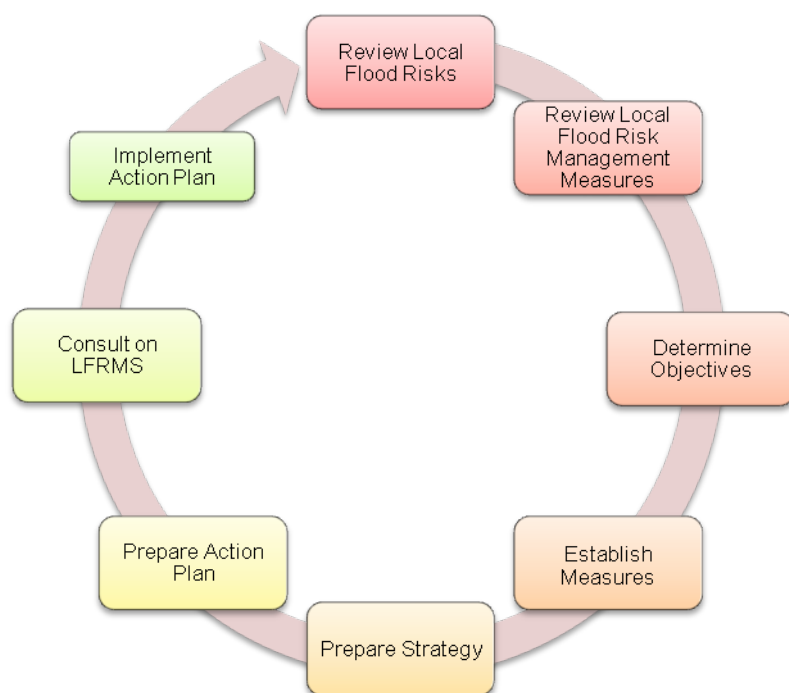
(i) how the strategy contributes to the achievement of wider environmental objectives.

1.3 Development of the Local Flood Risk Management Strategy

The preparation of Local Flood Risk Management Strategies is cyclical. The Strategy is intended to be used as a guide to inform and benchmark local flood risk management activities and as such should be in constant use. It should be periodically reviewed and updated where necessary.

This LFRMS has been developed by West Berkshire Council in consultation with its local partners in flood risk management and local communities.

The process followed for the development of this LFRMS is illustrated below.



1.4 Synopsis of the West Berkshire Council LFRMS

Section 3 presents the legislative context for this LFRMS, the power, duties and responsibilities of the Lead Local Flood Authority and the wider legislative context for flood risk management in England. Section 4 identifies the Risk Management Authorities operating within the West Berkshire district, their roles and responsibilities, along with details of how those authorities cooperate in discharging their responsibilities for local flood risk management. A brief summary of flood risk in West Berkshire is presented in Section 5.

The objectives, measures and action plan for flood risk management within the West Berkshire district are presented in Section 6 along with how they contribute to wider environmental objectives. Section 7 discusses how these may be funded and how funds will be distributed. Finally section 8 identifies how progress against achieving the objectives of the LFRMS will be monitored and the LFRMS review process, periods and drivers.

2 Legislative and Policy Context

There are several pieces of legislation and national and local policy documents that govern the roles, responsibilities and standards for flood risk management. This section provides a summary of the relevant legislation and policy documents.

2.1 Legislation

2.1.1 The Pitt Review (2008)

Following widespread floods during the summer of 2007, in which over 50,000 households across the UK were affected and damages exceeded £4billion, Sir Michael Pitt carried out an independent review of national flood risk management practices. The Pitt Review was published in June 2008 and called for urgent and fundamental changes to the way flood risk was being managed. The report contained 92 recommendations, of which 21 related specifically to Local Authorities (Appendix A). The recommendations were based around the concept of local authorities playing a major role in the management of local flood risk through coordinating with all the relevant authorities.

2.1.2 Flood and Water Management Act (2010)

Many of the recommendations contained within the Pitt Review were implemented within the Flood and Water Management Act (2010), which gained royal assent on the 8th April 2010 and provides legislation for the management of risks associated with flooding.

The Act reinforces the need to manage flooding holistically and in a sustainable manner. It also places a number of new roles and responsibilities on West Berkshire which is designated (through the Act) as a Lead Local Flood Authority (LLFA).

LLFAs have a **responsibility** to:

- develop, maintain, apply and monitor a Local Flood risk Management Strategy (LFRMS) (Section 9);
- consult the public and local risk management authorities on its LFRMS (Section 9);
- establish and maintain 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 (Section 21); and,
- set up an overview/scrutiny committee to oversee the flood risk management functions or coastal risk management functions of the local authority's area (Schedule 2).

The FWMA imposes **duties** on LLFAs to:

- Investigate flooding incidents (Section 19); and,
- Co-operate with other Risk Management Authorities (RMA) (Section 4 & 11).

LLFAs have **powers** to:

- Consent works on ordinary watercourses (Section 23);
- Designate 3rd party assets that affect flood risk and give notice to owners that the assets have been adopted (Schedule 1);
- Request information from Risk Management Authorities (Section 14); and
- Carry out works relating to groundwater and surface water flooding (Schedule 2).

These are discussed in more detail in later chapters.

National Flood and Coastal Erosion Risk Management Strategy (2020)

In July 2020, the Environment Agency published the updated Flood and Coastal Erosion Risk Management Strategy for England. The updated Flood and Coastal Erosion Risk Management Strategy sets an ambition for the management flood risk and coastal change up to 2100. This will be achieved through a series of shorter term objectives for the next 10 to 30 years.

The strategy states that the objectives will need to be achieved by investment in infrastructure combined with softer measures. Objectives are grouped under three broad ambitions:

- Create climate resilient places
- Ensure today's growth and infrastructure is resilient to tomorrow's climate
- Develop a nation of climate champions, able to adapt to flooding and coastal change through innovation

The National Flood Risk and Coastal Erosion Risk Management Strategy defines the responsibilities of LLFAs as:

“developing, maintaining and applying a strategy for local flood risk management in their areas and for maintaining a register of local flooding infrastructure. They also have an operational role as the lead authorities with responsibility for managing the risk of flooding from surface water, groundwater and ordinary watercourses.”

2.1.3 EU Floods Directive & Flood Risk Regulations (2009)

The European Union Floods Directive came into force on 26 November 2007. The Directive requires Member States to assess if watercourses and coastlines that are at risk from flooding, to map the flood extent, assets and people at risk in these areas and to take adequate and coordinated measures to reduce this flood risk.

The EU Floods Directive was transposed into law for England and Wales in The Flood Risk Regulations 2009 which came in to force in December of that year. The Flood Risk Regulations require the following four main activities are completed:

- Produce a Preliminary Flood Risk Assessment (PFRA) – this involves collecting information on past and future floods from surface water, groundwater and ordinary watercourses.
 - West Berkshire Council produced their Preliminary Flood Risk Assessment in June 2011.
- Identification of 'Flood Risk Areas', i.e. areas where the risk of flooding is 'significant'.
 - West Berkshire does not have any areas defined as being at 'significant' risk as defined by the Flood Risk Regulations therefore the Council is only required to produce the Preliminary Assessment Report.
- Prepare Flood Hazard and Flood Risk Maps – Where areas have been identified within the PFRA as being at significant risk then the Environment Agency and the Lead Local Flood Authorities are required to produce hazard and risk maps for indicative Flood Risk Areas by 22nd December 2013.
 - West Berkshire does not have areas defined as having 'significant' risk as defined by the Flood Risk Regulations therefore they are only required to produce the Preliminary Assessment Report under the first bullet point above.
- Prepare Flood Risk Management Plans – The final stage is for the production of a Flood Risk Management Plans for the indicative Flood Risk Areas by 22nd December 2015.

- West Berkshire does not have areas defined as having 'significant' risk as defined by the Flood Risk Regulations therefore they are only required to produce the Preliminary Assessment Report under the first bullet point above.

2.1.4 The Land Drainage Act (1991)

The Land Drainage Act details the duties and powers to manage land drainage for a number of bodies and groups, including local authorities, the Environment Agency, Internal Drainage Boards and riparian owners. The Flood and Water Management Act updates a number of elements of this legislation.

The key powers and duties provided by the Land Drainage Act are:

- Duty on internal drainage boards to exercise a general supervision over all matters relating to drainage of land;
- A general duty to the environment when exercising powers;
- Powers to maintain, improve and build new drainage related works;
- Consenting and enforcement powers for ordinary watercourses;
- Powers to create byelaws; and
- General power of entry onto land for water level management so that statutory authorities can exercise flood risk management for the common good.

2.1.5 The Localism Act (2011)

The Localism Act introduces a number of proposals to provide new freedoms and flexibilities for local government. With regards to flood risk management the Localism Act requires Lead Local Flood Authorities (LLFAs) to establish processes to enable overview and scrutiny committees to review and scrutinise risk management authorities in their area. Risk management authorities have a duty to comply with a request made by an overview and scrutiny committee for information or a response to a report in relation to its flood or coastal erosion risk management functions.

The Localism Act introduces the 'duty to cooperate', which requires all risk management authorities to work together. It is important these organisations work together across administrative boundaries when working in relation to flood and coastal erosion risk management.

2.1.6 Water Resources Act (1991)

The aim of the Water Resources Act is to prevent and minimise the pollution of water. Under the Act it is an offence to cause or knowingly permit any poisonous, noxious or polluting material, or any solid waste to enter any controlled water. The Environment Agency is responsible for policing this Act.

The definition of polluting material includes silt and soil from eroded areas. If silt or soil from eroded areas is found to be polluting a water body or watercourse, the Environment Agency has the power to prevent or clear up the pollution and recover the damages from the landowner or responsible person.

2.1.7 Highways Act (1980)

The Highways Act provides powers to West Berkshire Council as the Highway Authority for the creation, improvement and maintenance of roads and for acquisition of land. It also provides:

- Responsibility to maintain highways, including ensuring that highway drainage systems are clear and that blockages on the highway are cleared, this is a duty under the Highways Act and therefore strategic highways are inspected and maintained regularly.

- Powers to deliver works that they consider necessary to protect the highway from flooding. These works can either be on the highway itself or on land which has been acquired by the Highway Authority in the exercise of highway acquisition powers.
- Authority to divert parts of watercourses or carry out any other works on any form of watercourse if it is necessary for the construction, improvement or alteration of the highway or provides a new means of access to any premises from the highway.

2.1.8 Civil Contingencies Act (2004)

The Civil Contingencies Act details the framework for civil protection in the UK and sets out the actions required for a flood event. In order to provide protection in the event of a flood the Act is arranged in two sections: Part 1: local arrangements for civil protection; and Part 2: emergency powers.

Under Part 1 of the Act West Berkshire Council is responsible for:

- Undertaking risk assessments;
- Developing Emergency Plans;
- Developing Business Community Plans;
- Arranging to make information available to the public about civil protection matters and maintain arrangements to warn, inform and advise the public in the event of an emergency;
- Share information with other local responders to enable greater co-ordination;
- Co-operate with other local responders to enhance greater co-ordination and efficiency; and
- Provide advice and assistance to businesses and voluntary organisations about business continuity management.

2.1.9 Reservoirs Act (1975)

The Reservoirs Act is applicable to all reservoirs classified as 'large raised reservoirs' and regulates the responsibility for their management and supervision. Large raised reservoirs are defined as reservoirs which hold a volume of water of 25,000 cubic meters or more above the natural level of any part of the surrounding land adjoining the reservoir. ,

The Reservoirs Act is due to be amended by the Flood and Water Management Act, with the introduction of new arrangements for reservoir safety and the redefining of 'large raised reservoir' to include any reservoir with a volume of more than 10,000 cubic meters.

Under the changes provided by the Flood and Water Management Act all large raised reservoirs that are assessed as 'high risk' will be subject to full regulation, and any large raised reservoirs not at 'high risk' will need to be registered. In addition, all incidents at reservoirs will need to be reported.

A 'high risk' reservoir is any reservoir for which the Environment Agency considers that "human life could be endangered in the event of an uncontrolled release of water from the reservoir and the reservoir does not satisfy certain conditions".

If a reservoir is subject to 'full regulation' a qualified (panel) civil engineer must be appointed to supervise the design and construction, the reservoir must be continually supervised once constructed, an inspection must be undertaken every ten years, and any measures recommended to be taken in the interests of safety must be implemented and inspected by a supervising engineer.

2.1.10 The Conservation of Habitats and Species Regulations (2010)

The Conservation of Habitats and Species Regulations transpose the European Commission Habitats Directive (1992) into law in England and Wales.

The regulations focus on the importance of conserving natural habitats in order to help maintain and enhance biodiversity. The primary tool within the regulations for achieving this is the establishment of a network of protected areas and strict protection measures for particularly rare and threatened species.

The Conservation of Habitats and Species Regulations will be a material consideration for any flood alleviation measures and or watercourse maintenance activities, where it may be necessary to demonstrate the impact flood risk management measures may have on local habitats and their dependant species.

2.1.11 Water Environment Regulations (2003)

The Water Environment Regulations transpose the European Union Water Framework Directive (2000) into law in England and Wales. The Water Framework Directive is designed to improve and integrate the way water bodies are managed throughout Europe, requiring all member states to manage the water environment to consistent standards. In addition, European Member States are required to aim for inland and coastal waters to be at “good” chemical and ecological status by 2015.

The Environment Agency is the coordinating authority for the implementing the requirements of the Water Framework Directive. In order to address the requirements of the Directive, the Environment Agency has produced river basin management plans, which develop new and better ways of protecting and improving the water environment.

River basin management is the approach the Environment Agency is using to ensure combined efforts of the stakeholders achieve the improvement needed in the Thames River Basin District.

Objectives and measures within the LFRMS will need to consider whether they are compliant with the Water Framework Directive and how they contribute to the overall objectives of the river basin management plans. This offers opportunities to reduce flood risk and provide multiple benefits in line with the RBMP objectives.

River basin management is a continuous process of planning and delivery. The Water Framework Directive introduces a formal series of six year cycles. The first cycle will end in 2015.

2.1.12 River Basin Management Plan Thames River Basin District (2009)

The River Basin Management Plan for the Thames River Basin District covers the catchment areas draining West Berkshire. The Plan has been prepared by the Environment Agency in consultation with stakeholders in response to the requirements of the Water Framework Directive.

The Thames River Basin Management Plan sets out the status of water bodies throughout the River Thames Catchment, highlights the reasons water bodies in the basin don't achieve 'good' ecological status which include reference to poorly planned flood risk management infrastructure and diffuse pollution from urban centres. The plan identifies the Environment Agency's Flood and Coastal Erosion Risk Management investment programme as a main programme which can be used to improve the quality of waterbodies within the Thames catchment. This can be achieved through carrying out flood mitigation projects more sustainably such as incorporating Natural Flood Management (NFM).

2.2 National and Local Policies

2.2.1 Making Space for Water (July 2004)

The Making Space for Water strategy covers the period from 2004 until 2024 and sets out how the Government will adopt a more holistic approach to managing flood and coastal erosion risk in England during this period. All sources of flooding will be accounted for, with flood and coastal erosion risk becoming embedded in a range of Government policies. The strategy aims to manage risks by implementing integrated national and local approaches, with the purpose of reducing flood risk and providing environmental, social and economic benefit, consistent with the Government's sustainable development principles.

2.2.2 National Planning Policy Framework (2019)

To rationalise the volume of planning legislation and guidance the National Planning Policy Framework (NPPF) was introduced in March 2012 and updated in February 2019. The NPPF provides one coherent document replacing Planning Policy Statement 25: Development and Flood Risk (PPS25). The NPPF provides guidance on how flood risk should be included within various stages of the planning process.

NPPF Paragraph 155-157 states:

“155. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

156. Strategic policies should be informed by a strategic flood risk assessment, and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards.

157. All plans should apply a sequential, risk-based approach to the location of development – taking into account the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:

- *applying the sequential test and then, if necessary, the exception test as set out below;*
- *safeguarding land from development that is required, or likely to be required, for current or future flood management;*
- *using opportunities provided by new development to reduce the causes and impacts of flooding (where appropriate through the use of natural flood management techniques); and*
- *where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.”*

Through the above approach the NPPF specifically encourages a risk based approach to development and flood risk. It fundamentally aims to steer new development to areas of lowest flood risk, where this is not possible to achieve sustainable development then appropriate measures, which can include new flood defences and resilience measures, should be provided.

2.2.3 National Planning Practice Guidance

In March 2014, the Technical Guidance for the NPPF was replaced by the National Planning Practice Guidance (NPPG). The NPPG provides guidance on how the policy of the NPPF should be implemented. The NPPG elaborates on the requirements of the Sequential test and Exceptions tests,

providing guidance on the types of development appropriate in the various flood zones and the requirements of flood risk assessments in support of development. The NPPG also provides guidance on how climate change should be considered in the context of development planning.

The NPPF and the NPPG are material considerations for any new development and will be used by West Berkshire Council as the Local Planning Authority to steer development to the areas of lowest flood risk.

2.2.4 West Berkshire Preliminary Flood Risk Assessment (2011)

The West Berkshire Preliminary Flood Risk Assessment characterises the flood risk throughout West Berkshire now and how this might change in the future. It uses this data to determine if any areas are defined as being at significant flood risk.

The PFRA established that despite the flood history in West Berkshire no areas qualify for classification as being at significant flood risk. However, Newbury and Thatcham are identified as local adverse flood risk areas due to the impact of flooding in these towns on the towns themselves and adjoining communities.

2.2.5 Catchment Flood Management Plans (CFMP)

CFMPs provide an overview of flood risk across a river catchment. They enable a more holistic approach to flood risk management to be adopted and consider all types of flooding (except coastal flooding which is addressed in Shoreline Management Plans) and the impacts of climate change. They review flood risk management objectives over a 50 – 100 year period determining the most appropriate techniques to achieve a given level of flood protection. Techniques for managing flood risk include changes to the way we interact with, manage and occupy land within river catchments. CFMPs are used to assist the Environment Agency achieve the requirements of the Floods Directive and as a framework to deliver flood risk management measures with its partners.

2.2.6 Thames Catchment Flood Management Plan (2009)

The Thames Catchment Flood Management Plan characterises flood risk across the Thames River basin including the area of West Berkshire.

Key policies and actions at the catchment scale are provided in order to assist in the management of flood risk. For the flood risk typology associated with West Berkshire, the Environment Agency propose to take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits in areas of low to moderate flood risk.

The Environment Agency acknowledges that the scattered nature of flood risk throughout the area means managing the consequences of flooding will be an increasingly effective and sustainable approach to managing the risk.

Furthermore they indicate that community scale action related to flood resilience, flood awareness and watercourse maintenance will be encouraged.

2.2.7 Thatcham Surface Water Management Plan (2010)

The Thatcham Surface Water Management Plan (SWMP) was prepared following the flood event of July 2007 as part of the Defra pilot studies for Surface Water Management Plans.

Through development of the Plan, links were forged with stakeholders in local flood risk management, a detailed understanding of flood risk in Thatcham was developed and through the use of hydraulic models, options to alleviate flooding to the town were identified. The options were then presented as an action plan for implementation.

Since the completion of the SWMP, West Berkshire Council has been engaged in delivering the Action Plan including the implementation of several Flood Alleviation Schemes within Thatcham. Any future development in Thatcham will be reviewed to ensure they are consistent with the objectives of the action plan.

2.2.8 Lambourn Surface Water Management Plan (2018)

Following the July 2007 floods and subsequent February 2014 floods West Berkshire Council carried out a Surface Water Management Plan (SWMP) for Lambourn. The SWMP assessed the complex interactions between surface water, groundwater and fluvial flood risk within Lambourn and included detailed hydraulic modelling.

As part of the SWMP an Action Plan was developed and signed up to by all project partners, to manage the risk of flooding within Lambourn.

2.2.9 Pang Valley Flood Management Plan (2013)

The Pang Valley Flood Risk Management Plan sets out how flood risk will be managed throughout the Pang Valley through the period of 2013 to 2016. It gives details of the roles of the organisations and individuals who are responsible for managing flood risk and sets a number of flood risk management objectives. It draws together a range of proposed actions for individuals and organisations to undertake to minimise future flood risk.

