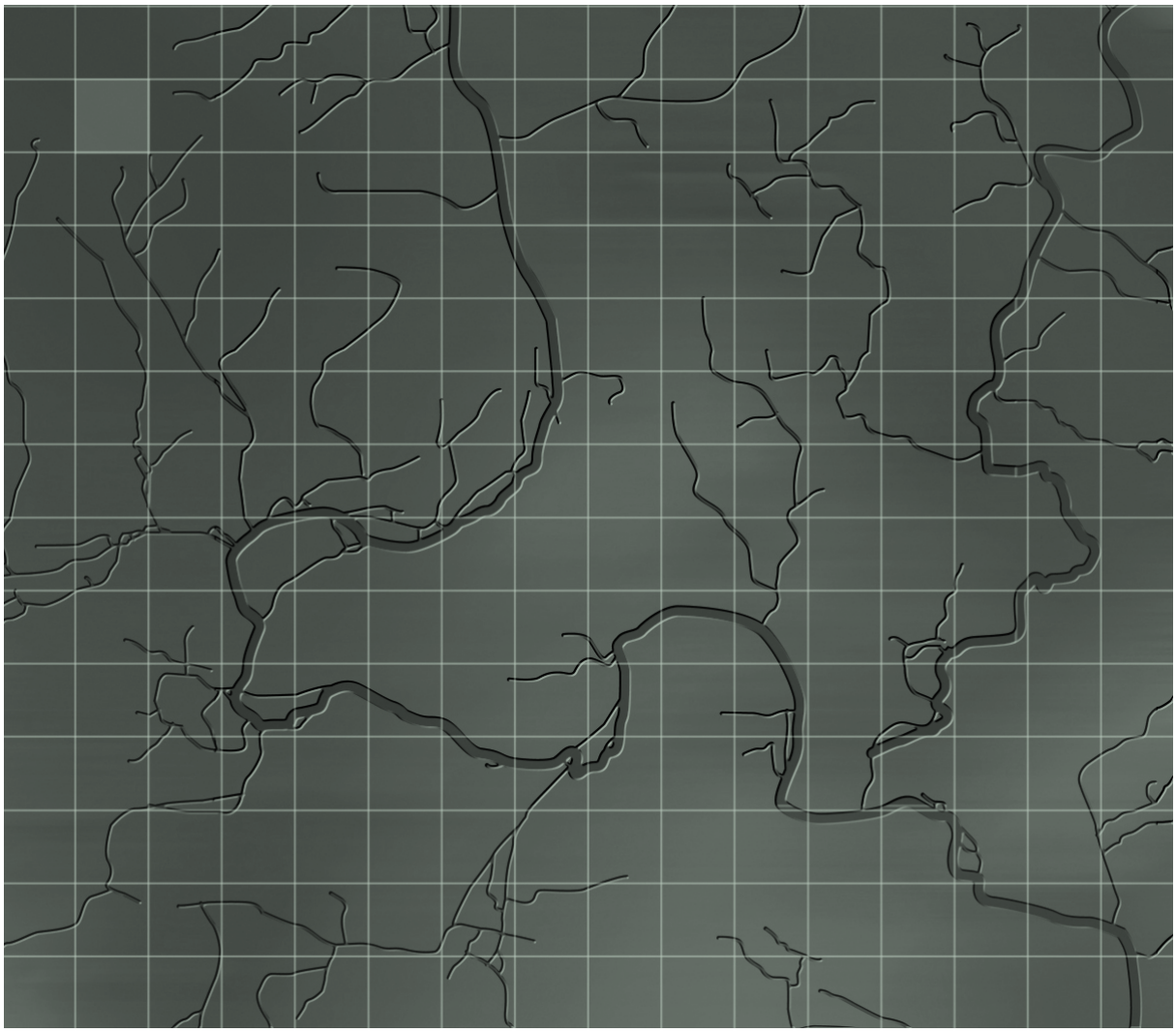
OXFORDSHIRE COUNTY COUNCIL

October 2024

Oxfordshire Local Flood Risk Management Strategy



WHS

OXFORDSHIRE COUNTY COUNCIL

Oxfordshire County Council

Oxfordshire Local Flood Risk Management Strategy

Document issue details

WHS10034

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4.0	25/10/2024	Draft	Daniel Hamilton (*Principal Consultant*)	Paul Blackman (*Director*)

For and on behalf of Wallingford HydroSolutions Ltd.

The WHS Quality & Environmental Management system is certified as meeting the requirements of ISO 9001:2015 and ISO 14001:2015 providing environmental consultancy (including monitoring and surveying), the development of hydrological software and associated training.

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Contents

1 Introduction

1.1 Background

Wallingford HydroSolutions (WHS) has been commissioned by Oxfordshire County Council (OCC) to undertake a Local Flood Risk Management Strategy (LFRMS). OCC is the Lead Local Flood Authority (LLFA). OCC, working in partnership with key stakeholders, is required to develop, apply, and monitor an LFRMS under the Flood and Water Management Act (2010). OCC's current strategy was written in 2016 and a new strategy is now required.

The LFRMS is a statutory document and Oxfordshire's Risk Management Authorities (RMAs) have a duty to act consistently with the strategy with respect to flood risk management. The strategy provides an overview of flood risk management across the county and the roles and responsibilities of RMAs and other key stakeholders. The strategy also provides information for residents, businesses, and developers to help understand and manage flood risk.

Underpinning the strategy are a series of objectives and measures that will be followed to manage and where possible reduce flood risk within Oxfordshire. These are set out in this document, along with detail on how they will be implemented and monitored through the plan period.

1.2 Scope

In developing the LFRMS five key stages, as set out in current guidance,[1] have been followed. These are outlined below:

- Understand Flood Risk
  - Explain and define flood risk issues in Oxfordshire.
  - Incorporate understanding of flood risk authorities working in Oxfordshire.
- Set Objectives
  - Ensure these align with the National Flood and Coastal Erosion Management (FCERM) strategy.
  - Work with others to set holistic objectives which address multiple issues in the community.
  - Objectives should seek to reduce local flood risk.
  - Objectives should encourage public awareness and facilitate engagement with other RMAs.
- Choose Measures
  - Should align with updated objectives.
  - Should be appropriate to the local setting and the consequences of flood risk.
  - Funding and viability should be considered.
  - Costs and benefits should be considered.
- Implementation
  - Details potential funding for measures.
  - Covers assignment of responsibilities and collaboration needed with other RMAs.
- Monitor and Review
  - Sets out how the strategy will be monitored.
  - Details what will trigger a review.

[1] Local Government Association, *Develop a local flood risk management strategy* https://www.local.gov.uk/topics/severe-weather/flooding/local-flood-risk-management-strategies-lfrms-guidance/develop-local accessed 19/01/2023

The strategy will cover a five-year period but also look at the longer-term consequences that need to be taken into account, particularly in relation to climate change. It will apply to flood risk management across the Oxfordshire administrative area which is shown in Figure 1 below.

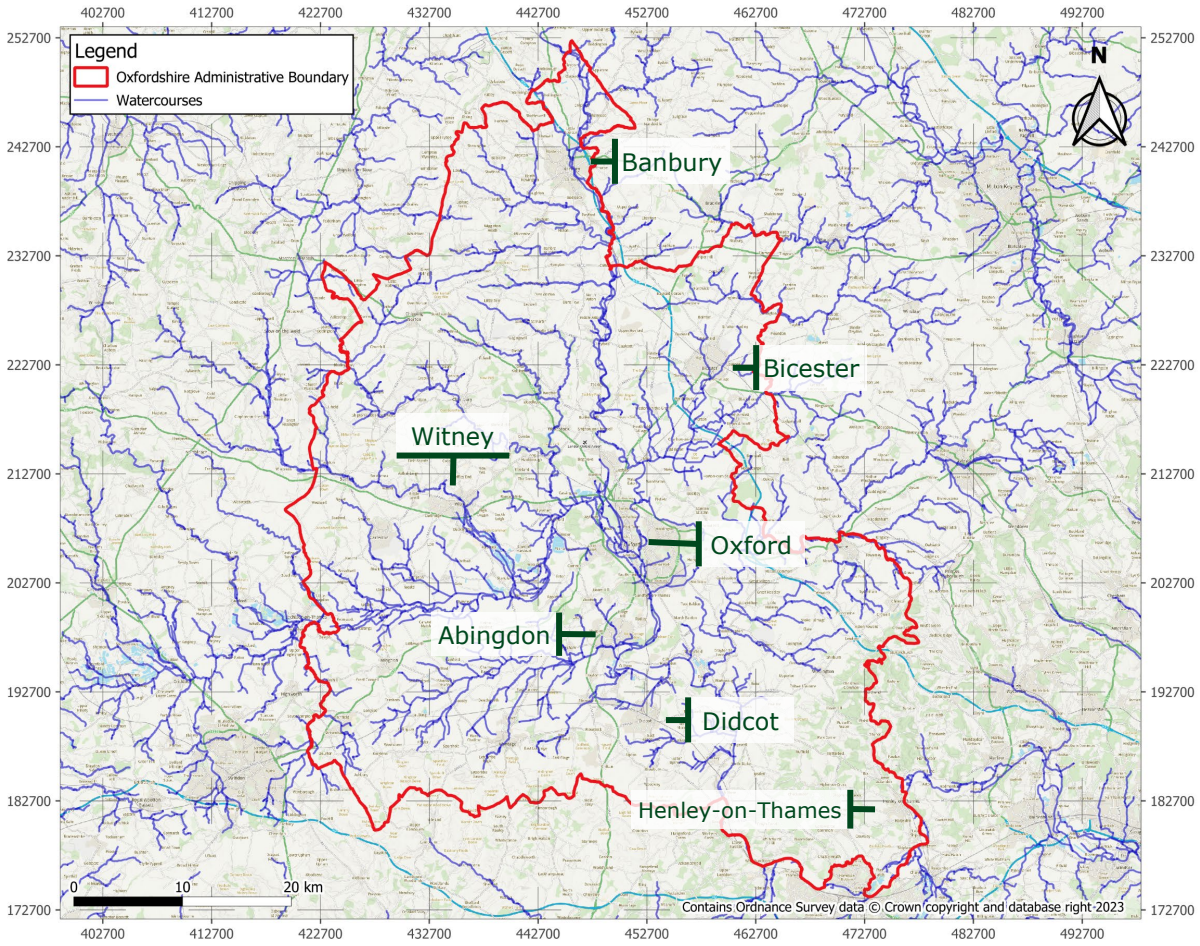

Figure 1- Overview of Study Area with key conurbations marked

2 Legislative and Strategic Context

2.1.1 Flood and Water Management Act 2010

The Flood and Water Management Act (FWMA) (2010)[2], sets out legislation on the management of risks in connection with flooding and coastal erosion for the United Kingdom. It highlights the need for an effective flood risk strategy, which must be developed, maintained, applied, and monitored regularly to adequately manage flood risk.

It gives a responsibility to the Environment Agency (EA) for developing a National FCERM Strategy and a responsibility to local authorities (LAs), as LLFAs, to co-ordinate flood risk management in their respective area.

Section 9 of the FWMA, requires LLFAs to develop, apply and monitor an LFRMS for local flood risk management in its area. This strategy has been produced by OCC as the LLFA to fulfil the requirements set out in the FWMA and follows guidance from the Local Government Association[3]. As well as being a legal requirement the LFRMS contributes to delivery of several priorities in OCC's wider strategic plan[4].

Other duties for the LLFA stated in the FWMA include consenting work on ordinary watercourses, investigating and reporting on significant flooding incidents, acting as a statutory consultee for major planning applications with surface water drainage implications and maintaining a register of designated flood assets and features (e.g. drains, ditches, pipes, gullies etc).

A significant forthcoming development is the implementation of Schedule 3 of the Act, which is expected during 2024. Schedule 3 provides a framework for the approval and adoption of drainage systems, a sustainable drainage system approving body (SAB) within LLFAs, and national standards on the design, construction, operation, and maintenance of sustainable drainage systems (SuDS) for the lifetime of the development. As noted above LLFAs within England are expected to take on the role of SABs which will bring a new set of responsibilities in the future. The potential impacts of Schedule 3 have been considered in development of this strategy. More detail on the roles, responsibilities and powers of the LLFA are provided in section 4.

2.1.2 National Strategy for Flood and Coastal Erosion Risk Management

The FWMA (2010) sets out how the EA must develop, maintain, and apply a National Strategy for FCERM in England. The most recent strategy was published in July 2020[5]. The strategy sets out how the EA will manage the risks from flooding and coastal erosion across England. It clarifies roles and responsibilities before setting out the policies and direction for all England's Flood RMAs to follow, with measures also specified to explain how targets will be achieved. The strategy highlights the importance of climate resilience in the development of future infrastructure and communicating flood and climate risk to the public.

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[2] UK Parliament (2010) *Flood and Water Management Act*, https://www.legislation.gov.uk/ukpga/2010/29/contents
[3] Local Government Association, Develop a local flood risk management strategy https://www.local.gov.uk/topics/severe-weather/flooding/local-flood-risk-management-strategies-lfrms-guidance/develop-local accessed 19/01/2023.
[4] OCC (2023) *Strategic plan 2023-2025*, www.oxfordshire.gov.uk/sites/default/files/file/about-council/OCCStrategicPlan2022.pdf
[5] EA (2020) *National Strategy for Flood and Coastal Erosion Risk Management*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf

This strategy has been produced to align with the objectives and principles described by the National FCERM Strategy (section 3.1 provides more detail on the national strategy).

2.1.3 Thames River Basin District Flood Risk Management Plan 2021-2027

The Flood Risk Regulations (2009) require the EA to work with LLFAs and other partners to develop FRMPs on a six-year cycle. Since UK left the European Union in 2020, the regulations were revoked before being fully retained by the Retained EU Law (Revocation and Reform) Act (2023)[6].

The latest FRMPs for England cover the period from 2021-2027. These strategic plans focus on the most significant areas of flooding and describe the risk of flooding now and in the future. They explain the objectives and the measures (actions) needed to manage flood risk at a national and local level.

National measures that apply to all river basin districts are described in a national overview document (part a)[7]. Measures that apply to specific river basin districts in nationally identified flood risk areas are described in 10 local flood risk management plans (part b). The relevant FRMP for Oxfordshire is the Thames River Basin FRMP 2021-2027[8]. The individual river basin districts selected including the Thames basin are defined by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[9].According to the EA, the FRMP helps the EA and others to:

- Identify measures (actions) that will reduce the likelihood and consequences of flooding.
- To improve resilience, which is the capacity of people and places to plan for, better protect, respond to, and to recover from flooding and coastal change, while informing the delivery of existing flood programmes.
- Work in partnership to deliver wider resilience measures. These include nature-based solutions, property flood resilience and SuDS.
- Plan and adapt to a changing climate through developing longer-term, adaptive approaches.

