

South Gloucestershire Local Flood Risk Management Strategy 2022-2027

Final

South Gloucestershire Council

July 2022



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Executive Summary

This Local Flood Risk Management Strategy (LFRMS) (2022 – 2027) sets out how we address the management of local flood risk and undertake our flood risk management responsibilities as required under the Flood and Water Management Act 2010. This strategy follows on from the existing Local Flood Risk Management Strategy (2015-2020) and extension (2021-2022). As part of the strategy update, a full review of the existing strategy and extension has been undertaken, so that the strategy aligns with the latest guidance and legislation. The local flood risk management extension (2021-22) identified a number of topics that were not included in the existing strategy, but are now felt to have strong merit for inclusion. In particular; climate change, biodiversity, natural flood management and sustainable development. The objectives in relation to flood risk management have also been updated to reflect the objectives that have been set in the Environment Agency's **National Flood and Coastal Erosion Risk Management Strategy (NFCERMS)**¹ for England. A new Action Plan has also been produced that sets the actions for the Authority to achieve its objectives over the period the LFRMS will cover (2022 – 2027) This plan consists of both a) District Wide Actions which are generic across the administrative area; and b) Priority Catchment Actions, whereby all catchments within the administrative area have been prioritised in order to focus the flood risk management on the top ten at highest risk of flooding.

The purpose of this strategy is to set out our approach to managing flood risk from local sources (i.e. surface water, ordinary watercourses and groundwater) in both the short and longer term, with proposals for sustainable actions that will help us to manage the risk in a way that delivers the greatest benefit to our residents, businesses and the environment. It also outlines how we will work with others to manage all sources of flooding within South Gloucestershire and neighbouring catchments.

Since 2010 flood risk in South Gloucestershire has been managed jointly between a number of Risk Management Authorities that include South Gloucestershire Council, the Environment Agency, National Highways (previously Highways England), Wessex Water and the Lower Severn Internal Drainage Board. This strategy provides links to documents that explain the role that each of these organisations play in managing flood risk. To ensure flooding is managed in an integrated way across these organisations, the strategy is inclusive and considers all functions and sources of flooding. The intention of this is to recognise where flood risk responsibilities coincide, and where partnership working, and jointly funded projects could be undertaken.

Under the Flood and Water Management Act 2010, all Risk Management Authorities are expected to exercise their flood and coastal erosion risk management functions consistently with the national strategy. As a result, the aims and objectives of this strategy are directly aligned to the objectives set out in the Environment Agency's **NFCERMS**¹ for England (adopted 25 September 2020). The national strategy provides a framework for guiding the operational activities and decision making of practitioners supporting the direction set by government policy in England and sets out the long-term delivery objectives the nation should take over the next 10 to 30 years. It also sets out shorter term, practical measures that Risk Management Authorities should take working with partners and communities.

The aims of the Local Flood Risk Management Strategy have been divided into six objectives, which have been aligned with the national strategy objectives:

1. **Evidence:** We will enhance our strategic understanding of flood risk from all sources, both in the present day and with climate change
2. **Resilience/Awareness:** We will work with communities to raise greater awareness of present and future flood risk through engagement, support and education to help them to become more resilient to future flood risk, considering the effects of climate change on different sources of flooding.

¹ National Flood and Coastal Erosion Risk Management Strategy. Environment Agency 2020. <https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england--2>

3. **Adaptation:** We will work with communities to implement adaptive approaches to enhance the natural and built environment (including: Asset Management, Natural Flood Management, Habitat Restoration and Sustainable Drainage Systems).
4. **Collaboration:** We will work with all risk management authorities and stakeholders to achieve a consistent, co-ordinated and risk-based approach to flood risk management.
5. **Sustainability:** We will contribute positively to sustainable growth and development, and support environmental net gain by influencing wider development, redevelopment and regeneration plans to deliver flood risk benefits, whilst enhancing biodiversity and promoting flood risk management measures that work with natural processes in our catchments.
6. **Opportunities:** We will seek opportunities (including funding, research and innovation) from existing and new sources to invest in making communities resilient to flooding now and in the future.

The action plan that forms part of the Local Flood Risk Management Strategy sets out specific actions that we will undertake in partnership with other Risk Management Authorities, to manage local flood risk within the administrative area from 2022 – 2027.

It is the principal aim of this strategy to support communities in becoming more resilient to future flood risk. These aims will be met by the projects that are taken forward in future work programmes, and by the actions set out in the action plan.

Investigations, new information, changing budgets and funding contributions, and subsequent flood events will alter what happens over the lifetime of the strategy, and minor changes may be made to the documents including the flood maps. Regular reviews of progress against the action plan will be conducted so that we can monitor the flood risk situation and adjust priorities as necessary. The strategy covers the period 2022 - 2027 and will be updated in five years.

1. Introduction

This Local Flood Risk Management Strategy (2022 – 2027) sets out how South Gloucestershire Council addresses the management of local flood risk and undertakes its flood risk management responsibilities that are a statutory requirement of the Flood and Water Management Act 2010. This follows on from the existing Local Flood Risk Management Strategy (2015-2020) and extension (2021-2022).

The Local Flood Risk Management Strategy must;

- assess the local flood risk – this is set out in Chapter 3 and Appendix C;
- set out objectives for managing local flooding – these are set out in Chapter 1
- list the costs and benefits of measures proposed to meet these objectives, and funding opportunities – these are set out in the action plan in Appendix A and Appendix B.

It is the principal aim of this strategy to support communities in becoming more resilient to future flood risk. This aim will be met by the projects that are taken forward in future work programmes, and by the actions set out in the action plan. Within this strategy, Priority Catchments have been identified using the national Risk of Flooding from Surface Water (RoFSW) mapping and historic flood risk data. Precedence will be given to investigating and managing the flood risk in these Priority Catchments. However, any value for money project with positive benefits, irrespective of its location, will be considered. Funding capital works is going to be challenging, especially where projects are required to have some partnership contributions in order to proceed. It may be that in many areas the risk of flooding is managed through early flood warnings (where these are available in areas at risk of fluvial and tidal flooding), and local resilience measures. Local authorities will also help communities take action to help themselves and carry out their own riparian responsibilities.

Local flood risk is defined in the Flood and Water Management Act (2010) as meaning flood risk from:

- a. surface runoff – which is defined as rainwater including snow and other precipitation which is on the surface of the ground (whether or not it is moving) and which has not entered a watercourse, drainage system or public sewer
- b. groundwater – which is defined as all water which is below the surface of the ground and in direct contact with the ground or subsoil; and
- c. ordinary watercourses - which is defined as a watercourse which does not form part of a Main River and which includes lakes, ponds or other areas of water which flow into an ordinary watercourse.

A glossary of technical terms can be found in Appendix H at the end of this report.

1.1 Strategy partners

Within South Gloucestershire there are a range of different organisations that have responsibility for flood risk management. In developing this strategy, South Gloucestershire Council worked in partnership with the relevant Risk Management Authorities to achieve an effective strategy and action plan for tackling and reducing the impacts of flooding across the administrative area. The partners included in the development of this strategy are:

- South Gloucestershire Council
- Avon Wildlife Trust

- Bath and North East Somerset Council
- Bristol Avon Catchment Partnership
- Bristol City Council
- Environment Agency
- Gloucestershire County Council
- National Highways (previously Highways England)
- Lower Severn Internal Drainage Board
- Parish Councils
- Frome Catchment Innovation Programme
- River Frome Reconnected Partnership
- Wessex Water
- Wiltshire Council

Figure 1: Flooding in Frampton



1.2 Consultation

Public Consultation on the draft strategy was undertaken between February and May 2022. The strategy was then updated based on the feedback received. The strategy was presented to elected members and senior officers in June and July 2022.

1.3 Purpose of revised strategy

The purpose of this strategy is to set out how South Gloucestershire Council undertakes its flood risk management responsibilities to meet the requirements of the Flood and Water Management Act 2010. As part of the update, a full review of the existing Local Flood Risk Management Strategy (LFRMS) has been undertaken. This has involved updating all flooding data, and signposting and referencing the current National and Local flood risk management guidance and strategies, much of which has been updated since the previous strategy was produced. There have also been improvements in available datasets. The local flood risk management extension (2021-22) identified a number of topics that were not included in the existing strategy, but are now felt to have strong merit for inclusion. In particular; climate change, biodiversity, natural flood management and sustainable development. The local strategy objectives have been updated to reflect the objectives that have been set in the Environment Agency's **National Flood and Coastal Erosion Risk Management Strategy (NFCERMS) for England**¹. A new Action Plan has also been produced that sets the actions for the Authority for it to achieve its objectives over the period the LFRMS will cover (2022 – 2027).

1.4 Legislative context

Within South Gloucestershire, national, regional and local legislation and policy provide a legislative framework under which flood risk is managed. At the core of this are the National Flood Risk Management Objectives which are set out within the **NFCERMS**¹. The Strategy's long-term vision is for: a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100 and this is supported by three long term ambitions, underpinned by evidence about future risk and investment needs;

- Climate resilient places
- Today's growth and infrastructure – resilient in tomorrow's climate

- A nation ready to respond and adapt to flooding and coastal change

Within South Gloucestershire, the Council has developed local strategies and policies, which build on national guidance, to meet housing and economic development growth. Details of these can be found on the [South Gloucestershire website](#)². There are specific documents available for [developers and designers, land and homeowners](#)³, and also for [surface water management](#)⁴, which sets out how SuDS should be delivered in South Gloucestershire. Wessex Water also have surface water and SuDS policies, details of which can be found on the [Wessex Water website](#)⁵.

[South Gloucestershire Council's Flood Risk webpage](#)⁶ provides information and advice for residents for managing flood risk, including emergency contact numbers and guidance documents on how to identify whether properties are at risk, types of flooding, preventing flooding, and instructions of what to do in a flood emergency.

Appendix F provides details of the background and national context of the LFRMS.

1.5 Flood resilience

In line with the [NFCERMS](#)¹, South Gloucestershire Council intend to focus on flood and coastal resilience ahead of conventional Flood and Coastal Erosion Risk Management (FCERM) schemes when managing flood risk within the administrative area.

Resilience is defined in the NFCERMS as *“The capacity of people and places to plan for, better protect, respond to, and to recover from flooding and coastal change. Places can achieve this by: making the best land use and development choices, better protecting people and places, responding to and recovering from flooding and coastal change whilst all the time adapting to climate change”*.

The National FCERM Strategy identifies four approaches to managing flood and coastal resilience as shown in Figure 2.

²Planning and development related to drainage webpage. South Gloucestershire Council. (2021) <https://www.southglos.gov.uk/environment/drainage-and-flood-risk-management/planning-development-related-drainage/>

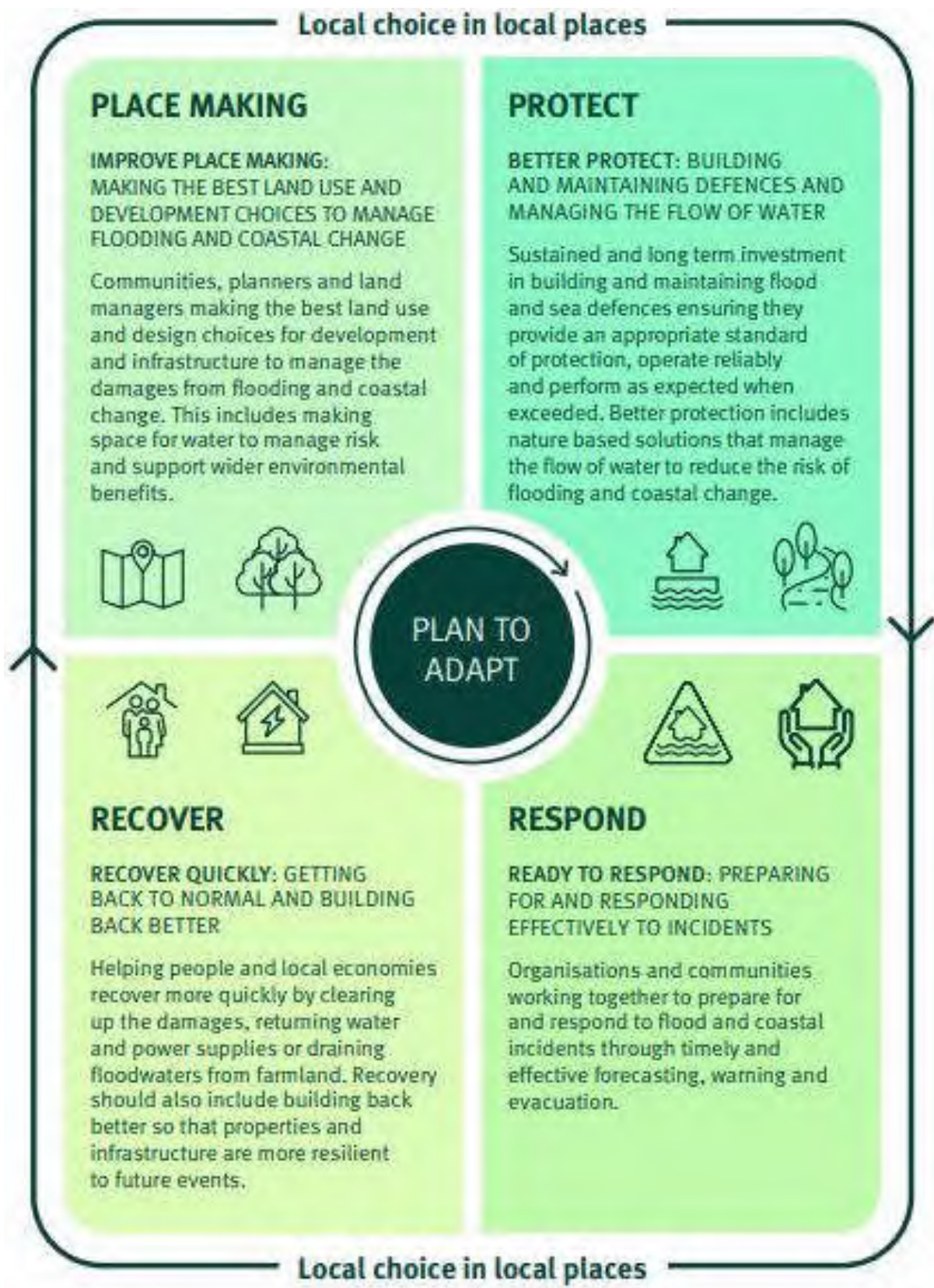
³ <https://www.southglos.gov.uk/documents/Land-ownersv2-final-Draft-290616.pdf>

⁴ <https://www.southglos.gov.uk/documents/Land-ownersv2-final-Draft-290616.pdf>

⁵ Planning Liaison. Wessex Water. <https://www.wessexwater.co.uk/services/building-and-developing/planning-liaison>

⁶ Flood Risk webpage. South Gloucestershire Council. (2021) <https://www.southglos.gov.uk/environment/drainage-and-flood-risk-management/flood-risk-2/>

Figure 2: The components of resilience (NFCERM Strategy, EA 2020)



The focus of conventional flood alleviation schemes is through investment to reduce the risk by reducing the probability and severity of harm posed by the hazard. However, it is not possible to provide such schemes for every community at risk, due to a range of environmental, technical and

funding limitations. Adopting a wider range of alternative actions, alongside the capital programme, can help to increase flood resilience. Such approaches can manage flood risk by reducing the likelihood and the impact (for example natural flood management interventions in the catchment) or they can help to reduce the consequences and impacts of flooding (such as property flood resilience, flood warning and emergency plans).

This combination of both traditional, engineered flood alleviation schemes, alongside wider catchment and community resilience actions, is a vital response as climate change increases flood risk. Such a strategy helps to include communities that would otherwise not qualify for an engineered scheme and hence remain at ever increasing flood risk. These wider actions to manage the risk - either reducing the probability and/or the impact - will mean that more vulnerable communities are resilient to flooding and able to remain sustainable and thriving places (Figure 3). Such placemaking helps create or sustain communities and places where people want to live, work and explore, and makes them better prepared to respond to and recover from flooding.

Flood resilience has several core themes, including:

- Property Flood Resilience – providing practical and cost effective steps to help lower flood risk through reduction of the impact of flooding on a receptor.
- Flood Emergency Planning – being prepared helps to reduce, control or mitigate the impact and consequences of flooding.
- Communication and stakeholder engagement - increasing the awareness of the risks of flooding and working with communities and stakeholders.

There are many resources available for individuals to increase their resilience to flooding. These include:

- **BeFloodReady**⁷
- **Communities prepared**⁸
- **National Flood Forum**⁹
- **Environment Agency guidance on what to do before, during and after a flood**¹⁰

The components of resilience (Figure 2) identifies four key themes which are fundamental to flood resilience: place making, protect, respond and recover. These themes have been considered when developing the action plan as part of this strategy.