Much of the information presented in the Pang Valley Flood Risk Management Plan is also presented in this LRFMS.

2.2.10 Lambourn Valley Flood Management Plan (2013)

The Lambourn Valley Flood Management Plan sets out how flood risk will be managed throughout the Lambourn Valley in the future. It also gives details of the roles of the organisations and individuals who are responsible for managing flood risk and sets a number of flood risk management objectives and draws together a range of proposed actions to be undertaken by individuals and organisations to minimise future flood risk.

Much of the information presented in the Lambourn Valley Flood Management Plan is also presented in this LRFMS.

2.2.11 West Berkshire Strategic Flood Risk Assessment (2019)

The West Berkshire Strategic Flood Risk Assessment (SFRA) was updated in 2019 to support the development of the Local Plan Review and Minerals and Waste Local Plan. The SFRA sets the evidence base for flood risk for the creation of Local Plan policies and also for the allocation of development within the district. The SFRA acts as the basis for carrying out the Sequential Test for the allocation process.

The West Berkshire SFRA also provides an overview of all types of flood risk and contains details of historic flooding within the district.

2.2.12 Newbury Flood Management Plan

The River Kennet and River Lambourn within Newbury are managed by a series of control structures along their lengths. These control structures are used to manage flood risk through the town as well as ensuring there is adequate water within the rivers.

The Newbury Flood Management Plan sets out a framework for the management of this control structures by different organisations including West Berkshire Council, the Environment Agency, the Canal & River Trust, and private owners and operators.

West Berkshire Council Sustainable Drainage Systems (SuDS) Supplementary Planning Document (SPD) (2018) The West Berkshire Council SuDS SPD is intended to outline the principles required for the delivery of SuDS as part of development within the district. In WBC's role as LLFA it is a statutory consultee to the planning process on surface water drainage matters for major developments. The SuDS SPD provides guidance to ensure that SuDS are appropriate for the local area and deliver the expected multi-functional benefit.

3 Flood Risk within West Berkshire

The nature of flood risk within West Berkshire is varied and widespread across the district. The main sources of flooding are summarized below, however, it is important to emphasise that the cause of flooding is not always certain or possible to be attributed to just one source of flooding.

Type	Description
Ground water flooding	Ground water flooding occurs when water levels in the ground rise above the ground surface. Ground water flooding occurs after long periods of rainfall and can last for several weeks or even months. The areas most at risk are often low-lying areas where the water table is more likely to be at a shallow depth. Ground water can be predicted well in advance by the Environment Agency who monitors ground water levels throughout the year. Ground water flooding in the Lambourn Valley is a significant contributor to other flooding types.
River flooding (Fluvial flooding)	River flooding, also known as fluvial flooding, occurs when a river channel cannot accommodate the volume of water flowing into it, causing water to spill over onto the surrounding land, or flood plains. These events normally follow an extended period of heavy rainfall and are usually predicted in advance by the Environment Agency and Met Office.
Surface water flooding (Pluvial flooding)	Surface water flooding, also known as pluvial flooding or flash flooding, occurs when heavy rainfall generates runoff which flows over the ground and ponds in low lying areas. This type of flooding is usually short lived and associated with heavy downpours of rain, thunderstorms etc., and is made much worse when the ground is already saturated. Often there is limited advance notice of surface water flooding; however, weather forecasts from the Met Office can give an indication of the flood risk.
Sewer flooding	Sewer flooding occurs when a sewer network cannot cope with the volume of water entering it or when the pipes within the network become blocked.
Highway flooding	Highway flooding is caused by heavy rainfall which coupled with blocked drains, gullies or roadside ditches, causes water to pond within the highway.

3.1 Overview of West Berkshire

The administrative area of West Berkshire Council covers approximately 700 km² and has a population of approximately 153,000 (source: 2011 West Berkshire District Profile) with an estimated 60,000 households (source: 2001 Census). West Berkshire's principal urban areas are Newbury, Thatcham, Hungerford and the areas of Tilehurst, Purley and Calcot to the west of Reading.

West Berkshire has two nuclear installation sites, which are AWE near Aldermaston and AWE near Burghfield. The world headquarters of Vodafone is located to the north of Newbury near to Junction 13 of the M4 motorway.

The topography of West Berkshire varies between the higher Downlands in the north and north-west of the district and the low lying floodplains of the Main Rivers, principally the Thames, Kennet, Lambourn and the Pang. The River Kennet's floodplain is defined on either side by steep slopes, rising to the county boundary with Hampshire to the south and to the Berkshire Downs to the North.

The geology of West Berkshire is comprised of The White Chalk overlain by Clay with Flints in much of the north and west of the district. To the south of Newbury and East of Thatcham the bedrock geology is predominately composed of the Thames Group overlain by Sands and Gravels. Alluvium is present in most river valleys, becoming quite expansive along the Kennet to the south and east of Thatcham.

Figure 3-1: Topography of West Berkshire

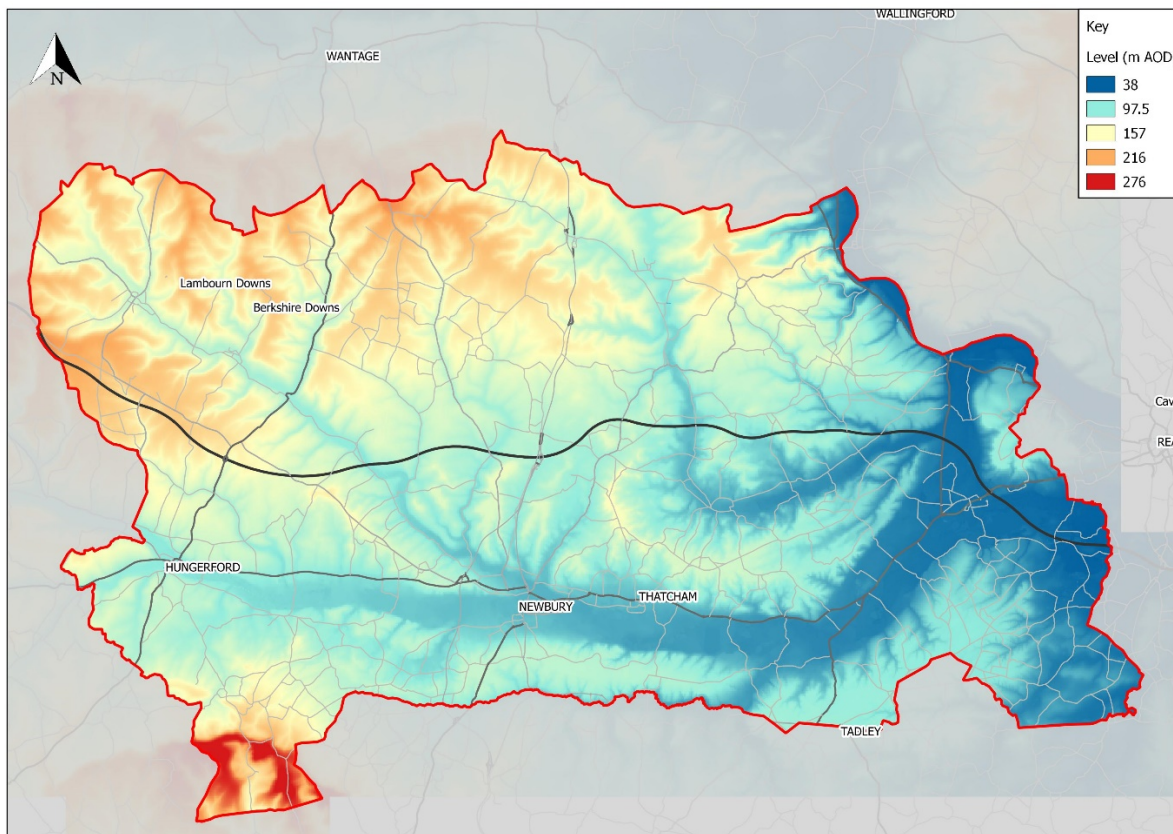
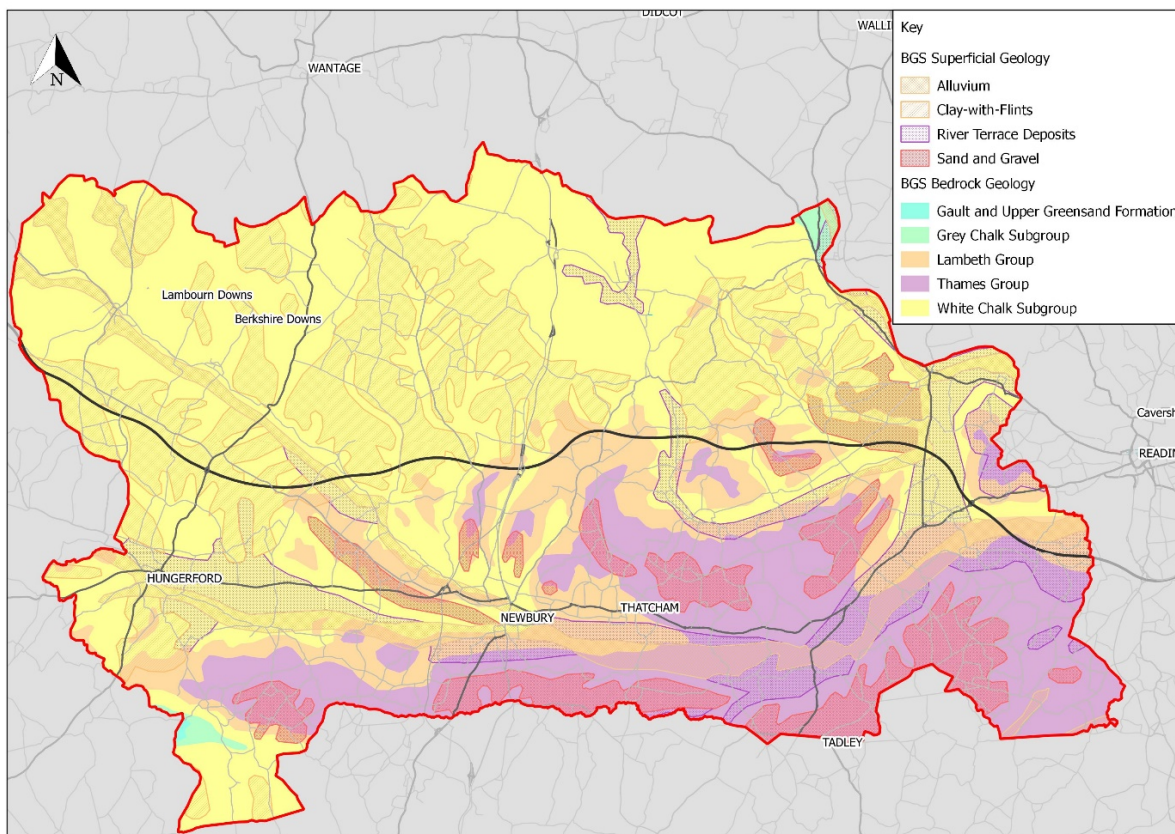


Figure 3-2: Geology of West Berkshire



Land use in West Berkshire is characterised by green space (which includes gardens and bodies of open water) and accounts for 95% of the land coverage within the district. Transport, buildings and other, non-specified land uses account for the remaining 5%. There are numerous SSSI's within West Berkshire and four international Designated Environmental Sites, namely, the Kennet and Lambourn Floodplain, the River Lambourn, Hartslock Wood and the Kennet Valley Alderwoods (

Figure 3-4). There are no World Heritage Sites within West Berkshire. West Berkshire also hosts approximately 350km of Chalk Stream.

Chalk streams are globally rare habitats, with only around 200 worldwide, predominantly in South and East England and small areas of Northern France. England contains around 85% of the world's chalk streams with almost 4000km of combined river length. Due to a combination of both the geological history and climate, these watercourses are limited to certain areas. West Berkshire contains four main chalk streams, the Rivers Lambourn, Kennet, Pang, and Loddon.

Chalk streams are characterised as rivers where more than 75% of the base flow is from groundwater aquifers, and the chalk geology through which the river runs. Due to the natural filtration provided by the chalk, these river waters have generally low turbidity and good chemical status. This allows for a wide range of fauna and flora to flourish, including many rare species such as fine-lined pea mussels, mayfly and southern damselfly. Fish species are also abundant and varied within chalk streams, primarily Brown Trout and Atlantic Salmon, but also including Grayling, Brook Lamprey, and Bullhead. This biodiversity, in turn provides food for key species within chalk streams such as otters, water voles, kingfishers and white-clawed crayfish.

The delicately balanced water ecosystems that thrive in chalk streams are constantly under threat from a number of sources. Over-abstraction has reduced many chalk streams ability to cope with drought, and in extreme cases they have dried up.

Agricultural run-off can lead to an increase in dissolved nutrients such as nitrates and phosphate which can cause eutrophication and lead to depleted dissolved oxygen concentrations within the rivers, ultimately leading to fish death. Fine particulates and suspended solids washed into chalk streams from urban run-off increase the turbidity of the naturally clear waters, reducing the amount of sunlight penetrating the waters.

The rivers in West Berkshire have been modified over hundreds of years to aid irrigation, drinking water supply, navigation, and flood management. An increase in urbanisation has led to further stream channel modification and diversion, whilst simultaneously increasing runoff areas. This reduces the amount of infiltration into the natural chalk aquifers that filter the water and feed the chalk streams, and increases the amount pollution washed into the streams.

Figure 3-3: West Berkshire Watercourses

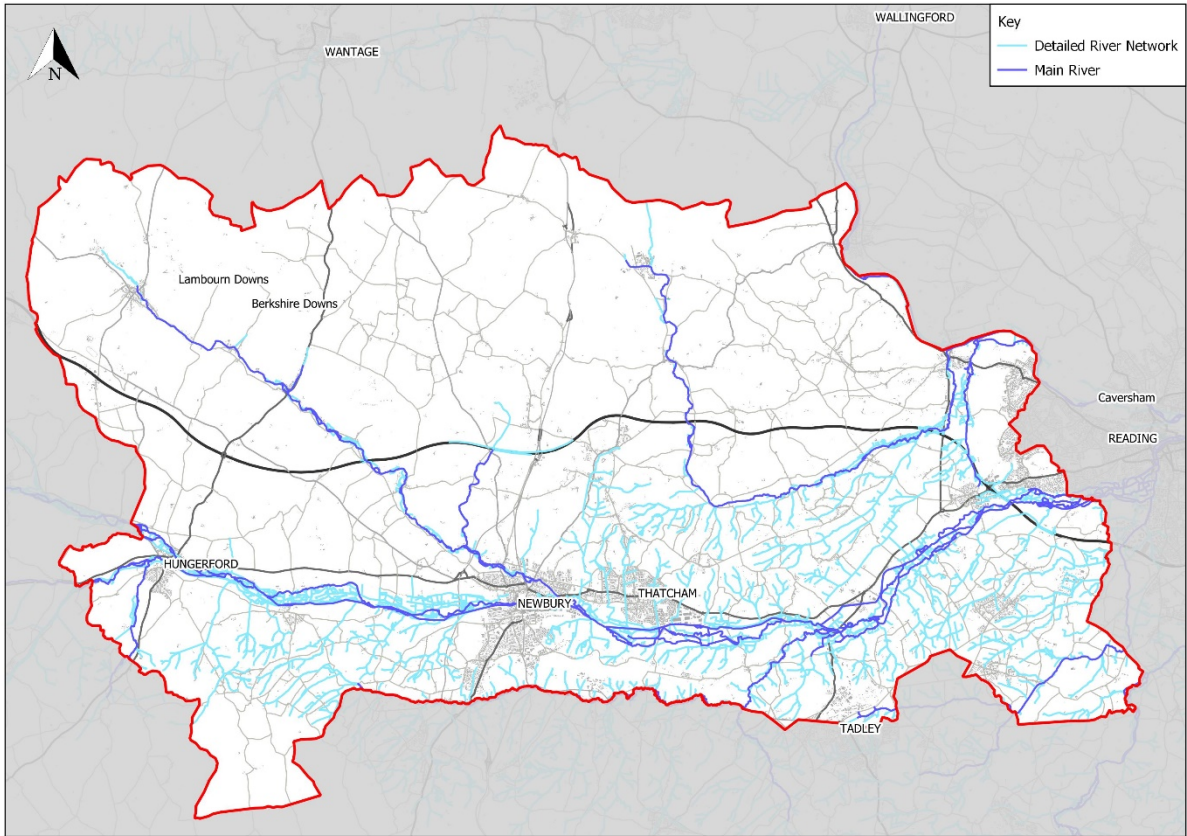
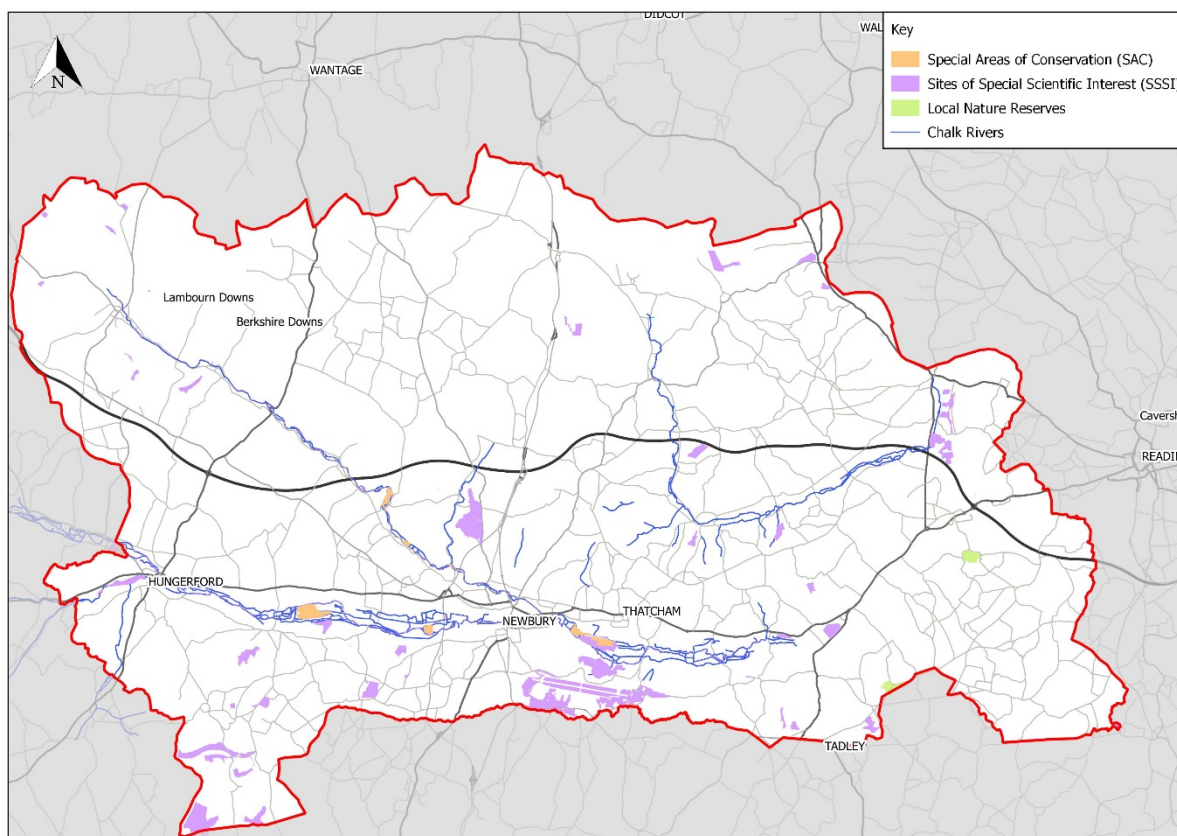


Figure 3-4: Environmentally Sensitive sites in West Berks



3.2 Types of Flooding and Risks within West Berkshire

West Berkshire understands that its residents will have less interest in distinguishing between types of flooding than ensuring the safety and security of their families, friends and property during a flood event. This LFRMS strategy takes this into account and therefore the interaction of the types of flooding has been considered in establishing the objectives and measures.