The key measures identified for the Thames FRMP are listed below. They are largely the responsibility of the EA however do require the support of other RMAs in many cases. They include to:

- Seek and support early engagement on large third-party infrastructure in Thames River Basin District
- Work as part of the Collaborative Delivery Framework to promote new ways of working in Thames River Basin District
- Work in partnership including with Thames Flood Advisors to support all LLFAs to apply for Government funding in the Thames River Basin District
- Work in partnership to develop a catchment-scale approach which will complement local flood risk schemes in the non-tidal River Thames catchment (Thames Valley)
- Work in partnership with other RMAs to support proactive development of strategic environmental plans in the Thames River Basin District
- Work in partnership with other RMAs to support the implementation of the Thames Regional Flood and Coastal Committee 25-year vision in the Thames River Basin District

[6] UK Government (2023) *Retained EU Law (Revocation and Reform) Act 2023* https://www.legislation.gov.uk/ukpga/2023/28/contents
[7] EA (2022) *National overview (part a)* https://www.gov.uk/government/publications/flood-risk-management-plans-2021-to-2027-national-overview-part-a/national-overview-part-a
[8] EA (2022) *Thames River Basin District Flood Risk Management Plan 2021 to 2027* https://www.gov.uk/government/publications/thames-river-basin-district-flood-risk-management-plan
[9] UK Government (2017) *The Water Environment (Water Framework Directive) (England and Wales) Regulations* 2017 https://www.legislation.gov.uk/uksi/2017/407/contents

The FRMPs are an important contribution towards helping to deliver the ambitions of the National FCERM Strategy for England, in addition to the government's 25-year environment plan[10].

2.1.4 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF)[11] sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. The latest NPPF was updated in September 2023 and replaces the previous NPPF published in July 2021.

In terms of flood risk, the NPPF sets out strict tests to protect people and property from flooding which all local planning authorities are expected to follow. The NPPF details the types of development permissible within specific flood risk zones. It also places onus on how a sequential risk-based approach (the sequential test) should be taken for development to ensure that it is directed away from areas at highest risk. Where development is necessary in such areas, an exception test should be applied ensuring development is i) made safe for its lifetime without increasing flood risk elsewhere, and ii) provides wider sustainability benefits to the community.

2.1.5 NPPF Flood Zones

As mentioned above, the NPPF categorises areas within the fluvial floodplain into zones of low, medium and high probability, as shown in Table 1.

Table 1- Flood Zones

Flood Zone	Definition
Flood Zone 1 (Low Probability)	Land having a less than 0.1% annual probability of river or sea flooding.
Flood Zone 2 (Medium Probability)	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding.
Flood Zone 3a (High Probability)	Land having a 1% or greater annual probability of river flooding; or land having a 0.5% or greater annual probability of sea flooding.
Flood Zone 3b (Functional Floodplain)	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: • land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding).

[10] HM Government (2018) *A Green Future: Our 25 Year Plan to Improve the Environment* https://assets.publishing.service.gov.uk/media/5ab3a67840f0b65bb584297e/25-year-environment-plan.pdf
[11] Ministry of Housing, Communities & Local Government (2023) *National Planning Policy Framework*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1182995/NPPF_Sept_23.pdf

Flood risk is a function of the probability of a flood occurrence and the direct consequences to the community or a receptor. On this basis, as shown in Table 2 different development types are assigned a vulnerability category which determines which flood zones they are permitted in. The types of development falling within each category (e.g. Residential classed as More vulnerable) are provided in the NPPF.

Table 2- NPPF flood risk vulnerability and flood zone compatibility

Flood Zone	Essential Infrastructure	Water Compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	✓	Exception Test required	✓	✓
Flood Zone 3a	Exception Test required	✓	✕	Exception Test required	✓
Flood Zone 3b	Exception Test required	✓	✕	✕	✕

2.1.6 Planning Practice Guidance- Flood Risk and coastal change

The Planning Practice Guidance (PPG)[12] supports the NPPF. The PPG on flood risk and coastal change was last updated in June 2021 and advises how to take account of and address the risks associated with flooding and coastal change in the planning process. It supports and aligns with the principles adopted by the NPPF but sets out more specific guidance for developers and planners.

2.1.7 Climate Change

The EA release guidance[13] on how local planning authorities, developers and their agents should use climate change allowances in flood risk assessments (FRAs). Making allowances for climate change minimises vulnerability and provides resilience to flooding and coastal change.

The climate change allowances are predictions of anticipated change and are provided for:

- Peak river flow
- Peak rainfall intensity
- Sea level rise
- Offshore wind speed and extreme wave height

There are allowances for different climate scenarios over different epochs, or periods of time, over the coming century. For Oxfordshire the peak river flow and peak rainfall intensity allowances are relevant and are covered in more detail below.

Peak river flow

Peak river flow allowances show the anticipated changes to peak flow by management catchment. Management catchments are sub-catchments of river basin districts. The range of allowances is based on percentiles, as follows.

- Central allowance is based on the 50th percentile.
- Higher Central allowance is based on the 70th percentile.

[12] Ministry of Housing, Communities & Local Government (2022) *Flood risk and coastal change*, https://www.gov.uk/guidance/flood-risk-and-coastal-change
[13] EA (2022), *Flood risk assessments: climate change allowances*, https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

- Upper End allowance is based on the 95th percentile.

The Oxfordshire administrative boundary crosses five management catchments in total. The peak river flow allowances for the five management catchments are summarised in Table 3.

Table 3- Peak River flow allowances for Oxfordshire Management Catchments

Allowance	Total Potential Change (2020s)	Total Potential Change (2050s)	Total Potential Change (2080s)
Cherwell and Ray			
Central	6%	4%	15%
Higher	11%	10%	25%
Upper	24%	27%	49%
Cotswolds			
Central	11%	13%	30%
Higher	17%	21%	43%
Upper	31%	43%	82%
Gloucestershire and the Vale			
Central	11%	11%	26%
Higher	17%	19%	41%
Upper	33%	43%	84%
Thames and South Chilterns			
Central	12%	14%	31%
Higher	17%	22%	43%
Upper	30%	42%	76%
Upper and Bedford Ouse			
Central	5%	4%	19%
Higher	10%	11%	30%
Upper	24%	30%	58%

Peak rainfall

Increased rainfall affects surface water flood risk and the design of drainage systems. Peak rainfall allowances are provided for the central and upper percentile and across two epochs. Once more the allowances are specified for each management catchment. The five management catchments spanning the county have the same central and upper end allowances. These are summarised in Table 4.

Table 4- Peak rainfall allowances applicable to Oxford City

Allowance	Total Potential Change (2050s)	Total Potential Change (2070s)
3.3% Annual Exceedance Probability (AEP)		
Central	20%	25%
Upper	35%	35%
1.0% Annual Exceedance Probability (AEP)		
Central	20%	25%
Upper	40%	40%

2.1.8 Non-statutory guidance for SuDS

The non-statutory guidance[14] for SuDS published by the Department for Environment, Food and Rural Affairs (Defra) in 2015, sets out the technical standards for SuDS systems in England. For greenfield developments, the peak runoff rate from the development to any highway drain, sewer, or surface water body for the 1 in 1 year and 1 in 100-year rainfall event should never exceed the peak greenfield runoff rate for the same event. For developments which were previously developed, the peak runoff rate from the development must be as close as reasonably practicable to the equivalent greenfield runoff rate over the same area; never exceeding the rate of discharge from the development prior to redevelopment for any event.

2.1.9 OCC Strategies

Alongside the LFRMS, OCC are also in the process of developing a local nature recovery strategy[15]. Currently the draft strategy is out for consultation. The strategy looks to deliver on the Environment Act 2021[16] and outlines the importance of the natural landscape in Oxfordshire. It sets out how the council will work with others to recover nature and improve air and water quality across Oxfordshire.

Also being developed is the Oxfordshire Climate Adaptation Route Map[17]. The route map is currently in draft status, to be approved by Cabinet in early 2025. OCC, Oxford City Council and the four Oxfordshire District Councils declared a Climate Emergency in 2019, making significant commitments towards net-zero before 2050 as well as climate action to improve climate resilience. The route map aims to set out how OCC will look to achieve this. A climate vulnerability assessment has been undertaken as part of the work and investigates the potential impacts of climate change on Oxfordshire including on flood risk.

[14] Department for Environmental, Food and Rural Affairs (2015) *Sustainable Drainage Systems Non-statutory technical standards for sustainable drainage systems*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf
[15] OCC(2024) *Local Nature Recovery Strategy* https://www.oxfordshire.gov.uk/residents/environment-and-planning/local-nature-recovery-strategy
[16] UK Government (2021) *Environment Act 2021* https://www.legislation.gov.uk/ukpga/2021/30/contents
[17] OCC(2024) *Oxfordshire Climate Adaption Route Map* https://insight.oxfordshire.gov.uk/cms/environment

3 Links to National Strategy

3.1 Consistency with the National Strategy

The National Flood and Coastal Erosion Risk Management Strategy for England is a statutory document and has been produced by the EA under the FWMA (2010). It sets out a framework for flood risk and coastal erosion risk management and what is required of the RMAs involved. The aim of the National Strategy is to ensure that flood and coastal erosion risk management is properly managed and co-ordinated, using a full range of options, supporting local decision making and engagement in risk management across catchments.

Under the FWMA (2010), all RMAs are expected to exercise their flood management functions and any other function that may affect flooding consistently with the national strategy. For example, LFRMS' produced by LLFAs must be consistent with the strategy. Through its 'strategic overview' role the EA exercises its strategic leadership for all sources of flooding and coastal change.

The original National Flood and Coastal Erosion Risk Management Strategy for England was published in 2011. The updated strategy recognises that substantial progress has been made since, with significant investment in flood defence infrastructure and progressively fewer properties flooding following recent incidents. It also recognises that internationally our understanding of future climate hazards has significantly improved, with collective improvements in i). our understanding of climate science, ii). learning from flood events and iii). developments in government policy. Taking this into account the strategy is heavily related to climate change.

This is reflected in the strategy's long-term vision, which is for: *a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100*.

The strategy also has 3 long-term ambitions, underpinned by evidence about future risk and investment needs. They are:

- Climate resilient places: working with partners to bolster resilience to flooding and coastal change across the nation, both now and in the face of climate change.
- Today's growth and infrastructure resilient in tomorrow's climate: making the right investment and planning decisions to secure sustainable growth and environmental improvements, as well as infrastructure resilient to flooding and coastal change.
- A nation ready to respond and adapt to flooding and coastal change: ensuring local people understand their risk to flooding and coastal change and know their responsibilities and how to take action.

The strategy highlights that it will not be effectively delivered by RMAs working on their own. Collaboration between RMAs will be central to delivery of the strategy along with the involvement of local communities. In this regard, the EA worked in collaboration with Flood and Coastal Erosion Risk Management (FCERM) practitioners in a wide range of organisations to develop the strategy.

Underlying each of the long-term ambitions above are a number of strategic objectives and associated measures which provide more detail on the steps that the EA and other RMAs should take to support the ambitions. It is the responsibility of OCC to ensure that the Local Strategy is consistent with the National Strategy. This has been achieved by ensuring that the strategic objectives and measures set out nationally are used to guide OCC's local objectives and measures set out herein.

3.2 Reporting on the Strategy

The EA has a national role in reporting to the Government about flood and coastal risk management, including the application of the National Strategy. OCC will report to the EA on the development and implementation of the Local Strategy, so that they can in turn report this to the government.

4 Risk Management Authorities and Functions

4.1 Risk Management Authorities

Defra is the policy lead for flood and coastal erosion risk management in England. Working with other parts of government including the Treasury, the Cabinet Office (for emergency response planning) and the Ministry of Housing, Communities and Local Government (for land-use and planning policy) they adopt new and revised policies. These national policies are then delivered by RMAs. The RMAs within England include:

- Environment Agency (EA)
- LLFAs
- District and Borough Councils
- Coast protection authorities
- Water and sewerage companies
- Internal Drainage Boards
- Highways authorities.

The Flood and Water Management Act 2010 requires these RMAs to:

- Co-operate with each other.
- Act in a manner that is consistent with the National Flood and Coastal Erosion Risk Management Strategy for England and the local flood risk management strategies developed by LLFAs.
- Exchange information.

They have flexibility to form partnerships and to act on behalf of one another. In Oxfordshire, the LLFA have agency agreements in place with the district councils within the county. These allow the individual councils to undertake some of the functions of the LLFA (e.g. Ordinary watercourse consenting, flood reporting, flood enforcement action and initial flood investigations) with the LLFA funding the work. This approach is considered beneficial in bringing local experience to the fore. Resources for the district teams are fixed and there is no sharing of resources between district teams undertaking these responsibilities.

Table 5 sets out the roles, responsibilities and powers of the RMAs acting within Oxfordshire. This is based on the roles and responsibilities defined in the FWMA (2010), the EA's latest national strategy and discussions with OCC acting as the LLFA. The powers identified tend to either be defined in the FWMA (2010) or the Land Drainage Act (1991)[18]. Note, Network Rail are not defined as an RMA by the FWMA (2010) however monitor flood risk to railways. This includes the deployment of flood defence systems and upgrading tracks and signalling equipment in response to flood events.

Figure 2 provides a high-level summary of who is responsible for different sources of flooding. The Oxfordshire Flood Toolkit[19] also contains information on who is responsible for different sources of flooding along with contact links to each RMA.

[18] UK Parliament (1991) *Land Drainage Act*, https://www.legislation.gov.uk/ukpga/1991/59/contents
[19] OCC (2024) *Who is responsible?* https://www.oxfordshirefloodtoolkit.com/contacts/

Table 5- Risk Management Authorities Role, Responsibilities and Powers

RMAs in Oxfordshire	Flood Risk Role	Responsibilities	Powers
Oxfordshire County Council	Acting as the Lead Local Flood Authority manages flood risk from: • Surface Water • Groundwater • Ordinary Watercourses Also, strategic and coordination role to district council and development.	• The development, maintenance, application, and monitoring of a strategy for local flood risk management. • Investigate significant local flooding incidents and publish the results of such investigations (Section 19 reports). • Maintain a register of assets- classed as physical features structures or features which have a significant effect on flood risk in their area. • Undertake a statutory consultee role providing technical advice on surface water drainage to local planning authorities for major developments (10 dwellings or more). • Exercise flood risk management functions in a manner consistent with the national strategy.	• Powers to request information from any person in connection with the authority's flood risk management functions. • Power to do works to manage flood risk from surface water, groundwater, and ordinary watercourses. • Power to designate structures and features that could affect flooding. • Power to issue ordinary watercourse consents and ensure a free flow of water within an ordinary watercourse is maintained. In Oxfordshire, this power has been delegated to the district and city councils within the county.
District Councils Cherwell District Council Oxford City Council South Oxfordshire District Council Vale of White Horse District Council West Oxfordshire District Council	Act as Land Drainage Authorities and manage: • Ordinary Watercourses • Contamination (Food & Health)	• Work in partnerships with LLFAs and other RMAs to ensure risks are managed effectively, including development allocation. • Exercise flood risk management functions in a manner consistent with the national strategy. In Oxfordshire some of the responsibilities and powers of the LLFA are taken on by the district councils through agency agreements, this includes: • Ordinary watercourse consenting. • Section 19 reporting. • Flood enforcement action. • Initial flood investigations	• Power to designate structures and features that affect flooding or coastal erosion. • Power to do works on ordinary watercourses and, with the EA's consent, main rivers. • Power to implement and maintain flood defences on ordinary watercourses. • Power to carry out flood risk management works on ordinary watercourses.
Environment Agency	Provide national strategic overview of coastal erosion and	• Developing long-term approaches to FCERM. This includes developing and	• Powers to request information from any person in connection with the EA's flood

	flood risk management for all forms of flooding. Manage flood risk from: • Main Rivers • The sea Also, role in monitoring and investigating pollution incidents.	applying the national flood and coastal erosion risk management strategy. • Allocation of national government funding to projects to manage flood and coastal erosion risks from all sources. • Delivering projects to manage flood risks from main rivers and maintaining assets on main rivers. • Duty to have regard to Local Flood Risk Management Strategies. • Working with other RMAs to prepare and deliver FRMPs. • Providing evidence and advice to support other RMAs. • Forecasting and mapping flood risk • A statutory consultee on development in the floodplain. • Working with the Met Office to provide flood forecasts and warnings. • Regulation of reservoir safety. • Duty to report to Ministers about flood and coastal erosion risk management including application of the national strategy.	and coastal erosion risk management functions. • Power to designate structures and features that affect flooding or coastal erosion. • Power to undertake works and surveys in relation to flooding from main rivers. • Power to issue flood risk permits for main rivers and ensure a free flow of water within a main river is maintained.
Highway Authorities (National Highways and Oxfordshire County Council)	Highways authority. Manage flood risk from: • Surface Water originating on the highway.	• Manage, maintain, and improve the Motorway and trunk roads across England. • Note, in Oxfordshire, National Highways are responsible for the M40 and A34. OCC is responsible for all other public roads. • Providing and managing highway ditches under the Highways Act 1980. • Co-operate with the other RMAs to ensure their flood management activities are well coordinated. • Duty to exercise their functions in a manner consistent with local and national strategies.	• Power to discharge surface water run-off into adjacent watercourses, subject to land drainage consent.