7 BeFloodReady webpage. www.befloodready.uk

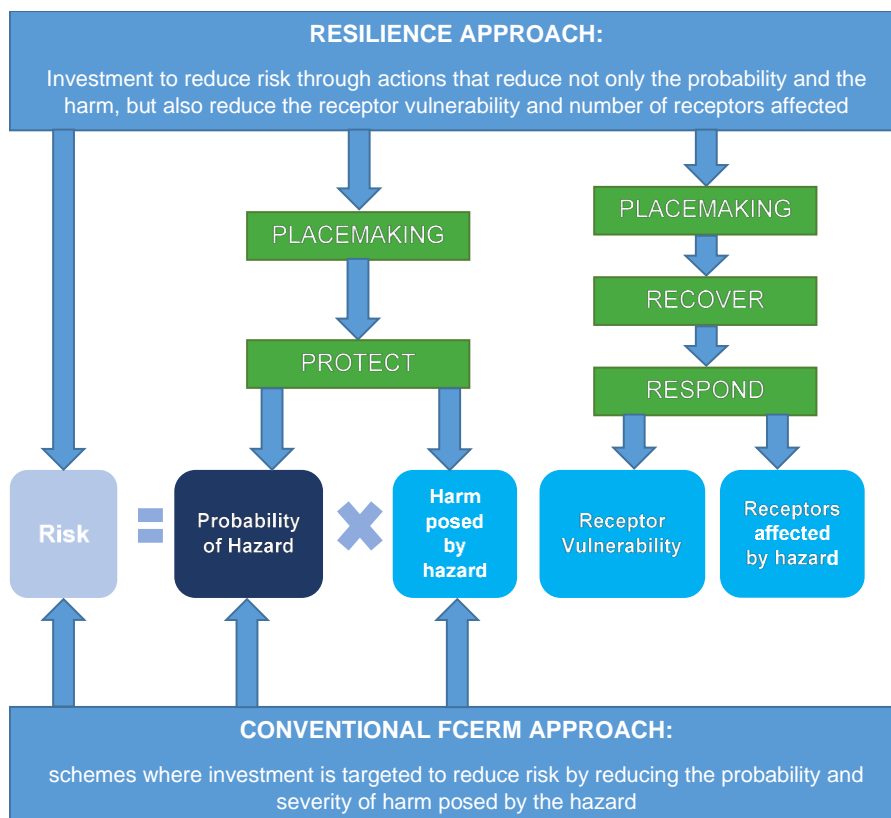
8 Communities Prepared webpage. <https://www.communitiesprepared.org.uk/>

9 National Flood Forum webpage. <https://nationalfloodforum.org.uk/>

10 What to do before, during and after a flood. Environment Agency.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/403213/LIT_5216.pdf

Figure 3: Difference between conventional flood risk management and resilience



1.6 Key themes for flood risk management in South Gloucestershire

South Gloucestershire Council have identified several key flood risk management themes which are important for this cycle of the LFRMS.

- Climate Change
- Sustainable Development
- Natural Flood Management
- Biodiversity
- Community Involvement
- Equalities.

These key themes are central to the Strategy and formed the basis of the action plans.

Further detail is outlined in the following sections.

1.6.1 Climate Change

In July 2019, South Gloucestershire Council declared a **Climate Emergency**¹¹ pledging to provide the leadership to enable South Gloucestershire to become carbon neutral by 2030. In addition, the council signed up to the UK100 pledge to ensure 100% renewable energy across the area by 2050.

¹¹Climate Emergency. South Gloucestershire Council. <https://www.southglos.gov.uk/environment/climate-change/climate-emergency/>

In order to deliver these pledges, SGC's aims are to:

- Maximise the generation of renewable energy from installations located within South Gloucestershire;
- Be prepared for the local impacts of the Climate Emergency, such as increased flood risk;
- Ensure nature in our local area is more protected, connected and healthy and biodiversity increased; and
- Increase tree cover across South Gloucestershire.

As part of the climate emergency response, South Gloucestershire aim out carry out further research on local climate resilience and measures that are needed to prepare for the local impacts of climate change. South Gloucestershire aim to build local climate resilience, for example by reducing flood risk through managing landscapes, by slowing the rate at which rainfall runs from higher ground into rivers and streams.

The impacts of climate change on surface water flood risk was considered as part of the catchment prioritisation process, and mapping displaying the surface water flood extents accounting for climate change is displayed in Appendix C.

1.6.2 **Natural Flood Management**

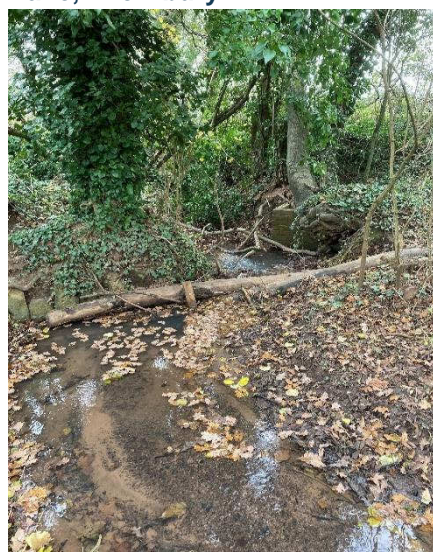
Natural flood management (NFM) aims to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast, and involves the use of and working with natural processes to reduce the risk of flooding and coastal erosion. NFM requires integrated catchment management and involves those who use and shape the land. NFM also requires partnership working with neighbouring authorities, organisations and water management bodies.

Developments provide opportunities to work with natural processes of catchments, floodplains, rivers and the coast to reduce flood and erosion risk, benefit the natural environment and reduce costs of schemes.

Conventional flood prevention schemes may be preferred, but consideration of 're-wilding' rivers upstream could provide cost efficiencies as well as considering multiple sources of flood risk (for example, reducing peak flows upstream such as through the creation of leaky dams across streams or building earth banks to capture runoff) could be cheaper and smaller-scale than implementing flood walls. With flood prevention schemes, consideration needs to be given to the impact that flood prevention has on the Water Framework Directive (WFD) status of watercourses. The WFD is a European Directive. It requires the introduction of strategic planning measures to manage, protect and improve the water environment and came into force in December 2000. The WFD was transposed into UK legislation through the Water Environment Regulations in 2003 which resulted in the Environment Agency being made responsible for the production of River Basin Management Plans (RBMPs). The South Gloucestershire area is covered by the South West River Basin District RBMP, which identifies the current quality of water bodies in the district and sets objectives for making further improvements to their ecological and chemical quality.

The Environment Agency has developed **Natural Flood Management (NFM) mapping**¹² which displays opportunities for NFM and is shown in Appendix C.

Figure 4: NFM at Kington Lane, Thornbury



¹² Working with Natural Processes. Environment Agency. www.jpahosting.com

These maps are to be used as a guide and supplemented with local knowledge to provide a starting point for discussions about NFM. NFM aims to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast. NFM should be used on a catchment wide scale and will help facilitate linkages between blue and green infrastructure.

1.6.3 Sustainable Development

Sustainable development is defined in the Brundtland Commission report as “development which meets present needs without affecting the ability of future generations to meet their own needs”¹³. In the context of flood and coastal erosion risk management, this can mean taking action so current and future generations are not exposed to increasing risk, and improving the resilience to current and future risk.

The **NFCERMS**¹ identifies ways in which investments made to adapt to the threats from flooding and coastal change can enable growth in a sustainable and climate resilient way. It also sets out that risk management authorities will work with partners to contribute towards sustainable development. This includes using nature based solutions, avoiding development in areas at highest risk of flooding and using sustainable drainage systems (SuDS).

New development should be guided away from flood risk areas through the **Sequential Test**¹⁴, considering all sources of flooding, as advised in the **National Planning Policy Framework**¹⁵.

Sustainable Drainage Systems (SuDS)

SuDS are management practices which enable surface water to be drained in a more sustainable manner and mimic the local natural drainage. The inclusion of SuDS within developments is an opportunity to enhance ecological and amenity value, increase biodiversity, and promote Green Infrastructure, incorporating above ground facilities into the development landscape strategy.

South Gloucestershire Council, as the LLFA, should be consulted on matters relating to surface water management. Guidance on the design and construction of SuDS can be found in SGC's **Supplementary Planning Document on SuDS**¹⁶.

It is essential that developers consider sustainable drainage at an early stage of the development process – ideally at the design brief or master-planning stage. This will assist with the delivery of well designed, appropriate and effective SuDS. Wessex Water are proactively seeking to adopt SUDS that meet adoptable design requirements and will work with SGC and the developer to ensure effective SuDS are designed and installed.

Proposals should also comply with the key SuDS principles (the four pillars of SuDS design - Figure 5) enabling solutions that deliver multiple long-term benefits. These principles are quantity, quality, amenity and biodiversity. There are a number of ways in which SuDS can be designed to meet surface water quantity, climate change resilience, water quality, biodiversity and amenity goals. Given this flexibility, SuDS are generally capable of overcoming or working alongside various constraints affecting a site, such as restrictions on infiltration, without detriment to achieving these goals.

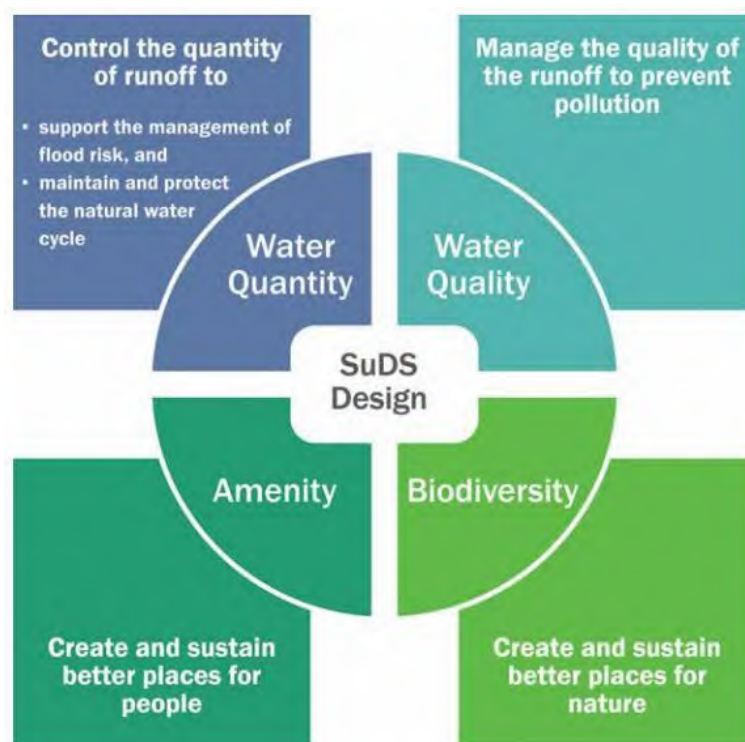
¹³ Brundtland Commission Report (1987)

¹⁴ <https://www.gov.uk/guidance/flood-risk-and-coastal-change#aim-of-Sequential-Test>

¹⁵ <https://www.gov.uk/guidance/national-planning-policy-framework>

¹⁶ Sustainable drainage systems - Guidance for new developments. South Gloucestershire Council 2021.

Figure 5 - The four pillars of SuDS design, from The SuDS Manual C753 (2015)



1.6.4 Biodiversity

Biodiversity is the whole variety of life on Earth and includes all species of plants and animals, their genetic variation, habitats and the ecosystems they are part of. Biodiversity is important and there are many benefits that we receive from the natural environment including food, fire, wood and water. It is important the impact on biodiversity should be considered during the design and build of flood defences.

Biodiversity net gain is an approach to development that leaves biodiversity in a better condition than it was originally.

South Gloucestershire Council has prepared a **Biodiversity Action Plan (2016-26)**¹⁷, which identifies local priorities and coordinates the action for wildlife across the administrative area, in order to halt biodiversity loss. This involves a range of groups and individuals. More information on biodiversity and biodiversity action plans can be found on the **South Gloucestershire Council website**¹⁸.

South Gloucestershire have prepared a **Local Nature Action Plan (LNAP)**¹⁹ which supports the South Gloucestershire Biodiversity Action Plan. A LNAP provides guidance on how to recognise and improve biodiversity assets.

South Gloucestershire Council has also prepared a **Green Infrastructure Strategy**²⁰. This sets out how South Gloucestershire Council plan, design and manage green infrastructure in order to work for a greener, healthier and more resilient future in light of the climate and nature emergency. The vision of the strategy is to create 'greener places where people and nature thrive'. When green infrastructure is well planned, designed, managed and connected it makes the most of natural

17 South Gloucestershire Biodiversity Action Plan 2016-2026. South Gloucestershire Council. 2016. <https://www.southglos.gov.uk/documents/Biodiversity-Action-Plan-2016-26.pdf>

18 <https://www.southglos.gov.uk/documents/Biodiversity-Action-Plan-2016-26.pdf>

19 Local Nature Action Plans: guidance for town and parish councils. South Gloucestershire Council. <https://beta.southglos.gov.uk/wp-content/uploads/Local-Nature-Action-Plans-guidance-for-town-and-parish-councils.pdf>

20 Draft Green Infrastructure Strategy – summary | BETA - South Gloucestershire Council (southglos.gov.uk)

environment 'ecosystem services'. This includes natural flood management and improved air and water quality.

Biodiversity can have flood risk benefits including:

- Enhancing wetlands can help improve resilience to future pressures, such as climate change, flooding and water quality issues.
- Nature based solutions to flooding, such as habitat creation, restoration and management.
- In the Severnside area, biodiversity plays an important role in providing natural coastal flood defences and water cleaning services.

1.6.5 **Community Involvement**

Community involvement is at the heart of this local strategy and the national strategy. Within flood risk areas, the best way for a member of the public to be involved in the management of flood risk is through a Flood Action Group. Flood Action Groups are a representative voice for their community and the aim of them is to work in partnership with the agencies and authorities whose work involves flood risk. Through these groups, members of the public can work on behalf of the wider community in finding ways to reduce flood risk.

The National Flood Forum supports communities in the formation of Flood Action Groups, gives tools to encourage their success and sustainability and initiates the first meeting with all the right professionals needed. You can find out whether a group already exists in your area by speaking with your local Parish or Town Council, South Gloucestershire Council, the Environment Agency, or by contacting the **National Flood Forum via their website**²¹. The Environment Agency also supports the formation of Flood Action Groups, and is working with the National Flood Forum to develop a network of community-led flood groups and volunteers, as outlined in their **FCERM Strategy Action Plan**²².

Communities Prepared²³ supplies community volunteer groups across the country with the knowledge, skills and confidence to prepare for, respond to, and recover from flooding and other emergencies. If you are interested in finding out more or would like to offer your time for local matters, the Parish and Town Council in your area is good organisation to contact. They will already be operating and governing a range of tasks and may require assistance. You can find the contact details for your local Parish or Town Council via the **South Gloucestershire Council website**²⁴.

1.6.6 **Equalities**

Flooding has a negative impact on communities and individuals, regardless of their Protected Characteristics. However for particular groups and communities the negative impacts can be amplified – for example, older/elderly people and disabled people can face particular challenges. These challenges can range from particular difficulties in keeping safe and being able to find suitable alternative accommodation and can be major in their implications for both individuals and services.

Therefore, through this Strategy, we will:

- Engage with and involve a wide diversity of communities so that a full range of needs and views are taken account of;
- Ensure we are aware of the benefits and impacts of our flood risk management actions on our diverse communities;

²¹ <https://nationalfloodforum.org.uk/>

²² <https://nationalfloodforum.org.uk/>

²³ <https://www.communitiesprepared.org.uk/>

²⁴ <https://www.southglos.gov.uk/council-and-democracy/councillors-democracy-and-elections/town-and-parish-councils/>

- Ensure that consideration of vulnerability in relation to Protected Characteristics is built into decision making.

Equality Impact Assessment and Analysis (EqIAA) will be conducted as appropriate throughout the delivery of this Strategy in order to identify impacts and actions for all communities.