There are many different types of flooding that affect West Berkshire and a brief overview is provided below,

Measuring Flood Severity/Occurrence

The severity of a flood is often referred to in terms of its estimated frequency of occurrence. This is on the basis that the greater the magnitude of the flood the less frequent it is when considered over a very long period of time. Using this system a flood referred to as a 1 in 20 year flood would be expected to occur more frequently than a 1 in 100 year flood but result in less widespread flooding.

The term 1 in 100 year or 1 in 20 year should not be confused with that type of flood occurring exactly every 100 or 20 years. In some cases it is possible to experience a 1 in 20 year flood in consecutive years but when considered over a long period of time only two of that magnitude of flood over 40 years, for example.

Rather than referring to a flood in terms of a 1 in 'x' year flood it can be simpler to refer to it in terms of the probability of it being exceeded in any one year. Table 3-1 presents the annual exceedance probability corresponding to the return period of a flood.

Table 3-1: Flood Return Periods and Annual Exceedance Probability

Return Period (1 in 'x' year)	Annual Exceedance Probability (%)
1	100.0
2	50.0
5	20.0
10	10.0
20	5.0
30	3.3
50	2.0
75	1.3
100	1.0
200	0.5
1000	0.1

Finally, when considering flood occurrence it can also be helpful to consider them in terms of 'odds'. For example there is a 20 to 1 chance of a flood occurring or there is a 100 to 1 chance of a flood occurring. In the event the 20 to 1 flood occurs there would be less flooding than if the 100 to 1 flood occurred.

3.2.1 Flooding from Rivers and Streams

Flooding from rivers and streams is also known as fluvial flooding. This type of flooding occurs when a watercourse cannot accommodate the volume of water that is flowing in it or when there is significant impedance to the passage of flow within the channel of the watercourse to the extent that it causes flow to come out of banks onto the floodplain.

The responsibility for flooding from watercourses in West Berkshire is split between the Environment Agency, who is responsible for Main Rivers (River Thames, River Kennet, River Pang, River Lambourn and Foudry Brook) and West Berkshire Council who is responsible for Ordinary Watercourses. Ordinary watercourses are any watercourses which are not designated by the Environment Agency as a Main River. Essentially this covers smaller watercourses, ditches and streams.

Historical Ordinary Watercourse Flooding

The majority of the ordinary watercourse flooding during the 2007 flood event was exacerbated due to a lack of maintenance of the watercourses. This was due to a lack of awareness of the responsibilities of riparian owners to maintain these watercourses. Whilst the flooding at Pangbourne was principally caused by the Sulham Brook over-topping its banks it was noted that there was an interaction between the Main River and local ordinary watercourses in the area that ultimately caused the river to over-top.

There are a number of local flood risk events that have been noted within the West Berkshire Strategic Flood Risk Assessment and Preliminary Flood Risk Assessment. These may have some influence from ordinary watercourses in combination with surface water flooding, however the exact nature of the interaction is unknown.

Historical Main River Flooding

Flooding from the River Kennet has been recorded as far back as the 19th century. Particularly severe flooding occurred in 1947, an event that caused widespread damage throughout the lower reaches of the River Thames catchment. Flooding within the lower reaches of the River Kennet, affected properties in Newbury and Thatcham (and surrounding areas) also occurred in 1971, 1990, 2000 and 2003.

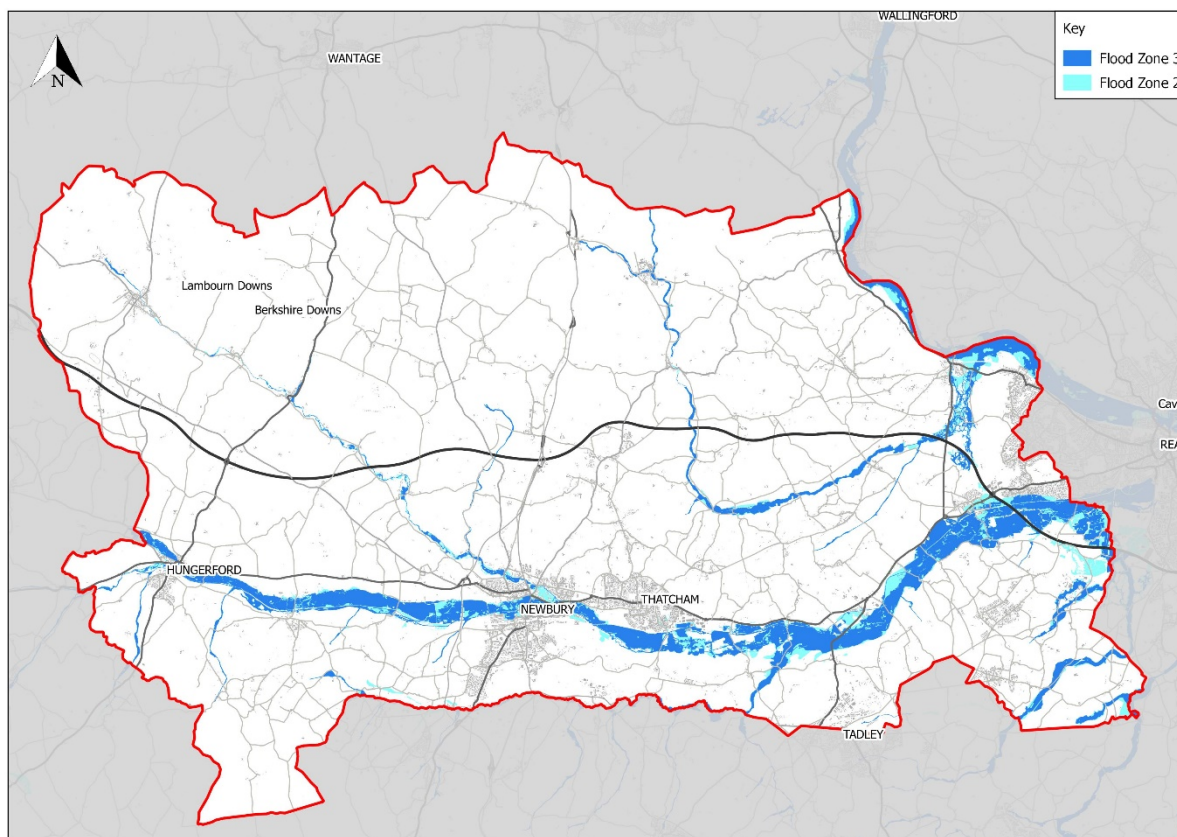
Table 3-2: West Berkshire River Flooding Historical Records

Date	Event
1915	River Thames flooding of Purley on Thames
1947	River Thames flooding of Purley on Thames
1974	River Thames flooding of Purley on Thames
1990	River Thames flooding of Purley on Thames
1992	Flooding across district including – Newbury, Thatcham, Aldermaston, Sulhampstead & Pangbourne
1993	River Pang flooding of Stanford Dingley and Pangbourne and localised flooding along River Enbourne
1999	River Kennet flooding of Burghfield and River Pang flooding of Tidmarsh and Pangbourne.
Jan 2003	River Thames flooding of Purley on Thames 40 homes flooded in worst event since 1947.
2008	River Thames flooding of Purley on Thames Flash flooding in Thatcham – Bowling Green Way Woolhampton- The Mill Stream overflow
2009	The Mill Stream overflow – Woolhampton
2010	River Lambourn – Head Waters overflow- Upper Lambourn
2012	River Thames flooding of Purley on Thames. River Lambourn flooding – Ground Water flooding of areas near Lambourn River (Upper Lambourn, Eastbury, Great Shefford, Boxford to Winterbourne Road near Winterbourne Wood and Shaw) . River Kennet flooding of Pingewood, Denford Mill (Hungerford), Marsh Benham and Ufton Lane (Ufton Nervet). Surface water flooding in Colthrop due to lack of maintenance of the stream.
2013/14	River Thames flooding of Purley on Thames.

Environment Agency Flood Map

The Environment Agency also produces a fluvial flooding map known as the Flood Map, which provides information on flood risk. The Flood Map for West Berkshire is provided in Figure 3-5.

Figure 3-5: Fluvial Flood Risk from Main Rivers



3.2.2 Flooding from the Land

Flooding from the land is also referred to as surface water flooding, pluvial flooding or flash flooding. This type of flooding occurs when high intensity rainfall is unable to enter local drainage networks or infiltrate into the ground due to the rate at which it is delivered resulting in runoff. The runoff flows over the surface of the ground following local topography and accumulates in low lying areas. It is usually associated with thunderstorms and can be exacerbated when the ground is saturated or extremely dry or when the drainage network has insufficient capacity to cope with the additional flow.

Surface Water Flood History

Historical information on surface water flood risk has previously been captured by the Preliminary Flood Risk Assessment (PFRA) and the Strategic Flood Risk Assessment (SFRA). The most notable event within West Berkshire was in July 2007 which was predominately due to heavy rain falling on saturated ground.

Table 3-3: West Berkshire Surface Water Flooding Historical Records

Date	Event
July 2007	Following unseasonably wet months in May & June torrential downpours in July 2007 contributed to widespread flooding across West Berkshire affecting 2500 homes. The communities of Thatcham, Pangbourne, Bucklebury, Burghfield and Woolhampton were some of the worst affected locally. However almost all communities were affected due to the intensity and widespread nature of the rainfall.
2016	Flooding within Newbury primarily affecting the railway station.

Table 3-4 presents the results of Parish Council reports, based on local information, undertaken in August 2007 to establish the numbers of properties that experience flooding in July of that year.

Table 3-4: Number of Properties Flooded in July 2007

Location	Number of properties
Thatcham	1107
Newbury	151
Pangbourne	123
Woolhampton	56
Lambourn	46

Flooding in July 2007 was exacerbated by blocked culverts, pipes and poorly maintained watercourses. A number of commercial buildings, schools and areas of agricultural land were also flooded. Within a number of parishes the flooding lasted for three days causing major property damage. Other parishes were subject to flash flooding of between half an hour and three hours.

In addition to residential property flooding, infrastructure and several key services were flooded during the 2007 floods, including:

- AWE Burghfield, which experienced on-site flooding, but it did not pose a risk to the public or interfere with operations.
- The headquarters of Vodafone, were badly flooded causing considerable disruption to business operations.
- The railway tracks at Newbury Station and Aldermaston Station, were flooded resulting in the main line between London and Penzance being closed for 24 hours.

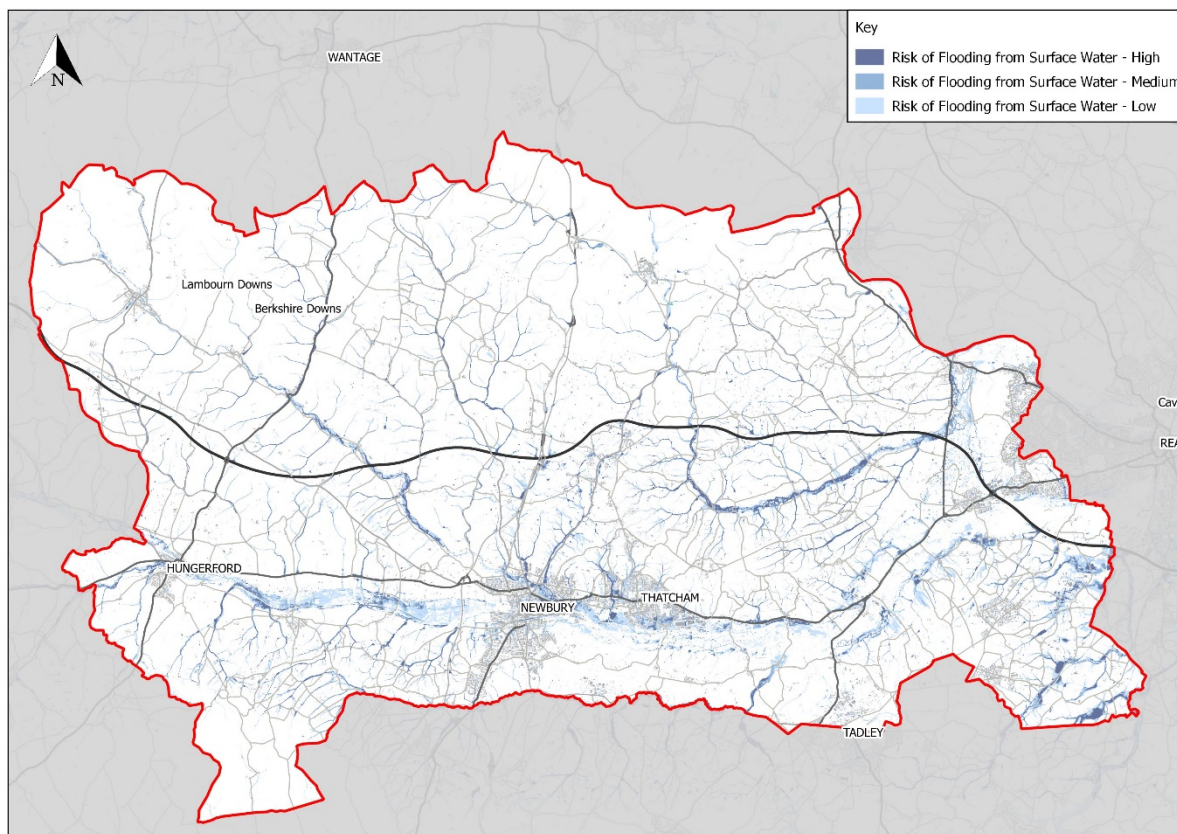
A small number of commercial buildings were also badly flooded in Thatcham and Newbury, although there is no precise information on the resulting economic losses.

Two schools were flooded within the District. Aldermaston Primary School in Aldermaston suffered internal flooding to a depth of 600mm, and Trinity Secondary School in Newbury, where the playing fields and car park were flooded by fast moving surface water flows of up to 300mm in depth.

Flood Map for Surface Water

The Environment Agency produces mapping of the estimated extent of flooding from surface water in its Risk of Flooding from Surface Water (RoFSW) map. The RoFSW provides an overview of the potential for surface water flooding throughout West Berkshire for the 1 in 30 year, 1 in 100 year and 1 in 1000 year storm events (Figure 3-6).

Figure 3-6: Risk of Flooding from Surface Water Map



Thatcham Surface Water Management Plan

The Thatcham Surface Water Management Plan (SWMP) was undertaken in 2010. The SWMP provided more detailed modelled information and identifies options for managing surface water within the Thatcham area. The modelling confirms that the surface water flows in Stoney Lane adjacent to the main entrance into Kennet School, was potentially life threatening. This concurs with anecdotal and photographic evidence from the 2007 flood events.

West Berkshire Council have been working on taking forward the Action Plan from the SWMP since its completion and have implemented several Flood Alleviation Schemes as part of this.

3.2.3 Flooding from the Ground

Flooding from the ground occurs when groundwater levels rise above the ground surface. Flooding of this type tends to occur in the winter and/or spring after long periods of sustained heavy rainfall on catchments with permeable geology (e.g. Chalk) and can last for several days, weeks or even months. The location and extent of groundwater flooding is difficult to predict. The areas most at risk are often low-lying areas where the water table is more likely to be at a shallow depth. Flooding can be experienced through water rising up from the underlying aquifer or from water flowing from springs.

High groundwater levels can also lead to water entering sewers through infiltration which causes them to surcharge potentially exacerbating flooding from the sewer network.

Groundwater Flood History

West Berkshire experiences this type of flooding along the chalk downs where intermittent streams and bournes are activated. Groundwater flooding was experienced in 2000/2001 when sustained periods of heavy rain caused groundwater levels to rise. Flooding was experienced in Great Shefford, Compton and Hampstead Norreys. Landscaping and culverting of groundwater fed watercourses running through Great Shefford and Compton has worsened problems, and blockages and lack of maintenance of the river bed made matters worse in Hampstead Norreys. Groundwater flooding also occurred in Pangbourne in 2000 where the Sulham Brook is also groundwater fed.

Table 3-5: West Berkshire Groundwater Flooding Historical Records

Date	Event
2000	Lambourn Downs flooded due to filling Aquifers. This lasted from Oct 2000 – Mar 2001 (ground water flooding)
2001	Ground Water flooding of Great Shefford, Compton and Hampstead Norreys (properties affected)
2014	Groundwater flooding across West Berkshire due to persistent winter rain causing internal flooding to properties.

3.2.4 Flooding on the Highway

Highway flooding can be defined as flooding caused by drainage systems being overwhelmed by heavy rainfall. This causes overflowing from blocked drains and gullies causing water to pond on the carriageway.

In accordance with Government guidance (Design Manual for Roads and Bridges), new highway drainage systems are designed to a 1 in 5 year storm. Storms greater these design events may exceed the capacity of the drainage system resulting in overland flows and localised flooding.

3.2.5 Flooding from Sewers and Drains

Sewer flooding occurs when the sewer network is overwhelmed with the volume of water that it is taking. It can happen at times of heavy rainfall when large amounts of surface water overcome the sewer network. It may also occur when the sewer discharges into a watercourse that is already in flood causing a backwater effect in the drainage system. Problems such as blockages, siltation, collapses and equipment or operational failure can also result in sewer flooding.

Given the dense, urban character of larger town centres in West Berkshire, it is inevitable that localised flooding problems will arise from under capacity drainage and sewer systems. In addition, there is mounting pressure on ageing systems as a result of climate change. In accordance with current Government guidance, sewer systems are designed to cater for the 3.33% (1 in 30) storm and highway soakaways are designed for 10% (1 in 10) storms. Storms greater than these design events will overwhelm the drainage system and result in uncontrolled overland flow which may result in localised flooding.

Combined sewer systems or erroneously connected foul drains to surface water sewers can give rise to flood waters contaminated with sewage.

Flooding can also occur by groundwater ingress into the sewer network resulting in overloading and flooding.

Thames Water collect and record incidents of sewer flooding in a DG5 register. Data from the DG5 register presented in the Strategic Flood Risk Assessment (SFRA) indicates that sewer flooding has occurred more in the eastern areas of West Berkshire and within Newbury.

3.2.6 Flooding from Canals, Reservoirs and Burst Water Mains

Canal and reservoir flooding occurs when there is a complete or partial failure of the canal or reservoir embankment or structure. This type of flooding may be caused by seepage erosion, overtopping of the canal or reservoir embankment or accidental damage to containment structures.

Burst water mains occur when water supply pipes are either disturbed during excavations or due to the degradation of water supply pipes.

These types of flood event are very rare. Canals, reservoirs and water supply and distribution networks are regularly inspected and maintained in order to ensure their continued safe operation. However, in the event of failure they could give rise to the sudden escape of large volumes of water.

Large areas of Newbury are at risk of flooding from the River Kennet and the Kennet and Avon Canal. Both share a perched channel which sits above the surrounding floodplain in places. The raised channel means that flood water cannot drain back into the river easily; therefore the potential flooding could last for a long time.

In addition, the River Kennet and Kennet and Avon Canal are fed by groundwater from the surrounding chalk which may exacerbate the river flooding. The predicted long flood duration and the raised channel banks mean that even a small amount of overspill into the adjacent floodplain would have the potential to cause flooding to large areas affecting many properties.

There are very few records of the Canal causing flooding. The SFRA reports that the Kennet and Avon canal has flooded during times of very heavy rainfall and the floodwater has inundated the *Cunning Man* public house on Reading Road, Burghfield.

Reservoir flood maps have been produced by the Environment Agency for large reservoirs (>25,000 cubic metres of water). Flood maps are not displayed for smaller reservoirs and details of flood depth and flow are not given. In West Berkshire there is one reservoir identified on the mapping at Aldermaston Court Lake to the south of Aldermaston.

3.3 Assessment of Flood Risk

Flooding is a natural phenomenon and process integral to the long term health of river systems. Risk from flooding arises when the probability of a flood results in a consequence for a sensitive receptor.