Thames Water, Anglian Water and Severn Trent Water	Water and Sewerage Company operate and maintain the condition of sewerage systems to reduce sewer flooding and protect water quality. Manage flood risk from: • Sewer flooding	• Maintain and manage their water supply and sewerage systems to manage the impact and reduce the risk of flooding and pollution to the environment. • Make sure their systems have the appropriate level of resilience to flooding and maintain essential services during emergencies. • Provide advice to LLFAs on their assets' impact on local flood risk. • Work with developers, landowners and LLFAs to understand and manage risks. • Work with the EA, LLFAs and district councils to coordinate the management of water supply and sewerage systems with other flood risk management work. • Duty to exercise their functions in a manner consistent with local and national strategies. • Undertake and publish Drainage and Wastewater Management Plans (DWMPs). Since the introduction of the Environment Act 2021, these plans are now a statutory duty for water companies.	• Power to undertaker to lay sewers, lateral drains, and disposal mains. • Power to specify requirements for discharge to public sewers and water mains requirements. • Power to adopt private sewers.
Buckingham & River Ouzel Internal Drainage Board	Act as Land Drainage Authority. Manage flood risk from: • Ordinary Watercourses The Buckingham and River Ouzel IDB is the only IDB in Oxfordshire and covers a relatively small area.	• Supervise land drainage and flood defence works on ordinary watercourses within their area. • Advise on planning applications, specifically the use of SuDS within their area. • Duty to exercise their functions in a manner consistent with local and national strategies.	• Power to designate structures and features that could affect flooding. • Power to do works on ordinary watercourses flooding within their boundary. • Power to issue ordinary watercourse consents and ensure a free flow of water within an ordinary watercourse is maintained.

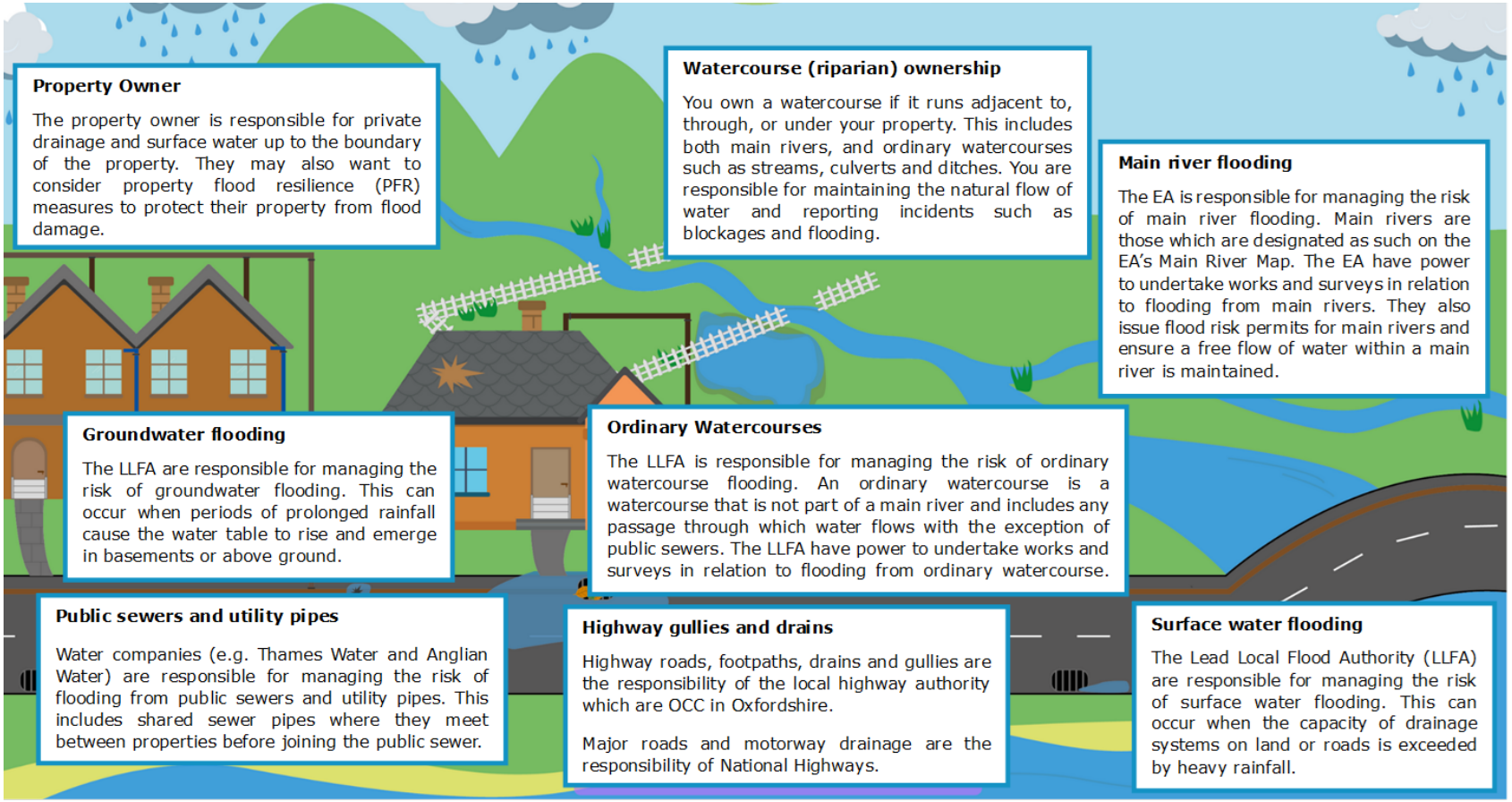

Figure 2-Schematic showing who is responsible for different sources of flood risk (image source: Flood Hub[20])

[20] Flood Hub (2024) *https://thefloodhub.co.uk*

4.2 Working Arrangements

The previous section summarised the main roles and responsibilities of the different RMAs acting within Oxfordshire. This section outlines their key working arrangements and interactions.

The Oxfordshire Risk Management Authority flood group comprises the main RMAs acting within Oxfordshire and was initially formed following the floods in July 2007. Its purpose is to facilitate a joined-up approach to flood risk management seeking to follow the recommendations of the Pitt Review. Following the introduction of the Flood Risk Regulations (2009) and FWMA (2010), one of the principal aims of the groups has been in ensuring that there is a synergy between each authority's approach to flooding and that there is joint ownership of an approach to addressing flood risk issues.

The group meets quarterly and includes representatives from:

- Environment Agency (EA)
- Oxfordshire County Council (LLFA)
- District Councils
  - Cherwell District Council
  - Oxford City Council
  - South Oxfordshire Council
  - Vale of White Horse District Council
  - West Oxfordshire District Council
- Thames Water

The group's membership includes engineers and planning officers from each of the districts along with Thames Water and the EA. It also considers engineering and operational aspects.

The group interacts with the LLFA internal steering group, the steering group is made up of relevant officers within OCC who have a flood risk role. The steering group oversees several groups acting at a district level to manage flood risk.

Figure 3 below identifies the governance arrangements. The diagram relates only to the management of this strategy and not to the prioritisation of schemes and allocation of funding which follow existing OCC and District Council governance.

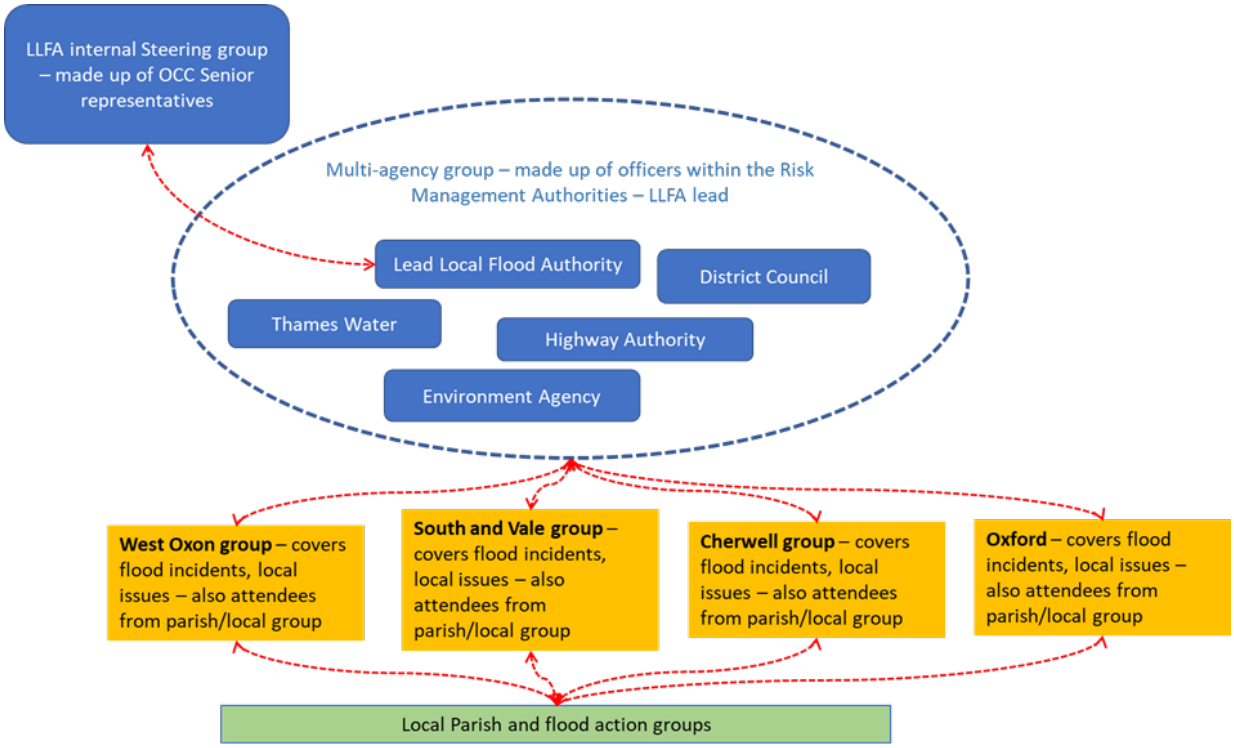

Figure 3- Governance Workflow Diagram

As mentioned, there are a number of groups acting at a district level to manage flood risk. This includes four district led groups, the Oxford Flood group, the South Oxfordshire and Vale of White Horse Flood Group, the West Oxfordshire Flood Group and the Cherwell Flood Group which pertain to the districts across Oxfordshire.

Communication with the districts at present tends to be on an informal basis, with the exception of the West Oxfordshire Multi Agency meeting which occurs quarterly. Despite this the LLFA and councils often work together and communicate with one another frequently, through regular partner meetings. Matters discussed include land, highway, foul and surface water drainage problems along with future programs for flood risk within their districts. Information is readily shared, and OCC keep regularly updated on the operations of the district councils.

Riparian owners are responsible maintaining watercourses under their ownership. However, the RMAs also use their powers where appropriate to help manage and maintain the network of pipes, culverts, ditches, and rivers that carry water through Oxford.

At the local and community level there are action groups. They work with local bodies including the EA, OCC, district councils, Thames Water and Network Rail. Working with these bodies, many of the groups have been involved with interventions to reduce flood risk.

5 Flood Risk in Oxfordshire

5.1 Flood Risk Definition

Flood risk is defined as the combination of the probability of flooding occurring (which is often expressed as a return period or Annual Exceedance Probability) combined with the consequences of it occurring. Thus, it is possible to define flood risk as:

5.2 About Oxfordshire

Oxfordshire has an estimated population of 725,291[21] in an area of 2,605 km^2. The place with the highest population in the county is the historic university city of Oxford, which is located in the centre of Oxfordshire and has a population of 162,000. Other significant urban areas are found in Banbury, Abingdon, Bicester, Witney, and Didcot which have populations ranging from 31,000 to 54,000. Outside of these population centres the county is largely rural and the majority of land use is agricultural.

The topography is dominated by the major river valley of the Thames which runs in a northwest to southeast direction across the county and many tributaries across Oxfordshire flow into the Thames. Most of the county is characterised by low rolling hills. White Horse Hill is the highest point, at 260m above Ordnance Datum.

The underlying bedrock geology follows bands running in a southwest to northeast direction, which dip to the southeast. The Lias Mudstone in the north of the county is proceeded by the Oolitic Limestone of the Cotswolds in the northwest followed progressively by overlying bands of clays, mudstone, siltstone, limestone, and sandstone in the Oxford area, before a significant area of chalk in the south and southeast.

5.3 Fluvial Flood Risk

The EA is responsible for managing the risk of flooding from main rivers, whereas LLFAs, district councils and IDBs carry out flood risk management work on ordinary watercourses.

The EA's 'Flood Map for Planning (Rivers and the Sea)' provides information on areas that are at risk of flooding if there were no flood defences. This dataset is available online and is the main reference for planning purposes. The mapping is updated when new flood risk models become available which provide an improved representation of flood risk. For smaller catchments not present in the 'Flood Map for Planning (Rivers and Sea)' the EA's Risk of Flooding from Surface Water (RoFSW) mapping can be used to estimate flood risk.

As mentioned, Oxfordshire is dominated by the Thames River basin, in total 96.8% of the Oxfordshire area. Smaller areas drain to the Anglian River basin to the East (2.4%) and the Severn River basin to the West (0.8 %).

Fluvial flooding is a major flood risk across Oxfordshire. The EA's 'Flood Map for Planning (Rivers and the Sea) across Oxfordshire is shown in Figure 4.

[21] Office for National Statistics (2021) *2021 Census Area Profile- Oxfordshire County* https://www.nomisweb.co.uk/sources/census_2021/report?compare=E10000025 accessed 05/12/23.

In Oxford it is the primary source of flood risk in terms of flooding extent, the number of properties at risk and historical flood damages. Oxford is located at the confluence of the River Thames and River Cherwell, and is at risk from both watercourses independently, as well as concurrently in large flood events.

Upstream of Oxford in western Oxfordshire, the Thames flows through largely rural land with a floodplain that is relatively broad and flat. It does incorporate several other tributaries including the River Evenlode and the River Windrush. These tributaries also flow through largely rural areas however the Windrush does pose a risk to parts of Burford, Swinbrook, Asthall and Witney.

Downstream of Oxford, many settlements in south Oxfordshire lie within the Thames floodplain and have experienced historical flooding from the river, including Sandford on Thames, Abingdon, Wallingford and Henley on Thames in addition to a number of smaller settlements along this reach.

In North Oxfordshire, fluvial flooding also presents a significant flood risk. Flooding associated with the River Cherwell is the dominant flooding mechanism in Banbury and effects parts of Kidlington. The Langford Brook presents a flood risk to some areas in Bicester and the River Ray to smaller settlements including Islip and Charlton-on-Otmoor. In general, fluvial flood extents are relatively constrained in urban areas where manmade structures act to control flood waters to a degree. In rural areas the flood extents are often extensive due to the flat topography.