1.7 Objectives

As part of the Local Flood Risk Management Strategy, six objectives for managing flood risk have been developed, which have been aligned with the national strategy objectives (see Appendix F for further details) and the key themes set out within Section 1.6;

1. **Evidence:** We will enhance our strategic understanding of flood risk from all sources, both in the present day and with climate change
2. **Resilience/Awareness:** We will work with communities to raise greater awareness of present and future flood risk through engagement, support and education to help them to become more resilient to future flood risk, considering the effects of climate change on different sources of flooding.
3. **Adaptation:** We will work with communities to implement adaptive approaches to enhance the natural and built environment (including: Asset Management, Natural Flood Management, Habitat Restoration and Sustainable Drainage Systems).
4. **Collaboration:** We will work with all risk management authorities and stakeholders to achieve a consistent, co-ordinated and risk-based approach to flood risk management.
5. **Sustainability:** We will contribute positively to sustainable growth and development, and support environmental net gain by influencing wider development, redevelopment and regeneration plans to deliver flood risk benefits, whilst enhancing biodiversity and promoting flood risk management measures that work with natural processes of our catchments.
6. **Opportunities:** We will seek opportunities (including funding, research and innovation) from existing and new sources to invest in making communities resilient to flooding now and in the future.

2. Roles and Responsibilities

This section sets out the primary roles and responsibilities for flood risk management within South Gloucestershire and provides relevant links to detailed documentation on the South Gloucestershire Council website.

South Gloucestershire Council, as Lead Local Flood Authority (LLFA) has a wide range of responsibilities under legislation including the Flood and Water Management Act 2010. These include:

- Investigating and reporting flooding incidents;
- Managing flood risk from surface water, groundwater and ordinary watercourses;
- Producing a Local Flood Risk Management Strategy (this document);
- Maintaining a register of flood risk management and drainage assets;
- Statutory consultee on major developments;
- Consenting works on ordinary watercourses; and
- Enforcing works to maintain the flow on ordinary watercourses.

The LLFA also has a local coordinating role, working alongside various other Risk Management Authorities (RMAs). Figure 6 shows the various responsibilities of each of these. Further details of the roles and responsibilities for flood risk management in South Gloucestershire can be found on the [South Gloucestershire Council website](#)²⁵.

2.1 Riparian Responsibilities

Home or business owners that have a watercourse or ditch on or alongside their land are likely to be riparian owners with maintenance rights and responsibilities. If the watercourse borders the property, it is normal for the boundary of responsibility to extend to halfway across the channel. Land drainage management and maintenance is vital to ensuring that surface water is adequately managed across the district.

The rights and responsibilities of riparian owners include:

- reporting incidents such as flooding, pollution, unusual changes in flow, collapsed or badly damaged banks and blockages which could cause flooding to [Main Rivers](#) or [Ordinary Watercourses](#)²⁶;
- protecting your property from flooding, and your land from erosion. However, you must get your plans agreed with the Risk Management Authority before you start work;
- maintaining riverbed and banks;
- allowing the flow of water to pass without obstruction;
- keeping banks clear of anything which could cause an obstruction and increase flood risk, either on your land or downstream if it is washed away;
- keeping any structures, such as culverts, trash screens, weirs and mill gates, clear of debris;

²⁵ <https://www.southglos.gov.uk/documents/Land-ownersv2-final-Draft-290616.pdf>

²⁶ <https://www.gov.uk/report-flood-cause>

- a legal obligation to notify the Environment Agency and the relevant Risk Management Authority if you would like to build or alter a structure that acts as an obstruction to a watercourse;
- preventing pollution, including removing litter and animal carcasses; and
- controlling invasive alien species e.g. Japanese knotweed.

Further information about riparian owner responsibilities can be found in the Environment Agency's publication '[Living on the Edge](#)'²⁷ and '[Owning a watercourse](#)'²⁸ and on the South Gloucestershire Council [website](#).

2.2 Land Drainage Consent

Land Drainage Consents for Ordinary Watercourses are managed by South Gloucestershire Council and the Lower Severn Internal Drainage Board depending on location. Any works to change the flow, discharge to, erect or remove a culvert, or create any impediment to flow in any ordinary watercourse outside of the Lower Severn Internal Drainage Board will require Land Drainage Consent from South Gloucestershire Council.

Any works on rhines or watercourses within the remit of the Lower Severn Internal Drainage Board will require their consent.

For work associated with a Main River; that is temporary or permanent works in, over, under or within 8 metres of a Main River or 16 metres of a tidally-influenced Main River, on or near a Main River flood defence structure, in a Main River floodplain or on or near a sea defence, an Environmental Permit for Flood Risk Activities from the Environment Agency may be required.

Further information is available on the South Gloucestershire Council [website](#)²⁹ and the Environment Agency [website](#)³⁰.

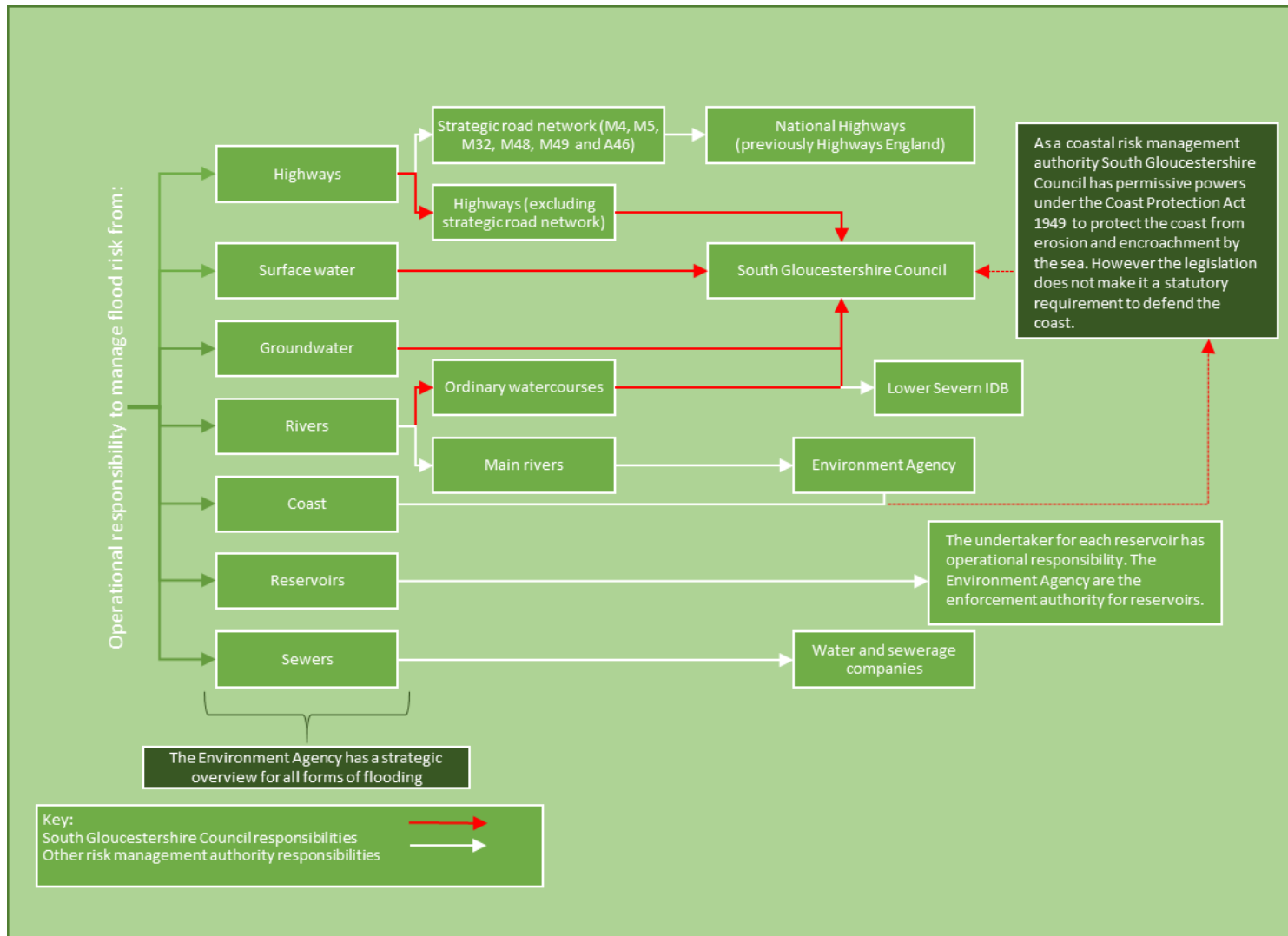
²⁷https://www.wlma.org.uk/uploads/EA_Guide_to_rights_and_responsibilities_of_riverside_ownership.pdf

²⁸ <https://www.gov.uk/guidance/owning-a-watercourse>

²⁹ <https://www.southglos.gov.uk/environment/drainage-and-flood-risk-management/land-drainage-land-homeowners/>

³⁰ <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

Figure 6 – Risk Management Authorities responsible for managing Flood Risk in South Gloucestershire



3. Flood Risk in South Gloucestershire

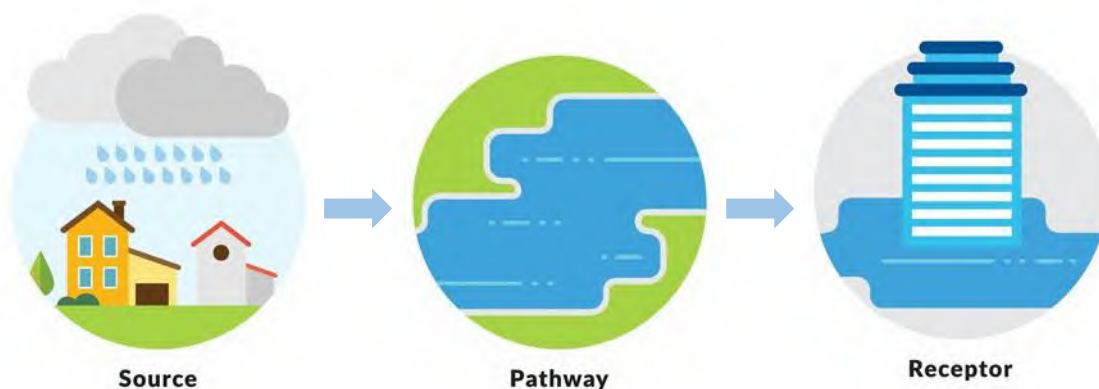
This section sets out the current understanding of flood risk from all sources in South Gloucestershire along with the projected impact of climate change on fluvial, coastal and surface water flood risk.

3.1 Flood Risk and Likelihood

Flooding is a hazard as it has the potential to cause harm to human health and life, and effect the natural and built environment. The term 'risk' acknowledges the actual harm caused and is different to a hazard. Flood Risk is a combination of the probability (or likelihood) of a flood event occurring and the consequence of its impacts:



Flooding is only a risk when the flood water affects people, property, agricultural land or another 'receptor'. The 'source' of the flooding could be from groundwater, surface water, ordinary watercourses, sewers, Main Rivers or the sea. The route or path the flood waters take is known as the pathway:



Risk captures the severity of, or related consequences produced by, a flood event. Impacts can be social, economic and environmental, for example the number of properties flooded and the level of associated economic damages. The consequences of a flood depend on the level of exposure and the vulnerability of those people or places affected.

Flood risk is often measured by a percentage probability or by stating how regularly it will occur. Many everyday practitioners refer to a 1% Annual Exceedance Probability (AEP) flood, or 1 in 100-year flood for example, but it is most important to understand that this does not mean that the flood will only happen once every 100 years. Instead, the chance of a flood of this magnitude occurring in any given year is 1%. Therefore, there is a chance that an event of this magnitude could happen one year and then the following year. We may also experience any number of smaller flood events between the larger events.

Rainfall events of a given return period can consist of torrential rain over a short period of time, or prolonged showers over a longer period. For example, in the UK, if 35mm of rainfall falls within one

hour this might be a 1 in 50-year (2% AEP) event. However, a different rainfall event in which 60mm falls over four hours could have the same probability. The important factors are the amount of rain that has fallen, and over how much time.

Rainfall rates during a storm event can also vary greatly from one location to another. It is important to interpret the surface water flood risk maps with this in mind because they model a rainfall event occurring everywhere in the administrative area at the same time. This is necessary to see where the biggest problems may be experienced, which then informs our work programme. In reality, during a storm event, it is more likely we will see certain towns and areas flooded as predicted on the flood maps while other areas receive significantly less rainfall and so flood to a much smaller extent.

Drainage systems and flood defences are designed to protect against a certain magnitude event occurring. Typically, surface water drains and sewers are designed to have capacity for a 1 in 30-year event (3.3% AEP), whilst river and tidal defences are generally built to protect against a 1 in 100-year (1% AEP) or 1 in 200-year (0.5% AEP) event, respectively. Whilst new highways constructed are designed to a 1 in 30-year event, the vast majority of the existing highways network is not built to modern standards and therefore have a lower standard which could be the 1 in 10 year event or lower.

3.2 Flooding in South Gloucestershire

South Gloucestershire Council as the Lead Local Flood Authority (LLFA) are required to develop and maintain a Local Flood Risk Management Strategy (this document). An important aspect of the strategy is to assess the flood risk within the administrative area and in particular the risk from surface water, groundwater and ordinary watercourses.

Flooding has occurred throughout South Gloucestershire at many different locations. To identify the areas in the administrative area which are at risk of flooding, existing flood risk mapping and reports of flooding are continually reviewed. This makes sure that the understanding of flood risk is based on the best available data.

Figure 7 - Flooding at Keynsham Road



To assess the potential impacts of flooding, property counts (both residential and non-residential) have been derived using the latest flood risk mapping from the Environment Agency open source datasets. Based on the Risk of Flooding from Surface Water mapping, South Gloucestershire has approximately 6,900 residential properties and 800 non-residential properties at risk of flooding during a 1 in 100-year (1% AEP) event. This is predicted to increase to approximately 13,900 residential and 1,200 non-residential properties as a result of the impact of climate change (based on the 45% climate change uplift – see Section 3.9.1).

3.3 Historic Flood Events

South Gloucestershire has a history of flooding in many different locations from fluvial, tidal, surface water, sewer and groundwater sources. Information collated from the Environment Agency's recorded flood outlines, SGC's recorded flood incidents, the existing Local Flood Risk Management Strategy and Wessex Water's sewer flood dataset were assessed to understand historic flooding in the district. This information was supplemented by information from other stakeholders.

The data shows the most frequent cause of flooding within South Gloucestershire to be fluvial along Main Rivers, surface water in inland and urban areas; tidal along the coastline; and a combination of

tidal and fluvial flooding in the Severn Estuary-draining tidal plain, particularly in the area of the Lower Severn Internal Drainage Board.

The key historical incidents of flooding identified are summarised as follows:

- 1981 – tidal flooding at Severn Beach resulted in tidal defences being built.
- 2000 – flood defences overtopped in Oldbury-on-Severn.
- 2001 – surface water and river flooding in Emersons Green on the Folly Brook as a result of heavy rainfall
- 2009 – high surface water runoff combined with reduced rhine capacity and sewer flooding caused internal flooding of properties in Aust.
- 2011 – significant flooding of an ordinary watercourse tributary of the Stoke Brook in Little Stoke due to poor maintenance.
- 2012 - Internal flooding of the NHS Blood and Transplant Centre in Filton occurred, following heavy rainfall
- Winter 2013/14 -extensive rainfall caused a number of localised flood incidents, the majority associated with Main Rivers, including the Avon, Frome, and Ladden Brook.
- 2016 – Flooding of Oldbury-on-Severn occurred during March and November 2016. The events were determined to have primarily been caused by overland flow due to saturated ground, low points in the drainage network, and the impact of tide locking in the area.

3.4 Surface Water Flooding

Flooding from surface water runoff is caused by intense short periods of rainfall or storms when the ground is already saturated. In urban areas, surface water will accumulate where it cannot infiltrate impermeable surfaces or be collected and conveyed within existing drainage systems. Surface water flooding is also linked to issues of poor drainage, or drainage blocked by debris, and sewer flooding.