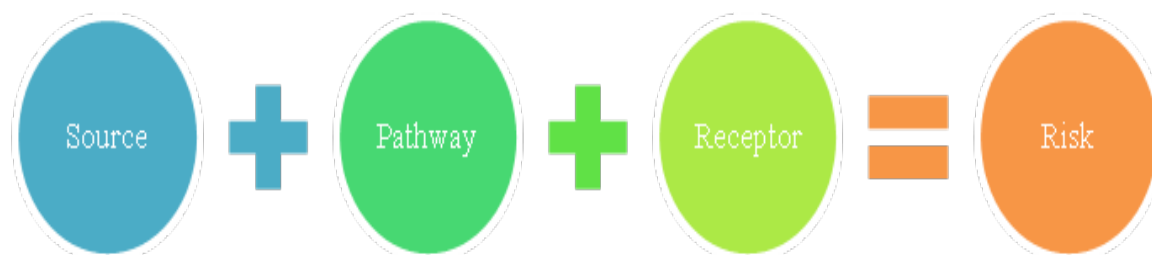
This is often expressed by the following model:



When assessing risk and determining risk management approaches, flooding is commonly considered in the context of the Source Pathway receptor model.

The Source, Pathway Receptor model specifies that in order for there to be a 'Risk' there must be a link ('pathway') between a 'source' (type of flooding) and a 'receptor' (people, homes, businesses).

Furthermore, the model stipulates that the risk can be removed if any one element (the source, pathway or receptor) of the model is removed.



These models can be demonstrated by the example of groundwater flooding in West Berkshire.

Parts of West Berkshire are underlain by a major aquifer in the Chalk which presents a flood source. The probability of flooding occurring from the Chalk is associated with the occurrence of periods of heavy, sustained rainfall giving rise to groundwater levels in the Chalk rising.

The pathway for groundwater flooding is the emergence of groundwater at the ground surface, affecting receptors, which in this case are the homes and residents of West Berkshire.

As can be seen from the information presented in this LFRMS, the risk to residents of West Berkshire from groundwater flooding is not the same. In some areas of West Berkshire there is no Chalk aquifer (i.e. no **source**), in other areas the Chalk is present but does not appear at the ground surface (i.e. no **pathway**) and finally across many areas of West Berkshire there is no development and no residents (i.e. no **receptor**).

Therefore for a risk from groundwater to be realised there must be a **receptor** (home and/or resident) located in an area of West Berkshire which is underlain by the Chalk (**source**), which is present at the ground surface and has been subject to prolonged and sustained heavy rainfall leading to rising groundwater levels (**pathway**).

3.4 Factors Influencing Flood Risk

The magnitude and effects of flooding can be made worse by climatic / meteorological factors, hydrological processes and land use / asset management. It is highly unlikely that any single factor will be solely responsible for influencing flood risk however some may be more significant than others. Similarly the influence of a factor will vary according to the type of flooding.

Meteorological Factors

Meteorological factors influencing flooding in West Berkshire include:

- the intensity of rainfall events / storms,
- the duration of rainfall events / storms,
- snowfall and snowmelt
- scale of storm systems

Hydrological Processes

Hydrological processes influencing flooding in West Berkshire include:

- Soil moisture level,

- Groundwater levels,
- Surface infiltration rate which is affected by vegetation, soil texture, density, structure and soil moisture,
- Presence of impervious cover such as snow and ice,
- Channel cross-sectional shape and roughness,
- Presence or absence of over bank flow, channel network, and
- Synchronization of run-offs from various parts of watershed.

Human Factors

Human factors influencing flooding in West Berkshire include:

- Land-use activities such as urbanisation increase run-off volume and rate
- Occupation of the flood plain obstructing flows
- Structural flood control measures such as embankments
- Greenhouse gas emissions which may affect climate change and frequency and magnitude of precipitation events;
- Decrease in conveyance of the river channels owing to build up of river debris, restriction of waterways, dumping of mineral, wastes and rubbish;
- Mining and other industries alter water regimes, pollute water channels and affect ecosystems; can also alter water courses
- Poor or inadequate maintenance of drainage systems and networks

Climate Change

Over the past century the UK has witnessed sea level rise and more of our winter rain falling in intense wet spells. Whilst seasonal rainfall is highly variable and some of the changes might reflect natural variation; the broad trends are in line with projections from climate models.

The UKCP18 is an update on the previous UKCP09 bringing together predications from the latest climatic modelling from the Met Office and around the world. This offers both an opportunity to understand how the climate has changed but also predicts climatic changes based on a range of climatic futures depending on estimates of greenhouse gas concentrations in the atmosphere.

The climatic data shows that within the UK there was an average temperature of 0.3°C between 2008-2017. Furthermore, all of the top ten warmest years on record have occurred since 1990. It is projected that this trend will continue with a shift towards warmer, wetter winters and hotter, drier summers, subject to natural variations.

UKCP18 reports that there has been an increase in annual average rainfall over the UK over the past decades. The most recent decade (2008–2017) there has been, on average 11% wetter than 1961–1990 and 4% wetter than 1981-2010. It is anticipated that this increase in rainfall will have an impact on flood risk across the country as well as drought conditions.

The findings of the UKCP18 have been incorporated into the Governments climate change allowances which are provided in the Planning Practice Guidance (PPG).

4 Local Flood Risk Management Roles and Responsibilities

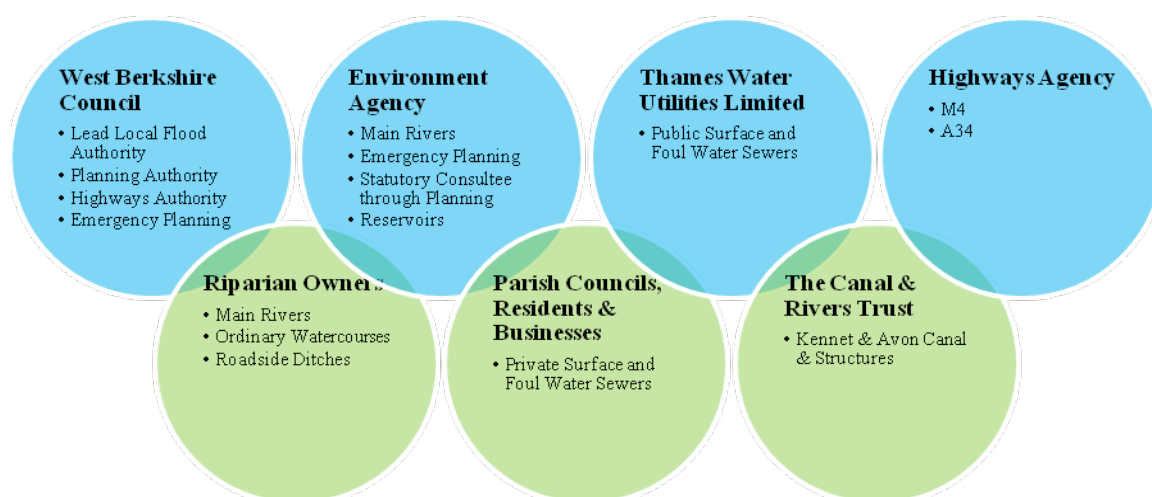
Section 9(a) of the FWMA 2010 requires this Strategy to specify the Risk Management Authorities in West Berkshire and the management functions that those Risk Management Authorities may exercise (Section 9(b)). The FWMA also imposes a duty on Lead Local Flood Authorities to cooperate with other Risk Management Authorities. This section of the LFRMS identifies the roles and responsibilities of the LLFA and Risk Management Authorities in West Berkshire and how they cooperate in the management of local flood risk.

There are several bodies operating within West Berkshire in the delivery of flood risk management. These bodies can be defined as:

- Flood Risk Management Authorities (as defined by the FWMA 2010), and
- Flood Risk Management Partners

These are distinguished in Figure 4-1 with their roles and responsibilities defined in the following sections.

Figure 4-1: West Berkshire Flood Risk Management Authorities and Partners and their responsibilities



4.1 Risk Management Authorities

4.1.1 West Berkshire Council

The Flood and Water Management Act 2010 designates West Berkshire Council as a Lead Local Flood Authority, which now has the following responsibilities, duties and powers:

LLFA Responsibilities

- develop, maintain, apply and monitor a Local Flood risk Management Strategy (LFRMS) (Section 9);
- consult the public and local risk management authorities on its LFRMS (Section 9);
- establish and maintain 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 (Section 21);

Flood Risk Assets are structures or features which are considered to have a significant effect on flood risk.

The LLFA is required to keep both an asset record (for use by risk management authorities) and an asset register (available for inspection by the public at all reasonable times).

- setup an overview/scrutiny committee to oversee the flood risk management functions or coastal risk management functions of the local authority's area (Schedule 2).

LLFA Duties

- Investigate flooding incidents (Section 19);

The aim of a Flood Investigation Report is to identify the Risk Management Authorities that have relevant functions with respect to the flood and to determine if those functions have been or are proposed to be exercised.

In addition the investigations may collate all useful information, providing an understanding of why and how the incident occurred and outline potential solutions and flood risk management actions.

Investigations will involve consultation with the relevant risk management authorities, landowners and private organisations involved. Details of when WBC will investigate incidents of flooding are provided in Appendix 3.

- Co-operate with other Risk Management Authorities (RMA) (Section 4 & 11).

LLFA Powers

- Consent works on ordinary watercourses (Section 23);

In April 2012, the regulation of ordinary watercourses passed to the LLFA to ensure that flood risk is managed appropriately.

The regulation consists of two elements:

- Issuing of Consents for any changes to ordinary watercourses that might obstruct or alter the flow of an ordinary watercourse;
- Enforcement action to rectify unlawful and potentially damaging work to a watercourse

Riparian owners will now have to apply for consent from the Lead Local Flood Authority for works which may affect the flow of water within an ordinary watercourse.

- Designate 3rd party assets that affect flood risk and give notice to owners that they have been adopted (Schedule 1);

The Flood and Water Management Act enables the LLFA to 'designate' features or structures where the following four conditions are met:

- The designating authority thinks the existence or location of the structure or feature affects a flood risk;
- The designating authority has flood risk management functions in respect of the risk which is affected;
- The structure or feature is not designated by another authority; and
- The owner of the structure or feature is not a designating authority.

If an asset becomes 'designated' its owner cannot alter or remove it without first consulting the designating risk management authority.

The aim of designating flood risk assets is to safeguard them against unchecked works which could increase flood risk in the area. An individual may appeal against a designation notice, refusal of consent, conditions placed on consent or an enforcement notice.

- Request information from Risk Management Authorities (Section 14);
- Do works relating to groundwater and surface water flooding (Schedule 2); and,

In December 2014 the government announced that Schedule 3 of the Flood and Water Management Act would not be enacted at this time. Therefore, LLFAs would not be required to establish SuDS Approving Bodies (SABs).

Instead, the government set out changes to planning that would apply for major development from 06 April 2015. This change confirmed that in considering planning applications, Local Planning Authorities (LPA) should consult the relevant Lead Local Flood Authority (LLFA) on the management of surface water; satisfy themselves that the proposed minimum standards of operation are appropriate and ensure through the use of planning conditions or planning obligations that there are clear arrangements in place for ongoing maintenance over the lifetime of the development.

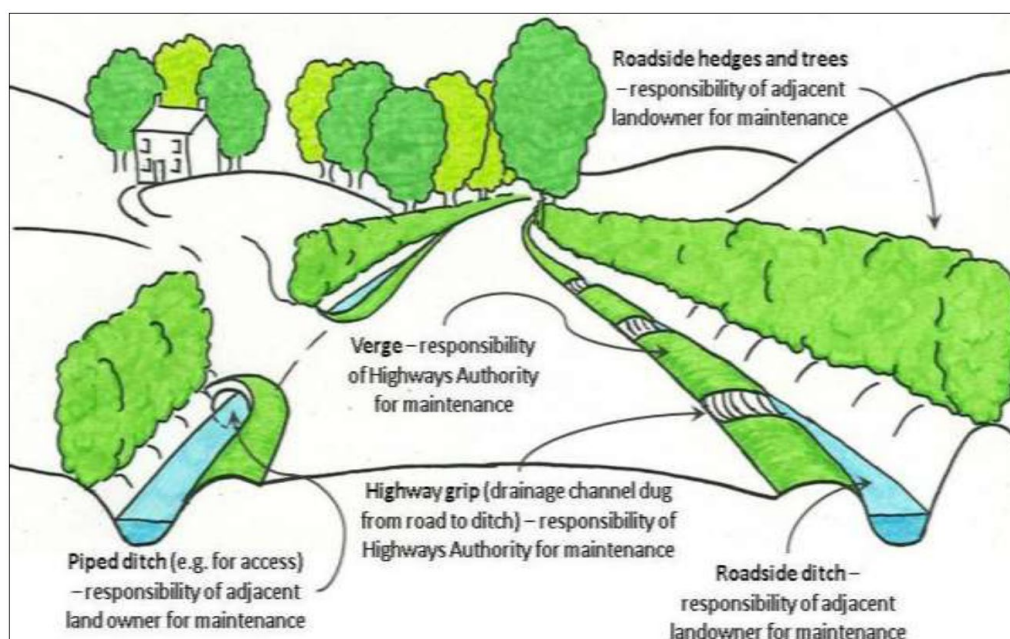
West Berkshire Council as Highway Authority

West Berkshire Council is also the Highway Authority and has the following responsibilities:

- Responsibility to maintain highways, including ensuring that highway drainage systems are clear and that blockages on the highway are cleared, this is a duty under the Highways Act.
- Powers to deliver works that they consider necessary to protect the highway from flooding. These works can either be on the highway itself or on land which has been acquired by the Highway Authority in the exercising of highway acquisition powers.
- The Highway Authority may divert parts of watercourses or carry out any other works on any form of watercourse if it is necessary for the construction, improvement or alteration of the highway or provides a new means of access to any premises from the highway.

Figure 4-2 illustrates the division of ownership and maintenance responsibilities for highways drainage in rural areas. Figure 4-3 presents similar information where areas are served by piped systems.

Figure 4-2: Ditch Ownership and Maintenance Responsibilities



As the Highway Authority, WBC's management of highways and their associated drainage could impact on local flood risk. This interaction between the potential runoff from highways or flooding to highways can also be used to improve local flood risk issues by directing water away from properties.

The LLFA and the Highway functions of the Council work together to ensure that their planning functions operate effectively together and consider potential solutions and issues at the local level.

West Berkshire as the Planning Authority

West Berkshire Council is also the Planning Authority and is responsible for preparing local development plans and for determining individual planning applications in line with national and local planning policy. WBC has overall responsibility for determining where new development will be located. They have a responsibility to ensure that flood risk is taken into account through the planning process by providing clear guidance and policies in relation to flooding.

As the Planning Authority, WBC has the opportunity to implement strategic development proposals that avoid development in areas of flood risk and ensure adequate and appropriate provision is made as part of new developments for surface water management.

The LLFA and the Planning Authority functions of the Council will need to work together to address some flooding issues. Particularly in the role of West Berkshire Council as a statutory consultee to planning in relation to surface water flood risk.

West Berkshire Council Emergency Planning

West Berkshire Council has a duty under the Civil Contingencies Act 2004 to have plans in place with respect to 'Risks in the Community'. Compliance is provided by the Council's Major Incident Plan and with respect to flooding risks through the Adverse Weather Plan and the annex relating to flooding.

The Council also has a duty to warn and inform the community – before, during and after a Major Incident. In the case of flooding, this is normally undertaken by communicating with Community Emergency/Flood Wardens, where they exist, Town and Parish Councils and Ward Members. In addition, the website and other communications means can be used.

Some communities have written Community Emergency Plans with a flood response element in them. Other communities do not have plans written or have no process in place. There is therefore a gap in community engagement and in support for flooding incidents across the Valley which this Plan needs to address.

4.1.2 Environment Agency

The Environment Agency has a national strategic role and local operational role in relation to flood risk management.

National Strategic Flood Risk Management Role

The Flood and Water Management Act requires the Environment Agency to publish the National Strategy. The National Strategy is then used by LLFAs as a basis for their LFRMS. The National Strategy aims to define and understand the roles and responsibilities of risk management authorities and to provide information to communities at risk.

The National Strategy identifies the following strategic actions for the Environment Agency:

- Use Strategic Plans such as the Catchment Flood Management Plan (CFMP) and the Shoreline Management Plan to set the direction of Flood Risk Management;
- Support the creation of Flood Risk Regulation by collating and reviewing the assessments, plans and maps that LLFAs produce;
- Provide data, information and tools to inform government policy and aid risk management authorities in delivering their responsibilities;
- Support collaboration, knowledge-building and sharing of good practice including provision of capacity-building schemes;
- Manage the Regional Flood and Coastal Committees (RFCCs) and support their decisions in allocating funding for flood defence and flood resilience;
- Report and monitor on flood and coastal erosion risk management; and
- Provide grants to risk management authorities to support the implementation of their incidental flooding or environmental powers.

The draft National Strategy will update these strategic overviews to:

- Provide national data, information and tools on flooding and coastal change, to be shared publicly, appropriate for the decisions that risk management authorities need to make in helping everyone understand the risks we're managing;
- Lead effective partnerships that enable place-shaping, to manage flooding and coastal change;

- Provide timely and effective information and warnings;
- Exercise a general supervision of flooding and coastal change in England;
- Leading flooding and coastal change as part of broader climate resilience contributing to integrated solutions to the environmental and societal challenges the nation faces;
- Overseeing the collaboration, sharing and monitoring between flooding and coastal change infrastructure owners; and
- Providing reporting and assurance that the final strategy's objectives and measures are being progressed.

Local Operational Role

The Environment Agency's Local Operational Role includes emergency planning, advising on planning applications and managing flooding from main rivers and reservoirs.

Emergency Planning

The Environment Agency, as part of their role in emergency planning, contributes to the development of multi-agency flood plans. These are developed by local resilience forums to help the organisations involved with responding to a flood work efficiently together.

To help provide better warning to organisations, the media and the public the Environment Agency also works with the Met Office in the Flood Forecasting Centre.

Planning Process

In 2006 the Environment Agency were made statutory consultee for all planning applications in areas where there is a risk of flooding and for any site greater than 1 hectare in size. The Environment Agency will provide advice on flood risk and help the local planning authority to technically interpret developer's Flood Risk Assessments that have been submitted. In April 2015, changes to the planning process changed the responsibility of surface water flooding to the LLFA so the Environment Agency are now only consulted on application within the Flood Zones (flood risk from rivers and the sea) and sites greater than 1ha.

Main Rivers

Main Rivers are watercourses shown on the Statutory Main River Map held by the Environment Agency and Defra. The Environment Agency has permissive powers to carry out works of maintenance and improvement on Main Rivers. This can include any structure or appliance for controlling or regulating flow of water into or out of the channel. The overall responsibility for maintenance of Main Rivers lies with the riparian owner.

The Environment Agency can bring flood defence schemes forward through the Regional Flood and Coastal Committees, and it will work with lead local flood authorities and local communities to shape schemes which respond to local priorities.

The Environment Agency are also the regulating authority with regards to consenting works carried out by others, in, under, over or within 8 metres of a main river in accordance with the Water Resources Act 1991 and the Thames Region Land Drainage Byelaws.

Reservoirs

The Environment Agency enforce the Reservoirs Act 1975, (amended within the FWMA 2010), which is the safety legislation for reservoirs in the United Kingdom. The Environment Agency is responsible as the Enforcement Authority in England and Wales for reservoirs that are greater than 25,000m³

(amended to 10,000m³ in Flood and Water Management Act but is yet to be enacted). As enforcement Authority the Environment Agency must ensure flood plans are produced for specified reservoirs. However the responsibility for carrying out work to manage reservoir safety lies with the reservoir owner/operator who should produce the flood plans.

4.2 Thames Water Utilities

The water industry is highly regulated and the quality of customer service and the prices they are able to charge their customers are regulated by the Water Services Regulation Authority (WSRA), commonly known as Ofwat. Sewerage companies have a general duty (under Section 94 of the Water Industry Act 1991) to provide, extend and improve the public sewer system to ensure that their areas are, and continue to be, effectually drained.