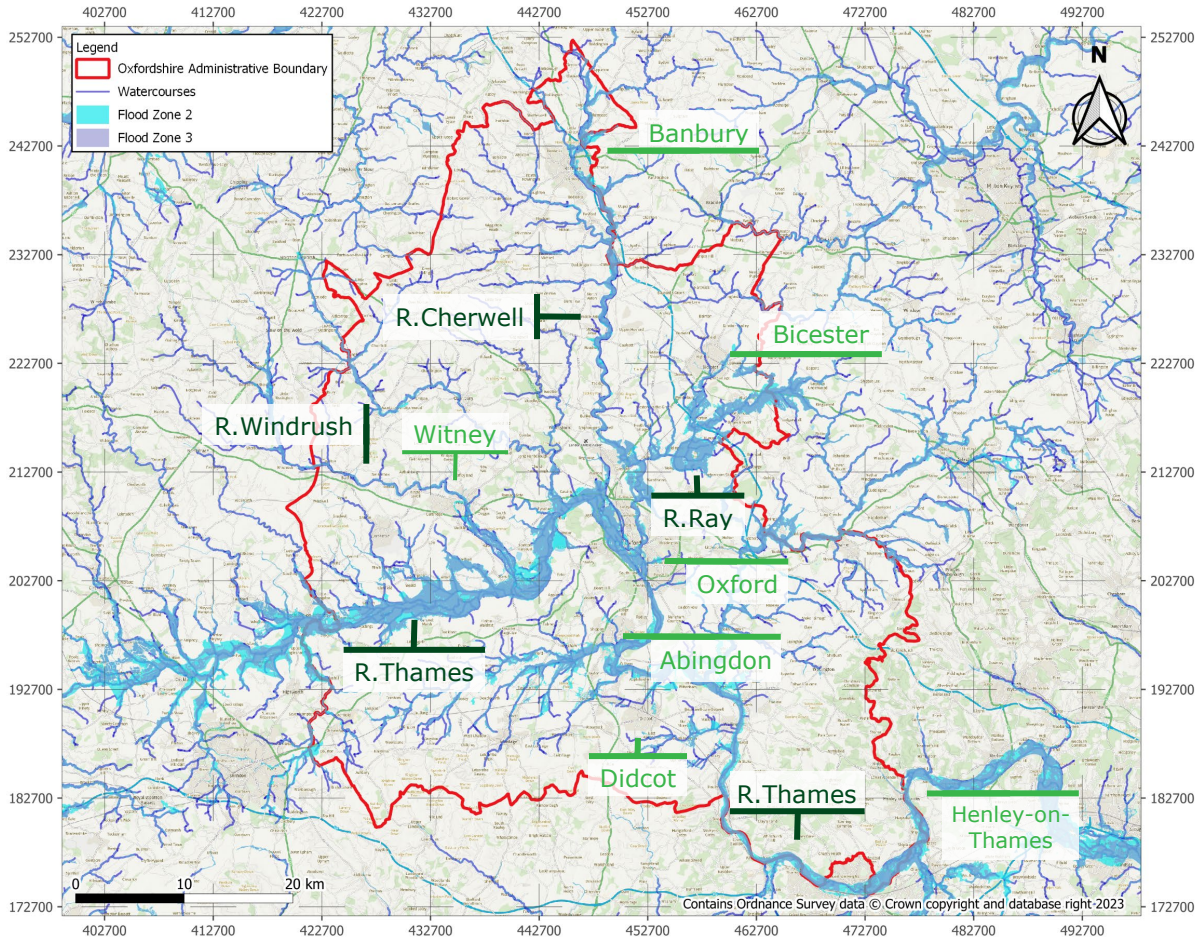

Figure 4- Fluvial Flood Map for Oxfordshire with main watercourses and key conurbations marked

5.4 Surface Water Flood Risk

Surface water flooding occurs when rainfall exceeds the ability of the ground to absorb that rainfall, and the resulting runoff impacts property or infrastructure. Surface water flooding is often worse following very intense rain and in areas where the ground is less able to absorb water. This includes urban areas with lots of hard surfacing, areas underlain by impermeable bedrock or soils such as clay and areas subject to soil compaction due to intense land use.

Insufficient capacity in the surface water drains can also contribute to surface water flood risk. Drains in many cases are old and not designed to cope with heavy rainfall, especially with the impact of climate change. Surface water flooding is a significant flood risk in urban areas due to the high proportion of impermeable surfaces, which cause a significant increase in runoff rates and consequently the volume of water that flows into the sewer network.

One of the main issues with surface water flooding is that in areas with no history of flooding relatively small changes to hard surfacing and surface gradients can cause flooding. As a result, continuing development could mean that surface water flooding can become more frequent and, although not on the same scale as fluvial flooding, it can still cause significant disruption.

Managing the risk of surface water flooding is the responsibility of LLFAs. The EA produce the Risk of Flooding from Surface Water (RoFSW) map. This national scale mapping identifies those areas at risk of surface water flooding during three probability events: 3.33% annual probability (1 in 30 year), 1% annual probability (1 in 100 year) and 0.1% annual probability (1 in 1,000 year).

A limited number of properties in many of Oxfordshire's urban centres are shown to be at medium to high risk including in parts of Oxford, Banbury, Bicester, Kidlington, Abingdon, Didcot, Witney and Henley-on-Thames along with a number of smaller settlements. Based on the LLFA's flood incident record there have also been many historical incidents of surface water flooding in these areas related to overland flow paths, areas of ponding and exceedance of drainage systems during heavy rainfall.

In Oxfordshire's rural areas whilst the risks to people and property are less, these areas have still experienced flooding, mostly from overland flow. Rural roads can become impassable due to overland flow and properties have been flooded directly. Changes in farming practices can exacerbate overland flow due to the removal of hedgerows and trees.

5.5 Groundwater Flood Risk

Groundwater flooding occurs when groundwater exceeds its normal range and emerges at ground level affecting property and infrastructure. The LLFA are responsible for managing the risk of groundwater flooding. This can occur when periods of prolonged rainfall cause the water table to rise and emerge in basements or above ground. There are no publicly available flood risk maps for groundwater.

In Oxfordshire the degree of groundwater flood risk is largely dependent on the underlying geology (see Figure 5) and ground levels. Groundwater flooding usually occurs in low lying areas underlain by permeable rock and aquifers that allow groundwater to rise to the surface through the permeable subsoil following long periods of wet weather. Low lying areas may be more susceptible to groundwater flooding because the water table is usually at a much shallower depth and groundwater paths tend to travel from high to low ground.

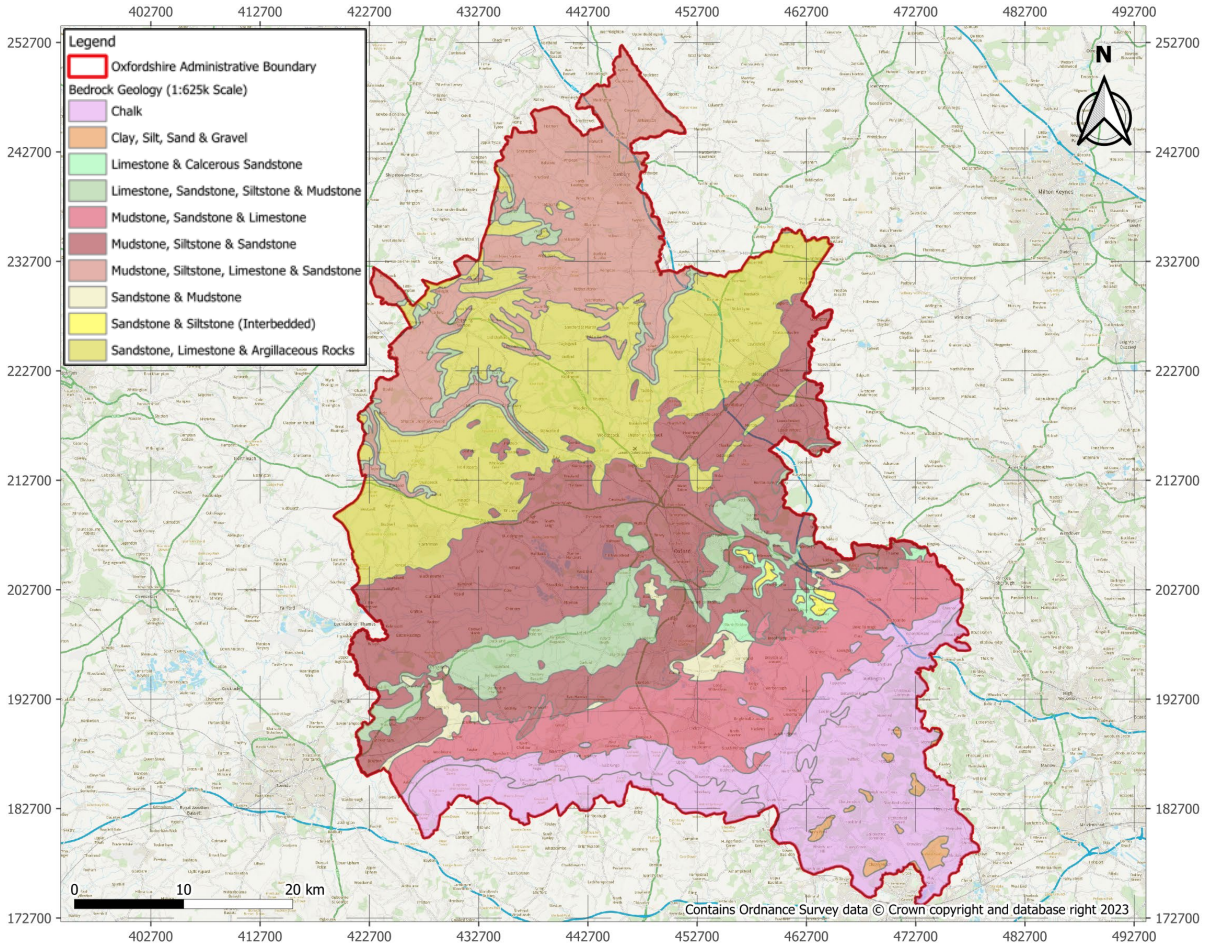

Figure 5- BGS Geology 1:625k for Oxfordshire. Contains British Geological Survey materials © UKRI (2024)

Over more permeable substrates including the Oolitic Limestone of the Cotswolds, the sandstone and limestone layers near Oxford and the significant area of chalk in the south of the county, groundwater recharge will be greater and the water table more likely to be mobile. In these areas groundwater flood risk is more significant.

In less permeable substrates such as the Lias Mudstone in the north of the county and the mudstone and clay layers in and around Oxford, drainage into the subsurface will be more impeded and the strata are generally unproductive. In these areas surface water flooding is likely to be more of an issue than groundwater flooding.

Groundwater flooding may appear as a wide area of flooding (across flat ground) or at a point (at a spring or within a basement of a property). Its impacts include:

- Flooding of basements, underground car parks and similar structures
- Flooding of land and property, damaging possessions/crops/stock
- Flooding of sewer systems, in some cases opening manhole covers and flooding the area with sewage (causing pollution as well as a flood incident)
- Flooding of utilities sited underground (power lines/telecoms/drinking water supply) causing service failures.

Groundwater flooding may last far longer compared to other types (from weeks to months). The amount of damage that can result may also be substantially higher, and there may be prolonged closure of access routes, roads and railways.

5.6 Sewer Flood Risk

Sewer flooding generally results in localised short-term flooding caused by intense rainfall events overloading the capacity of sewers. Flooding can also occur as a result of blockage, poor maintenance or structural failure.

Thames Water, Anglian Water and Severn Trent Water manage the risk of flooding to water supply and public sewerage facilities in addition to the flood risks generated from the failure of their infrastructure. They make sure their systems have the appropriate level of resilience to flooding and provide advice to LLFAs on how their assets impact on local flood risk and how this risk can be managed.

Private drains are those serving a single property, within that property's boundary. These drains are the responsibility of the property owner who gains benefit from them.

Sewer flooding incidents have been recorded across the majority of the Oxfordshire area in Thames Water's DG5[22] records, which date back to privatisation in 1989. There have been 153 incidents in Oxford City, 192 in West Oxfordshire, 240 in Cherwell, 223 in the Vale of White Horse and 293 incidents in South Oxfordshire. As Anglian Water and Severn Trent Water only serve a very small proportion of the county, which is predominantly rural, their DG5 records have not been requested.

5.7 Reservoir Flood Risk

The EA regulate reservoir safety with reservoir owners having to meet the standards they implement. In Oxfordshire owners include the EA, Thames Water, the Canal and River Trust, the RSPB and private individuals.

In 2021 the EA published updated maps showing the flood risk associated with reservoirs. Dam breach and flood modelling techniques were used to produce a new national set of reservoir flood maps for England. The maps show two flooding scenarios, including a 'dry-day' and a 'wet-day'. The 'dry-day' scenario predicts the flooding that would occur if the dam or reservoir failed when rivers are at normal levels. The 'wet day' scenario predicts how much worse the flooding might be if a river is already experiencing an extreme natural flood.

The main reservoirs which could impact Oxfordshire include the following:

- Banbury FAS (grid reference SP4672443436) Owner: Environment Agency
- Farmoor No.1 (grid reference: SP4450006800) Owner: Thames Water Limited
- Farmoor No.2 (grid reference: SP4450006000) Owner: Thames Water Limited
- Clattercote (grid reference SP4510048500) Owner: Canal & River Trust
- Wormleighton (grid refence SP4483351747) Owner: Canal & River Trust
- Grimsbury (grid reference SP4590042200) Owner: Thames Water Limited
- Bodicote (grid reference SP4532737665) Owner: Private Individual
- Otmoor Phase 1 (grid reference SP5610013900) Owner: RSPB
- Otmoor Phase 2 (grid reference SP5610013600) Owner: RSPB

[22] OCC (2023) *Oxfordshire CC SFHD data_Mar23.xlsx*

The modelled extents tend to lie along the River Thames, River Cherwell, and River Ray. The two Farmoor reservoirs impact the River Thames whilst the Banbury FAS, Grimsbury Clattercote, Wormleighton and Boticote impact the River Cherwell and River Thames downstream of the confluence between the two watercourses. The River Ray could be impacted by the two reservoirs at Otmoor.

Whilst many areas within the floodplains of these rivers are shown to be at risk, reservoir failure is a rare event with a very low probability of occurrence. Current reservoir regulation, which has been further enhanced by the FWMA (2010), aims to make sure that all reservoirs are properly maintained and monitored to detect and repair any problem.

6 Objectives & Measures

As the LLFA, OCC have a duty to develop, apply and monitor a LFRMS. The primary goal of the strategy is to manage flood risk and the impacts of flooding on people and property across the county. Supporting the strategy are a series of objectives and measures which will act as the framework across the plan period for meeting this goal. These have been set through a number of workshops and consultation within OCC, in addition to consultation with other RMAs working in Oxfordshire.

The objectives contained in this strategy relate to five key areas: improving understanding, greater collaboration, preventing increases in flood risk, ensuring holistic and sustainable approaches, and improved communication. These look to align with the National FCERM Strategy to reduce local flood risk. They also consider the aims and aspirations of people living and businesses working in the area.

Underpinning each of these objectives are a collection of associated measures. These identify specific flood risk management actions to address local needs and meet the objectives set. The measures reflect the nature of flooding within Oxfordshire and its consequences. They also prioritise how the LLFA will work with others to maximise outcomes.