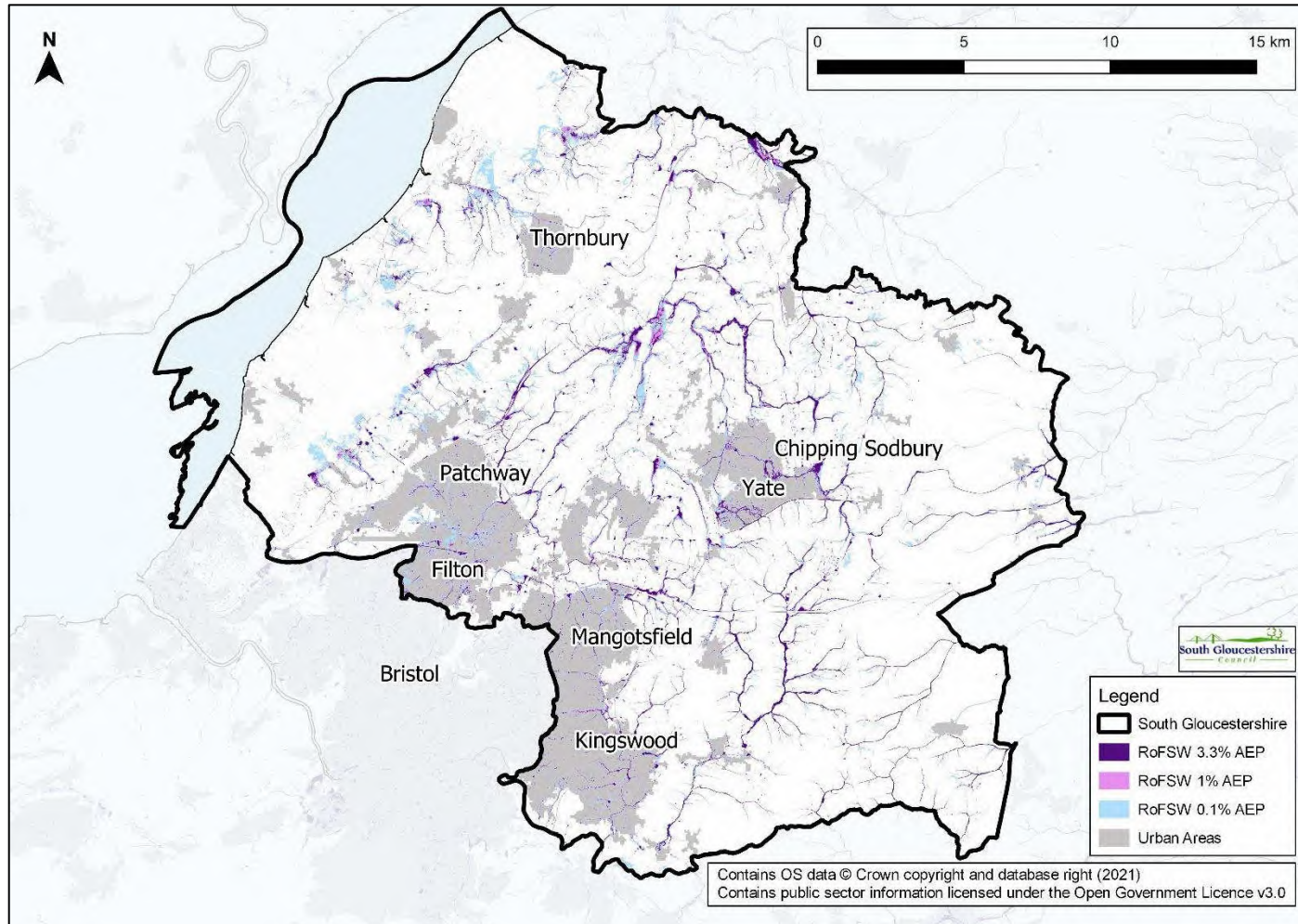
Surface water flooding is a major concern within South Gloucestershire. The existing Local Flood Risk Management Strategy identifies that urban areas north and north east of Bristol, such as Filton and Kingswood, as well as Thornbury, Emerson's Green, Longwell Green, Yate, Chipping Sodbury, Pilning, Hanham, Aust and North Common are at the greatest risk of surface water flooding. Tide locking is also an issue around Oldbury-on-Severn where high tides prevent surface water from draining from gravity outfalls along the defended coastal plain. Other low lying areas at risk of tidal flooding may also be at risk of tide-locking.

The Risk of Flooding from Surface Water (RoFSW) map (Figure 9) shows predicted flood extents that predominantly follow topographical flow paths of existing watercourses or dry valleys. Some isolated ponding occurs upslope of topographic features including railway lines and roads.

Figure 8 – Flooding at Kington Lane, Thornbury



Figure 9 – Flood risk from surface water, based on the Risk of Flooding from Surface Water dataset



ROFSW data downloaded March 2021

3.5 River and Sea Flooding

Flood risk from Main Rivers, ordinary watercourses and the sea is displayed in Figure 11 and is based upon the Environment Agency's Flood Zones.

3.5.1 Main River Flooding

Main Rivers are designated by the Environment Agency and are watercourses that carry significant flood risk. Heavy rainfall and flows from the upstream catchment can cause rivers to overtop their banks and spill onto the adjacent floodplain. The characteristics of the river catchments are dominated by their topography.

The major river catchments in South Gloucestershire are the Little Avon, River Frome, the River Avon, and their tributaries; Ladden Brook, Bradley Brook, Folly Brook, Hortham Brook, Patchway Brook, Stoke Brook, Henbury Trym, River Boyd and Siston Brook. These watercourses are managed by the Environment Agency although riparian responsibilities still apply.

The settlements identified as most at risk of fluvial flooding are Hanham, Swineford, Emersons Green, Chipping Sodbury and Yate. Figure 12 displays the Main River, ordinary watercourse and IDB designations within the administrative area.

Figure 10 - Flooding in Swineford



3.5.2 Ordinary Watercourse Flooding

An ordinary watercourse is any watercourse (river, stream, ditch, cut, sluice, rife, dyke or non-public open sewer) that is not identified as a Main River. Flooding can occur from an ordinary watercourse overtopping its bank due to the volume of water or because the channel or culverts become blocked. Within South Gloucestershire, many ordinary watercourses are known as 'rhines', particularly in the west of the district with the land that drains into the Severn Estuary. The Lower Severn Internal Drainage Board is responsible for managing the flood risk from ordinary watercourses in their administrative area (shown in Figure 12) and South Gloucestershire is responsible for managing risk from the other ordinary watercourses.

Ordinary watercourses may pose localised fluvial flood risks but are more difficult to predict. Generalised Flood Zone mapping (where more detailed modelling investigations are not available) has only been prepared for watercourses with a catchment greater than 3km². Therefore, whilst these smaller watercourses may not be shown as having flood risk on the flood risk mapping, it does not necessarily mean that there is no flood risk.

Historic flooding records indicate there has been significant flooding of an ordinary watercourse tributary of the Stoke Brook in Little Stoke due to poor maintenance. North Yate and Filton are also identified as at risk. Areas at risk are from the rhines in the west of South Gloucestershire include Oldbury on Severn, Thornbury, Pilning, Olveston and Tockington.

3.5.3 Tidal Flooding

Tidal flooding is caused by extreme tide levels exceeding ground and / or defence levels. The Severn Estuary is located along the north-west boundary of the study area and is the source of tidal flood risk within South Gloucestershire, and has a high tidal range. Major tidal flooding occurred in 1981 which led to the construction of tidal defences along the Severn Estuary.

The areas identified from the Environment Agency Flood Zones as most at risk of tidal flooding are Severnside, Severn Beach, New Passage and Oldbury/Shepperdine (Figure 11). In some places along the coastline, such as within the Lower Severn IDB area, tidal flood risk can occur in combination with fluvial and surface water sources which can exacerbate flood risk, particularly by reducing the capacity of rhines (drainage channels) discharging to the Severn Estuary which can be tide locked.

The **Severn Estuary Coastal Group** works to promote sustainable shoreline management around the Severn Estuary. It is comprised of coastal managers, planners, local authorities from England and Wales, Natural Resource Wales and the Environment Agency.

A Shoreline Management Plan (SMP) provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner. In doing so, an SMP is a high-level document that forms an important part of the strategy for flood and coastal defence. The **Severn Estuary Shoreline Management Plan**³¹ (SMP2) covers the length of the coastline in the South Gloucestershire area. The plan was approved in 2017, replacing the earlier SMP1 (2000). The coastline in the study area is being actively managed under the 'hold the line' policy, except for a small section around Aust which is designated as 'no active intervention'. The SMP is currently being updated. Although the policy is to 'hold the line', new development should be avoided in these areas as funding cannot be guaranteed to be made available for the lifetime of the development and a residual flood risk will remain. Furthermore, the 'hold the line' policy does not guarantee the defences will be maintained or raised in line with climate change.

Additionally, the Environment Agency have produced a **Severn Tidal Tributaries catchment flood management plan**³² which sets out current and future flood risk and investment plans for the coast to manage tidal flooding.

As a coastal risk management authority SGC has permissive powers under the Coast Protection Act 1949 to protect the coast from erosion and encroachment by the sea. However the legislation does not make it a statutory requirement to defend the coast. Whilst this strategy only covers the council's responsibilities as the Lead Local Flood Authority, it should be acknowledged that the council's other responsibilities may overlap with flood risk, particularly with regard to planning and coastal protection.

3.6 Groundwater Flooding

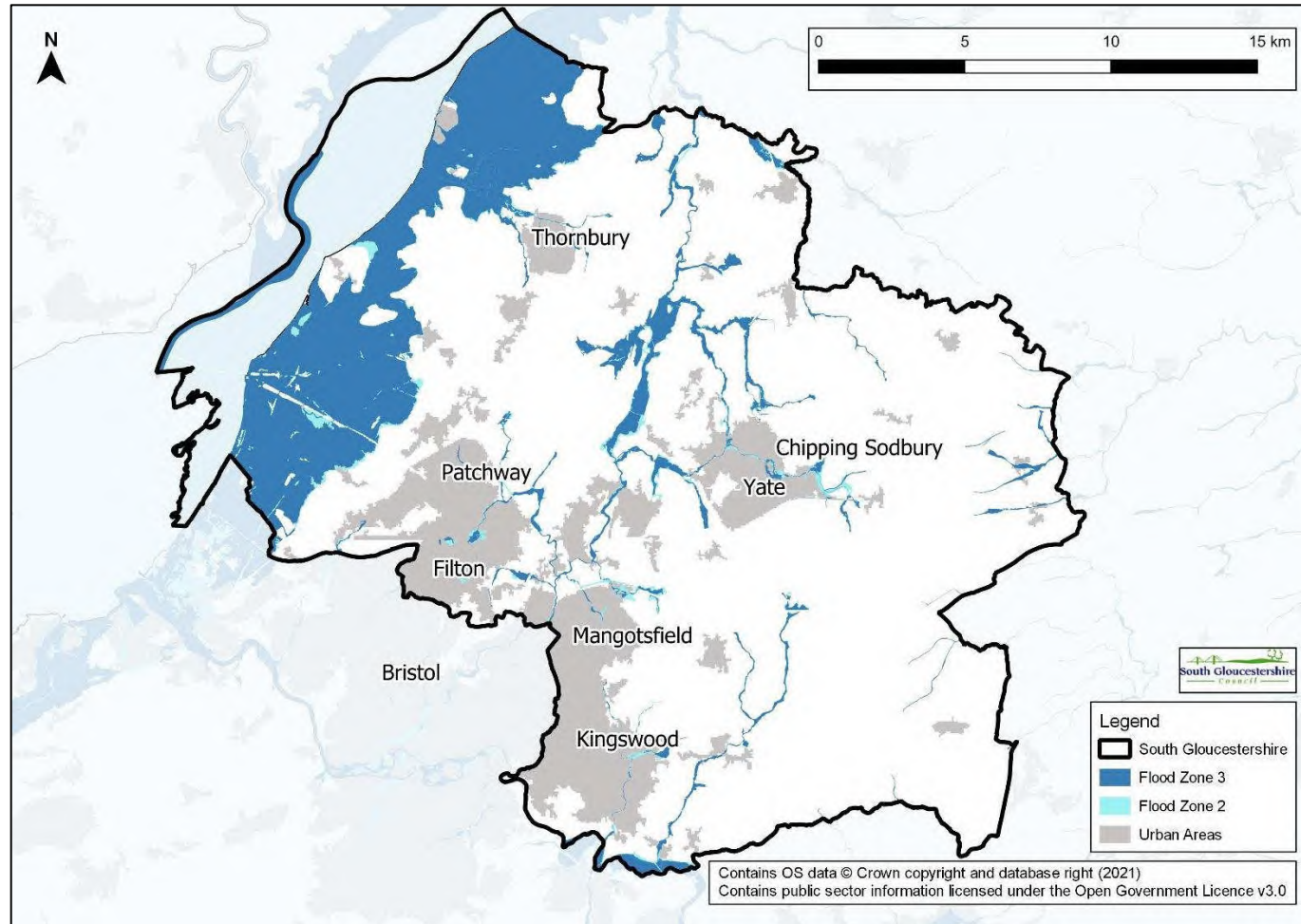
Groundwater flooding is the term used to describe flooding caused by high groundwater levels. It occurs as excess water emerges at the ground surface, there is a high water table, or within manmade underground structures such as basements. Groundwater flooding tends to be more persistent than surface water flooding, in some cases lasting for weeks or months, and it can result in significant damage to property.

³¹ Severn Estuary Shoreline Management Plan. Severn Estuary Coastal Group. 2017. <https://severnestuarycoastalgroup.org.uk/shoreline-management-plan/smp2-action-plan/>

³² Severn Tidal Tributaries catchment flood management plan. Environment Agency. 2009. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/289097/Severn_Tidal_Tributaries_Catchment_Management_Plan.pdf

Cromhall and Bitton are identified in the previous strategy as having reported historic incidents of groundwater flooding, and other settlements may be at localised risk, although the vast majority of South Gloucestershire is considered at low risk of groundwater flooding. The national scale 5m resolution JBA Groundwater map (June 2017), shown in Figure 13, has been used to assess groundwater flood risk. This strategic high level modelling involves simulating groundwater levels for a range of return periods (including 75, 100 and 200-years). Groundwater levels are then compared to ground surface levels to determine the head difference in metres. This shows small, localised areas at high risk of groundwater flooding including parts of Chipping Sodbury and Yate, Thornbury, Tytherington, Iron Acton and Almondsbury.

Figure 11 – Flood risk from rivers and sea, based on the Environment Agency Flood Zones