The Water Industry Act 1991 Part IV states:

94 *General duty to provide sewerage system.*

(1) *It shall be the duty of every sewerage undertaker—*

(a) *to provide, improve and extend such a system of public sewers (whether inside its area or elsewhere) and so to cleanse and maintain those sewers [and any lateral drains which belong to or vest in the undertaker] as to ensure that that area is and continues to be effectually drained; and*

(b) *to make provision for the emptying of those sewers and such further provision (whether inside its area or elsewhere) as is necessary from time to time for effectually dealing, by means of sewage disposal works or otherwise, with the contents of those sewers.*

Ofwat enforces this duty. Ofwat only collects detailed information from companies about internal flooding of properties. This is defined as “...flooding which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes....”. This includes garages which are integral to the property but not detached garages.

Companies report annually to Ofwat the number of properties affected by internal flooding from sewers. This is apportioned between:

- properties flooding because of overloaded sewers; and
- properties flooding from other causes, typically blockages, including equipment failures (e.g. pumping stations) and collapsed sewers.

Since 1995 companies have been required to report properties at risk of internal flooding once in every ten years. These are often referred to as the 2 in 10 and 1 in 10 registers. In reporting the numbers on these two registers, companies provide figures showing the numbers added to, and removed from, these registers. Data on external sewer flooding is not routinely collected.

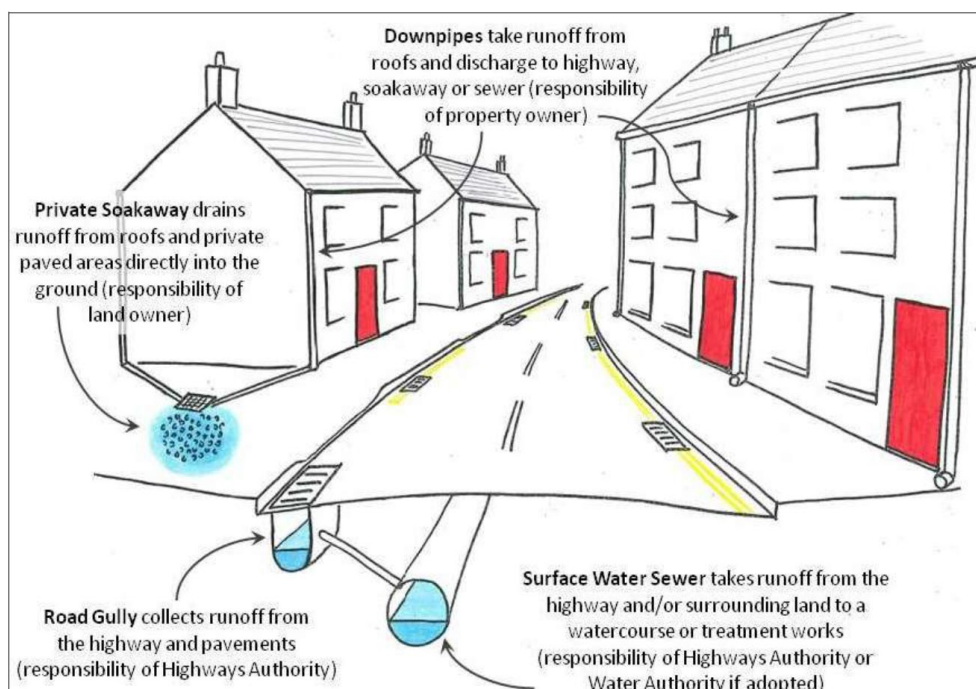
Thames Water has the following responsibilities around flood risk management

- Respond to flooding incidents involving their assets;
- Maintenance of a register of properties at risk of flooding due to hydraulic overload in the sewerage network (DG5 register)
- Provide, maintain and operate systems of public sewers and works for the purpose of draining an area;

- Have a duty to co-operate with other relevant authorities in the exercise of their flood risk management functions;
- Must have a regard to national and local flood risk management strategies; and
- Non-statutory consultee to the planning process when new development may affect existing public sewers.

Figure 4-3 illustrates the complexities associated with ownership and maintenance of the sewer network (both public and private).

Figure 4-3: Drainage Network Ownership and Maintenance Responsibilities



The DG5 Register

All water and sewerage companies maintain a register of properties at risk of flooding due to hydraulic overload in the sewerage network; this is known as the DG5 register and part of the set of Ofwat DG (Director General) Indicators.

The DG5 Register is a register of properties and areas that have suffered or are likely to suffer flooding from public foul, combined or surface water sewers, due to the system being overloaded. For a sewer to be classified as over-loaded the flow of a storm is unable to pass through it due to a permanent problem not due to problems such as blockage, siltation or collapse. When a solution is in place to rectify the overloading a property or area is removed from the register.

Tackling Sewer Flooding

As part of the obligation to Ofwat, sewerage companies are required to undertake capacity improvements to alleviate sewer flooding problems on the DG5 register during the current Asset Management Period (2010 – 2015) with priority being given to more frequent internal flooding problems.

4.3 Highways Agency

The Highways Agency is an Executive Agency of the Department for Transport (DfT), and is responsible for operating, maintaining and improving the strategic road network in England on behalf of the Secretary of State for Transport.

Within West Berkshire the Highways Agency is responsible for highways drainage associated with the M4 and A34.

The Highways Agency has the same obligations to co-operate on flood risk issues as the Highway Authority. It also has the following responsibilities under other legislation:

- Responsibility to maintain highways, including ensuring that highway drainage systems are clear and that blockages on the highway are cleared, this is a duty under the Highways Act and therefore strategic highways are inspected and maintained regularly.
- Powers to deliver works that they consider necessary to protect the highway from flooding. These works can either be on the highway itself or on land which has been acquired by the Highway Authority in the exercise of highway acquisition powers.
- The Highway Authority may divert parts of watercourses or carry out any other works on any form of watercourse if it is necessary for the construction, improvement or alteration of the highway or provides a new means of access to any premises from the highway.

4.4 Flood Risk Management Partners

4.4.1 The Canal and Rivers Trust

The Canal and Rivers Trust is a charity organisation managing the Kennet and Avon Canal which runs through West Berkshire from West to East. The Canal and Rivers Trust is not a risk management authority within the definition of the FWMA. However the Kennet and Avon Canal forms a significant part of the water management system within West Berkshire.

4.4.2 Riparian Owners & Landowners

Whilst not designated as Risk Management Authorities; Riparian Owners are integral in ensuring the rivers, streams and ditches throughout West Berkshire operate efficiently to mitigate flooding.

Landowners and householders whose properties are adjacent to or border a river, stream or ditch are likely to be riparian owners with responsibilities for the maintenance of the watercourse to ensure it can receive water from land upstream of their property.

They have the responsibility for maintaining the bed and banks of the watercourse and ensuring there is no obstruction, diversion or pollution to the flow of the watercourse. Any works to the watercourse will need consent from either the Environment Agency (if Main River) or the LLFA (if an Ordinary Watercourse).

Riparian owners have a right to protect their property from flooding but in most cases will need to discuss the methods of doing this with the Environment Agency, LLFA or Local Authority.

4.4.3 Parish Councils

Parish Councils have no formal duties in the management of flood risk, however they have an important role to play in establishing local groups and developing community flood plans. Parish Councils can recruit Community Flood Wardens who help to support and prepare the community for flood events. They can also assist in identifying and reporting flood risk issues and vulnerable residents that may require special help.

Throughout West Berkshire, Parish Councils have been integral in establishing and contributing to the:

- Thatcham Flood Forum
- Pang Valley Flood Management Plan, and

- Lambourn Valley Flood Management Plan.

Therefore also a number of information flood action groups throughout the district.

4.4.4 Residents and Businesses

Responsibility for protecting individual properties from flooding lies in the first instance with the property owner. While in some circumstances other organisations or property owners may be liable due to neglect of their own responsibilities, there will be many occasions when flooding occurs despite all parties meeting their responsibilities. It is therefore vitally important that householders and businesses whose homes and premises are at risk of flooding, take the following steps to ensure the impact to their home reduced:

- Check whether their property is at risk of flooding from any sources;
- Ensure that they are prepared in the event of a flood;
- Take measures to ensure that the impact of flooding to their property is reduced, either through permanent measures or temporary measures; and
- Where possible take out flood insurance.

Information on whether households are at risk can be obtained from the Environment Agency and the Local Authority. All households in Flood Zone 2 and 3 (areas at risk from fluvial flooding from a main river) should have been contacted, to notify them of this and, unless they have chosen to opt-out, will receive flood warnings from the Environment Agency when the risk of Main River flooding is high. Information can also be found on the gov.uk website: <https://flood-map-for-planning.service.gov.uk/> and the Flood Alerts page on Facebook: <https://www.facebook.com/FloodAlerts/>

Information about surface water flood risk is published by the Environment Agency at the following website: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>.

The Environment Agency provides information on what to do to prepare a property for emergencies. This includes how to make a flood plan which will help occupants to decide what practical actions to take before and after a flood. Refer to the Environment Agency's Website for further details

Another useful reference for residents and businesses are the National Flood Forum's Blue Pages Directory which provides information and advice on what products are available to help protect homes or businesses against flooding.

4.5 Risk Management Authority Cooperation & Communication

4.5.1 Berkshire Five Strategic & Technical Group

The FWMA requires Risk Management Authorities to work together and cooperate on flood risk management. As part of this commitment to cooperate West Berkshire Council has played an active role in setting up and working with other LLFAs within the Berkshire and Hampshire area.

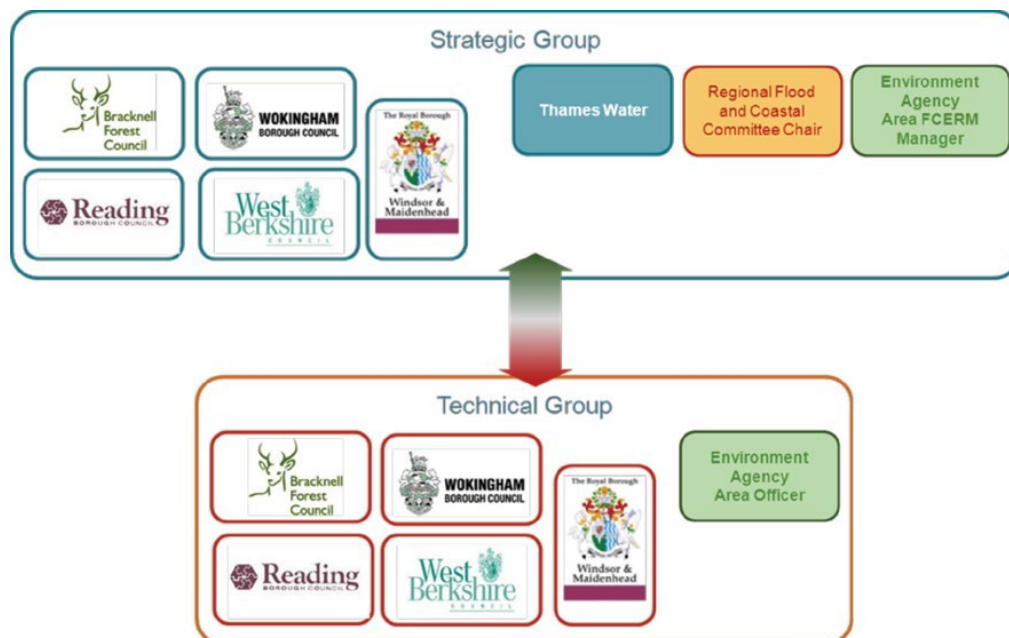
The Berkshire Five Technical Group was set up to facilitate discussions on the implementation of the FWMA and to share best practice. The Group consists of five of the Berkshire Unitary Authorities, these are:

- Bracknell Forest Council (BFC);
- Reading Borough Council (RBC);
- Royal Borough of Windsor and Maidenhead (RBWM);
- West Berkshire Council (WBC); and

- Wokingham Borough Council (WBC).

N.B. Slough Borough Council has aligned itself with South Buckinghamshire Council due to the local drainage catchments.

Figure 4-4: Berkshire Five Strategic and Technical Group



There are two separate groups (Figure 4-4). The Strategic Group comprises heads of department within the LLFA, Thames Water, the Environment Agency and the Chair whom is a representative of the Thames Regional Flood and Coastal Committee. The Strategic Group set the direction and guide the work of the Technical Group.

The Technical Group is comprised of officers within the LLFA which aim to discuss the technical aspects of how the Floods and Water Management Act will be implemented. The Technical Group provides information and suggests approaches to the implementation of the FWMA for decisions at the Strategic Group.

4.5.2 West Berkshire Council Overview and Scrutiny Committee

Engagement and cooperation within WBC to expedite implementation of the requirements of the FWMA is facilitated by the Overview and Scrutiny Committee. This is comprised of elected Members from within WBC representing the departments / functions considered critical for the successful implementation of the FWMA

5 Measures to Reduce and Manage Flood Risk

Section 9(c) of the Flood and Water Management Act requires a LFRMS to specify the objectives for managing local flood risk. In addition the LFRMS is required to specify the measures proposed to achieve those objectives (Section 9(d)) and how and when those measures are expected to be implemented (Section 9(e)).

This chapter of the LFRMS identifies the local flood risk management measures already identified through various programmes implemented by West Berkshire Council and the progress made towards implementing those measures. The chapter presents a single definitive list of objectives (taking account of objectives identified through other studies), the measures to address those objectives and combines them into an Action Plan for implementation.

5.1 Existing Local Flood Risk Management Measures

Whilst one of the aims of this strategy is to identify what flood measures can be used to manage flood risk it is also important to consider what measures have already been considered and successfully implemented within West Berkshire.

A number of actions have been undertaken within West Berkshire to identify and alleviate future flooding incidents, identified in the following sections. These include monitoring, communication strategies, assessments and implementation of flood alleviation measures.

5.1.1 Flood Risk Monitoring

A network was set up by the Environment Agency to predict groundwater flooding from Chalk aquifers. When groundwater levels in the boreholes reach a given depth, warnings are triggered and issued to WBC and other agencies. The Environment Agency can use these levels to calculate how many days it will take before a known flood level is reached that could give rise to groundwater flooding.

Despite groundwater flood warning and management procedures being in place for locations with a history of groundwater, there is still some uncertainty about the effectiveness and standards of protection offered across West Berkshire.

5.1.2 Flood Risk Management Communications

West Berkshire is committed to disseminating data, information and best practice to assist its residents and businesses better prepare for future flood events. To this end West Berkshire Council is engaged in a programme of communications to meet with other Risk Management Authorities, neighbouring local authorities and partners in flood risk management.

Table 5-1 presents a summary of the engagement mechanisms employed by West Berkshire Council.

Table 5-1: Existing Flood Risk Management Engagement Mechanisms

Method of Engagement	Frequency	Description
Berkshire 5 Partnership	Quarterly	Forum for discussion and dissemination of data, information and best practices between the 5 Berkshire Local Authorities
Direct parish contact	As required	A contact list for Parish planning groups is maintained and used to disseminate information through email and hardcopy.
'Meet the experts' training events	2 per year	Training sessions that are open to the public, parish planning groups, parish councils and the general public.
District/Parish conference	2 per year	This is a targeted conference for organised by the Council that covers many different issues.
Community planning newsletter	Once a year	This highlight planning successes, but could be used to raise awareness of flood risk issues within a planning context
Community council for Berkshire (CCB)	As required	This supports direct engagement with the community in the form of public meetings, circulating leaflets and support 'champions'
Attendance at Flood Forums	As required	Attendance at meetings for Thatcham, Lambourn Valley and Pang Valley Flood Forums with the Environment Agency and Thames Water to provide updates on flood risk and ongoing projects.

5.1.3 Flood Risk Management Assessments

In order to progress flood alleviation schemes and to obtain funding, studies into the causes and nature of flood risk are normally required. West Berkshire Council is active in developing its understanding of flood risk and using this information to inform the development of plans to alleviate flooding.

To ensure an ongoing programme of flood mitigation schemes West Berkshire identifies 'pipeline' projects as early as possible based on Section 19 Flood Investigations and takes these forward as studies as funding becomes available. Table 5-2 presents pipeline projects and ongoing and completed studies within West Berkshire.

Table 5-2: Current Flood Risk Management Studies

Project Stage	Scheme Name	Description
Pipeline	Memorial Fields FAS, Thatcham	Part of the Thatcham SWMP Action Plan.
	Colthrop Industrial Estate FAS, Thatcham	Not identified in the Thatcham SWMP. Further scheme to protect industrial areas in East Thatcham.
	Great Shefford FAS	Bypass channel to increase capacity of Great Shefford Stream through village.
	Grazeley Green FAS	Enhancement of watercourse network around Grazeley Green upstream of AWE Burghfield/
	Upper Lambourn FAS	Investigation into flooding from the head of the River Lambourn. Likely to be groundwater influences.
	Pang Valley Flood Study	Investigation into combined surface water and fluvial flood risk in Pangbourne.
	Newbury Railway Station	Investigation into surface water flooding of the Newbury Railway Station

	Thatcham PLP	Property Level Protection scheme to protect any remaining properties at risk of surface water flooding in Thatcham.
Studies	North Thatcham FAS	Study to identify and design a surface water flood alleviation scheme in North Thatcham
	East Thatcham FAS	Study to identify and design a surface water flood alleviation scheme in East Thatcham
Pending	Hampstead Norreys FAS	Funding awarded for by-pass channel through Hampstead Norreys to increase capacity of River Pang.
	Stanford Dingley FAS	Funding awarded for by-pass channel through Stanford Dingley to increase capacity of River Pang.
	Lambourn Central FAS	Flood mitigation proposals to dredge silt from the River Lambourn through the village of Lambourn

5.1.4 Completed Flood Alleviation Schemes

Following the completion of studies West Berkshire Council has applied for and/or been successful in its application for funding to implement physical measures to alleviate flooding. Schemes completed since the previous version on the LFRMS across West Berkshire are presented in Table 5-3.

Table 5-3: Flood Alleviation Schemes Pending implementation in West Berkshire

Completed Schemes	Completion date
Newbury Cemetery FAS	2013
Cold Ash FAS	2014
Eastbury FAS	2015
Lower Padworth PLP scheme	2015
Wellington Close and Cromwell Road PLP scheme	2015
Winterbourne FAS	2016
Boxford PLP scheme	2016
Tull Way FAS	2017
Waller Driver PLP scheme	2017
Purley-on-Thames PLP scheme	2019
Lambourn PLP scheme	2020
Floral Way FAS	2020
Dunston Park FAS	2020

5.2 West Berkshire Flood Risk Management Measures

The previous version of the LFRMS was the first to be completed by the Council following the designation of the Council as a Lead Local Flood Authority with responsibility for preparation of a Local Flood Risk Management Strategy. The objectives and measures therefore focussed on setting up processes and understanding risk. However, six years on, roles and responsibilities have been more clearly defined and West Berkshire Council have put processes in place for ongoing flood risk management across the district. Therefore, the focus of the objectives and measures set in this LFRMS move towards long term management of flood risk using an adaptive approach.

Specific measures for the Thatcham SWMP, Lambourn SWMP and the Pang and Lambourn Valley Flood Management Plans are contained within the Action Plans for those documents.

The following section identifies the measures to manage flood risk within West Berkshire to achieve the objectives of this strategy. These measures are also presented in Appendix A as an Action Plan for

5.2.1 Objective 1 - *Maintain and update understanding of flood risk within West Berkshire and increase public awareness.*

West Berkshire has already collected and captured a lot of data and information on flooding within the district. It is only through continuing to capture information from flood events and using this to obtain a better understanding of where the greatest local risk occur, the causes and who should be involved can WBC identify possible measures to reduce flooding.

Flood Investigations used to update knowledge

Depending on the severity, West Berkshire Council carry out Section 19 Flood Investigations of flood events that occur within the district. These reports have provided information on the local effects of flood events and the mechanisms of flooding and have been used to improve the understanding of local flood risk sources, issues and mechanisms and supplement applications for funding to implement flood alleviation schemes.