Table 6 overpage provides a summary of the objectives and measures for the LFRMS. The following sections provide further detail and explain how they will be implemented.

Table 6- Objectives and measures in Oxfordshire's LFRMS

Objectives	Measures
Objective 1: Improve understanding of flood risks and ensure that all stakeholders understand their roles and responsibilities for flood risk management.	1.1 Clarify roles and responsibilities and publish LFRMS on Flood Toolkit website.
	1.2 Continue to prepare Section 19 reports to investigate flood incidents which meet the flood investigation criteria establishing their causes and identifying potential solutions.
	1.3 Continue preparation of a prioritised list of locations and potential schemes.
	1.4 Review Section 30 Schedule 1 asset register and confirm any actions to improve knowledge of third-party assets that manage flood risk by end of the plan period.
	1.5 Continue to review and maintain flood incident record to improve knowledge of flood hotspots within Oxfordshire, ensuring that the most relevant data are collected.
Objective 2: Take a collaborative approach to reducing flood risks, using all available resources and funds in an integrated way and in so doing manage and reduce overall flood risk.	2.1 Continue to maintain links with the Highways Department and work collaboratively to identify opportunities for flood risk improvements throughout the plan period.
	2.2 Increase interaction and data sharing with Thames Water through targeted engagement and escalation process where required.
	2.3 Develop skills and capability in different forms of flood risk management, including different funding sources and partnership funding schemes.
	2.4 Continue to work with other RMAs and others in order to take a collaborative approach to managing flood risk.
Objective 3: Take a sustainable and holistic approach to flood risk management, seeking to deliver wider environmental and social benefits, climate change mitigation and improvements under the Water Framework Directive.	3.1 – Seek opportunities to provide biodiversity and surface water run-off water quality enhancements through statutory planning consultations on drainage, and potentially through the SuDS Approval Body, if the legislation is approved by end of the plan period.
	3.2 – Develop on existing pilot schemes for local flood wardens and expand to further flood risk areas by the end of the plan period.
	3.3 – Liaise with town councils and parish councils to develop community emergency plans
	3.4 – Work with landowners to implement the mitigation recommendations identified in S19 reports, and priority areas.

Objective 4: Prevent an increase in flood risk from development where possible, by preventing additional flow entering existing drainage systems and watercourses.	4.1 – Seek opportunities to manage and improve surface water run-off impacts from developments through statutory consultations on planning applications and SuDS Approval Body consents by end of the plan period.
	4.2 – Update local SuDS guidance in conjunction with Highway department to ensure a common set of standards by end of the plan period.
	4.3 –Develop joint approaches between Highways and the LLFA to explore how SuDS principles can be used for new developments or retro-fitted where problems exist.
	4.4 – Identify highway networks that are at risk of flooding and establish the resilience measures required by end of the plan period, making use of the current 'resilient highways' initiatives undertaken by Highways.
	4.5 – Ongoing development of a SuDS maintenance database and maintenance database for highway assets by end of the plan period.
	4.6 – In our LLFA role as consultees on SFRAs and FRAs for major developments, ensure adaptive approaches are explored to mitigate climate change impacts in relation to flooding.
Objective 5: Seek opportunities to communicate to people the potential impacts of flooding and how they can reduce the impact.	5.1 – Continue promotion and development of the Oxfordshire County Council Flood Toolkit website with updated information on LLFA role, resilience, post event recovery and links to other services.
	5.2 – Establish links with the BeFloodReady Property Flood Resilience Centre in Wallingford and if appropriate other initiatives to identify resources available and make accessible through the Flood Toolkit website by end of the plan period.
	5.3 –Encourage greater collaboration and data sharing between Highways fix my street reports and LLFA toolkit reports by end of the plan period.
	5.4 – Reinforce links with the Environment Agency and other RMAs through the Thames Valley Local Resilience Forum to ensure aligned communication during flood events and sharing of best practice on working with communities by end of the plan period.
	5.5 – Ensure LLFA attendance at local flood forum meetings
	5.6- Communicate flood risk issues to councillors through lunch & learn sessions and/or newsletters by end of the plan period.

6.2 Objective 1 - Improve understanding

Improve understanding of flood risks and ensure that all stakeholders understand their roles and responsibilities for flood risk management.

As outlined in section 5 Oxfordshire is at risk from a number of different sources of flood risk with a range of RMAs responsible for flood risk management. Interaction between these sources is often complicated so a coordinated approach to flood risk management is vital. Having a strong understanding of flood risk helps support this, therefore through the plan period the LLFA working independently and with other RMAs will seek where possible to improve understanding of flood risk. This will be supported by implementation of the measures outlined below.

Measure 1.1: Clarify roles and responsibilities and publish LFRMS on Flood Toolkit website

The Oxfordshire Flood Toolkit[23] developed by the LLFA since publication of the previous strategy provides advice about flooding in Oxfordshire. This includes but is not limited to finding if you are at risk of flooding, how planning and development should take account of flood risk and what to do in an emergency. It also provides a high-level summary of who is responsible for different forms of flooding. During the plan period this will be developed and maintained to provide greater detail on the roles, responsibilities, and powers of RMAs within Oxfordshire.

Measure 1.2: Continue to prepare Section 19 reports to investigate flood incidents which meet the flood investigation criteria establishing their causes and identifying potential solutions

As part of the duties under the FWMA (2010), LLFAs are required to investigate significant flood incidents, known as Section 19 reports. In Oxfordshire, to date a flood event must meet one of the thresholds listed on the Oxfordshire Flood Toolkit website[24] to initiate the requirement for an investigation and report. During the plan period and in response to learning from future floods OCC will review their thresholds for undertaking Section 19 flood investigation reports.

On becoming aware of a flood which meets the thresholds or is agreed to require further investigation by the Flood Risk Management Team in collaboration with RMAs, section 19 of the FWMA (2010) states that an LLFA must, to the extent that it considers it necessary or appropriate, investigate:

- Which RMAs have relevant flood risk management functions
- Whether each of those RMAs has exercised, or is proposing to exercise, those functions in response to the flood

Where an authority carries out an investigation it must publish the results of its investigation and notify other RMAs.

To meet these requirements, Section 19 reports in Oxfordshire tend to follow the stages and structure detailed in the workflow shown in Figure 6.

[23] Oxfordshire County Council (2023) *Oxfordshire Flood Toolkit* https://www.oxfordshirefloodtoolkit.com/
[24] Oxfordshire County Council (2024) *Report a Flood* https://www.oxfordshirefloodtoolkit.com/emergency/report-flood/

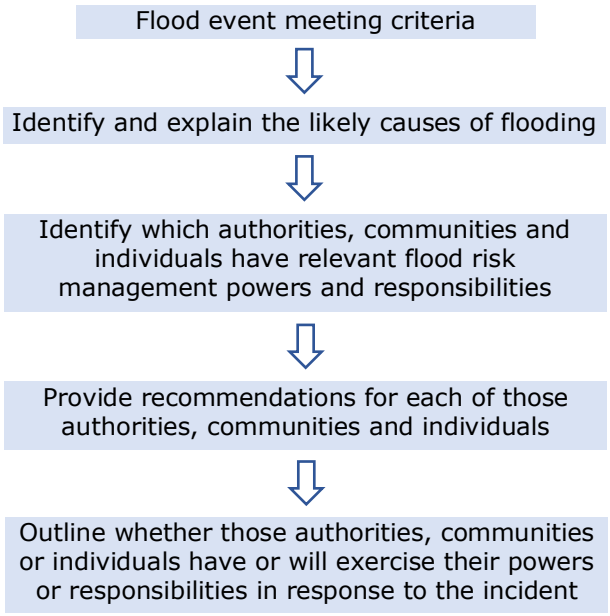

Figure 6- S19 reporting workflow

It should be noted that whilst the LLFA has the power to make recommendations for future flood risk management within a Section 19 report, it cannot:

- Resolve the flooding issues or provide designed solutions; or
- Force authorities to undertake any of the recommended actions.

Figure 7-Flooding in Witney during Christmas 2020, an event which prompted a requirement for a S19 report

Under this measure, the LLFA will continue to prepare S19 reports and work with district councils and other RMAs to fully establish the causes and potential solutions to the flooding issues encountered. They will also maintain close links to Oxfordshire's highway teams for any events meeting the Class C and Class U S19 criteria.

Measure 1.3: Continue preparation of a prioritised list of locations and potential schemes

OCC acting as the LLFA is preparing information and a methodology to support the prioritisation of flood risk areas for further flood risk investigative work, and support a longer-term programme of opportunities and actions.

This project will use a Geographical Information System (GIS) multi-criteria analysis tool, to identify and prioritise locations most at risk of flooding from local sources and specific to Oxfordshire. It will also provide evidence and support decision making for the County and will work in conjunction with partners and other strategies.

Better knowledge of flood risk areas will allow for the identification of potential schemes, and also help deliver capital maintenance including smaller scale interventions and more focussed monitoring.

Measure 1.4: Review Section 30 Schedule 1 asset register and confirm any actions to improve knowledge of third-party assets that manage flood risk by end of the plan period

Section 30 Schedule 1 of the FWMA (2010) provides the power for 'designating authorities' to formally designate features or assets which form flood risk management systems, but which are not maintained or operated by those responsible for managing the risk. The LLFA has the power to provide consent to the alteration, removal, or replacement of a feature. There is also an enforcement element to this process, where action can be taken against anyone contravening the Act; for example, altering a feature without consent.

Under this measure, the council will review the current asset register and identify where information may be lacking on the presence, location, condition, and function of 3rd party assets before confirming actions to improve this knowledge and the management of these assets in general.

Measure 1.5: Continue to review and maintain flood incident record to improve knowledge of flood hotspots within Oxfordshire, ensuring that the most relevant data are collected.

The LLFA maintain a flood incident record, listing all the flood incidents reported since 2007. Floods can be reported via the Oxfordshire Toolkit website by the public and through direct consultation with the LLFA (from the EA, district councils and emergency services).

Flood incidents come from multiple sources which does result in some inconsistencies with the level of detail ascribed to each flood incident. However, the Toolkit website now has several useful fields which guide users to ensure that the most relevant data is collected.

The flood incident record is also currently being transferred to a GIS Layer which will help make it more accessible and manageable. These actions, along with continued review and maintenance of the incident record will bring an improved knowledge of flood hotspots across the county.

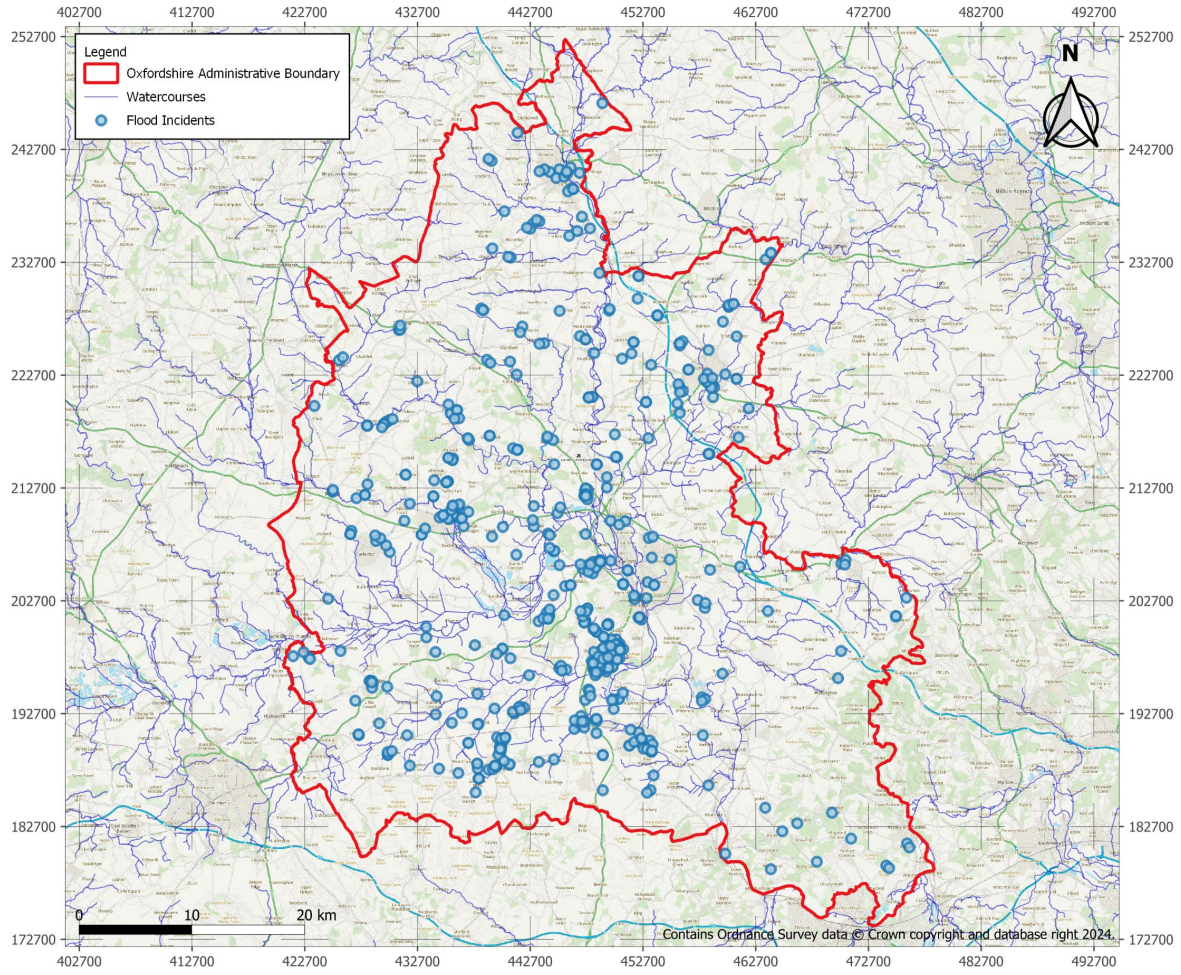

Figure 8- Oxfordshire Recorded Flood Incidents

It should be noted that in addition to the flood hotspots database, OCC are also a member of Project Groundwater[25]. The programme aims to improve monitoring of when and where groundwater emerges and overall awareness of groundwater flooding. It is led by Buckinghamshire Council in partnership with five other authorities including OCC and Flood Community Groups.

6.3 Objective 2 - Taking a Collaborative Approach

Take a collaborative approach to reducing flood risks, using all available resources and funds in an integrated way and in so doing manage and reduce overall flood risk.

A collaborative approach is vital to ensure effective delivery of the strategy. As outlined in section 4.2 there are existing governance arrangements in place which support collaboration within Oxfordshire. Ensuring that these arrangements are maintained and strengthened through the plan period will support flood risk management and ensure that the needs of all stakeholders are factored into the decision-making process.

[25] Project Groundwater (2024) https://www.projectgroundwater.co.uk/

Measure 2.1: Continue to maintain links with the Highways Department and work collaboratively to identify opportunities for flood risk improvements throughout the plan period.

Highways authorities are responsible for providing and managing highway drainage and roadside ditches. They must ensure that road projects do not increase flood risk. National Highways is responsible for motorways and major trunk roads. OCC is responsible for other roads. The LLFA already have quarterly meetings with the Highways department in OCC, and both often work alongside each other. The focus of this measure is in continuing to maintain these links and identify opportunities collaboratively.

Measure 2.2: Increase interaction and data sharing with Thames Water through targeted engagement and escalation process where required.