Flood Zones downloaded March 2021

Figure 12 – Main River, Ordinary Watercourse, IDB designation

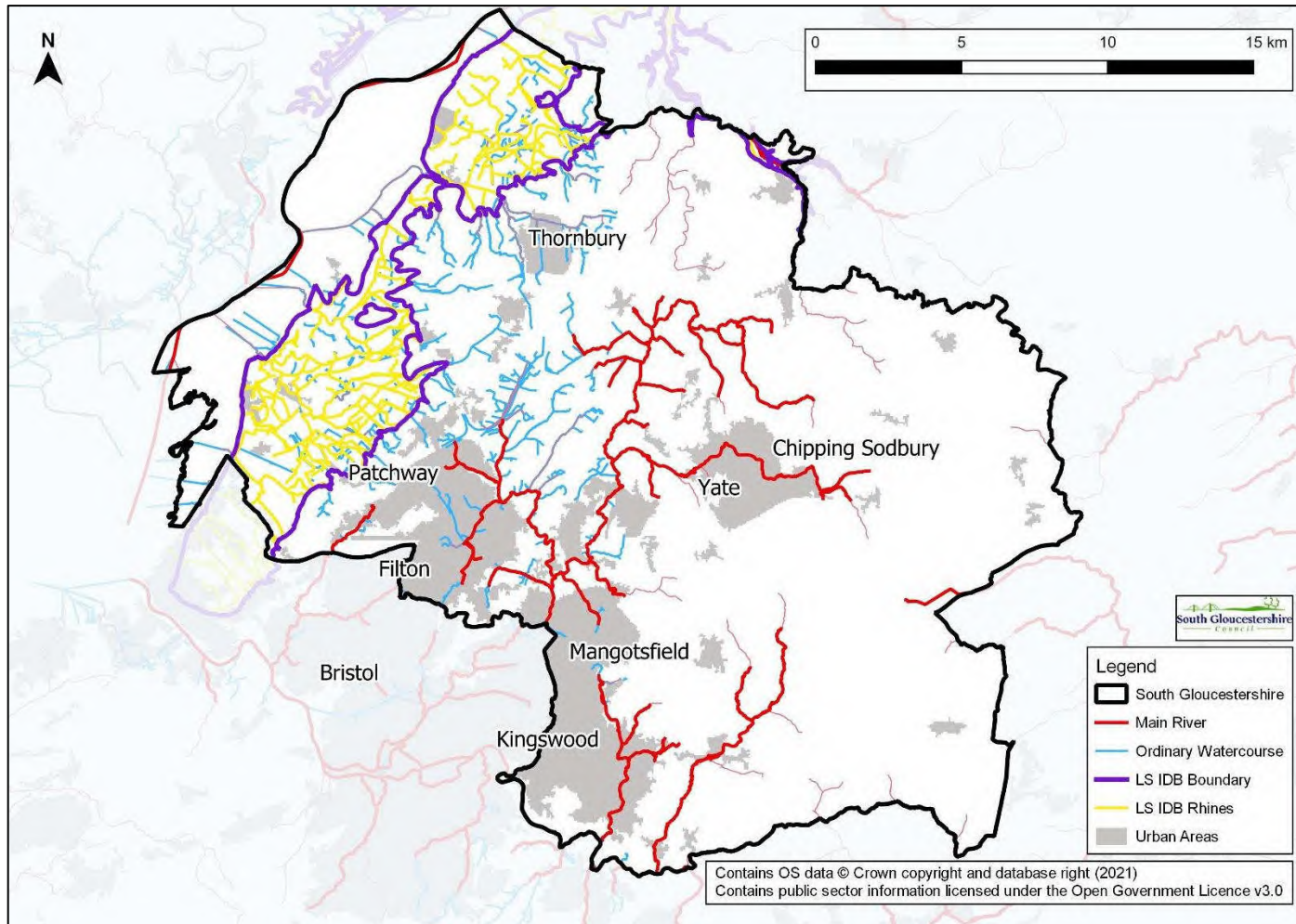
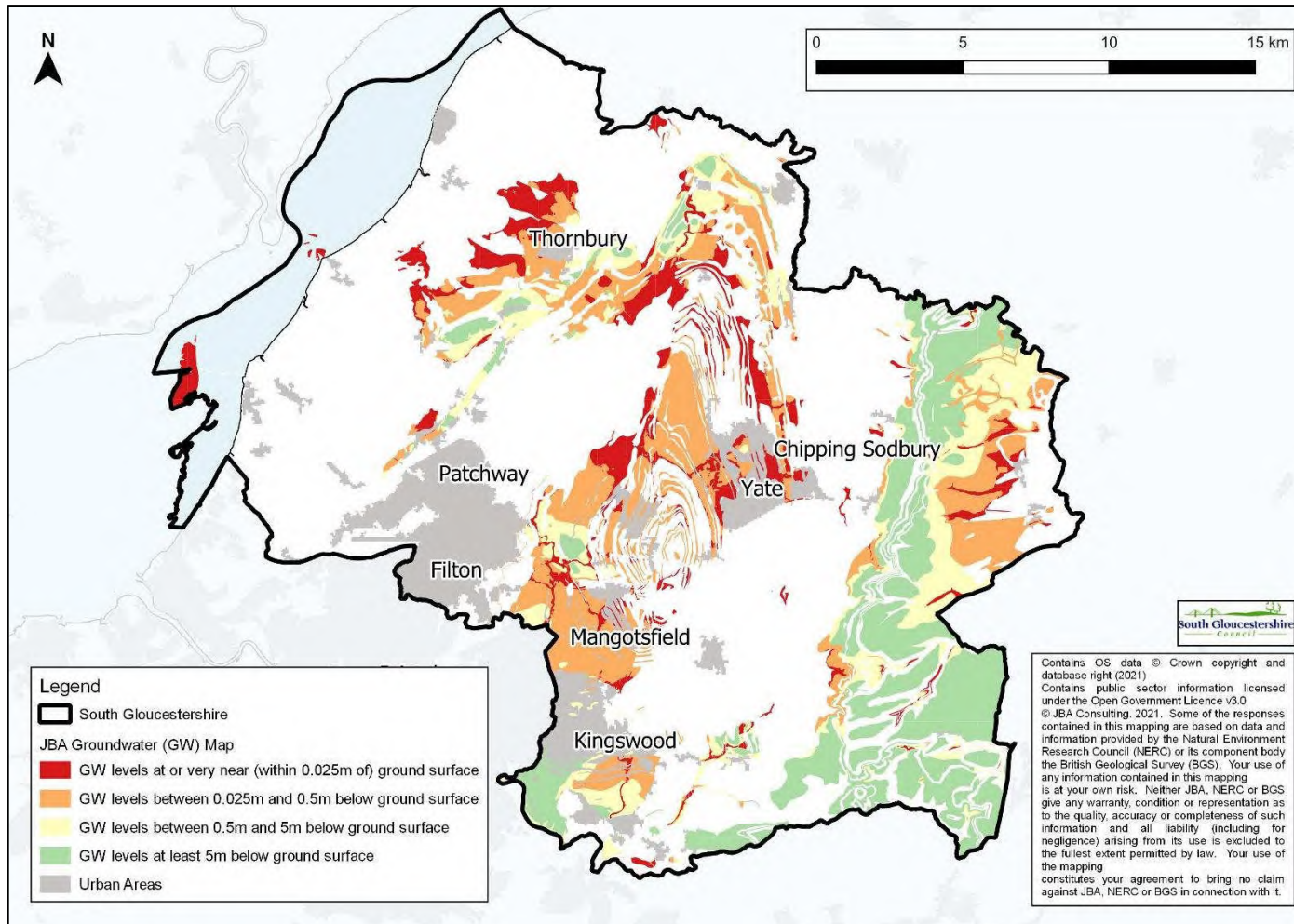


Figure 13 – Flood risk from groundwater, based on the Groundwater Flood Risk Map



3.7 Reservoir Flooding

Reservoirs with an impounded volume greater than 25,000 cubic metres are governed by the Reservoir Act 1975 and are listed on a register held by the Environment Agency. The level and standard of inspection and maintenance required under the Act means that the risk of flooding from reservoirs is relatively low. Legislation under the Flood and Water Management Act requires the Environment Agency to designate the risk of flooding from these reservoirs. The Environment Agency is currently progressing a 'Risk Designation' process so that the risk is formally determined.

The Environment Agency released an update to its reservoir flood mapping in 2021 for all reservoirs in England, to provide a more accurate indication of flood risk in the very unlikely event of a reservoir failure. The Reservoir Flood Maps shows worst case inundation extents of nine reservoirs impacting South Gloucestershire. Some of these reservoirs are located outside of South Gloucestershire, in Bath and North East Somerset, and Wiltshire. Areas at risk of flooding from reservoirs include along the River Frome, River Avon, Folly Brook, Siston Brook and Bradley Brook.

3.8 Sewer Flooding

Sewer flooding occurs when intense rainfall overloads the sewer system capacity (surface water, foul or combined), and / or when sewers cannot discharge properly to watercourses due to high water levels. Sewer flooding can also be caused when problems such as blockages, collapses or equipment (such as pump) failure occur in the sewerage system. Surface water inundation of manhole openings and entry of groundwater may cause high flows for prolonged periods of time.

Storm overflows are used during heavy rainstorms to protect properties from flooding and to prevent sewage from overflowing into streets and homes. Further details on storm overflows can be found on the [Wessex Water website](#)³³.

Since 1980, the Sewers for Adoption guidelines (now replaced by the Design Construction Guidance) have meant that most new surface water sewers have been designed to have capacity for a rainfall event with a 1 in 30 chance of occurring in any given year (3.33% AEP), although until recently this did not apply to smaller private systems.

Consequently, even where sewers are built to current specifications, they can still be overwhelmed by larger events of the magnitude often considered when looking at river or surface water flooding (e.g. a 1 in 100 chance of occurring in any given year (1% AEP)). Wessex Water considers the impact of largescale new developments on the existing infrastructure and look to make enhancements to the network if new development will increase sewer flood risk. The [Drainage and Wastewater Management Plan](#)³⁴ takes into account the impact of growth, climate change and urban creep on the drainage and wastewater infrastructure to inform future investment requirements.

Wessex Water provides records of incidents of flooding relating to public foul, combined or surface water sewers and identifies which properties suffered flooding. Data covers all reported incidents attributed to hydraulic inadequacy within the administrative area between April 2004 and August 2020 unless the risk of flooding has been resolved through action taken by Wessex Water. All but two of the incidents are located in the more heavily urbanised areas of South Gloucestershire bordering Bristol, with the remaining two located in Tytherington.

Wessex Water are in the process of constructing a new relief sewer in North Bristol which is due to be complete by Spring 2023. The North Bristol relief sewer forms part of Wessex Water's long-term sewerage strategy for the next 100 years.

3.9 Impacts of Climate Change

The impacts of climate change are well documented and have a significant influence on flood risk in South Gloucestershire. The anticipated effects of climate change in South Gloucestershire are

³³ Storm overflows webpage. Wessex Water. <https://www.wessexwater.co.uk/services/sewerage/storm-overflows>

³⁴ Drainage and Wastewater Management Plan webpage. Wessex Water. <https://www.wessexwater.co.uk/dwmp>

summarised in the sections below. Further details on likely climate change scenarios can be found within the **Strategic Flood Risk Assessment**³⁵ Level 1 (2021) for South Gloucestershire.

3.9.1 **Surface Water**

Climate change projections show an increased chance of warmer, wetter winters and hotter, drier summers with a higher likelihood of more frequent and intense rainfall. This is likely to make severe flooding occur more often, particularly in summer when the intensity of convective storms is expected to increase, leading to greater overland flow as a result of incapacity in existing systems.

At the time of undertaking this work, the **Environment Agency pluvial climate change allowances**³⁶ had not been updated since 2016. As these are based on UKCP09 data which predates the latest projections from UKCP18, the uplifts are now considered to be out of date and therefore it was not recommend to use these. Therefore the uplifts from the **Future Drainage project 2021**³⁷ (developed by a consortium led by Newcastle University that includes JBA Consulting, the Met Office, and Loughborough University) were used.

Uplifts in rainfall intensity of between 20% and 45% are anticipated by 2070 for a 1% AEP (1 in 100-year) event, depending on the rainfall event duration and spatial location within South Gloucestershire.

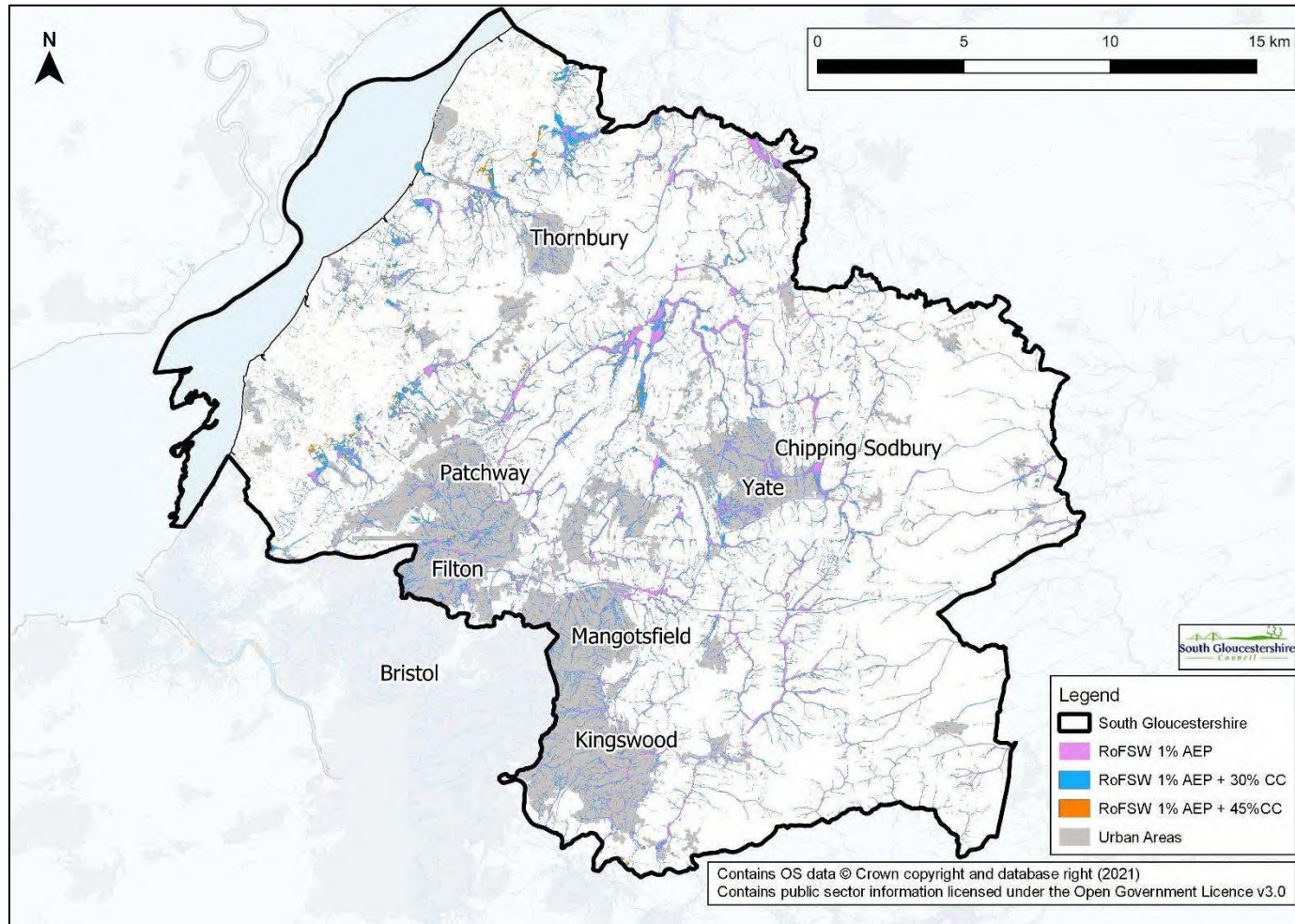
To assess the impacts of climate change on surface water flood risk, the Risk of Flooding from Surface Water (RoFSW) mapping has been updated with 30% (Central) and 45% (Upper End) uplifts (i.e. with no variation spatially or for different duration events). This is a conservative approach based on the maximum estimated uplift for each allowance across the three different duration events used within the RoFSW mapping (1-hour, 3-hour and 6-hour). Figure 14 shows that the extent of surface water flooding is likely to increase with climate change across South Gloucestershire, particularly within the low lying areas in the IDB boundary and along topographical flow paths of existing watercourses such as the River Frome and its tributaries including the Ladden Brook. The following settlements have been identified from the catchment prioritisation analysis (see section 0 and Appendix E) to be particularly sensitive to increases in rainfall intensity as a result of climate change, with all these areas experiencing an increase of more than two times the number of properties at risk of flooding; Almondsbury, Alveston, Hallen, and Emersons Green. Across the whole of South Gloucestershire, there is predicted to be a 70% increase in the numbers of properties at risk of flooding as a result of a 30% increase in rainfall intensity, rising to 100% with a 45% increase in rainfall intensity.

35 <https://www.southglos.gov.uk/environment/drainage-and-flood-risk-management/planning-development-related-drainage/>

36 Flood risk assessments: climate change allowances – sea level allowances. Environment Agency. (2016, updated 2020) <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

37 <https://www.ukclimateresilience.org/projects/future-drainage-ensemble-climate-change-rainfall-estimates-for-sustainable-drainage/>

Figure 14 – Flood risk from surface water with 30% and 45% climate change allowances, based on the Risk of Flooding from Surface Water dataset



3.9.2 *Fluvial*

Climate change is expected to result in higher peak river flows. South Gloucestershire is located within the Severn River Basin District, in the Avon, Bristol and North Somerset Streams management catchment. The latest **Environment Agency fluvial climate change allowances**³⁸, published in July 2021, show that the total potential increase in flows anticipated for the 2080s (2070 to 2115), is likely to be between 26% and 71% higher than present day.

To see the likely impact of climate change on fluvial flood extents for the 1% AEP (1 in 100-year) event (Flood Zone 3a) refer to the **Strategic Flood Risk Assessment**³⁵.

3.9.3 *Tidal*

Climate change is predicted to result in higher sea-levels caused by melting ice sheets and more extreme storm events which will create higher storm surges

The **Environment Agency's 2019 sea level allowances**³⁸ predict a cumulative rise of between 1.21m to 1.62m to the year 2125 (assuming a base year of 2000). These are based on coastal regions and South Gloucestershire is within the South West region. Further details can be found on the **Environment Agency Climate Change Allowances Guidance website**³⁸.

To see the likely impact of climate change on coastal flood extents for the 0.5% AEP (1 in 200-year) event (Flood Zone 3a) refer to the **Strategic Flood Risk Assessment**³⁵.

3.9.4 *Groundwater*

The effect of climate change on groundwater flood risk, and those watercourses where groundwater has a large influence on winter flood flows, is much more uncertain than with other sources of flooding. Milder wetter winters may increase the frequency of groundwater flooding incidents in areas that are already susceptible to groundwater flooding and also leading to catchments being saturated for longer periods. Warmer drier summers may counteract this effect by drawing down groundwater levels to a greater extent during the summer months.

3.10 *Flood Defences*

3.10.1 *Existing Flood Defences*

Flood defences are any assets that provide flood or coastal protection functions. An assessment of the Environment Agency Spatial Flood Defence dataset has been carried out. Flood defences which potentially provide a standard of protection from an event with a 1 in 2 chance of occurring in any given year (50% AEP) or more have been considered. The datasets include manmade and natural defences which may arise for instance due to the presence of naturally high ground adjacent to a settlement, have been considered.