The flood investigations policy for West Berkshire is included as Appendix B.

Measure 1 - West Berkshire Council will use information from FWMA Section 19 Flood Investigations to inform their knowledge of flooding within the district.

Flood Records Database

Reports of flooding from residents are currently used as a potential trigger for Section 19 Flood Investigations. However, reports of more common place flooding are not necessarily recorded by the Council. Capturing this will help ensure a thorough understanding of flood risk in West Berkshire, for both Risk Management Authorities and local communities. Knowledge and understanding on flood risk will improve and change over time as new information comes forward and the effects of climate change are better understood. It is important to consider the types of information available and the limitations of this information in defining flood risk. Data and information of flood events is also held and updated by a number of different organisations.

Measure 2 - West Berkshire Council will create a Flood Records database based on resident reports.

Share Information through Flood Forums

Across West Berkshire there are several Flood Forums covering the highest risk and most populated parts of the district. These groups are led by local residents and provides a forum for sharing information and knowledge within the community. West Berkshire as the LLFA meets regularly with representatives to understand issues and concerns, share information about flood risk and to provide information on works programmes within the area. The Flood Forums are also attended by other RMAs within the district.

Measure 3 - West Berkshire Council will use Flood Forums to disseminate data and information on flood risk to assist these communities in maintaining up-to-date Flood Plans.

Support Education of Future Workforce

It is important to recognise that as a society we need to adapt to the changing climate and resulting increase in flood risk that this will begin. To achieve this will require a workforce of flood risk professionals equipped with the tools to adapt to this challenge. West Berkshire Council is well placed to support educational establishments in teaching young people about flood risk as part of their studies. This can be achieved through visits to schools, where requested, online information and working with Flood Forums.

Measure 4 - Where opportunities arise, West Berkshire Council will provide support to schools and colleges to increase awareness of flood risk support the next generation of flood risk professionals.

5.2.2 Objective 2 - Develop plans to reduce existing flood risk taking account of people, communities and the environment.

Appraisal, Assessment and Design of Flood Alleviation Schemes

Funding available for the implementation of flood alleviation schemes is not guaranteed. However, due to the lower revenues associated with the appraisal, assessment and design of flood alleviation schemes funding can be easier to secure.

West Berkshire Council recognises that the position with regards to funding can change and that the ability to rapidly deploy a scheme to alleviate flooding may be advantageous. The Council identifies potential schemes based on flood investigations at the earliest opportunities and begins reviewing potential funding streams from the outset.

This ensures that schemes are appraised, assessed and designed will result in a suite of schemes that can be 'taken off a shelf' as and when funding becomes available.

Measure 5 - West Berkshire Council will continue progressing the appraisal, assessment and design development of the flood alleviation schemes identified through existing and future investigations.

Securing Funding

In the past, West Berkshire Council has been successful in securing funding for numerous Flood Alleviation Schemes by working with partners across the district and developing a detailed understanding of the funding processes. However, the award of funding to implement flood alleviation schemes is not guaranteed. Schemes seeking government funding compete with each other on the basis of the maximum return provided for every pound invested. Schemes are considered more favourably where it can be demonstrated that additional (i.e. non-government) funding will contribute to the costs of a flood alleviation scheme.

In order to ensure all opportunities for partnership funding are explored for schemes; partners, communities and beneficiaries need to be made aware of the scheme and the timeline for the funding application. A coordinated partnership approach will be led by West Berkshire Council in applying for funding.

Measure 6 - West Berkshire Council will work with local RMAs and partners in flood risk management to actively apply for government funding to implement flood alleviation schemes and where necessary property level flood protection measures.

Consider Climate Resilience of Existing Schemes

Where possible, all of West Berkshire Council's Flood Alleviation Schemes are designed to include an allowance for climate change based on the national guidance at the time of design. However, climate change guidance routinely changes based on the latest research and predictions. To ensure that communities maintain continuing resilience to flood risk going forward, West Berkshire Council should consider the implications of evolving climate change predictions on their existing flood mitigation infrastructure to ensure it is robust. Where practicable, further works may need to be undertaken to infrastructure to improve the climatic resilience.

Measure 7 - West Berkshire will review existing Flood Alleviation Schemes against a range of climate futures, as these emerge, following guidance from central government.

5.2.3 Objective 3 - Identify and implement measures that aim to reduce existing flood risk

There are a number of mechanisms which can be used to reduce existing flood risk in West Berkshire. West Berkshire Council has a responsibility to deliver a number of these measures under the FWMA,

including investigating significant flood events, designating structures or features which contribute to flood risk management and maintaining a register of flood risk assets.

Flood Investigations

Flood Investigations will be undertaken in West Berkshire following a flood event which meets the criteria set out in the Council's flood investigation policy (see Appendix B). As part of each investigation a report will be produced detailing, amongst other criteria, the recommendations for future actions to reduce or mitigate flood risk.

Measure 8 - When undertaking Flood Investigations, West Berkshire Council will identify areas that require further studies or where alleviation measures could be used to reduce flood risk.

Flood Investigations

Flood Investigations will be undertaken in West Berkshire following a flood event which meets the criteria set out in the Council's flood investigation policy (see Appendix B). As part of each investigation a report will be produced detailing, amongst other criteria, the recommendations for future actions to reduce or mitigate flood risk.

Measure 8 - When undertaking Flood Investigations, West Berkshire Council will identify areas that require further studies or where alleviation measures could be used to reduce flood risk.

Designations

Under Schedule 1 of the FWMA West Berkshire Council has the power to designate a privately owned structure or feature which contributes to the management of flood risk at a particular location. Designation prevents a feature or structure being altered or removed without consent, ensuring it continues to perform its flood risk management role.

A designation notice is also a local land charge, which ensures any successive owners or occupiers of land or property where a designation exists are also subject to the existing designation.

Measure 9 - West Berkshire Council will develop and implement a procedure for identifying structures or features that would benefit from being designated.

Residual Risk

Due to the nature of surface water flooding, it is not always possible, or practical, to design schemes that provide protection to all properties within a given area. Furthermore, the additional scheme costs required to protect additional properties may risk jeopardising economic viability and therefore funding potential. Instead, it may be possible to design further schemes that protect remaining properties or implement property level protection (PLP) measures for the most at risk properties.

Measure 10 - West Berkshire Council will review areas where flood mitigation measures have been implemented to confirm their effectiveness and, where necessary, consider further

Natural Flood Management and Land Management

In recent years, the flood risk management industry has recognised the benefits of Natural Flood Management (NFM) in providing flood risk benefits where capital schemes are uneconomical or impractical. This may involve targeted felling of trees to create 'leaky dams', naturalising watercourses to create wetlands and/or planting trees to attenuate overland flow and encourage infiltration. This type of measures can be done relatively cheaply as part of existing land management processes. Such measures can not only reduce the risk of flooding but can also provide benefits in terms of enhancing ecology and biodiversity.

Measure 11 - In areas of existing flood risk, where capital schemes are inappropriate, West Berkshire Council will look for opportunities to implement Natural Flood Management schemes and amend agricultural land practices to reduce the risk of flooding to communities.

Efficient Partnership Working

West Berkshire Council have carried out numerous Flood Alleviation Schemes in recent years and these have typically been earthworks schemes involving the construction of basins or bunds to attenuate surface water flows. Invariably this can result in a surplus or deficiency of earthworks fill material that needs to be sent to landfill or imported at significant expense. Where possible, RMAs should work together to align workstreams and programmes so that fill material can be shared between projects. This has the potential to offer significant cost savings and enhance the funding potential of schemes.

Measure 12 - West Berkshire Council will work with other RMAs to find opportunities for efficiency savings when implementing Flood Alleviation Schemes (e.g. importing or exporting earthworks fill material).

5.2.4 Objective 4 - *Ensure that planning decisions take full account of flood risk*

Flood risk is an intrinsic consideration in determining planning applications as the location and type of future development can heavily influence flood risk within the catchment, and potentially increase flood risk downstream of the development. In order to plan for flood risk implications, flood risk should be considered at the pre-application stage for all development, and the relevant flood risk management authorities should be involved in these discussions.

As the Local Planning Authority (LPA), WBC is responsible for ensuring flood risk is not increased by new development. WBC as the LLLFA is also a statutory consultee to the planning system on surface water flood risk and sustainable drainage for major development.

Local SuDS Requirements

Since April 2015, West Berkshire Council, as the LLFA, has been a Statutory Consultee to the planning system on surface water flood risk and sustainable drainage for all major development. Under this role, the LLFA advise the LLFA on the adequacy of proposed major development to manage flood risk. To assist with this role, and informing developers of expectations, West Berkshire Council has developed a Supplementary Planning Guidance (SPG) which provides guidance on design sustainable drainage for new developments.

Measure 13 - West Berkshire Council will ensure that development within the district does not increase surface water flood risk and meets the requirements of national local policy and guidance.

Strategic Land Allocation for Flood Alleviation

Individual developments are only required under national planning policy to manage the flood risk to the development and any flood risk arising from the development. The more strategic flood risk issues in the catchment are therefore not managed. An opportunity exists through the Local Development Plan to manage flood risk more strategically by identifying areas where flood risk management measures could be implemented, which would benefit a greater number of people. This land could then be designated for flood alleviation measures in the future.

Using current and future knowledge of flood risk, West Berkshire Council can identify the best locations for providing flood alleviation measures. These sites can then be 'safeguarded' so as to be left clear of development, or if developed that the developer would be expected to address the wider flood risk issues as part of their scheme.

These potential sites can be used to help prioritise which sites West Berkshire Council will look to bring forward first, helping local parishes, wards and residents identify when partnership funding contributions will be sought.

Measure 14 - West Berkshire Council will consider how areas suitable for strategic flood alleviation measures can be safeguarded as development proposals come forward.

Environmental Net Gain

It is anticipated the upcoming Environment Bill will make it mandatory for new developments to demonstrate that they provide Environmental Net Gain. This essentially means developing sites in a way that offers an overall improvement to the environment prior to development. West Berkshire Council

consider that SuDS offer significant opportunities to contribute to Environment Net Gain as part of new developments providing that 'good quality' SuDS are proposed.

Measure 15 - West Berkshire Council will consider how Environmental Net Gain can be contributed to through the implementation of good quality SuDS as part of new developments.

SuDS Approving Body (SAB) Role

In December 2014 the government set out changes to planning that apply for major development from 6 April 2015. This change confirmed that in considering planning applications the LPA should consult the Lead Local Flood Authority on the management of surface water for major developments.

This meant that Schedule 3 of the Flood and Water Management Act (FWMA) was not be enacted at that time and that Lead Local Flood Authorities were not required to establish SuDS Approving Bodies (SABs) as previously envisaged by the FWMA.

This is not to say the Schedule 3 would never be implemented and, whilst there are no current proposals to do so, West Berkshire Council is conscious of the need to be prepared should this happen.

Measure 16 - West Berkshire Council will be aware of its potential duties as a SuDS Approving Body (SAB) should the government implement Schedule 3 of the Flood and Water Management Act (FWMA).

Implementation of WBC LFRMS Measures

West Berkshire Council acknowledges that the ability to implement the measures they have identified will be dependent on the available of funding and resources.

With this in mind flexible delivery timescales are provided for the measures as opposed to specific dates. As progress towards achieving the measures more specific delivery dates and programmes may be provided for each measure.

West Berkshire Council has opted to specify those measures that will be delivered in the 'short', 'medium' and 'long' term. These are defined as:

- Short Term – less than 3 years
- Medium Term – 3 to 6 years (i.e. within the lifetime of the strategy)
- Long Term – greater than 6 years (i.e. extending beyond the lifetime of the strategy).

Timeframes for delivery of the Measures is presented in the Action Plan in Appendix A.

6 Flood Risk Management Funding

Given the non-structural nature of the identified measures, West Berkshire Council has determined that funding for the measures will be provided centrally. This section sets out the different types of funding that are available to the LLFA and its partners in flood risk management when structural measures to alleviate flooding are established.

6.1 National Funding

There are multiple funding streams available for the delivery of structural flood risk management measures. The following include the possible routes of funding however these may change in the future.

6.1.1 Flood and Coastal Resilience Partnership Fund

In May 2011, Defra introduced a new approach to the way that funding is allocated to flood and coastal defence projects. Instead of meeting the full costs of just a limited number of schemes, the partnership approach to funding flood and coastal resilience means that Government money is potentially available towards the costs of any worthwhile scheme. Funding levels are based on the numbers of households protected, the damages being prevented, and the other benefits a project would deliver. Overall, more schemes are likely to go ahead than under the previous 'all or nothing' approach if contributions from other sources are present.

6.1.2 Payment for Outcomes

The Pitt Review recommended that 'Government should develop a scheme that allows and encourages local communities to invest in flood risk management measures'. This new approach is proposed for all capital maintenance and defence projects seeking funding. The scheme aims to encourage communities to take more responsibility for the flood risk that they face and aims to deliver more benefit by encouraging total investment to increase beyond the levels that Defra alone can afford. The new approach will see funding levels for each scheme (provided by Defra through Flood Defence Grant in Aid) relating directly to benefits, in terms of the number of households protected, the damages being prevented plus other scheme benefits such as environmental benefits, amenity improvements, agricultural productivity and benefits to business.

Under this system some schemes will receive complete funding, if the benefits significantly outweigh the costs, and for others partial funding would be available. It is hoped that this approach would encourage people to find cheaper ways to achieve positive outcomes and/or find other funding mechanisms to pay the remaining costs of the scheme. The Environment Agency is responsible for allocating central government funding to manage flood and coastal erosion risk in England.

The village of Bucklebury has experienced a number of floods since the early 1990's and further back in time there was a significant flood following a snow melt in 1907. The extreme rainfall in July 2007 resulted in the River Pang overtopping and flooding 25 houses, the village hall and a listed Norman church for several days.

Following the 2007 flood the residents of Bucklebury formed a flood committee and worked with the Environment Agency, West Berkshire Council and the Thames Regional Flood Defence Committee to build a flood defence scheme which comprised flood embankments, a dry ford and a bypass channel to divert flood water around the village. In addition a further embankment between Bucklebury and Stanford Dingley was constructed to ensure that the diverted waters do not impact Stanford Dingley downstream

The residents of Bucklebury raised £65,000 towards the defences, while West Berkshire Council contributed £45,000. The remaining funds were provided by the Thames Regional Flood Defence Committee.

6.2 Local Funding

6.2.1 Funding to Lead Local Flood Authorities through Area Based Grants

Funding for the LLFA to meet the responsibilities placed on them by the FWMA has been allocated through Area Based Grants or local services support grants. The money is not ring fenced so individual authorities must decide how much grant to spend, subject to limits on overall budget and the need for investment on other priorities. The amount of money allocated for each LLFA varies based on the overall risk within the relevant area.

6.2.2 Community Infrastructure Levy (CIL)

The Community Infrastructure Levy (CIL) came into force in April 2010 and provides the local authorities with an alternative source of potential funding for flood defence and alleviation schemes, only the charging authority is able to determine what to spend the CIL on. It allows the local authorities to raise funds from new development in their area in order to pay for the impact that the development has on local infrastructure. CIL is based on the concept that all development will have some impact on local infrastructure and services, so it is fair that all development will contribute towards the cost of maintaining or upgrading local infrastructure. Local authorities are required to use this funding for infrastructure needed to support the development; it can be used to construct new infrastructure, increase the capacity of existing infrastructure or repair failing infrastructure. The Localism Act 2011 provides broad definitions of the infrastructure that can be covered by this scheme including transport, flood defence, schools, hospitals and parks.

6.2.3 Section 106 Funding – Developers Contributions

Section 106 of the Town and Country Planning Act 1990 allows a local planning authority to enter into an agreement with a landowner or developer in association with granting of planning permission. A section 106 agreement is used to address issues that are necessary to make a development acceptable, such as supporting provision of services and infrastructure.

It is recommended that local planning authorities should make more use of Section 106 agreements and 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.

Review and Development of the LFRMS

Reviewing and updating this strategy will be essential to ensure it remains fit for purpose and as a way of demonstrating successes in delivering reduced flood risk within West Berkshire.

It is proposed that a brief review should be undertaken after three years. The review will:

- assess our progress towards achieving the objectives of this strategy.
- consider the successes and shortcomings of the risk management authorities and the success and failures of our flood risk management measures.
- identify new objectives and measures to address flood risk issues present at the time and those anticipated over the life of the LFRMS and beyond.
- Collate any new data on flood risk within West Berkshire.

In the meantime, if there any significant changes in relation to flood risk management in the next few years with it may be necessary to produce some strategy supplements. For this reason the strategy and the associated Action Plan should be viewed as a 'living' document.

Action to Reduce and Manage Flood Risk

West Berkshire Council will apply this strategy through the implementation of the Action Plan presented in Appendix A. This sets out activities based on the strategies in the previous chapters. It does not cover all the work that is being undertaken but instead sets out the additional and site-specific schemes that will be undertaken by each flood risk management authority and Parish Councils both individually and in partnership.

The individual actions are intended to be sustainable and centre on a risk-based proportionate approach that reflects the size and complexity of the flood risk and our financial ability to manage these risks. The Action Plan will be supported by other Flood Risk Management Plans and established relationships with local Flood Forums, and will ensure that activities are joined up across the different stakeholders and risk management authorities.

The Action Plan will be reviewed and updated on a monthly basis and a comprehensive refresh will be undertaken annually. This will include:

- actions to meet the Flood Risk Regulations in the coming year.
- projects which will be submitted to the Environment Agency for entry onto the medium term plan.
- actions from the Surface Water Management Plans and Flood Risk Management Plans which will be delivered in the current year.
- other activities that will be undertaken by the risk management authorities and Parish Councils in the next year.

Scrutiny

Scrutiny in local government was formally created by the Local Government Act 2000. It is a process of examining and monitoring the activity of councils with the aim of improving the quality of local services. At West Berkshire Council scrutiny is led by the Overview and Scrutiny Management Commission, which comprises 16 Members that reflect the political makeup of the Council.

The Flood and Water Management Act has made an amendment to the Local Government Act, under Section 21F, introducing powers for Overview and Scrutiny Committees to review and scrutinise the activities of the flood risk management authorities. In addition, under the Flood Risk management

Overview and Scrutiny (England) Regulations 2011, the lead local flood authorities Overview and Scrutiny Committee is empowered to request reports or the attendance at meetings of any flood risk management authority, to enable the scrutiny of the delivery of their flood risk management functions.

The role of the Overview and Scrutiny Commission will be:

- Policy development - the Commission may review current and draft policies and plans on flooding, risk and contingencies.
- Reactive reviews – the Commission may review the flood risk management authorities responses to flooding after it had occurred to find out what happened and where lessons could be lessons.

The combination of these two activities will enable the Council to use a more proactive approach to managing future flood risk by applying the lessons learned to the development of this strategy and other related policies.

The Overview and Scrutiny Commission will receive an annual report on performance and progress over the financial year and plans for the forthcoming financial year. The report will be submitted to the Commission in April every year.

Regional Flood and Coastal Committees

Regional Flood and Coastal Committees scrutinises the Environment Agency's work. They may also examine documents that West Berkshire Council and other Lead Local Flood Authorities produce under the Flood and water Management Act and the Flood Risk Regulations.