Thames Water manage the risk of flooding to water supply and sewerage facilities and flood risks from the failure of their infrastructure. As part of this role, they should also collaborate with the LLFA, this includes the following actions:

- Providing advice to LLFAs on how water and sewerage company assets impact on local flood risk.
- Working with developers, landowners and LLFAs to understand and manage risks – for example, by working to manage the amount of rainfall that enters sewerage systems.
- Work with the EA, LLFAs and district councils to coordinate the management of water supply and sewerage systems with other flood risk management work.

This measure seeks to help facilitate these responsibilities and improve collaboration between the LLFA and Thames Water, it should include:

- Attendance at quarterly meetings of the Oxfordshire Risk Management Authority flood group.
- Targeted engagement with Thames Water and escalation process to ensure efficient communication.
- Increased data sharing of flooding associated with sewer assets.

Measure 2.3: Develop skills and capability in different forms of flood risk management, including different funding sources and partnership funding schemes.

Collaboration between RMAs will help develop the skills and capabilities in different forms of flood risk management within the LLFA. Seeking opportunities for new funding could also help support the development of skills through experience on different flood risk management projects.

The government uses a partnership funding approach to allocate grants for flood and coastal erosion risk management projects. The Partnership Funding policy approach was introduced in 2011 to replace a priority scoring system. The approach to funding flood risk management projects shares the costs between national and local sources of funding. Any project where the benefits are greater than the costs can qualify for a contribution from government funding. The amount of funding a project is eligible for will depend on the benefits it provides; typically measured as the benefits to people and property. Projects in more deprived areas, and ones that provide environmental or other wider economic benefits may attract more grant.

Where the Government funding available does not cover its full cost, additional funding may need to be raised from partners. Anyone who benefits from an FCERM project can be a partner, including:

- Local communities
- Businesses
- Developers
- Local councils

The EA has published guidance[26] on partnership funding for flood risk management projects, which provides more detail on how funding can be calculated and some of the main principles governing partnership funding.

This measure commits the LLFA to investigating different funding sources to support partnership funding schemes. This could support the successful delivery of flood risk management projects and comes with the added benefit of developing skills and experience within the LLFA.

Measure 2.4: Continue to work with other RMAs and others in order to take a collaborative approach to managing flood risk.

This measure relates to the continued functioning of the Oxfordshire Risk Management Authority flood group and specific collaboration between the LLFA and each RMA on specific flood risk matters.

It ties closely with the EA's national strategy which highlights that effective flood risk management will not be delivered by RMAs working on their own. Collaboration between RMAs, as well as individuals, communities, the third sector, businesses, farmers and land managers should contribute to planning and adapting to future flooding. This includes working collaboratively, and where appropriate supporting RMAs and others on flood risk management schemes.

The EA's programme of flood risk management schemes is important in this regard, it relates to main rivers and includes some of the rivers in Oxfordshire. For example, the Oxford Flood Alleviation Scheme, which OCC are currently supporting on. OCC are also supporting the Littleworth Natural Flood Management project. The Thames Valley Flood Scheme could also potentially be of relevance in the future. It is investigating ways to manage flood risk on a large scale across the Thames Valley including flood storage and natural flood management (NFM).

Under this measure OCC will also continue working with RMAs and others in order to take a collaborative approach to managing flood risk. OCC will also ensure where possible that they are up to date and aware of any EA, district or Thames Water plans that could contribute to managing flood in the county.

6.4 Objective 3 - Take a Sustainable and Holistic Approach

Take a sustainable and holistic approach to flood risk management, seeking to deliver wider environmental and social benefits, climate change mitigation and improvements under the Water Framework Directive.

The strategy will sit alongside the council's other strategic policies related to climate change, sustainability, and biodiversity along with river basin management plans, the EA's national strategy for flood risk and wider national legislation. The strategy will look to align with these, seeking approaches to flood risk management which are holistic and bring multiple benefits. In its role as LLFA OCC will consider the full range of appropriate flood risk management techniques, including innovative approaches or technologies.

In terms of climate change, the latest projections for the UK published in 2021 show that Oxfordshire is likely to experience more frequent extremes in temperature, rainfall, and wind. OCC declared a climate emergency in 2019 and developed a climate action framework[27], which sets out their targets

[26] Environment Agency (2023) *Partnership funding for FCERM projects* https://www.gov.uk/guidance/partnership-funding-for-fcerm-projects accessed 18/12/2023
[27] Oxfordshire County Council (2020) *2020 Climate Action Framework* https://www.oxfordshire.gov.uk/sites/default/files/file/about-council/OCC_Climate_Action_Framework2020.pdf accessed 19/12/2023

and approach to tacking climate change in the short, medium, and long term. Currently the council is also developing a climate change strategy, assessing the risk and vulnerability of areas across Oxfordshire. The council are also committed to becoming carbon neutral by 2030. The LLFA will work within these frameworks and aims, with the approach to flood risk informed by the latest climate change modelling and most reliable evidence that becomes available.

Sustainability and biodiversity will also be prioritised in line with the latest NPPF. Local guidance will also be considered, OCC has worked with the Berkshire, Buckinghamshire, and Oxfordshire Wildlife Trust (BBOWT) and the Thames Valley Environmental Records Centre (TVERC) to produce a Biodiversity and Planning guidance document[28] published in 2014. The guidance combines planning policy with information about wildlife sites, habitats, and species to help identify where biodiversity should be protected. OCC has also published a green infrastructure report[29] which sets out the strategic case for investment in green infrastructure to meet the county's sustainability challenges.

Oxfordshire is largely covered by the Thames River Basin Management Plan[30] (RBMP) with a small area in the northwest of the county falling within the Anglian RBMP[31]. The latest plans were both published in October 2022. They set the legally binding locally specific environmental objectives that underpin water regulation (such as permitting) and planning activities. This also includes investment programmes to enhance the water environment. The RBMPs tie into the EU Water Framework Directive which is transposed into law in England and Wales by the Water Environment (Water Framework Directive) (England and Wales) 2017 Regulations. The overall aim is to ensure that all watercourses achieve a "good status" by defined date (2027 in the latest RBMPs). OCC has a major role in this and will work with the EA to ensure that all relevant actions are identified, prioritised, resourced, and implemented.

Thames Water's future plans for Oxfordshire also need to be considered. They are currently developing the Southeast Strategic Reservoir Option. This is a reservoir in the Upper Thames catchment, southwest of Abingdon. The reservoir will be filled with water from the Thames in winter and when river levels drop, or demand for water increases, water would be released from the reservoir back into the river for re-abstraction downstream. As well as providing a resilient water supply for the southeast, the reservoir also provides opportunities to create new habitats and increase biodiversity.

As outlined in taking a holistic approach to flood risk other strategic objectives related to the environment will be considered, so too will the views and needs of communities across Oxfordshire. Community resilience plays a critical role in being prepared for and during flooding events. Following the 2007 floods several communities across the county began to develop community and parish emergency plans. OCC will continue to support these with the LLFA working with community groups

[28] OCC, BBOWT, TVERC (2014) *Biodiversity and Planning in Oxfordshire* *https*://www2.oxfordshire.gov.uk/cms/sites/default/files/folders/documents/environmentandplanning/countryside/naturalenvironment/Wholedocument.pdf accessed 19/12/2023

[29] Oxfordshire County Council (2020) *Making the case for investment in Green Infrastructure in Oxfordshire* https://www.oxfordshire.gov.uk/sites/default/files/file/countryside/GreenInfrastructurefulltext.pdf accessed 19/12/2023

[30] Environment Agency (2022) *Thames River basin district river basin management plan* https://www.gov.uk/guidance/thames-river-basin-district-river-basin-management-plan-updated-2022 accessed 19/12/23

[31] Environment Agency (2022) *Anglian River basin district river basin management plan* https://www.gov.uk/guidance/anglian-river-basin-district-river-basin-management-plan-updated-2022 accessed 19/12/23

to help facilitate their development. The measures below provide more detail on how the LFRMS will seek to deliver Objective 3 throughout the plan period.

Measure 3.1: Seek opportunities to provide biodiversity and surface water run-off water quality enhancements through statutory planning consultations on drainage, and potentially through the SuDS Approval Body, if the legislation is approved by end of the plan period.

The LLFA are statutory consultees in the planning process to assess major planning applications (e.g. 10 or more homes or major commercial developments) for their surface water drainage implications.

New developments should consider Sustainable Drainage Systems (SuDS), moving away from traditional below ground piped drainage systems. SuDS manage rainwater runoff in a way that is more similar to the natural runoff process retaining water at or near the ground surface.

SuDS can take many forms, both above and below ground. Some types of SuDS include planting, others include proprietary manufactured products.

There are four main categories of benefits that can be achieved by SuDS water quantity, water quality, amenity, and biodiversity. These are referred to as the four pillars of SuDS (see Figure 9).

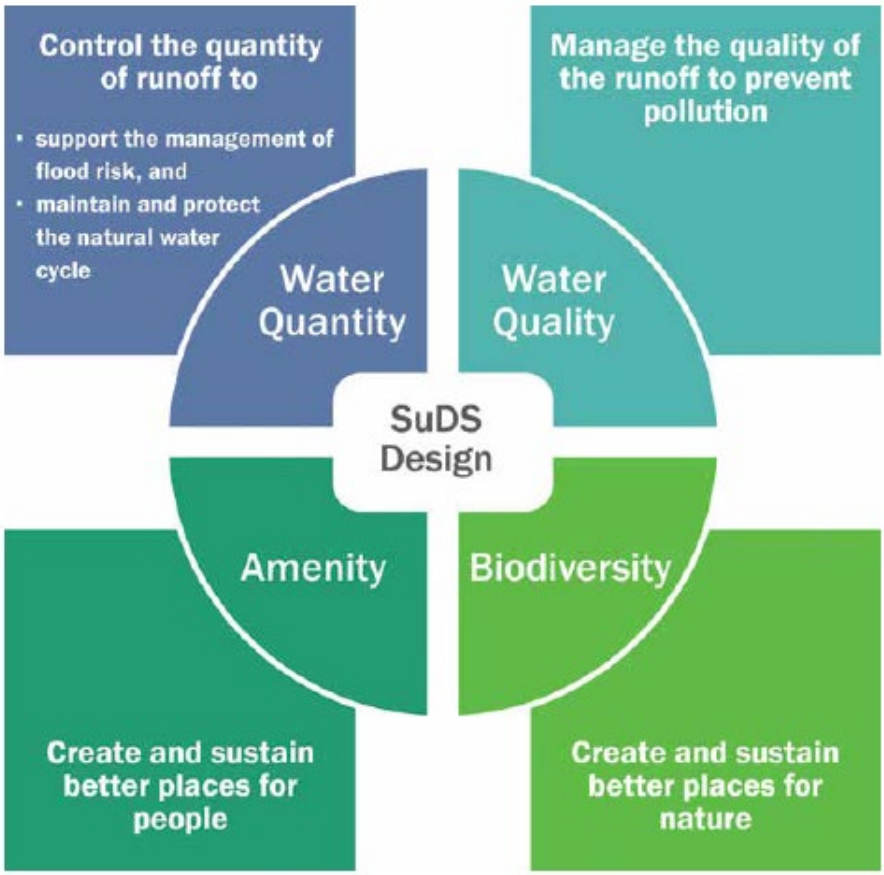

Figure 9- Four main categories of benefits that can be achieved by SuDS (Source: CIRIA[32])

[32] CIRIA (2015) *The SuDS Manual C753*

In its role as statutory consultee the LLFA will work with developers to ensure that the benefits of SuDS are maximised. During the plan period, Schedule 3 of the FWMA is set to be implemented in England (scheduled for 2024). The core purpose of Schedule 3 is to make the incorporation of SuDS into new developments mandatory. It will involve the introduction of SuDS approval bodies (SAB) whose duty it will be to adopt new SuDS on the basis that they meet certain conditions. OCC will take on the role of the SAB in Oxfordshire, giving the council greater responsibilities in managing, approving, and maintaining SuDS throughout the county. The SAB process forms another statutory process outside of planning.

In taking on this role, OCC will require more resources not only in approving SuDS plans but also inspecting and maintaining SuDS when it is built. It will also bring more opportunities to ensure that SuDS schemes are developed consistently.

It should also be noted that OCC also engage with the districts on the wider local plans for future development. In these roles, OCC can shape future development in Oxfordshire ensuring that the holistic benefits that SuDS can provide are prioritised.

Measure 3.2: Develop on existing pilot schemes for local flood wardens and expand to further flood risk areas by the end of the plan period.

Flood wardens are members of the local community, they can be individuals, representatives of the parish council or existing volunteers. The main role of flood wardens is to monitor blocked drains, culverts, ditches in need of repair, tree branches or obstructions in rivers/watercourses, and anything else that may cause a flood risk and report them to the appropriate land, property owners or the LLFA so that they can be resolved before a major flood event occurs.

Flood wardens can also play a role in helping local communities to understand their flood risk and offering their local knowledge to emergency service during and after a flood.

The Joint Oxfordshire Resilience Team (JORT), highways team and volunteer coordination team, can support flood wardens in their role and provide the necessary training. The council has helped set up three pilot flood warden schemes within Oxfordshire located in Ascott under Wychwood, Witney and more recently Sunningwell. They have also published a flood warden handbook[33] providing flood wardens with the information they need to undertake their role; the diagram below shows the five key responsibilities covered by the handbook.

[33] Oxfordshire County Council (2023) *The Flood Warden Handbook Version 1.03*

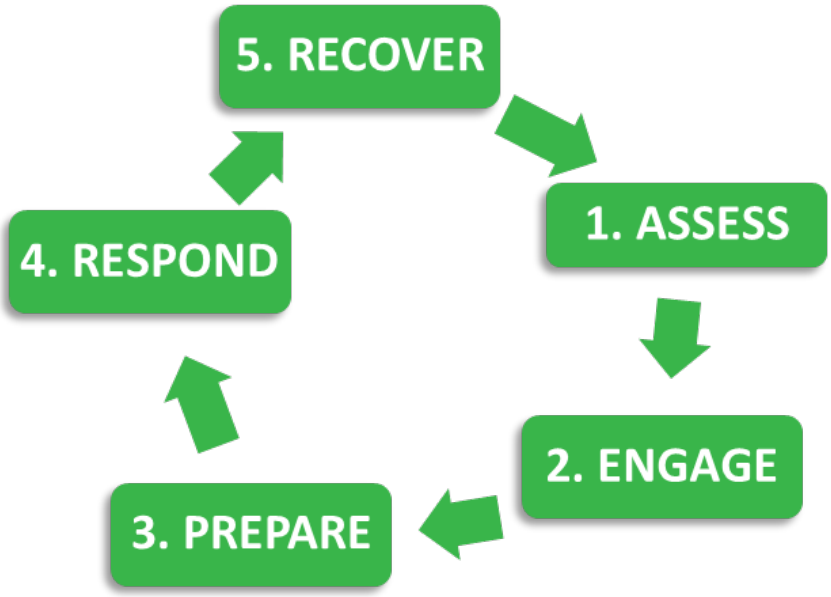

Figure 10- Five steps identified in OCC's Flood Warden Handbook

Under this measure, the council will look to expand flood warden schemes to more locations at flood risk. This should help bring more community awareness of flood risk and improves the LLFA's awareness of issues present in particular areas. Schemes such as this tie into one of the ambitions of EA's national strategy which seeks to aim for a nation ready to respond to flooding and highlights the training and supporting of flood wardens as a means of supporting this.

Measure 3.3: Liaise with town and parish councils to develop community emergency plans.