All Main Rivers in South Gloucestershire have fluvial defences along their lengths, largely consisting of high ground and embankments along with sections of walls, demountable defences, and flood gates. The majority of the coastline in South Gloucestershire is protected by coastal defences including embankments, beaches, demountable defences, cliffs, and flood walls. Most of the flood defences provide a standard of protection between 20% and 50% (i.e. protection will be provided for an event with an annual exceedance probability of up to 50%). Further details of the flood defences in South Gloucestershire can be found within the **Strategic Flood Risk Assessment**³⁵.

³⁸ Flood risk assessments: climate change allowances. Environment Agency. (2016, updated 2020) <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

3.10.2 **Asset Management**

As part of the responsibilities as LLFA, South Gloucestershire Council have produced a **Flood Risk Asset Register**³⁹, which contains details and locations of assets in the administrative area, including drainage assets, Sustainable Drainage Systems (SuDS) flood defences, flood risk structures, highway gullies and manholes.

Asset Management and Maintenance are a key aspect of the Strategy to ensure the ongoing efficiency of the drainage networks throughout South Gloucestershire.

³⁹ Flood Risk Asset Register. South Gloucestershire Council.

<https://bcc.maps.arcgis.com/apps/webappviewer/index.html?id=c46d9e5f8fd3432dae1fdc37ad925590>

4. Achievements over the last six years

This section sets out the progress and achievements that have been made by the council over the last six years, since 2015 when the previous strategy was published.

4.1 Statutory Responsibilities

4.1.1 Key Performance Indicators

South Gloucestershire Council monitor Key Performance Indicators (KPIs) as part of its statutory responsibilities. These indicators are considered significant in relation to flood risk as this will be elevated by the changing climate and therefore it is important that new development and infrastructure is planned to be sustainable and existing flood risks are managed and betterment to communities is potentially achieved. The performance of these since the previous strategy, compared to the baseline target, is outlined below:

	KPI 1: The % of drainage advice given within the timescale set in the planning application process (baseline target of 80%)	KPI 2: The % of ordinary watercourse permission given within the 8 week timescale (baseline target of 80%)
2015/16	94%	84%
2016/17	95%	85%
2017/18	98%	96%
2018/19	96%	91%
2019/20	96%	91%
2020/21	94%	86%

4.1.2 Enforcement

In line with its statutory responsibilities, South Gloucestershire Council successfully carried out 14 Enforcement Actions during the period 2015 to 2021. The type of actions this included were enforcing landowners to maintain watercourses and other water features so as to reduce flood risk to third party land and the removal of unconsented structures / assets from within watercourses that were deemed as posing a high flood risk.

4.2 Flood Risk Management Initiatives

4.2.1 Flood Investigations

After significant flood events take place, LLFAs have a duty to undertake investigations into the causes of the flood event and identify those RMA's with flood risk management responsibilities. These are also known as Section 19 investigations. Since the previous strategy was produced, South Gloucestershire Council have undertaken two Section 19 flood investigations for flood events which

occurred in **Oldbury-on-Severn**⁴⁰ and **NHS Blood & Transplant Centre, Filton**⁴¹. Section 19 investigations are formal flood investigations that the LLFA are required to complete when made aware of a flood that meets certain predetermined criteria, as required by Section 19 of the Flood and Water Management Act 2010 (FWMA). The investigation should determine the relevant flood risk management authorities (RMA's) that should have been involved in the event and how they exercised their functions during and after the event, and which flood risk management actions have been (or should be) taken to mitigate future flood risk. The findings are compiled into a final report and shared with all relevant authorities.

The NHS Blood & Transplant Centre, Filton event occurred on 24 September 2012. Internal flooding of the NHS Blood and Transplant Centre in Filton occurred, following heavy rainfall with an Annual Exceedance Probability of around 7% (a 1 in 15-year event). It was concluded that the flooding occurred due to failure of culverts carrying the Stoke Brook watercourse through Network Rail land, most likely due to blockage, under sizing, and inadequate pumping (which had been installed as an emergency remedial measure as a result of reduced capacity in the culverts following deformation of the corrugated arch construction. Following the investigation, far larger box culverts were constructed, significantly reducing the flood risk.

The Oldbury-on-Severn events occurred during March and November 2016. The events were determined to have primarily been caused by overland flow due to saturated ground, low points in the drainage network, and the impact of tidal locking in the area. It was concluded that the flood risk to the area was affected by the tidal conditions reducing the capacity of the rhines, and that further investigation was warranted to assess the conveyance of the drainage network and capacity of the tidal flaps. SGC carried out an investigation into local flood risk in Oldbury-on-Severn in 2017 using Local Levy funding obtained from the EA. A report (dated June 2017) was produced that summarised the investigation and recommended a number of actions that should be undertaken to reduce this risk. The recommended actions for Oldbury-on-Severn were then actioned using monies from the Department for Transport (DfT) Challenge Fund.

4.2.2 **Highway Drainage Improvement Works**

Flood alleviation schemes have been completed as part of the Challenge Fund flood resilience works (Tranche 2A), funded by the Department for Transport. These primarily consisted of highway drainage improvements, including repairs and replacement to increase capacity and reduce maintenance liability of drainage assets. These were implemented in:

- Abson Road, Pucklechurch (completed February 2019)
- Beckspool Road, Frenchay (completed March 2019)
- Cherry Gardens, Bitton (completed October 2018)
- Bath Road, Swineford (completed December 2018)
- High Street, Wick (completed December 2019)
- High Street, Winterbourne (completed March 2019)
- Wotton Road, Bagstone and Rangeworthy (completed November 2019)
- Oldbury-on-Severn - included reinstatement of an historic rhine to direct storm flows away from the village and increase storage capacity (completed March 2020)

40 Flood Investigation (Section 19 Report) NHS Blood & Transplant Centre. South Gloucestershire Council. 2017. <https://www.southglos.gov.uk/documents/Section-19-Flood-report-Filton-v7.pdf>

41 Flood Investigation (Section 19 Report) Oldbury-on-Severn. South Gloucestershire Council. 2017. <https://www.southglos.gov.uk/documents/Oldbury-on-Severn-Flood-Report-May-2017.pdf>

South Gloucestershire Council were successful in securing a further £3.2 million in government funding, under the Department for Transport's (DfT) Local Highway Maintenance Challenge Fund, to carry out major maintenance work at eight sites across South Gloucestershire. The work is currently being undertaken at the time of writing the strategy, and the sites include Gipsy Patch Lane (Stoke Gifford), Perrinpit Road/Old Gloucester Road, Frampton Cotterell/Gaunt's Earthcott, Coldharbour Lane (Filton), Bristol Road (Frenchay), B4509 The Downs (Wickwar), B4058/B4059 Yate Road (Iron Acton), Stover Road at Frome Bridge (Yate), New Avon Bridge and Keynsham Road (Willsbridge). At seven of these sites the work focuses on flood resilience, including the replacement and upgrading of drainage systems that have insufficient capacity or maintenance issues. These improvements will bring benefits to the local communities and the traveling public who use these roads. The work means that the sites will be more able to cope with extreme weather causing less disruption and will also reduce the need for reactive maintenance works and result in a cost saving for the Council. Further background and details of the works can be found on the [South Gloucestershire council website](#)⁴².

4.2.3 *Natural Flood Management*

South Gloucestershire Council commissioned the Flood and Wildlife Advisory Group in 2020 to work with farmers and landowners to implement Natural Flood Management (NFM) features. Several sites that have been subject to frequent flooding were identified that were suitable for NFM techniques and where traditional highway drainage improvements alone would not be effective. At each site, the mechanism for flooding was identified, and land management measures on private land have been proposed to reduce the flood risk. The sites are Perrinpit Lane and Old Gloucester Road, Kington Lane, Itchinton Road/Earthcott Road junction, Shellards Lane and Stidcot Lane. At the time of writing the strategy, the Kington Lane, Stidcot Lane and Itchington Road/ Earthcott Road schemes have been completed.

4.2.4 *Surface Water Modelling*

South Gloucestershire Council have undertaken surface water flood modelling in Thornbury (2020) and Yate/Chipping Sodbury (2021) to update existing evidence, to better understand properties and infrastructure most at risk from flooding, to better understand flood mechanisms and the existing drainage network and to inform priorities for future investment. Both the Yate & Chipping Sodbury and Thornbury surface water mapping and modelling work were delivered using funds from the DEFRA grant to update the Environment Agency's Risk of Flooding from Surface Water (RoFSW) map (although the RoFSW mapping was still to be updated when the catchment prioritisation work was undertaken, it is now represented in national mapping).

The Thornbury study generally found that flood extents within the village were lower in the detailed modelling than the RoFSW mapping, the exceptions to this were to the east of Morton Way, where the detailed model showed an increase in flooding as a result of the inclusion of a culvert within the model and Easton Hill Road, Park Road, the B4061 and Oldbury Lane, all locations where flooding

Figure 15 – Flooding at Perrinpit Road, Frampton Cotterell



Figure 16 - NFM at Kington Lane, Thornbury



⁴² <https://www.southglos.gov.uk/environment/drainage-and-flood-risk-management/highway-drainage-improvement-works/challenge-fund-bid-highway-drainage-resilience-improvements/>

had been observed historically. The model also showed increased flood depths to the northwest of Thornbury as a result of increased backwater effects from the watercourse downstream.

The Yate and Chipping Sodbury study generally found that the flood extents align well with the RoFSW mapping. The exception to this is in areas crossing rail or road embankments, such as the corner of Shire Way and Westerleigh Road, where representation of the surface water sewer system provides additional capacity in the model and flood extents are reduced. In Rodford Way, the overland flow path is reduced compared to the RoFSW due to representation of a large culvert. Further reductions in flood extent compared to the RoFSW are also seen around Station Road (between Quarry Road and Link Road) and Firgrove Crescent, and Blenheim Drive, due to improved representation of the River Frome, and more capacity being provided for discharge of surface water.

4.2.5 *Frome Catchment Innovation Programme*

Bristol City Council was awarded funding by DEFRA in 2021 as part of the Flood and Coastal Resilience Innovation Programme for the **Frome Catchment Innovation Programme**⁴³. The funding is to develop a business case for new ways to manage the River Frome and surrounding areas to boost wildlife, public spaces, and flood resilience across the river catchment. South Gloucestershire Council is one of the key partners involved in the programme.

The funding will help to develop early proposals for different projects covering the whole River Frome catchment. If the business case is approved by Bristol City Council's Cabinet and then Defra in 2022, around £6m of funding could be unlocked to carry out projects, including:

- Natural flood management and improved land management in upstream rural areas in South Gloucestershire.
- Retrofitting Sustainable Drainage Systems (SuDS). These will locally reduce surface water flooding of local infrastructure, as well as transforming local public spaces with increased trees and wildlife within more urban areas.
- Landscape Enterprise Networks (LENS). These aim to bring businesses and land managers together to find solutions that meet both of their needs.
- Restoration of the river as part of the Frome Gateway regeneration project in Bristol.

The project will also look at innovative ways to meet the need for regeneration of brownfield land to build housing and new community spaces in areas at risk of flooding, in order to make new developments safe in the long term as well as helping better understand the River Frome and its interaction with the Bristol Floating harbour.

4.2.6 *River Frome Reconnected*

The **River Frome Reconnected**⁴⁴ is a partnership project between South Gloucestershire Council, Bristol City Council, Wessex Water, the Environment Agency and the Bristol Avon Catchment Partnership (BACP). It aims to improve the health and resilience of the River Frome and its catchment and to make sure the river can be accessed and enjoyed by all. Other key partners involved in the project include Bristol Avon Rivers Trust, Avon Wildlife Trust, Natural England, Farming and Wildlife Advisory Group South West, Network Rail and many others. Pre-feasibility work for the project began in 2017, and it is now delivering an ongoing integrated joint work programme across 5 themes;

- Responding to and managing flood risk (including water quality)
- Reconnecting people and communities
- Reconnecting the Frome to nature

⁴³ Innovative projects to protect against flooding selected: <https://www.gov.uk/government/news/innovative-projects-to-protect-against-flooding-selected>

⁴⁴ River Frome Reconnected Project: <https://www.southglos.gov.uk/environment/frome-reconnected-project/>

- Redevelopment and planning the Frome
- Resilient Landscapes/Sustainable Land Management

More information is available in the **catchment plan**⁴⁵.

4.2.7 **Avonmouth Severnside Enterprise Area**

The **Avonmouth Severnside Enterprise Area**⁴⁶ (ASEA) Ecology Mitigation and Flood Defence Project is currently under construction and is intended to support the growth of the Avonmouth Severnside Enterprise Area. The ASEA scheme will upgrade existing defences along a 17 km stretch of coastline, including the defences from Severn Beach to Aust. The flood defences to be constructed by the consented ASEA scheme are designed to offer a 1 in 200-year (0.5% AEP) standard of protection over a 60-year design life, this considers the following factors:

- For existing development: applies a 2076 design life (i.e. 60-year design life relative to a “present day” 2016 base year);
- For anticipated new development in the ASEA area: applies a 2098 design life (i.e. 60-year design life relative to a 2038 base year, assuming associated future development within the ASEA area is completed by 2038); and
- The proposed flood defences include a lower standard of protection at Old Passage, where a local 1:75-AEP (to 2076) standard of protection is proposed (as requested by and agreed with affected property/landowners) with a 1:200 AEP (to 2076) standard of protection second line of defence proposed further inland.

⁴⁵ River Frome Reconnected Catchment Plan. 2021. <https://www.southglos.gov.uk/documents/RFR-Catchment-Plan-V6final.pdf>

⁴⁶ Avonmouth Severnside Enterprise Area (ASEA) Ecology Mitigation and Flood Defence Project: Avonmouth and Severnside Enterprise Area – Ecology Mitigation and Flood Defence Project (asea-flood-ecology.co.uk)

5. Catchment Prioritisation

South Gloucestershire Council have prioritised catchments within the administrative area in order to focus the flood risk management actions by developing a priority action plan for each of the ten highest Priority Catchments. This section, along with Appendix E sets out the approach that has been taken to the prioritisation.

5.1 Approach

To identify areas that are at significant risk of flooding from local sources, an assessment of flood risk has been undertaken for South Gloucestershire. This assessment has identified 10 Priority Catchments within the administrative area to help inform where the actions should be focused.

For the purposes of this assessment South Gloucestershire has been split into 33 areas based on the Water Framework Directive (WFD) watercourse catchments to allow a catchment based approach to be taken. To identify the Priority Catchments data has been used from the Risk of Flooding from Surface Water dataset and climate change assessment as well as a series of secondary datasets.

Secondary datasets, including historic flooding and flood risk from other sources (fluvial & tidal and groundwater) were used to weight the Priority Catchments.

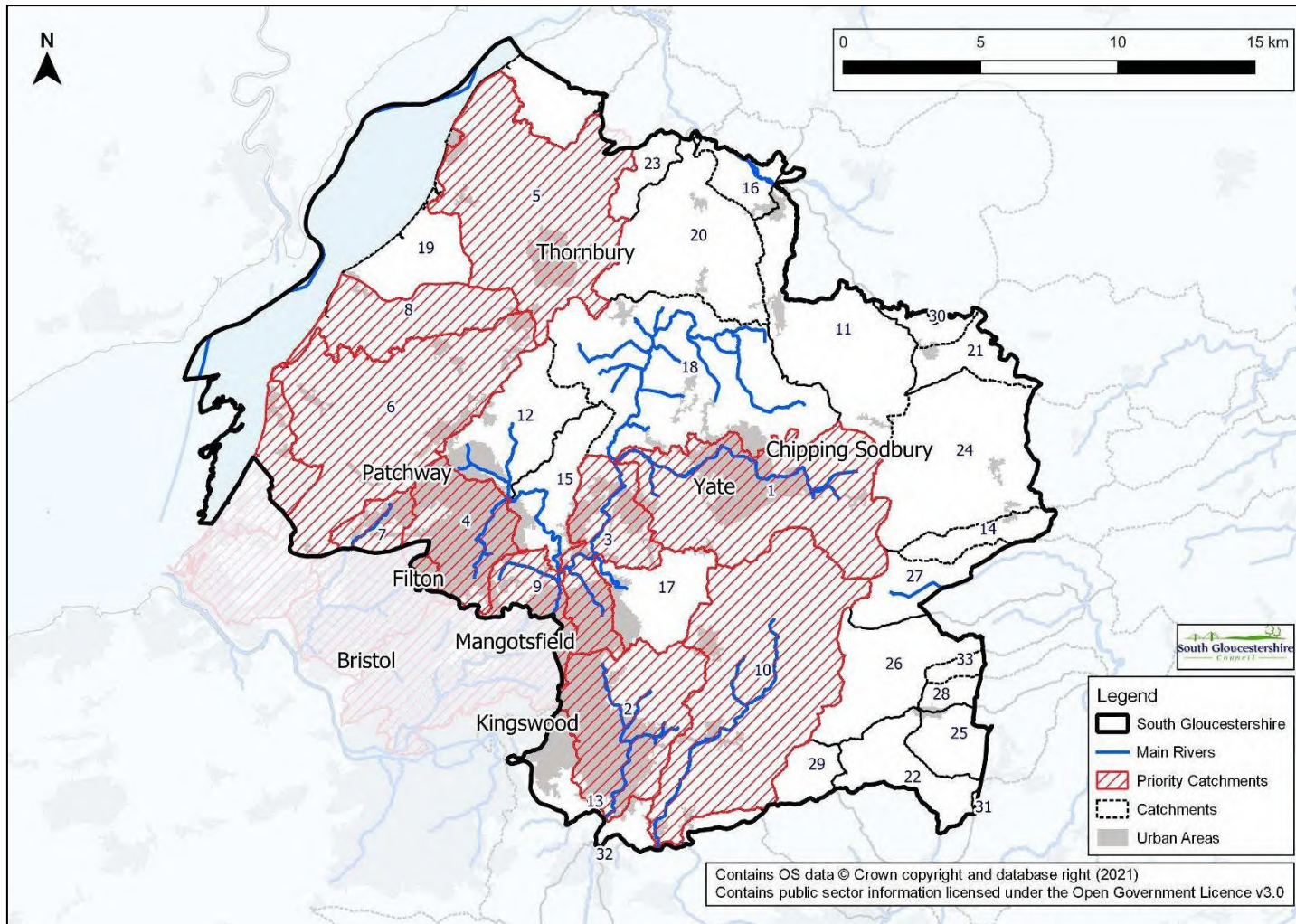
Alongside this a series of tertiary datasets were used to inform, support and challenge the prioritisation. These included details of potential investment within the catchments, potential for tide locking, risk of flooding from reservoirs and any cross-boundary issues that were identified – these datasets were provided by the Council, Wessex Water, Lower Severn IDB, Environment Agency, neighbouring authorities and parish councils.