Appendix 1: West Berkshire Council - Strategic Flood Action Plan

Table A1 Progress on measures since previous Local Flood Risk Management Strategy

No.	Measure	Progress since previous LFRMS	Take forward to LFRMS update?
Objective 1 - Provide a clear explanation of the roles and responsibilities of organisations and individuals in the management of Flood Risk and establish how best to increase public awareness of how we will work together to manage this risk.			
1	West Berkshire Council will work with RMAs and Partners in flood risk management to establish definitions of the Roles and Responsibilities of those involved with the management of flood risk.	Completed. WBC attend quarterly meetings with other Risk Management Authorities (RMAs) across Berkshire to discuss flood risk management and best practice. WBC also attend the Regional Flood and Coastal Committee to discuss and agree flood risk management measures going forward.	No
2	West Berkshire Council will publish the roles and responsibilities of local RMAs and other identified partners on the Council website to assist residents in identifying who to contact with regards to flooding.	Completed. West Berkshire Council has published which RMA or partner has responsibility for each source of flood risk.	No
3	West Berkshire Council will identify local communities that would benefit from establishing Flood Forums (that include, flood authorities, community leaders and other interested parties) and through those forums encourage the communities to establish flood plans to co-ordinate flood risk management actions with these communities.	Completed. West Berkshire Council have enabling flood forums to be set up for Lambourn Valley, Pang Valley and Lambourn Valley. West Berkshire Council, as well as the Environment Agency and Thames Water, attend regular meetings with these flood forums to support their activities and liaise with them regarding flood risk and mitigation measures. It is not considered that any other areas would benefit from a Flood Forum but there are several informal action groups that West Berkshire Council support where possible.	No
4	West Berkshire Council will establish a communication/engagement plan to inform communications with RMAs and local communities.	Completed. West Berkshire Council communicate with other RMAs across Berkshire at quarterly meetings and disseminate information to the public through the Flood Forums.	No
Objective 2 - Develop a clear understanding of flood risk within West Berkshire			
5	West Berkshire Council will use information from FWMA Section 19 Flood Investigations to inform their knowledge of flooding within the district.	Ongoing. WBC undertake Section 19 reports where necessary and use to information to inform decisions in their role as a Risk Management Authority.	Yes
6	West Berkshire Council will establish a policy and procedure for LLFA investigations of flood events in accordance with Section 19 of the FWMA.	Completed. WBC have prepared a published a " <i>Duty to Investigate Flooding Incidents Policy Document</i> " which sets out the triggers and process for carrying out	No
7	West Berkshire Council will create a Flood Records database and pro-forma for recording flood events.	Ongoing. WBC collect flood risk records from resident reports and these are used to inform knowledge of flood risk. WBC will look at improving the existing system to collate this information in a database.	Yes
8	West Berkshire Council will develop a procedure to develop and augment their Asset register, taking account of information that will need to be supplied to the SAB.	No longer relevant following government's decision not to implement Schedule 3 of the Flood and Water Management Act.	No

Objective 3. Develop plans to reduce existing flood risk taking account of people, communities and the environment.			
9	West Berkshire Council will continue progressing the appraisal, assessment and design development of the flood alleviation schemes identified through existing and future investigations.	Ongoing. West Berkshire Council continue to make significant progress in implementing Flood Alleviation Schemes across the district.	Yes
10	West Berkshire Council will work with local RMAs and partners in flood risk management to actively apply for government funding to implement flood alleviation schemes and where necessary property level flood protection measures.	Ongoing. West Berkshire Council continue to make significant progress in implementing Flood Alleviation Schemes across the district.	Yes
11	West Berkshire Council will establish standard 'criteria for viability' for flood alleviation scheme capital works to ensure that proposals take into account the environment and provide multiple benefits where practicable.	Completed. This has been achieved through familiarisation with the Flood Defence Grant in Aid (FDGiA) funding system and the mechanisms for demonstrating economical schemes. However, WBC have demonstrated that they are able to implement schemes even where not traditionally viable such as the Winterbourne Flood Alleviation Scheme.	No
Objective 4 - Identify measures that aim to reduce existing flood risk			
12	When undertaking Flood Investigations, West Berkshire Council will identify areas that require further studies or where alleviation measures could be used to reduce flood risk.	Ongoing. West Berkshire Council consider potential mitigation options as part of any flood investigation. These are then identified as 'pipeline projects' and taken forward when funding is available.	Yes
13	West Berkshire Council will develop and implement a procedure for identifying structures or features that would benefit from being designated.	Ongoing. WBC have not determined that any features require designation as yet. However, the Council has constructed numerous flood mitigation schemes which remain within the Council's ownership and maintenance responsibility.	Yes
14	West Berkshire Council will use their Asset Register to develop a system of co-ordinating maintenance activities for significant structures and features. These co-ordinated maintenance activities will be detailed in an operating manual(s).	Completed. WBC use their knowledge and experience of critical structures in combination with input from community flood wardens to coordinate maintenance activities on a regular basis and ahead of any specific storm events.	No
Objective 5 - Ensure that planning decisions take full account of flood risk			
15	West Berkshire Council will develop and publish local standards that must be adhered to when submitting a SuDS application to the SAB. These standards will set out the requirements associated with the technical design, maintenance and legal obligations for SuDS in West Berkshire.	No longer relevant following government's decision not to implement Schedule 3 of the Flood and Water Management Act.	No
16	West Berkshire Council will formulate and implement a procedure for the SAB to process drainage applications taking into account links to the Planning and Building Control Roles that West Berkshire already undertake.	No longer relevant following government's decision not to implement Schedule 3 of the Flood and Water Management Act.	No
17	West Berkshire Council will develop a procedure for how inspection and enforcement of SuDS may be undertaken jointly between planning, building control, Highways and the SAB.	No longer relevant following government's decision not to implement Schedule 3 of the Flood and Water Management Act.	No
18	West Berkshire Council will develop an integrated Flood Management and Development Site Plan in order to identify areas suitable for strategic flood alleviation measures.	Ongoing. WBC identify Flood Alleviation Schemes as 'pipeline projects' following flood investigations. The Local Planning Authority within WBC are made aware of these locations to inform development management planning.	Yes

Objective 6 - Ensure that emergency plans are effective and that individuals and communities understand the risks along with their role in an emergency.			
19	West Berkshire Council will update their Major Incident Plan as further information on flood risk across West Berkshire becomes available.	Completed. WBC updated their Major Incident Plan with input from the LLFA on responding to flood events. It is noted that the LLFA have a role in responding to flood events which is outlined in the Major Incident Plan.	No
20	West Berkshire Council will review and collate local Flood Plans to ensure their flood risk management actions are suitable, appropriate and consistent with the West Berkshire Council Major Incident Plan.	Completed. WBC Emergency Planner is consulted on local flood plans to ensure a consistent approach to flood response.	No
21	West Berkshire Council will use Flood Forums to disseminate data and information on flood risk to assist these communities in maintaining up-to-date Flood Plans.	Ongoing. WBC continue to attend Flood Forums with other Risk Management Authorities to disseminate information about flood risk within the community.	Yes

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Table A2 – Summary of Flood Risk Mitigation Measures

Ref. No.	Measures	Lead Authority	WBC Officer	Lead	Timescale	Potential Funding
Objective 1 - Maintain and update understanding of flood risk within West Berkshire and increase public awareness.						
1	West Berkshire Council will use information from FWMA Section 19 Flood Investigations to inform their knowledge of flooding within the district.	WBC	S Clark		Ongoing	Internal officer time
2	West Berkshire Council will create a Flood Records database and pro-forma for recording flood events.	WBC	S Clark		Apr-21	Internal officer time
3	West Berkshire Council will use Flood Forums to disseminate data and information on flood risk to assist these communities in maintaining up-to-date Flood Plans.	WBC	S Clark		Ongoing	Internal officer time
4	Where opportunities arise, West Berkshire Council will provide support to schools and colleges to increase awareness of flood risk and the measures being undertaken to alleviate this.	WBC	S Clark		Ongoing	Internal officer time
Objective 2 - Develop plans to reduce existing flood risk taking account of people, communities and the environment.						
5	West Berkshire Council will continue progressing the appraisal, assessment and design development of the flood alleviation schemes identified through existing and future investigations.	WBC	S Clark		Ongoing	Internal officer time
6	West Berkshire Council will work with local RMAs and partners in flood risk management to actively apply for government funding to implement flood alleviation schemes and where necessary property level flood protection measures.	WBC	S Clark		Ongoing	FDGiA, Local Levy, Partnership Funding
7	West Berkshire will review existing Flood Alleviation Schemes against a range of climate futures, as these emerge, following guidance from central government.	WBC	S Clark		Ongoing	FDGiA, Local Levy, Partnership Funding
Objective 3 - Identify measures that aim to reduce existing flood risk						
8	When undertaking Flood Investigations, West Berkshire Council will identify areas that require further studies or where alleviation measures could be used to reduce flood risk.	WBC	S Clark		Ongoing	Internal officer time
9	West Berkshire Council will develop and implement a procedure for identifying structures or features that would benefit from being designated.	WBC	S Clark		Apr-21	Internal officer time
10	West Berkshire Council will review areas where flood mitigation measures have been implemented to confirm their effectiveness and, where necessary, consider further measures to manage any residual risk.	WBC	S Clark		Ongoing	Internal officer time
11	In areas of existing flood risk, where capital schemes are inappropriate, West Berkshire Council will look for opportunities to implement Natural Flood Management schemes and amend agricultural land practices to reduce the risk of flooding to communities.	WBC	S Clark		Ongoing	FDGiA, Local Levy, Partnership Funding
12	West Berkshire Council will work with other RMAs to find opportunities for efficiency savings when implementing Flood Alleviation Schemes (e.g. importing or exporting earthworks fill material).	WBC	S Clark		Ongoing	FDGiA, Local Levy, Partnership Funding
Objective 4 - Ensure that planning decisions take full account of flood risk						
13	West Berkshire Council will ensure that development within the district does not increase surface water flood risk and meets the requirements of national local policy and guidance.	WBC	S Clark		Ongoing	Internal officer time
14	West Berkshire Council will consider how areas suitable for strategic flood alleviation measures can be safeguarded as development proposals come forward.	WBC	S Clark		Ongoing	Internal officer time
15	West Berkshire Council will consider how Environmental Net Gain can be contributed to through the implementation of good quality SuDS as part of new developments.	WBC	S Clark		Apr-21	Internal officer time
16	West Berkshire Council will be aware of its potential duties as a SuDS Approving Body (SAB) should the government implement Schedule 3 of the Flood and Water Management Act (FWMA).	WBC	S Clark		Ongoing	Internal officer time

Appendix 2: Glossary

Aquifer	An underground body of permeable rock which can contain or transmit groundwater.
Breach	Flooding caused by the constructional failure of a flood defence or other structure that is acting as a flood defence.
Biodiversity	The diversity of plant and animal life in a particular habitat.
Catchment	The area contributing surface water flow to a point on a drainage or river system.
Catchment Flood Management Plans (CFMP)	Catchment Flood Management Plans have been produced by the Environment Agency and are high-level planning tools that set out objectives for flood risk management for each river catchment. They also identify flood risk management policies that are economically practical, have a potential life of 50 to 100 years, and will aid partnership working to put them in place. CFMPs consider flood risk from rivers, surface water, groundwater and tidal flooding but do not consider sewer flooding.
Catchpit (or manhole)	A small chamber incorporating a sediment collection sump which the runoff flows through.
Civil Contingencies Act (2004)	The Civil Contingencies Act establishes a framework for emergency planning and response to large scale emergencies, such as flooding. The Act defines the obligations of different organisations and provides additional powers for the Government during an emergency. The Act designates the County Council as a category one responder, meaning it has a legal responsibility to assess the risk of emergencies and put plans in place to manage them.
Climate Change	A long-term change in the statistical distribution of weather patterns over periods of time that range from decades to millions of years. It may be a change in the average weather conditions or a change in the distribution of weather events with respect to an average, for example, greater or fewer extreme weather events. Climate change may be limited to a specific region, or may occur across the whole planet.
Climate Change Act (2008)	An Act that requires a UK-wide climate change risk assessment every five years, accompanied by a national adaptation programme that is also reviewed every five years. It also requires public bodies and statutory organisations such as water companies to report on how they are adapting to climate change.
Combined Sewer	A sewer designed to carry foul sewage and surface runoff in the same pipe.
Conservation of Habitats and Species Regulations (2010)	An Act which transposed the Habitats Directive into UK law. The regulations aim to help maintain and enhance biodiversity throughout the EU, by conserving natural habitats, flora and fauna. The main way it does this is by establishing a coherent network of protected areas and strict protection measures for particularly rare and threatened species.

Critical Infrastructure	A term used to describe the assets that are essential for the functioning of a society and economy. Most commonly associated with the term are facilities for: electricity generation, transmission and distribution; gas production, transport and distribution; oil and oil products production, transport and distribution; telecommunication; water supply (drinking water, waste water/sewage, stemming of surface water (e.g. dikes and sluices)); agriculture, food production and distribution; heating (e.g. natural gas, fuel oil, district heating); public health (hospitals, ambulances); transportation systems (fuel supply, railway network, airports, harbours, inland shipping); financial services (banking, clearing); and security services (police, military).
Culvert	A closed conduit used for the conveyance of water under a road, Railway embankment, canal, property, or similar obstruction.
Defence (Flood Defence)	A structure that alters the natural flow of water or flood water for the purposes of flood defence, thereby reducing the risk of flooding. A defence may be 'formal' (a structure built and maintained specifically for flood defence purposes) or 'informal'/'defacto' (a structure that provides a flood defence function but has not been built and/or maintained for this purpose).
Detention Basin	A vegetated depression that is normally dry except during and after flood events. Constructed to store water temporarily to attenuate flows.
EC Floods Directive	A European Directive that has been transposed to UK law through the Flood Risk Regulations (2009).
Environment Agency	An Executive Non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs and an Assembly Sponsored Public Body responsible to the National Assembly for Wales. The Environment Agency's principal aims are to protect and improve the environment, and to promote sustainable development.
Floodplain	Land adjacent to a watercourse that would be subject to repeated flooding under natural conditions.
Flooding	A flood is an overflow of an expanse of water that submerges land. Both the Flood and Water Management Act (2010) and the Flood Risk Regulations (2009) state that it doesn't matter whether a flood is caused by: heavy rainfall; a river overflowing its banks or being breached; a dam overflowing or being breached; tidal waters; groundwater; or anything else including a combination of factors. However, both state that a 'flood' does not include: a flood caused from any part of a sewerage system, unless wholly or partly caused by an increase in the volume of rainwater (including snow and other precipitation) entering or otherwise affecting the system; or a flood caused by a burst water main.
Flood Map	A multi-layered map which provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences.
Flood Map for Surface Water	The most recently produced data set developed by the Environment Agency. The Flood Map for Surface Water better represents the mechanisms that cause surface water flooding.

Flood and Water Management Act (2010)	The Act brings together the recommendations of the Pitt review and previous policies, to improve the management of water resources and create a more comprehensive and risk based regime for managing the risk of flooding from all sources. The Act reinforces the need to take an integrated approach to the management of flooding and places a number of new responsibilities on local authorities
Flood Hazard Map	A map that defines flood risk areas and shows: the likely extent (including water level or depth) of possible floods; the likely direction and speed of flow of possible floods; and whether the probability of each possible flood occurring is low, medium or high (in the opinion of the person preparing the map).
Flood Resilience	Actions taken which allow the ingress of flood water through a property but enable swift recovery after the flood event. Flood resilience measures may include (among others) flood-resistant construction materials, raised electricity sockets and water-resistant flooring.
Flood Resistance	Actions taken to prevent the ingress of flood water to a property. See Property Level Protection.
Flood Risk	Flood risk is a combination of the chance (or probability) of a particular flood event and the impact (or consequences) that the event would cause if it took place.
Flood Risk Map	A map showing: the number of people living in the area who are likely to be affected in the event of flooding; the type of economic activity likely to be affected in the event of flooding; any industrial activities in the area that may increase the risk of pollution in the event of flooding; any relevant protected areas that may be affected in the event of flooding; any areas of water subject to specified measures or protection for the purpose of maintaining the water quality that may be affected in the event of flooding; and any other effect on human health, economic activity or the environment (including cultural heritage).
Flood Risk Management (FRM)	A process to reduce the probability of occurrence through the management of land, river systems and flood defences and reduce the impact through influencing development on flood risk areas, flood warning and emergency response.
Flood Risk Management Authority Includes:	(a) the Environment Agency, (b) the Lead Local Flood Authority - West Berkshire Council, (c) a water company - Thames Water Utilities, and (d) the Local Highway Authority - West Berkshire Council.
Flood Risk Management Plan	A plan for the management of a significant flood risk. The plan must include details of: objectives set by the person preparing the plan for the purpose of managing the flood risk; and the proposed measures for achieving those objectives (including measures required by any provision of an Act or subordinate legislation).
The Flood Risk Regulations	The Flood Risk Regulations were enacted in December 2009 to implement the requirements of the EU Floods Directive, which aims to provide a consistent approach to managing flood risk across Europe. The regulations outline the roles and responsibilities of the various authorities consistent with the Flood and Water Management Act 2010 and provide for the delivery of the outputs required by the directive. The Directive requires Member States to develop and update a series of tools for managing all sources of flood risk.

Flood Zones	Nationally consistent delineation of 'high' and 'medium' flood risk, published on a quarterly basis by the Environment Agency
Flood Zone 1 Low Probability	Defined as an area only at risk of flooding from flood events with an Annual Exceedance Probability (AEP) of less than 0.1% (1 in 1000). The probability of flooding occurring in this area in any one year is less than 0.1%.
Flood Zone 2 Medium Probability	Defined as an area at risk of flooding from flood events with an Annual Exceedance Probability (AEP) of between 1% (1 in 100) and 0.1% (1 in 1000). The probability of flooding occurring in this area in any one year is between 1% and 0.1%.
Flood Zone 3a High probability	Defined as an area at risk of flooding from flood events with an Annual Exceedance Probability (AEP) of greater than 1% (1 in 100r). The probability of flooding occurring in this area in any one year is greater than 1%.
Flood Zone 3b Functional Floodplain	Defined as land where water has to flow or be stored in times of flood. Usually defined as areas at risk of flooding from flood events with an Annual Exceedance Probability (AEP) of greater than 5% (1 in 20) design event. The probability of flooding occurring in this area in any one year is greater than 5%.
Fluvial	The processes associated with rivers and streams and the deposits and landforms created by them.
Foul Drainage	The infrastructure that drains the water and sewage that discharges from within houses.
GIS Geographic Information System	GIS is any system which stores geographical data, such as elevations, location of buildings and extent of flood outlines.
Grip	A shallow channel in the highway verge connecting the edge of the road to a roadside ditch, allowing rainwater to drain off the highway.
Groundwater	Water located beneath the ground surface, either in soil pore spaces or fractures in rock.
Gully	Opening in a road pavement, covered by a cast iron grate, which allows water to drain into a conventional drainage system.
Highways Agency	
Highway Authority	A local authority responsible for the maintenance and drainage of highways maintainable at the public expense.
Highway Drain	A conduit draining the highway on a highway maintainable at the public expense.
Land Drainage Act (1991)	The Land Drainage Act outlines the duties and powers to manage land drainage for local authorities and Internal Drainage Boards. There is no Internal Drainage Board in West Berkshire. West Berkshire Council is the land drainage authority.
Impermeable Surface	An artificial non-porous surface that generates surface water run-off after rainfall.

Infiltration (into a sewer)	The entry of groundwater into a sewer.
Infiltration (into the ground)	The passage of surface water into the ground.
Main River	All watercourses shown on the statutory main river maps held by the Environment Agency and the Department for Environment, Food and Rural Affairs (Defra). This can include any structure or for controlling or regulating the flow of water into, in or out of the channel. The Environment Agency has permissive power to carry out works of maintenance and improvement on these rivers.
Medium Term Plan	The Medium Term Plan shows flood and coastal management schemes which the Environment Agency Board has allocated Defra grant in aid and have been approved by the Regional Flood and Coastal Committees.
National Flood and Coastal Erosion Risk Management Strategy	The Environment Agency's National Strategy was published in May 2011 and provides an overview of how flood risk and the risk of coastal erosion will be managed across England. The aims and objectives of the National Strategy have been translated onto a local scale through this Local Flood Risk Management Strategy for West Berkshire.
National Planning Policy Framework (NPPF)	Sets out the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.
Ordinary Watercourse	Any watercourse (including ditches and streams) that is not identified as a main river on the Defra register.
Pervious Surface	A surface that allows the inflow of rainwater into the underlying construction or soil.
Public Sewer	A sewer that is vested and maintained by the sewage undertaker.
Pitt Review	Sir Michael Pitt carried out an independent review of the 2007 floods and made a number of recommendations for future flood risk management. In particular, he recommended that local authorities should play a more significant role in tackling local problems of flooding and coordinating all relevant agencies. Many of the recommendations of The Pitt Review have been enacted through the Flood and Water Management Act.
Planning Policy Statement 25: Development and Flood Risk, Practice Guide	Sets out the Government's spatial planning policy relating to development and flood risk. Its aims are to ensure that flood risk is taken into account at all stages in the planning process, to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall. This practice guide provides guidelines on how to implement development and flood risk policies by the land use planning system. The guide also includes working examples through case studies. This Practice Guide (at Appendix B)

contains a checklist to help developers and applicants to prepare an appropriate, site-specific flood risk assessment in accordance with the policy in PPS25, and the advice in the Practice Guide.