Developing a community flood plan can be an effective way to encourage the community to become more resilient. This may involve members of the parish council forming a Flood Action Group, a core of local people who act as a representative voice for the wider community on flood risk matters. Members of the action group would be most familiar with the plan and the actions they should take, with the wider community also made aware that there is a plan in place. The plan can support emergency services to identify the resources available, contact key members of the group, and identify properties that may have vulnerable residents inside.

As part of the strategy, the council's resilience team will liaise with respective parish councils to offer support in developing community emergency plans, outlining their scope and implementation. The strategy further recognises and encourages the important role Parish councils play in gathering information on areas at risk of flooding, in raising additional funding for local flood defence measures and for undertaking regular maintenance.

Measure 3.4: Work with landowners to implement the mitigation recommendations identified in S19 reports, and priority areas.

This measure strongly aligns with a strategic objective in the latest EA's strategy, which is for RMAs to work with landowners to help adapt their land use practices in order to contribute to greater resilience to flooding.

Mitigative actions have been identified in a number of the LLFA's existing S19 reports including recommendations for agricultural landowners to carry out works to help to retain the natural land drainage regime, provide the best soil conditions for the continued agricultural use of the land and reduce surface runoff where possible.

During the plan period, the LLFA will increase engagement with landowners to better monitor and encourage suitable land use practices with respect to identified flood risks. The LLFA will investigate and where appropriate adopt processes to streamline implementation of flood risk management measures, such as establishing an LLFA minor groundworks contractor framework.

6.5 Objective 4 - Prevent an Increase in Flood Risk

Prevent an increase in flood risk from development where possible, by preventing additional flow entering existing drainage systems and watercourses.

New development tends to be associated with an increase in the impermeable areas which if not properly managed will increase existing surface water run-off rates causing an increase to flood risk. The LLFA acting as statutory consultee on surface water drainage for major developments, promote the use of SuDS and review strategies to safeguard against additional flow entering existing drainage systems and watercourses.

Prevention of flood risk also relies on riparian owners being aware of and undertaking their responsibilities to let water flow through their land, maintain bed and banks, leave banks free of development (unless permitted), not cause obstructions and inform the relevant people if planning to build or alter a structure. In its role the LLFA will continue to work with riparian owners to encourage a proactive approach to managing watercourses reducing the likelihood of future flooding.

Increases in flood risk are also minimised through collaboration with other RMAs on major flood alleviation projects (e.g. Oxford Flood Alleviation Scheme), shared knowledge of flood defence assets (permanent and temporary) and coordinated flood response.

Measure 4.1: Seek opportunities to manage and improve surface water run-off impacts from developments through statutory consultations on planning applications and SuDS Approval Body consents by end of the plan period.

The LLFA acting as statutory consultee on surface water drainage for major developments, promote the use of SuDS and review strategies to safeguard against additional flow entering existing drainage systems and watercourses. Under this measure the LLFA will continue in this role, whilst also seeking opportunities to improve surface water run-off impacts from development. This could include seeking a betterment on existing runoff rates in areas at risk of flooding or supporting blue and green infrastructure in urban settings. Following the implementation of Schedule 3 of the FWMA in England (scheduled for 2024), OCC will take on the role of the SAB in Oxfordshire, this gives the council greater responsibilities in managing, approving, and maintaining SuDS throughout the county, thereby offering more opportunities to ensure that SuDS schemes are being implemented properly with their performance maintained going forward.

OCC also engage with the districts on the wider local plans for development which SFRAs support. In these roles, OCC can shape future development in Oxfordshire ensuring that the management of surface water impacts are brought to the fore.

Measure 4.2: Update local SuDS guidance in conjunction with Highway department to ensure a common set of standards by end of the plan period.

The LLFA has published local SuDS guidance[34] intended to assist developers in the design of all surface water drainage systems, and to support Local Planning Authorities in considering drainage proposals for new development in Oxfordshire. The guidance sets out the standards that the LLFA apply in assessing all surface water drainage proposals. The guidance document is continually updated, the latest version was published in 2021.

The guidance currently only focuses on major development, the OCC highways department has its own drainage policy[35] and follows the national standards for highways which cover the design of highway drainage systems[36]. The highways department have been consulted in the development of the LFRMS and it has been agreed that during the plan period the LLFA and highways department will work together to update the existing guidance for SuDS so that they cover both major developments and highways. The construction of new highways goes hand in hand with new development so having a universal document for both should encourage more joined up thinking and more integrated applications of SuDS. It also ensures that a common set of standards are being followed to reduce the impacts on surface water runoff from impermeable land uses.

The allowable discharge rates and volumes in the standards are likely to remain largely steered by national guidance in the form of non-statutory guidance for SuDS. However, updates to the guidance will also focus on ensuring that the document is user friendly and understandable to a range of stakeholders. The LLFA will also consult with the district councils on the standards to help ensure a clear consistent awareness for minor developments.

Measure 4.3: Develop joint approaches between Highways and the LLFA to explore how SuDS principles can be used for new developments or retrofitted where problems exist.

Under this measure, investigating how SuDS principles can be used to address issues will be prioritised, with a specific focus on development and highways as one system rather than as separate elements.

There are already formal quarterly meetings between the LLFA, the highways department and other RMAs. The LLFA and highways team already work together and share information so there exists a precedent to further develop joint approaches. Joint approaches that consider a broader range of stakeholders are more likely to bring the holistic benefits sought by Objective 3 of the strategy.

[34] Oxfordshire County Council (2021) *Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire* https://www.oxfordshirefloodtoolkit.com/wp-content/uploads/2022/01/LOCAL-STANDARDS-AND-GUIDANCE-FOR-SURFACE-WATER-DRAINAGE-ON-MAJOR-DEVELOPMENT-IN-OXFORDSHIRE-Jan-22-2.pdf accessed 22/12/2023
[35] Oxfordshire County Council (2023) *Highways Drainage Policy* https://www.oxfordshire.gov.uk/sites/default/files/file/roads-and-transport-major-projects/drainagepolicy.pdf
[36] Standards for Highways (2022) *CG 501 – Design of highways drainage systems* https://www.standardsforhighways.co.uk/search/6355ee38-413a-4a11-989b-0f33af89c4ed accessed 22/12/2023

Figure 11- Broad Meadow Scheme, an example of temporary SuDS retrofitting, (Source: Oxford City Council[37])

Measure 4.4: Identify highway networks that are at risk of flooding and establish the resilience measures required by end of the plan period, making use of the current 'resilient highways' initiatives undertaken by Highways.

The highways department are already undertaking this measure as part of their *resilient highways' initiatives*. As part of this work there is a move away from treating issues at source to focusing on the highway system as a whole. The LLFA will support this and look to help identify areas at risk of flooding based on the information they hold and advise on potential measures where appropriate.

Measure 4.5: Ongoing development of a SuDS maintenance database and maintenance database for highway assets by end of the plan period.

The LLFA have been developing a SuDS maintenance database and there also exists a database for highway assets. The information from these two databases will be shared between the LLFA and highways so that problem areas are known, and action can be taken. Continued development of the SuDS maintenance database will be particularly useful with the introduction of Schedule 3, when the LLFA become responsible for maintaining SuDS features.

Measure 4.6: In our LLFA role as consultees on SFRAs and FRAs for major developments, ensure adaptive approaches are explored to mitigate climate change impacts in relation to flooding.

In advising and reviewing SFRAs, the LLFA can shape development allocations put forward by the district councils and will ensure that these adequately account for the impacts of climate change. They will also advise on the principles outlined within SFRAs for flood mitigation, flood resilience and SuDS. OCC also engage with the districts on the wider local plans for development that SFRAs support. In these roles, OCC can shape future development in Oxfordshire ensuring that a sequential approach to development has been applied which considers climate change and is resilient to flooding.

At the site level, the LLFA act as a statutory consultee for surface water drainage and groundwater, they also have a regulatory role on consenting works on ordinary watercourses. In these roles they

[37] Oxford City Council (2022) Broad Meadow https://www.oxford.gov.uk/info/20359/building_projects/1530/broad_meadow

can ensure that the impacts associated with these sources of flood risk are considered in site-specific FRAs. Where flood risks are significant, they will ensure that suitable mitigation and resilience measures are being proposed that consider the impacts of climate change. They will also work closely with the EA and Thames Water to ensure that climate change is considered when addressing risk from main rivers and sewers.

In their approval role for drainage from major developments within Oxfordshire, the LLFA will also ensure that drainage strategies account for the impacts of climate change on surface water runoff. This will ensure that developments maintain existing runoff rates and volumes throughout their lifetime and do not contribute to flood risk in the future.

6.6 Objective 5 - Communicate to People

Seek opportunities to communicate to people the potential impacts of flooding and how they can reduce the impact.

Community engagement is a fundamental part of local flood risk management. Through engagement with the public, a greater awareness of flood risk and the measures available to address it is achieved. This in turn improves community resilience and preparedness in the event of a flood.

This objective ties into one of the key ambitions of the national strategy- *a nation ready to respond to flooding* and one of its strategic objectives *Between now and 2050, people will understand the potential impact of flooding and coastal change on their lives and livelihoods and will take action to reduce that impact.*

Communication links with other RMAs are also vital in all aspects of flood risk management and ensure that the needs of all stakeholders are factored into the decision-making process.

OCC already engage with the public and other RMAs through face-to-face engagement and online resources such as the Oxfordshire Flood toolkit. The measures associated with this objective focus on continuing these roles and strengthening links where possible.

Measure 5.1: Continue promotion and development of the Oxfordshire County Council Flood Toolkit website with updated information on LLFA role, resilience, post event recovery and links to other services.

The Flood Toolkit website (see Figure 12) has been developed by OCC in recent years and provides homeowners, businesses, landowners, and the community with key information on flooding. This includes how to find whether you are at risk of flooding, how to report a flood incident, information on flood prevention, advice on post event recovery and how flood risk relates to the planning system. It also outlines the responsibilities of RMAs and other stakeholders and provides links to other services.

Under this measure, OCC will continue to develop the website making sure that it is kept up to date. By further promoting the website to residents and businesses in Oxfordshire, there is an opportunity to raise awareness of flood risk and the resources available. This in turn will help people better understand the potential impacts of flooding and how to take action.

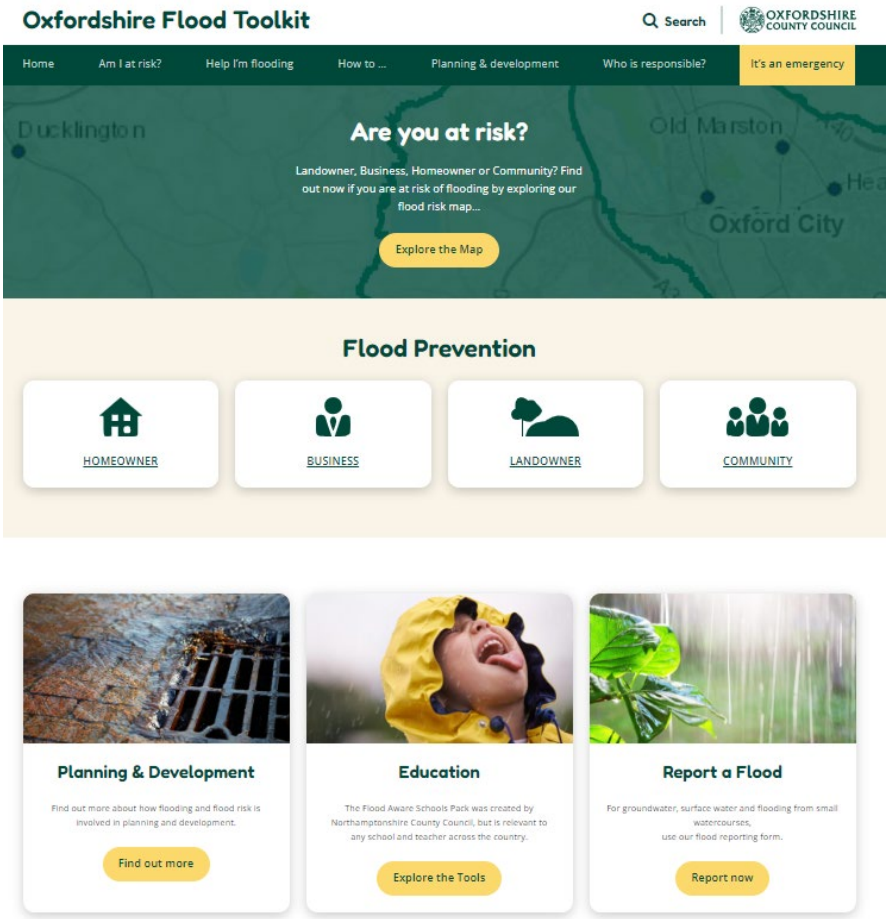

Figure 12- Oxfordshire Flood Toolkit Website

Measure 5.2: Establish links with the BeFloodReady Property Flood Resilience Centre in Wallingford and if appropriate other initiatives to identify resources available and make accessible through the Flood Toolkit website by end of the plan period.

The BeFloodReady Property Flood Resilience Centre was opened in Wallingford in May 2023. It is the UK's first dedicated facility to deliver accredited training on the specification, installation, and maintenance of Property Flood Resilience (PFR) measures. Funded by Defra, the centre is used to upskill professionals from a wide range of industries.

The LLFA will establish links with the centre to identify any resources and training available to improve knowledge of PFR internally. It will also identify opportunities to work with the centre to promote flood resilience in the county. This will include providing a link to the BeFloodReady website[38] via its Flood Toolkit website. The BeFloodReady website provides guidance and information on PFR to homes, businesses, and communities. The LLFA has also published a short guidance document on PFR[39], this could also be updated to provide links to BeFloodReady' resources.

[38] BeFloodReady (2023) https://www.befloodready.uk/
[39] Oxfordshire County Council (2023) *Reduce the impact of flooding on your home* https://www.oxfordshirefloodtoolkit.com/pdfs/12/protect-your-home.pdf accessed 02/01/2024.

Figure 13- Oxfordshire guidance document for homeowners

It should be noted that whilst PFR measures do help the resilience of individual homes and businesses, this option often forms a last line of defence. In this regard, they should be considered holistically and weighed against other measures which may provide flood prevention such as community flood defence schemes or larger flood alleviation works.

Measure 5.3: Encourage greater collaboration and data sharing between Highways fix my street reports and LLFA toolkit reports by end of the plan period

OCC provide a fix my street resource online[40], which can be used to report, view, and discuss local highway faults. Whilst many of the issues reported relate to non-flood related issues (e.g. potholes, electrical faults etc), drainage and flooding issues are sometimes reported. It is important that these issues are also captured in the LLFA's flood incident record to provide as full a picture as possible of flood hotspots across Oxfordshire.

Under this measure, the LLFA will work with highways over the plan period to ensure that measures are put in place to ensure that the relevant data between the two datasets are shared. This should also help with incident response ensuring that the correct team are alerted when managing particular issues.

[40] Oxfordshire County Council (2023) Fix my street *https://fixmystreet.oxfordshire.gov.uk/* accessed 02/01/2024.

Measure 5.4: Reinforce links with the Environment Agency and other RMAs through the Thames Valley Local Resilience Forum to ensure aligned communication during flood events and sharing of best practice on working with communities by end of the plan period

As mentioned in the EA's current national strategy, effective flood risk management will not be delivered by RMAs working on their own. In this regard, OCC will take steps during the plan period to reinforce links with the EA and other RMAs. This measure specifically relates to improving communication during flood events and jointly finding ways to best work with communities.

As an initial stage, it would be helpful to establish the EA's and other RMAs current engagement with the community before, during and after flood events. This should help ensure that a consistent message is being delivered to residents and should safeguard against repetition. Expanding upon this opportunities will be sought to share methods of engagement in the community. This could be undertaken during Risk Management Authority flood group meetings or through more informal liaison.