The approach used to assess the catchment prioritisation is detailed in Appendix E.

Through partnership consultation, the Priority Catchments have been considered by local experts from the Strategy Partners organisations, including the Council, Wessex Water, the Lower Severn IDB and by the Environment Agency. As part of this process, details of numbers of areas with a known history of flooding and the number of properties potentially at risk of flooding in the present day and with the impacts of climate change within each catchment were provided, along with detailed mapping of the primary, secondary and tertiary datasets for each area.

Figure 17 shows the prioritised order of the WFD catchments within South Gloucestershire. The top 10 areas have also been identified with hatching.

Figure 17: South Gloucestershire catchment prioritisation



6. Action Plans

This section sets out the specific actions that South Gloucestershire Council, as Lead Local Flood Authority, will take to manage local flood risk within the administrative area. These have been divided into District Wide and Priority Catchment actions based on the prioritisation approach set out in Appendix E.

6.1 District Wide Action Plan

A District Wide action plan has been created which provides actions which apply across South Gloucestershire this has been included in Appendix A. The action plan has been developed using the components of resilience (Figure 2), which identifies four key themes which are fundamental to flood resilience: place making, protect, respond and recover. These themes have been aligned to the actions emphasising the importance of flood resilience in local flood risk management.

6.2 Priority Catchment Action Plan

For the 10 identified Priority Catchments, a catchment specific action plan has been developed. These are provided in Appendix B. As with the District Wide action plan, the specific actions have been developed with an emphasis on improving flood resilience, through developing emergency plans with an emphasis on flood recovery as well as preparedness, encouraging uptake of flood warning and alerts (where these are currently available for areas at risk of fluvial and tidal flooding) and enhancing the existing evidence base of surface water flood risk. The Priority Catchments are:

1. River Frome (source to confluence Ladden Brook)
2. Siston Brook (source to confluence River Avon)
3. River Frome (confluence Ladden Brook to confluence Folly Brook)
4. Stoke Brook (source to confluence Bradley Brook)
5. Oldbury Naite Rhine
6. Chestle Pill
7. River Trym (source to confluence River Avon)
8. Coastal catchment 2 (Aust to Avonmouth)
9. River Frome (Bradley Brook to confluence Floating Harbour)
10. River Boyd (source to confluence River Avon)

In the event of a 'significant' flood event, SGC would look to take action if and where possible, independent of whether the location is within the Top 10 Priority Catchments.

6.3 Sources of funding for flood risk management

Budgets are often limited so it is important to identify exactly what can be done, what will require additional contributions, and what can be programmed to happen later. There are various funding streams available to fund projects, some available nationally and some from local sources. Details of the main funding sources available can be found within Appendix G. A diagram detailing the sources of funding for Flood and Coastal Erosion risk management can be found [here](#)⁴⁷.

7. Implementation, Monitoring and Review

This section sets out the process by which South Gloucestershire Council will implement, monitor and review this Strategy. The Local Flood Risk Management Strategy has been developed to support in understanding and managing local flood risk and therefore it is considered appropriate that as a minimum an annual review of the document will be carried out to make sure that it remains in line with local and national policy.

7.1 Implementation and Monitoring

This local flood risk management strategy for 2022 – 2027 represents a co-ordinated area-wide approach to flood risk management. The strategy sets out or provides links to the roles, responsibilities, objectives, and the priorities of the Risk Management Authorities. South Gloucestershire, in partnership with the other Risk Management Authorities and key stakeholders, will use the strategy to support the management of local flooding issues across South Gloucestershire over the next five years.

The key focus for the next five years is to increase flood resilience. The focus on delivering actions will be based on the ten Priority Catchments identified. However, opportunistic actions that can be taken will be considered on their merits, i.e. any value for money project with positive benefits, irrespective of its location. Funding capital works can be challenging, especially where projects are required to have some partnership contributions in order to proceed. It may be that in many areas the risk of flooding is managed through early flood warnings and local resilience measures (where these are available in areas at risk of fluvial and tidal flooding).

Where appropriate, South Gloucestershire Council, will seek to fund schemes through multiple routes, details of several funding sources currently available can be found on the [DEFRA website](#)⁴⁷ and in Appendix G. Additionally, the Council will continually seek news sources of funding to support our flood risk management objectives.

As well as physical works, the Risk Management Authorities in South Gloucestershire will seek to reduce flood risk through other measures that can increase flood resilience especially through working with communities. Other actions such as planning and development control, highways management, consenting of watercourses and drainage works will also assist with managing risk across the area. We will seek to retain and develop the expertise already present in the Council as well as increasing capacity where required. Through collaborative working and addressing issues at the appropriate authority level, we will make the best use of the resources and funding available. All the Risk Management Authorities involved are committed to delivering these objectives and to reduce flood risk to the communities of South Gloucestershire. South Gloucestershire Council will continue to take responsibility and lead these meetings with the other stakeholders.

The Action Plans will be monitored annually or following a significant flooding incident. This will involve assessing which actions have been delivered and determining whether there has been any change to the prioritisation of actions, in line with current flood risk management priorities and funding availability. Findings from this monitoring process will be presented to the members of the Street Care and Transport Unit and the South Gloucestershire Council Flood Risk Management Partnership Operational Working Group.

7.2 Review

The Strategy has been developed to deliver a short to medium (6-year) improvement plan to establish a sound evidence and knowledge base upon which to develop a longer-term investment plan for local flood risk management activities in South Gloucestershire.

⁴⁷ Central Government Funding for Flood and Coastal Erosion Risk Management in England. DEFRA. March 2021.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/974066/Funding_FCERM_March_2021_Final_accessible.pdf

It is proposed that a review of the Strategy should be scheduled for 2027, and thereafter every six years (or more regularly) to coincide with the requirement under the Flood Risk Regulations 2009 to revise the Flood Risk Management Plan.

However, the Strategy should be viewed as a dynamic strategy and may require review more regularly to recognise specific changes. Potential triggers for a review may include:

- Occurrence of a significant and widespread surface water flood event,
- Significant changes to datasets or information which may alter the understanding of risk within South Gloucestershire (such as the locations of critical infrastructure),
- Significant amendments to the legal responsibilities and/or roles and functions of Risk Management Authorities and/or other organisations,
- Annual Monitoring identifies that the Strategy is not achieving its objectives,
- Changes to relevant national legislation, or
- Change in funding availability which has a significant effect on the Strategy Action Plan.

8. Appendices

Appendix A District Wide Action Plan

Appendix B Priority Catchment Action Plan

Appendix C Maps and Plans

Appendix D Strategic Environmental Assessment

Appendix E Catchment Prioritisation Approach

As part of the South Gloucestershire LFRMS, a flood risk appraisal was undertaken in order to identify and prioritise the areas of South Gloucestershire most at risk of flooding and to help inform where actions should be focused. A catchment based approach has been taken using the Water Framework Directive (WFD) watercourse catchments.

E1 – Data

Data used within the analysis has been divided into three groups, primary, secondary and tertiary, depending on the perceived level of significance within the catchment prioritisation process.

E1.1 – Primary datasets

This data was used in the initial cluster analysis and formed the basis of the catchment prioritisation.

- Water Framework Directive (WFD) watercourse catchments (33 catchments in study area)
- National Receptor Dataset 2014 (NRD)
- Ordnance Survey (OS) MasterMap buildings
- Risk of Flooding from Surface Water (RoFSW) dataset (March 2021)
- RoFSW + climate change

E1.2 – Secondary data

This data was used to weight the initial catchment prioritisation,

- Historic Flooding: including South Gloucestershire Council flood register, Wessex Water, Environment Agency Historic Flood outlines and stakeholder information
- Flood Zone 2
- Flood Zone 3
- Zone 3 and 4 of the JBA groundwater map
- SFRA Cumulative impact assessment

E1.3 – Tertiary data

The following datasets were not directly used in the catchment prioritisation, but were presented in the flood risk appraisal for context and further consideration.

- Potential investment locations
- Parish Council information
- Flood defences located in catchment
- Funding/national capital programmes
- Risk of reservoir flooding
- Risk of tide locking

E2 – Cluster Analysis

The Risk of Flooding from Surface Water (RoFSW) was used as the primary dataset to assess flood risk. It shows the flooding that takes place from the 'surface runoff' generated by rainwater (including snow and other precipitation) for the 1 in 30-year (3.3% AEP), 1 in 100-year (1% AEP) and 1 in 1000-year (0.1% AEP) rainfall events. This dataset has been chosen because, unlike the Environment Agency Flood Zones, it includes watercourses with catchments smaller than (3km²), and as surface water flooding is the responsibility of the Lead Local Flood Authority, as opposed to Main River fluvial or tidal flooding, the responsibility for which predominantly lies with the Environment Agency. Additionally, climate change uplifts have been applied to the Risk of Flooding from Surface Water datasets, based on the allowances set out in section 3.9.1.

These data sets were used to identify clusters of properties at risk of surface water flooding. The approach used to identify these clusters is set out below:

1. National Receptor Dataset 2014 (NRD) was used to identify all ground and basement properties. This avoids heavily weighting the analysis towards urban regions where there are typically more above ground properties. The Multi Coloured Manual (MCM) codes within the NRD were used to identify residential and non-residential properties. Non-residential properties were further classified into types of property (emergency services, education, utility services, transport, offices, commercial and retail). A sensibility check of the NRD data was done compared to OS mapping to identify where there had been significant areas of development since 2014, and additional points added to the NRD data manually.
2. Building footprints were extracted from the OS MasterMap data for each NRD point identified within step 1.
3. Building footprints were screened against the Risk of Flooding from Surface Water datasets and all NRD points where the flood risk intersects the building footprint were extracted. This was undertaken for each of the three RoFSW return periods (3.3%, 1% and 0.1%) plus two climate change uplifts (1% AEP +30% and 1% AEP + 45%) individually, creating five sets of data.
4. The NRD point for each property at risk of flooding within each dataset were buffered by 50m (to create a 100m diameter circle around each point).
5. The NRD buffers within each dataset were merged together where they intersected to generate clusters of properties at risk. Clusters with fewer than three properties were then discounted to avoid skewing the prioritisation towards individual properties in rural catchments, where there will be less opportunity for schemes to be undertaken due to lower cost-benefit ratios.
6. To generate an individual "risk score" for each WFD catchment and return period, the total number of properties within all the clusters (containing three or more properties) in a catchment was divided by the total number of clusters in each catchment (the average number of properties per cluster within a catchment).
7. To give greater weighting to locations susceptible to more frequent flooding, the individual "risk scores" for each Annual Exceedance Probability (AEP) was combined to produce an overall prioritisation. This was achieved by multiplying the individual "risk scores" for each AEP by their AEP and then adding them together. i.e. the 3.3% AEP averages were multiplied by 3.3, the 1% AEP averages (an average of the 1% AEP, 1% AEP + 30% CC and 1% AEP + 45% CC) multiplied by 1 and the 0.1% AEP averages multiplied by 0.1.
8. Finally, the primary prioritisation scores were normalised by dividing the score for each WFD catchment by the maximum score – giving a score between one and zero for each WFD catchment.

E3 – Weighting

Once the initial prioritisation of catchments was generated, the secondary datasets were used to adjust the weightings of the catchments to consider the impact other sources of flooding and historic flood records may have on the prioritisation of catchments. This allows catchment priorities to be influenced by existing (verified) flood risk information and potential for partnership working as a result of flood risk from multiple sources.

A weighting was applied to normalised flood risk score for each of these datasets within each WFD catchment based on the following information:

- Historic Flooding: derived from information provided by South Gloucestershire Council, Wessex Water, stakeholders as part of this study and the number of properties in the Environment Agency Historic Flood outlines **[0.5]**
- Number of properties in Flood Zone 2 (normalised) **[0.1]**
- Number of properties in Flood Zone 3 (normalised) **[0.1]**
- Number of properties in the highest risk (Zone 3 and 4) of the JBA groundwater map (normalised) **[0.1]**
- SFRA Cumulative impact assessment – derived from the SFRA assessment of cumulative impacts of development on flood risk. This dataset helps to highlight where future development is likely to lead to increased flood risk. This is split into three categories; high risk **[0.15]**, medium risk **[0.05]**, low risk **[0]**

For each secondary dataset, the score was normalised by dividing each WFD score by the maximum score – giving a score between one and zero for each WFD catchment. A weighting (shown in bold square brackets) was applied to each secondary dataset and then was added to the primary prioritisation score. The secondary weightings were calculated to add up to 1, which is the equivalent of the primary data.

Appendix F Legislative Context

In England, 5.2 million properties are at risk of flooding with numbers rising over future decades. The Flood and Water Management Act 2010 requires upper and unitary councils to be Lead Local Flood Authorities and manage surface water, groundwater and ordinary watercourses. The Flood and Water Management Act is an important part of how the Government reacted to the 2007 floods. The subsequent **Pitt Review**⁴⁸ (2008) recommended urgent and fundamental changes to the way the country was adapting to increased flooding.

Lead Local Flood Authorities, Borough and District Councils, Water Companies and Internal Drainage Boards have effectively joined the Environment Agency in a partnership to manage flood risk across all sources. Any combination of sources of flooding could exist in an area so partnership working and joint projects are expected.

The **national strategy**¹ and local strategy are at the forefront of this approach, putting new ways of working into practice. The local strategies across England set out how people, communities, business and the public sector should work together. They are enabling Lead Local Flood Authorities and other Risk Management Authorities to plan for the future. For details of how the local strategy aligns with other flood risk management documents see Figure 18.

A new **national strategy**¹ was consulted on in 2019 and was published in July 2020. The Strategy provides a framework to guide the activities of Risk Management Authorities involved in FCERM work.

The Strategy's long-term vision is for: a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100.