Pluvial	Direct runoff as a result of rainfall and the processes associated with it.
Precipitation	Describes rain, sleet, hail, snow and other forms of water falling from the sky.
Preliminary Flood Risk Assessment (PFRA)	The Preliminary Flood Risk Assessment is a process involving an assessment of past floods and the possible harmful consequences of future floods, leading to the identification of Areas of Significant Risk. All LLFAs must prepare a PFRA report in relation to flooding in the LLFA's area. The LLFA is not required to include information about flooding from the sea, main rivers and reservoirs unless the authority thinks that it may affect flooding from another source. The floods to be included are those which had significant harmful consequences for human health, economic activity or the environment (including cultural heritage), or which would have significant harmful consequences for those matters if they were to occur now. The report may ignore past floods of a kind that are not likely to occur now.
Priority 1 and Priority 2 Roads	The roads within West Berkshire have been prioritised for the purposes of gritting. A roads together with certain B roads and other roads are called the Precautionary Network (P1). The Adverse Network (P2) covers certain links to villages not on the precautionary network as well as certain bus routes and industrial estates. Maps of the P1 and P2 roads within West Berkshire can be found on the Council's web pages. The M4 is gritted by the Highways Agency.
Regional Flood and Coastal Committee (RFCC)	RFCCs were set up under the Floods and Water Management Act 2010. The committees have a chair appointed by the Minister, members from Lead Local Flood Authorities (allowing for local democratic input) and independent members recruited by the Environment Agency who have specialist skills or backgrounds. RFCCs play an important local role in guiding flood and coastal risk management activities within catchments and along the coast, advising on and approving programmes of work for their areas as well as raising local levies to fund local priority projects and works in partnership with others.
Reservoir	Artificial lake used to store water. Reservoirs may be created in river valleys by the construction of a dam or may be built by excavation in the ground or by conventional construction techniques such a brickwork or cast concrete. Reservoirs greater than 10,000m ³ are governed by the Reservoirs Act.
Residual Risk	The risk which remains after all risk avoidance, reduction and mitigation measures have been implemented.
Retention Pond	A pond where run-off is detained for a sufficient time to allow settlement and biological treatment of some pollutants.
Return Period	The probability of a flood of a given magnitude occurring within any one year e.g. a 1% (1 in 100) flood event has a 1% probability of occurring once in any one year.

Riparian Owner	All landowners whose property is adjoining to a body of water have the right to make reasonable use of it and the responsibility to suitably maintain it.
River Basin Management Plans (RBMP)	River Basin Management Plans have been produced by the Environment Agency for the eleven river basin districts in England and Wales and are the central tool setting out the objectives and actions required to achieve the objectives of the Water Framework Directive. RBMPs describe the main issues for each river basin district and state the environmental objectives for the basin, explain the objectives selected to achieve good ecological status and summarise the actions needed to deliver those objectives. A River Basin District is: a river basin, or several river basins, and the river basin's adjacent coastal waters.
Property Level Protection	Is the process of reducing the risk of flooding entering a home through the use of a range of products, such as air brick covers, flood doors and barriers and non-return valves on the drainage system These are also know as property flood protection.
Run-off	Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable, is saturated or rainfall is particularly intense.
Sequential Test	Informed by a SFRA, a planning authority applies the Sequential Test to demonstrate that there are no reasonably available sites in areas with less risk of flooding that would be appropriate to the type of development or land use proposed.
Sewer	<p>A sewer is a pipe which carries and removes either rainwater (surface) or foul water (or a combination of both) from more than one property. A sewer can also be categorised as being a private or public sewer and can carry surface or foul water.</p> <ul style="list-style-type: none"> • A Private Sewer is solely the responsibility of the occupiers/owners of the properties that it serves. • A Public Sewer is a sewer that has been adopted and maintained by a Sewerage Undertaker.
Sewer flooding	The consequence of sewer systems exceeding their capacity during a rainfall event.
Site of Special Scientific Interest (SSSI)	An area of land or water notified under the Wildlife and Countryside Act 1981 as being of geological or nature conservation importance in the opinion of Natural England.
Soakaway	An underground structure where collected surface water is held to allow it to pass into the ground over time.
Sluice Gate	A wooden or metal barrier in groves that are set into the sides of a watercourse, commonly used to control water levels and flow rates in rivers and canals.
Strategic Flood Risk Assessment (SFRA)	An SFRA is used as a tool by a planning authority to assess flood risk for spatial planning, producing development briefs, setting constraints, informing sustainability appraisals and identifying locations of emergency planning measures and requirements for flood risk assessments. The purpose of a SFRA is to assess and map all forms of flood risk from groundwater, surface water, impounded water bodies, sewer and river sources, taking into account future climate change predictions, to allow planning authorities to use this as an

evidence base to locate future development primarily in low flood risk areas. The outputs from an SFRA also assist in the production of sustainable policies for the long-term management of flood risk.

Sustainable	A way to describe something that will not restrict the ability of others, now and in the future. It will also stimulate economic growth, maximise well-being and protect the environment, while not impacting future generations to do the same
Sustainable Drainage Systems (SuDS).	SuDS are drainage systems which are designed to reduce the impact of urbanisation on the hydrology of a river system.
Surface Runoff	Rainwater (including snow and other precipitation) which: is on the surface of the ground (whether or not it is moving); and has not entered a watercourse, draining system or public sewer. Areas that suffer a depth of greater than 0.1m are considered to be at risk of surface water flooding. Flooding that is greater than 0.3m deep is classed as being at risk of deep surface water flooding.
Surface Water Management Plans (SWMP)	Surface Water Management Plans are produced by local authorities and are described as a framework through which key local partners with a responsibility for surface water and drainage in their area work together to understand the causes of surface water flooding and agree the most cost effective way of managing that risk. The purpose is to make sustainable surface water management decisions that are evidence based, risk based, future proofed and inclusive of stakeholder views. A SWMP should establish a long-term action plan to manage surface water in an area and should influence future capital investment, drainage maintenance, public engagement and understanding, land-use planning, emergency planning and future developments.
The Water Framework Directive	The Water Framework Directive was introduced in December 2000 and became UK law in December 2003. The directive focuses on improving the ecology of our water ecosystems and aims to protect and enhance the quality of surface water, groundwater, estuaries and coastal waters. The Environment Agency are the lead authority responsible for the delivery of these targets, but must work closely with lead local flood authorities, such as the County Council, to ensure that targets are achieved.
Weir	A horizontal structure across a river of predetermined height to control the flow of rivers in order to prevent flooding and help render rivers navigable.

Appendix 3: West Berkshire Council Flood Investigation Report Policy

1. Introduction

1.1. The Flood and Water Management Act 2010 (the Act) places a duty on the Council, as the Lead Local Flood Authority for its area, to investigate flooding incidents that it becomes aware of, to the extent that it considers necessary or appropriate.

1.2. Section 19 of the Act states:

'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'*

2. Threshold for Investigation

2.1. The Council will investigate all flooding incidents reported by the public, or that otherwise come to its attention, that involve:

- Internal flooding of habitable property, excluding garages and out buildings.
- Flooding that breaches or threatens the critical infrastructure e.g electricity sub stations and switching centres, A roads, railways, bridges, flood defences, water treatment works, pumping stations.
- Flooding that directly results in serious injury or death.
- Flooding that incurs a significant economic impact to businesses.

- Flooding that places vulnerable individuals or vulnerable communities at risk e.g. hospitals, care and nursing homes, schools, secure units etc.
 - Weight of public interest. The LLFA may consider a flood investigation necessary if deemed important enough by elected members. The weight of public interest should also be taken into consideration when determining if a flood investigation should be carried out.
- 2.2. The Council may also investigate smaller “near miss” flooding incidents, but will not publish the findings of such investigations in a public forum but will share with the professional partners.
- 2.3. The Council, as Highway Authority, will continue to investigate smaller scale flooding on the highway, but will not publish the findings of such investigations.

3. Purpose and Scale of Investigations

- 3.1. Any investigations undertaken will seek to establish the likely causes of the flooding incident, the relevant risk management authorities, and identify any recommended actions to be undertaken by the relevant risk management authorities in order to reduce the risk of a recurrence.
- 3.2. The investigations will be undertaken during, or as soon as possible after, the flooding incident, and will be appropriate to the scale and nature of the flooding incident.
- 3.3. Small scale flooding incidents, and incidents where the relevant risk management authorities are immediately apparent or are undertaking actions to alleviate the cause of the flooding incident, are likely to require limited investigations.
- 3.4. Large scale flooding incidents, incidents where the relevant flood risk management authorities are unclear, and incidents where a number of risk management authorities are involved, are likely to require more detailed investigations. In such circumstances the Council will work closely with the risk management authorities involved and may, where appropriate, prepare a detailed report.

4. Flood Investigation Procedure

- 1) Flood reported to the LLFA;
- 2) Flooding log started;
- 3) Flood investigator appointed;
- 4) Initial LLFA assessment undertaken as to whether this constitutes a section 19 report;
- 5) If yes, formal notification issued to partner risk management authorities notifying of the investigation and requesting any relevant information (see Appendix B for formal notification);
- 6) Flood investigation undertaken and report drafted in consultation with partner risk management authorities;

- 7) Draft report issued for comment;
- 8) Report and associated actions approved by the Councillor for, Emergency Planning;
- 9) Finalised report to be published on the Council's internet as below (section 5).
- 10) Where a number of flood investigations are needed simultaneously, investigations will be prioritised by the Projects Manager in consultation with the Executive Councillor.

5. Publication of Findings of Investigations

- 5.1 The findings of all investigations undertaken by the Council will be recorded on a spreadsheet. The spreadsheet, and any detailed reports relating to flooding incidents on the spreadsheet, will be published on the Council's website.

6. Risk management authorities

- 6.1 The principal flood risk management authorities are:

- The Environment Agency (Risk management authority – Flood and Water Management Act 2010)
- West Berkshire Council (Lead local flood authority – Flood and Water Management Act 2010)
- West Berkshire Council (Highway authority – Highways Act 1980)
- Thames Water Utilities Ltd. (Water company – Water Industry Act 1991)

Appendix 4: West Berkshire Council Sandbag Policy

1.0 Introduction

This document details West Berkshire Council's Policy with regard to the deployment of sand bags or other flood defence equipment, in order to reduce the impact of river flooding and reduce the impact of flash flooding in the area.

2.0 Councils Responsibilities

The Council has no legal duty to provide sandbags to the community unless the flooding is due to flooding from the Highway or other Council owned land and is likely to affect others adversely. However the Council has consciously considered the issues in relation to flooding and the impact it can have on the communities affected. As a result sandbags may be provided on condition that the situation fits the criteria as set out below in 4.0.

3.0 Property Owners Responsibilities

The responsibility for flood protection of property is the sole responsibility of the property owners. As a result all such owners should assess the risk of flooding to their property and take the necessary precautions to protect their own property. Measures may include installing physical flood protection barriers and joining the FLOODLINE Direct Warning (FDW) system. Information regarding the flood risk of properties in relation to river flooding can be found on the Environment Agencies website.

4.0.1 Provision of Sandbags

Sandbags will **only** be deployed having regard to the following priorities:

- a) to prevent loss of life or serious injury, including vulnerable people (having regard to the Vulnerable People Plan)
- b) to maintain access for emergency services
- c) to protect vital facilities within the community, including critical infrastructure e.g. electrical sub stations, sewage works etc.
- d) to protect key transport and main access routes
- e) to reinforce flood defences preventing the flooding of multiple properties
- f) to protect WBC business property (with relevant recharges to services as deemed appropriate)
- g) if a privately owned property (not including a garage, garden shed, out building and garden etc.) is in imminent risk of flooding i.e., within the next 2hrs and that the 'fabric' of a building is at risk as a result
- h) Mutual aid to other responding agencies.

5. Council Actions in Readiness for Flooding Events

5.1 Sandbag Stocks

In order to facilitate the Council response the Council will:

- a. Maintain a stock of 500 sandbags at the depot for flooding purposes
- b. Increase the stock to 1000 sandbags at the depot with 2 pallets loaded and ready to move should prior warning be given regarding severe weather that may cause flooding and affect the West Berkshire area. The triggers for this action would normally be an extreme rainfall alert, a severe weather warning and/or a flood watch/warning notification.

5.2 Sandbags Numbers

Where it is decided to supply sandbags in accordance with this policy (4.0) then the number of sandbags delivered to any property will be based on the following:

- a. Domestic Properties in imminent risk of internal flooding:
 - i. 6 per door
 - ii. 3 per airbrick
- b. Commercial Properties protection against internal flooding:
 - i. 6 per door
 - ii. 3 per airbrick

5.3 Control of Sandbag Provision

The decisions to deploy sandbags in accordance with this policy will normally be made by the Highways Team in Highways and Transport.

Outside the criteria, (as in 4.0 above) then decisions will be made to deploy sandbags by the Civil Contingencies Team or Duty Emergency Manager in conjunction with Highways and Transport, or the Controller/Highways Co-ordinator if the Emergency Operations Centre is operating.

5.4 Delivery Timings

The Council Highways Contractor who provides this service has a 2hr response time. That is to say that it will take 2 hours from the initial call to the contractor to the delivery being made on site subject to the availability of labour and equipment.

In addition the Council has only a small stock of sandbags and staff that may be deployed to deliver them. The Council should not be relied upon to deliver sandbags. Council resources may be deployed elsewhere in a large geographical area.

6.0 What the Council will NOT provide:

In accordance with the criteria set out in section 4.0, West Berkshire Council **WILL NOT**:-

- a. provide sandbags for individual residential properties that do not satisfy the set criteria.
- b. provide sandbags to protect gardens.
- c. provide sandbags for protecting outbuildings (including garages, whether integral or external).
- d. provide sandbags for protecting non-habitable parts of any private dwelling.

- e. provide sandbags for protecting commercial premises unless it is deemed to be a critical infrastructure site.
- f. provide sandbags as a precautionary measure unless there is a real risk of internal flooding within the next 2hrs.
- g. guarantee the supply of sandbags to any premises. Residents are urged to make their own arrangements before flooding occurs.
- h. guarantee the effectiveness or adequacy of supply of sandbag products provided by the Authority.
- i. accept responsibility for placement of sandbags, except at location where the infirmity or disability of the sole occupant is an issue.
- j. collect sandbags free of charge. Once they are delivered they will be deemed to be the responsibility of the premises involved except for where the infirmity or disability of the sole occupant is an issue.

7.0 Charges and Costs

7.1 West Berkshire Council will not normally charge for the delivery of sandbags to the priority categories as detailed in 4.0 (a-d) above.

7.2 Charges will be made for sandbag provision in the following cases:

- a) if a property has flooded within the last 6 months, where sandbags have previously been provided by the Council *and* no flood defences have been prepared or installed by the owner of the property.
- b) if in accordance with 4.1 (g) the property is found not to be in imminent risk of flooding and is a precautionary request.
- c) any business where sandbags are provided including critical infrastructure.
- d) other Council buildings, including schools.

7.3 The service charges will normally be a minimum of £118.00 (cost to attend a minor emergency in current contract – subject to annual inflation rise) and will include the cost of the bags, delivery and an admin charge.

8.0 Other Suppliers of Flood Protection Products

8.1 There are other suppliers of property flood protection products which may be more appropriate for the premises. Many such products can be viewed on the National Flood Forum Website.

8.2 In addition, there are other sources of sandbags within the West Berkshire Council and surrounding areas as attached on Annex A. Other suppliers may also be able to provide sand and bags either filled or to be filled in addition prices may vary so it is recommended to shop around.

9.0 Building a Sandbag Defence

9.1 Although new styles of flood protection products have been developed in recent years, sandbags can provide a temporary defence against flood water. However, it is vital they are used correctly if they are to provide full benefit. Annex B gives guidance as to using sandbags.

Appendix 5: LFRMS Data Sources and Limitations

Source	Dataset	Description	Limitations
Environment Agency	Areas Susceptible to Surface Water Flooding	The first generation national mapping, outlining areas of risk from surface water flooding across the country with three susceptibility bandings (less, intermediate and more)	Provides a good understanding of broad locations where areas may be susceptible to surface water flooding.
	Risk of Flooding from Surface Water Map	The national surface water flood mapping which is regularly updated as new data becomes available. This dataset includes three flood events (with a 1 in 30, 1 in 100 and 1 in 1000 chance of occurring).	This mapping is indicative only and should not be used as the sole evidence for identifying flood risk.
	Flood Map	Shows the extent of flooding from rivers with a catchment of more than 3km ² and from the sea. Based on hydraulic river modelling. The Flood Map gives a good indication of the areas at risk of flooding in England and Wales.	It cannot provide detail on individual properties. Modelling only provides a representation of a flood event.
	Indicative Flood Risk Areas	Nationally identified flood risk areas, based on the definition of 'significant' flood risk described by Defra and the Welsh Assembly Government.	Used for the Preliminary Flood risk Assessment. High-level information of broad areas.
	Reservoir Flood Maps	Inundation mapping from reservoirs above 25,000 cubic metres. They are based on the worst case scenario extent from nationally consistent data.	The mapping is used for emergency planning purposes. The maps are only intended as a guide and are not a prediction of what will happen.

Source	Dataset	Description	Limitations
West Berkshire Council	Strategic Flood Risk Assessment (SFRA)	SFRA contains information on historic flooding, including flooding from surface water, groundwater and canals.	Local information is based on people's recollection of the flood event and may contain inaccuracies and lack of detail on source and extent.
	Flooding in West Berkshire 2007	A comprehensive investigation into of the flooding that occurred across West Berkshire in 2007.	Local information is based on people's recollection of the flood event and may contain inaccuracies and lack of detail on source and extent.
	Flooding in West Berkshire 2000/01	A comprehensive investigation into of the flooding that occurred across West Berkshire in 2000/01.	Local information is based on people's recollection of the flood event and may contain inaccuracies and lack of detail on source and extent.
	Thatcham Surface Water Management Plan	A comprehensive study of the flooding at Thatcham in 2007, containing historical flooding records and 2D models.	More detailed modelling to provide detail for flood schemes
Town and Parish Councils	Parish Flood Reports	For each Parish affected by the Flooding and Flood Survey Plans showing the affected properties and flow paths. These use local residents own knowledge and information to map local flood flows and properties flooded	Local information is based on people's recollection of the flood event and may contain inaccuracies and lack of detail on source and extent.
Canal and Rivers Trust	Detailed account of the flooding at each location, problems identified and recommended actions	Local information is based on people's recollection of the flood event and may contain inaccuracies and lack of detail on source and extent	Local information is based on people's recollection of the flood event and may contain inaccuracies and lack of detail on source and extent.
Berkshire Fire and Rescue	Anecdotal information on local flood history and flooding hotspots	Local information is based on people's recollection of the flood event and may contain inaccuracies and lack of detail on source and extent.	Local information is based on people's recollection of the flood event and may contain inaccuracies and lack of detail on source and extent.

Source	Dataset	Description	Limitations
Thames Water	DG5 Register	Records of sewer flooding incidents in the West Berkshire Area	It provides only a broad location of where flood incidents have been reported.

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If you require this information in an alternative format or translation, please call 01635 551111 and ask for Transport and Countryside.

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