There can be challenges and inefficiencies in sharing data due to data confidentiality issues with the need for individual data sharing agreements for separate projects and with each RMA. Through the plan period the LLFA will explore ways in which this process can be streamlined.

Measure 5.5: Ensure LLFA attendance at local flood forum meetings.

The LLFA currently attend a number of formal and informal meetings. Some examples of the local flood forum meetings the LLFA attend and contribute to are listed below:

- Thames Valley Local Resilience Forum Meeting- set up by the EA/OCC resilience team.
- Thames RFCC Main Committee Meeting- set up by the EA.
- ADEPT Flood meeting- ADEPT are a flood management group consisting of a number of LLFAs. This meeting is typically set up by Kent County Council
- Oxford Flood Alleviation Scheme Programme Board Meeting- set up by the EA.

On a more informal bases the LLFA also meet with the EA monthly and are in regular communication with the district councils. The frequency of these communications is often dependent on the time of year and any recent flood events. Meetings with Thames Water are formalised as and when needed.

Under this measure the LLFA will work to ensure continued attendance at each of these meetings and any other relevant flood forum meetings that may arise during the plan period. This will ensure that the LLFA are updated on flood risk matters at the local to regional scale.

Measure 5.6: Communicate flood risk issues to councillors through lunch & learn sessions and/or newsletters by end of the plan period.

In Oxfordshire councillors can be elected to a parish or town council, a district council, and the county council. County councillors are elected for a four-year term. Councillors engage with their local communities and reflect their views. They form a vital source of information for issues in the community including flooding and can play a key role in influencing local policy. In this regard keeping councillors up to date on flood risk issues across the county could prove vital in the management of future flood risk.

Within the LLFA, communication with councillors on flood risk matters is currently on an ad-hoc basis. However, under this measure the LLFA will take steps to engage with councillors more actively. This could include arranging face to face lunch and learn sessions on key flood risk issues or circulation of a periodic newsletter to keep councillors regularly updated on the LLFA's function and activities.

7 Implementation

7.1 Investment

RMAs in Oxfordshire have a responsibility to investigate and promote opportunities to deliver flood risk management activities that will aim to reduce the number of people and properties at risk of flooding. There is limited financial support from the government to deliver all the identified requirements, therefore, in line with the system for national allocation of capital funding, all RMAs should prioritise activities using a risk-based approach. This includes the measures identified in this strategy.

The Action Plan supporting this strategy will indicate how investment in flood risk management will be prioritised in Oxfordshire. Other RMAs will be consulted regarding the implementation of the strategy and development of the action plan, to ensure responsibilities are clearly assigned and that priorities are aligned between relevant partners.

7.2 Funding

Flood risk management funding is available through multiple sources and in many cases funding of measures relies on pooling resources from more than one of these sources. Figure 14 shows the various routes and combinations of funding that can be sought, whilst Table 7 provides more detail on each funding source.

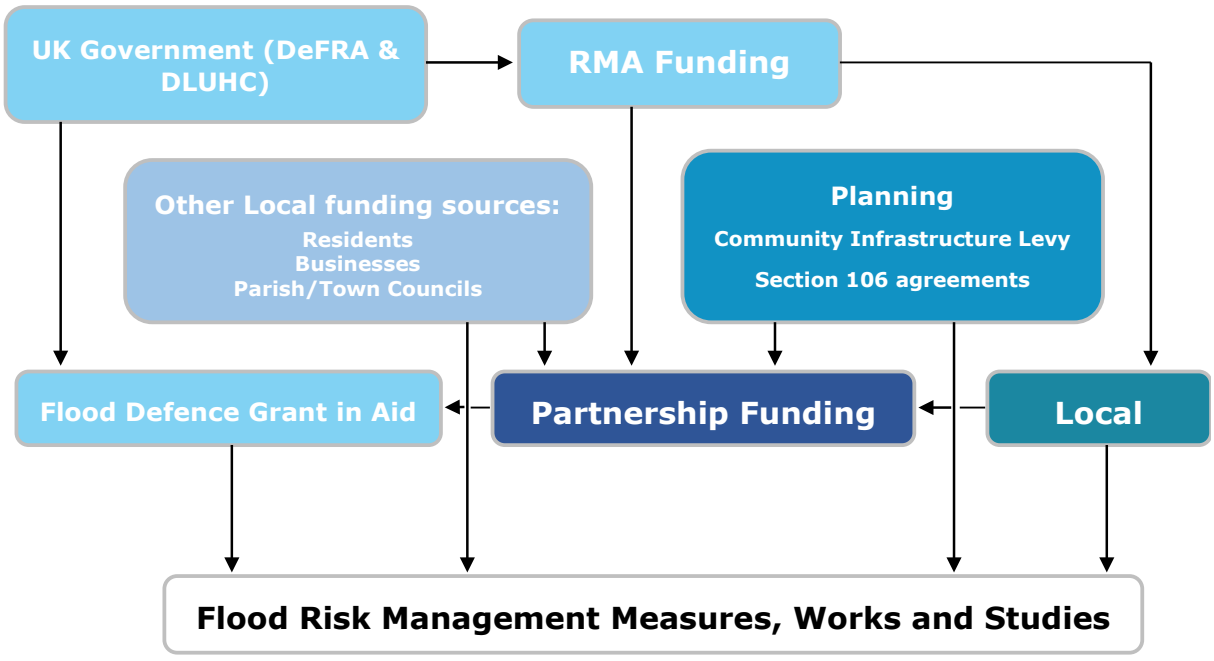

Figure 14- Funding mechanisms available to support flood risk management

Table 7- Information on funding mechanisms

Funding Mechanism	Source	Summary	Eligible Uses
National Funding: Flood Defence Grant in Aid (FDGiA)	DeFRA (through the EA)	The primary tool for obtaining capital funding of flood improvements is through the FDGiA process. Potential measures are submitted to the Medium-Term Plan (MTP), administered by the EA. Each scheme will then be considered, along with others from across the Country, for allocation of funding. It is unlikely that any measures will achieve 100% funding via FDGiA, therefore often proposals are submitted once other sources of partnership funding have been secured.	• Build new flood defences (e.g. channels, walls or embankments) • Build new structures (e.g. sluices or pumping stations) • Improve existing defences and structures. • Refurbish existing defences or structures where it extends their original design life. • Produce natural flood management measures. • Improve preparing for, responding to and recovering from flood or erosion events. • Dredge and de-silt – one off projects to bring a channel to a condition where the RMA can maintain it. • Protect or enhance the natural environment where there is a legal requirement to do so.
Lead Local Flood Authority Funding	DeFRA and Department for Levelling Up, Housing and Communities (through the LLFA)	Funding for LLFAs to carry out their new duties under the FWMA (2010) is set out under a burdens agreement between Defra and the Department for Levelling Up, Housing and Communities. The funding is not ring fenced and local authorities are free to decide how much to spend in light of other local priorities.	Funding for LLFA to carry out their duties as defined by the FWMA (2010) including: • Development of LFRMS • Employment of flood risk staff • Commission of investigative studies (S19 reports) • Contribute towards the practical delivery of flood improvement measures
Local Levy	Funds are raised by a levy on county and unitary authorities which fall within the regional flood and coastal committee boundary (e.g. Thames region)	The local levy is managed by Regional Flood and Coastal Committees (RFCC). The Thames Local Levy is obtained through payments from Oxfordshire, Swindon, London, Essex, Buckingham, Hertfordshire, Surrey, and Hampshire. All RMAs within these areas can apply for local levy funds from the RFCC for carrying out any of the flood and coastal erosion risk management functions within their area. The levy is set and voted for by the committee which includes representative from LLFAs and independent members.	The local levy can fund or part fund all types of flood risk management projects, both traditional and natural approaches. It can be used as partnership funding on GiA funded projects. The local levy therefore allows locally important projects to be progressed ahead of larger-scale national priorities.

Community Infrastructure Levy (CIL)	Funds are raised by local authorities choosing to charge a levy on new developments in their area	The CIL is a charge which can be levied by local authorities on new development in their area to help them deliver the infrastructure. The levy only applies in areas where a local authority has approved, a charging schedule which sets out its levy rates. In most cases new development (>100 m^2) is liable.	The money raised from the CIL can be used to support a range of infrastructure, which could include flood improvement works.
Section 106 Agreements	Agreement of financial contribution between developer and local authority	Planning obligations under Section 106 of the Town and Country Planning Act 1990 (as amended) are a mechanism which make a development proposal acceptable in planning terms, that would not otherwise be acceptable. They are focused on site specific mitigation to limit the impact of development.	Contributions from the developer will be used to address issues that are necessary to make a development acceptable. This could include mitigation against potential flood risk. Contributions can be pooled (max 5 developments) towards the same item of infrastructure. Section 106 cannot be used to fund infrastructure that is already identified for potential CIL funding.
Partnership Projects and Shared Resource	Collaboration between RMAs to align investment and pool resources	Collaboration between RMAs on flood infrastructure projects is a means of pooling resources to secure FDGia funding. Resources can also be pooled to support local measures not applying for FDGia funding.	Can fund or part fund all types of flood risk management projects, both traditional and natural approaches including those covered by GiA and local levy arrangements.
Other Potential Partners	Examples include: • Network Rail • Natural England • NGOs • Forestry Commission • Parish Councils • National Farmers Union • Utilities companies • Waste management • Residents	As well as RMAs there are several other organisations that will have a major interest in flood risk management activities and can be sought to provide funding.	Can fund or part fund all types of flood risk management projects, both traditional and natural approaches including those covered by GiA and local levy arrangements.

The table above outlines the funding sources available and it is clear that to help reduce damage from flooding at the property level, to businesses and to communities, funding is often needed. The Oxfordshire Flood Toolkit has a funding tool[41] to help users find the best sources of funding for potential projects. This involves completing five questions related to who is looking for funding, the flood risk measures sought, funds already available and when funding is required.

7.3 Prioritisation

The current process for prioritisation of measures to manage local flood risk is for OCC acting as the LLFA and its partners to identify potential measures based on areas considered to be at risk of flooding.

This is typically based on a review of past flood events including information and evidence received from district councils, parish councils and residents of Oxfordshire. It will also cover the GIS project being undertaken to identify flood hotspots as outlined in measure 1.3.

Potential measures are then assessed by the relevant RMAs before being submitted to the Oxfordshire Risk Management Authority flooding group for further consideration and approval. In some cases, measures may need to bid for additional funding.

The Risk Management Authority flooding group establishes the relative priority of measures based on a range of criteria including but not limited to flood risk to property, flood risk to highway routes, flood risk to land, health hazard and risks to vulnerable people.

OCC work with partners to co-ordinate and submit bids to the EA indicating the level of grant aid support required and compete nationally for grant funding. In this process the relative priority of applications might be adjusted to take account of other factors including the availability of alternative sources of funding, interaction with other policies, and other matters that would influence a holistic Oxfordshire approach.

[41] OCC(2024) *Funder finder* https://www.oxfordshirefloodtoolkit.com/risk/funding/

8 Monitoring and Reviewing the Strategy

8.1 Consultation

OCC will consult all RMAs on outline timetabling arrangements a significant time before the date proposed for formal adoption. This will enable approval and adoption procedures to be programmed.

The timetable will also include an appropriate period for public consultation. This consultation will involve online consultation. For this, materials will be prepared to help clearly inform consultees, along with questionnaires and/or other methods to record feedback.

Consultation will also be undertaken by raising the profile of the strategy's main outcomes on the Oxfordshire flood toolkit website. Direct e-mails will be sent to key stakeholders making them aware of the consultation procedures available and inviting them to comment on the strategy.

8.2 Monitoring Procedures and Updating the Strategy

The LFRMS will be fully reviewed and updated within a minimum of five years from adoption, denoting the end of the plan period. OCC will maintain a log of issues arising from operation of the strategy to which all local authorities can contribute and to which all partners can refer.

OCC will also consider the need for any updates in the interim due to major changes in legislation, a significant flood event or any other issues arising from operation. When determining whether an update is required consideration will be given to the degree to which an event or issue could influence the focus of flood risk management in Oxfordshire including the objectives and measures underlying the strategy and the action plan supporting it.

Glossary

Annual Exceedance Probability (AEP)- The probability of a certain size of flood flow occurring in a single year. A 1 per cent AEP flood flow has a 1 per cent, or 1-in-100 chance of occurring in any one year.

Exception Test- The exception test is a test required before allowing development to be allocated or permitted in situations where suitable sites at lower risk of flooding are not available following application of the sequential test. It requires two elements to be satisfied:

- development that has to be in a flood risk area will provide wider sustainability benefits to the community that outweigh flood risk; and
- the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Flood Risk Activity Permits- Work on or near main rivers is regulated by environmental permits issued by the EA. You may need to apply for permission to do any of the following regulated flood risk activities:

- erecting any temporary or permanent structure in, over or under a main river, such as a culvert, outfall, weir, dam, pipe crossing, erosion protection, scaffolding or bridge
- altering, repairing or maintaining any temporary or permanent structure in, over or under a main river, where the work could affect the flow of water in the river or affect any drainage work.
- building or altering any permanent or temporary structure designed to contain or divert flood waters from a main river.
- dredging, raising or removing any material from a main river, including when you are intending to improve flow in the river or use the materials removed.
- diverting or impounding the flow of water or changing the level of water in a main river
- quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert
- any activity within 8 metres of the bank of a main river, or 16 metres if it is a tidal main river.
- any activity within 8 metres of any flood defence structure or culvert on a main river, or 16 metres on a tidal river

Fluvial Flooding- Fluvial flooding or river flooding, occurs when the water level in a river, lake or stream rises and overflows onto the neighbouring land. The water level rise of the river could be due to excessive rain or snowmelt.

Groundwater Flooding- Groundwater flooding is when groundwater exceeds its normal range and emerges at ground level.

Main Rivers- Main rivers are usually larger rivers and streams. They are designated as such and shown on the Main River Map. The Environment Agency carries out maintenance, improvement, or construction work on main rivers to manage flood risk.

Ordinary Watercourse- Ordinary watercourses include every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows and which does not form part of a main river.

Ordinary Watercourse Consent- If planning to do works on an ordinary watercourse consent is often required from the LLFA. This includes works that are:

- Likely to cause an obstruction to flow or restrict storage.
- That involve the construction of a culvert.
- That will cause changes to structures (dams, weirs, culverts or other like structures) already in place. These will also need consent from the council regardless of other consents or planning permission you may already have obtained.
- That construct temporary works or structures that interfere with or change the flow of water in a watercourse.

Surface Water Flooding- Surface water flooding is when intense rainfall overwhelms the ground's ability to absorb rainfall or the capacity of drainage systems.

Sewer Flooding- Sewer flooding is typically when intense rainfall events overloads the capacity of sewers. Flooding can also occur as a result of blockage, poor maintenance or structural failure of sewerage assets.

Sequential Test- The Sequential Test looks to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account. Where it is not possible to locate development in low-risk areas, the Sequential Test should go on to compare reasonably available sites:

- Within medium risk areas; and
- Then, only where there are no reasonably available sites in low and medium risk areas, within high-risk areas.

Return Period- The average length of time in years between events such as the flooding of a particular level. A 1 in 100-year return level is where there is a 1 in 100 chance of that level being exceeded in a year.

Reservoir Flooding- Reservoir flooding relates to flooding which occurs in the unlikely event of a dam or reservoir failure.

Sustainable Drainage Systems (SuDS)- SuDS are a collection of water management practices that aim to align modern drainage systems with natural water processes and are part of a larger green infrastructure strategy.