The new national strategy contains three long term ambitions, underpinned by evidence about future risk and investment needs:

- Climate resilient places
- Today's growth and infrastructure – resilient in tomorrow's climate
- A nation ready to respond and adapt to flooding and coastal change

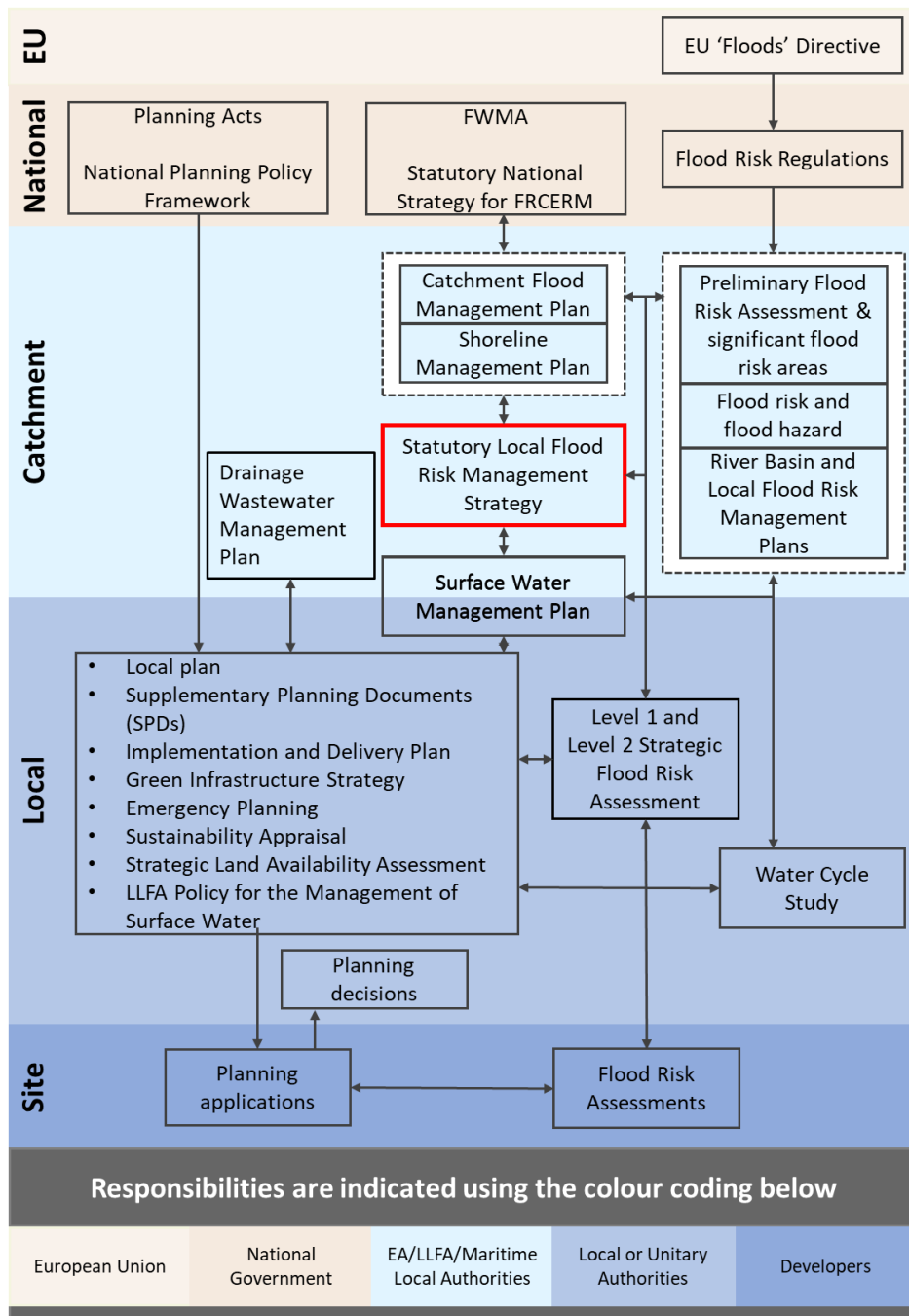
The Strategy sets out the long-term delivery objectives the nation should take over the next 10 to 30 years as well as shorter term, practical measures Risk Management Authorities should take working with partners and communities.

The Strategy's measures are either a reaffirming of existing activities, recognition of existing and new statutory requirements or voluntary funded actions. All measures are therefore cost neutral, in that they do not lead to cost increases for Risk Management Authorities.

In the March 2020 budget, the government announced a new £5.2 billion programme of funding for flood risk and coastal erosion projects from 2021 to 2027. The government published a policy statement in July 2020, which is informed by the national strategy. This sets out the government's long-term ambition to create a nation more resilient to future flood and coastal erosion risk.

⁴⁸https://webarchive.nationalarchives.gov.uk/20100812084907/http://archive.cabinetoffice.gov.uk/pittreview/_/media/assets/www.cabinetoffice.gov.uk/flooding_review/pitt_review_full%20pdf.pdf

Figure 18: Responsibilities for key flood risk documents



Under the Flood and Water Management Act 2010, all Risk Management Authorities are expected to exercise their flood and coastal erosion risk management functions consistently with the national strategy and to exercise all other functions that may affect flooding or coastal change having regard to the national strategy.

South Gloucestershire Council has the responsibility for developing, maintaining, applying and monitoring the implementation of a local flood risk management strategy within the district. Local flood risk management strategies produced by lead local flood authorities must be consistent with the national strategy. Table 1 provides a summary of the relevant national, regional and local legislation.

Table 1: Summary of legislation

Document, lead author, and date	Relevant direct legislation	Information	Policy and measures	Development design requirements	Next update due	
National	National Flood and Coastal Erosion Risk Management Strategy (Environment Agency) 2020	Flood and Water Management Act	No	Yes	No	2026
	Natural Flood Management Plans (Environment Agency)	N/A	Yes	No	No	-
	National Planning Policy Framework (MHCLG) 2021	Planning and Compulsory Purchase Act 2004 as amended & The Town and Country Planning (Local Planning) (England) Regulations 2012 as amended	No	Yes	Yes	-
	National Planning Practice Guidance (MHCLG) 2019		Yes	No	Yes	-
Regional	Severn River Basin District Management Plan (Environment Agency) 2015	WFD	No	Yes	No	In the process of being updated. These were out for consultation at the time of writing the LFRMS and are due to be released in

Document, lead author, and date	Relevant direct legislation	Information	Policy and measures	Development design requirements	Next update due
					2022.
Severn River Basin District Flood Risk Management Plan (Environment Agency) 2016	Flood Risk Regulations	No	Yes	No	FRMPs are in the process of being updated. These were out for consultation at the time of writing the LFRMS and are due to be released in 2022.
Bristol and Avon, Severn Tidal Tributaries Catchment Flood Risk Management Plans (Environment Agency) 2012, 2009	N/A	Yes	Yes	No	-
Climate change guidance for development and flood risk (Environment Agency) 2021	N/A	No	No	Yes	2022

Document, lead author, and date	Relevant direct legislation	Information	Policy and measures	Development design requirements	Next update due
South Gloucestershire Strategic Flood Risk Assessment (South Gloucestershire Council) 2021	Planning legislation and NPPF	Yes	No	Yes	
Designers and Developers (South Gloucestershire Council)	N/A	Yes	No	Yes	
Severn Estuary Shoreline Management Plan 2 (2010)		Yes	Yes		SMP currently being refreshed

F1 – National Flood and Coastal Erosion Management Strategy for England

The National Flood and Coastal Erosion Risk Management Strategy for England was published in July 2020, following a public consultation in autumn 2019. The strategy sets out 20 strategic objectives, 18 of which are under the three ambitions:

Future risk and investment

A. Between now and 2025 the Environment Agency will have better evidence to inform future risk and investment needs for managing all sources of flood and coastal change.

B. Between now and 2030 Risk Management Authorities will make greater use of funding and financing from non-public sector sources to contribute to the investment needs of flood and coastal resilience.

Ambition 1. Climate resilient places

1.1. Between now and 2050 the nation will bolster its resilience to flooding and coastal change.

1.2. Between now and 2050 Risk Management Authorities will help places plan and adapt to flooding and coastal change for a range of climate scenarios.

1.3. Between now and 2050 Risk Management Authorities will help coastal communities transition and adapt to a changing climate.

1.4. Between now and 2030 Risk Management Authorities will use nature based solutions and improve the environment through their investments in flood and coastal resilience.

1.5. Between now and 2030 Risk Management Authorities will work with farmers and landowners to help them adapt their businesses and practices to be resilient to flooding and coastal change.

Ambition 2. Today's growth and infrastructure – resilient in tomorrow's climate

2.1. Between now and 2030 all new development will contribute to making places resilient to flooding and coastal change.

2.2. Between now and 2030 all Risk Management Authorities will encourage environmental net gain in all new development to support resilience to flooding and coastal change.

2.3. Between now and 2030 Risk Management Authorities will support investments to manage flooding and coastal change that enables growth in a sustainable and climate resilient way.

2.4. Between now and 2040 Risk Management Authorities will work with the finance sector and other partners to mainstream property flood resilience measures and to 'build back better' after flooding.

2.5. Between now and 2030 owners of flood and coastal defences will understand and take responsibility for achieving flood and coastal resilience.

2.6. Between now and 2030, owners and operators of large raised reservoirs will ensure they are safe in a changing climate.

2.7. By 2030 water companies will plan for their infrastructure to be resilient to flooding and coastal change.

2.8. Between now and 2050 Risk Management Authorities will work with national infrastructure providers to contribute to more flood and coastal resilient places.

Ambition 3. A nation ready to respond and adapt to flooding and coastal change.

3.1. 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. 3.2. Between now and 2030 people will receive the information and support they need to transform how the nation better prepares and responds to flooding and coastal change.

3.3. Between now and 2030 people and businesses will receive the support they need from all those involved in recovery after flooding so they can get back to normal quicker after flooding.

3.4. Between now and 2030 the Environment Agency will have an oversight of skills and capabilities across the flooding and coastal change sector to identify gaps and future needs.

3.5. Between now and 2030 the nation will be recognised as world leader in researching and managing flooding and coastal change.

F2 – Strategic Environmental Assessment

The Strategic Environmental Assessment is a generic tool that was originally introduced by the European Union Directive 2001/42/EC (The SEA Directive). The objective of the SEA Directive is to “to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development (Article 1)”. This requires national, regional and local authorities in Member States to carry out a strategic environmental assessment on certain plans and strategies that they promote, such as this strategy. The requirements for this were transposed into English Law, prior to the UK’s departure from the EU. The Environmental Assessment of Plans and Programmes (Amendment) Regulations 2020 now apply to this work.

Monitoring of the significant environmental effects of implementing the strategy will be undertaken to comply with legislation, to ensure that any unforeseen adverse effects of the strategy are recognised and dealt with.

A Strategic Environmental Assessment (SEA) has been undertaken alongside the strategy so that significant environmental effects arising from this strategy are identified, assessed and mitigated.

Appendix G Sources of Funding

South Gloucestershire Council is funded by a Formula Grant provided by the Department for Communities and Local Government. Together with locally collected council tax and some other smaller sources of funding, these resources fund the entire range of services administered by the council. Flood risk management is only one of the services which must be considered alongside all the other activities the council provides including waste and recycling, health and social care, schools, planning and development, highways and transport, and public amenity.

In the main, flood risk management projects are funded by a combination of the following funding streams:

- National funding – Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA) and Area based Grants for LLFAs,
- Regional funding – Local Levy, and
- Local / other funding contributions – for example, private contributions, local residents and businesses, and Council capital funding (see Table 2 for further information).

The mechanism for attracting the national (FCRM GiA) and regional (Local Levy) funding gives priority to the protection of residential properties.

Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA)

Flood and Coastal Risk Management Grant in Aid (FCRM GiA) is the capital budget set aside by central government for flood defence projects across England. Following consultation during 2011, Defra introduced a new approach to the funding of flood risk management capital projects. This approach was termed the 'Flood and Coastal Resilience Partnership Funding' approach. The **Partnership Funding**⁴⁹ Approach is governed by the Environment Agency and represents a key source of funding for flood alleviation measures proposed by the Environment Agency, LLFAs and Internal Drainage Boards. The approach to calculating partnership funding was further updated in 2020 make it easier for non-flood defence schemes to secure funding.

The key benefits of the approach are:

- Communities, through their Regional Flood and Coastal Committees (RFCCs), can take decisions on which projects should proceed, based on local willingness to contribute financially towards the benefits that would be delivered,
- The programme of capital works will be prioritised based on the damages being prevented by the project, and
- A higher proportion of capital projects can be eligible for some government funding, subject to finances being available.

Other Sources of Funding

In order to maximise the benefits of FCRM GiA to funding of flood risk management capital projects, we will work closely with partnering organisations and other bodies to attract alternative sources of funding. It is important to note that the likelihood of securing FCRM GiA can significantly increase when other sources of funding are secured.

In taking forward flood risk management activities we will need to consider securing funding from alternative sources, including Central Government, other RMAs and stakeholders and private beneficiaries. One of our key aspirations is to maximise multi-beneficial outcomes of new schemes or activities. This could open up more avenues of internal revenue than purely flood risk management, particularly where measures address existing Key Issues for the Council as identified in the Local

⁴⁹ Partnership funding for FCRM projects. <https://www.gov.uk/guidance/partnership-funding-for-fcrm-projects>

Plan, such as managing the environment and heritage, improving health and wellbeing, and improving existing communities.

Table 2 identifies further potential sources of funding which could contribute to the delivery of flood risk management projects or schemes.

Table 2: Potential sources of funding

Potential sources of funding	Description	Administered by
Local Levy	A levy on local authorities within the boundary of each Regional Flood and Coastal Committee (RFCC). The Local Levy is used to support, with the approval of the committee, flood risk management projects that are not considered to be national priorities and hence do not attract full national funding through the FCRM GiA.	Environment Agency through Wessex RFCC
Private Contributions	Voluntary, but funding from beneficiaries of projects could make contributions from national funding viable. Contributions could be financial or "in kind" e.g. land, volunteer labour.	South Gloucestershire Council
Water Company Investment	Investment is heavily regulated by Ofwat but there may be opportunities for contributions to area-wide projects which help to address sewer under-capacity problems.	Wessex Water
Community Infrastructure Levy (CIL)	The Community Infrastructure Levy (CIL) allows Local Authorities to raise funds from developers undertaking new building projects within their area of governance. Such funds can be used to mitigate the effects of the development, including flood defences.	South Gloucestershire Council
Section 106 Agreements	Section 106 agreements (Town and Country Planning Act 1990) are a mechanism designed to make a development proposal acceptable in planning terms, through the site specific mitigation of impacts from a development.	South Gloucestershire Council
Local Residents / Businesses	Community engagement can be a very effective means of raising awareness of flood risks and management activities in local areas, and promoting a sense of 'helping communities to help themselves' can result in contributions from private sources, such as local residents and businesses.	South Gloucestershire Council
Local Flood Risk Management Partners	Local Flood Risk Management Partners, or Risk Management Authorities, could be engaged. For example Wessex Water manage much of the drainage system and therefore could be a potential source of funding if a scheme offers mutual benefits.	South Gloucestershire Council
Council Tax	A "ring-fenced" provision within the annual council tax for the specific purpose of addressing flood risk management.	South Gloucestershire Council
Business Rates Supplements	Agreement from local businesses to raise rates for specified purposes.	South Gloucestershire Council

Potential sources of funding	Description	Administered by
Council Capital Funding	The Councils infrastructure programme prioritising capital improvement projects. The Council programme may include funding for drainage capacity improvements for highway drainage systems, for example, but could include a flood scheme, if benefits can be identified.	South Gloucestershire Council
Council Revenue Funding	The Council has a number of revenue streams to support technical and administrative processes and to maintain Council and Highways Authority infrastructure. Existing revenue budgets include Highways Drainage Maintenance, Highways Gully Maintenance, Watercourse Maintenance and funding for the Street Care and Transport Unit for discharging the Lead Local Flood Authority duty for the Council.	South Gloucestershire Council
Flood and coastal resilience innovation programme	Bristol City Council was recently awarded funding by Defra to develop a business case for new ways to manage the River Frome and surrounding areas to boost wildlife, public spaces, and flood resilience across the river catchment. SGC is one of the key partners involved in the programme.	Bristol City Council

Appendix H Glossary of key terms

Term / Acronym	Definition
Annual Exceedance Probability (AEP)	The chance or probability of an event occurring annually. It is expressed as a percentage.
CFMP	Catchment Flood Management Plans (CFMPs) give an overview of the flood risk across each river catchment. They recommend ways of managing those risks now and over the next 50-100 years.
Cluster	A group or concentration of properties that may be affected by flooding. These properties are considered to be at risk of having internal damage from flooding.
Culvert	A culvert is a watercourse that has been enclosed in a structure such as a pipe.
Combined Sewer	A separate underground pipe system designed specifically for transporting sewage, excess rain and surface water from houses, commercial buildings and roads for treatment or disposal.
Defra	Department for Environment, Food and Rural Affairs.
Duty	Duty is a legal obligation, set out by legislation, which is imposed on an individual or organisation requiring adherence.
Flood and Coastal Erosion Risk Management Grant in Aid (FCERM GiA)	Flood and Coastal Erosion Risk Management Grant in Aid is the central funding pot of Defra (The Department of Food and Rural Affairs) that is spent each year on flood risk reduction measures.
Flood Map for Planning	The Flood Map for Planning is a multi-layered map which provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences. The flood zones do not take into account flood defences.
Flood Risk Assessment (FRA)	A Flood Risk Assessment is an assessment of the risk of flooding from all flooding mechanisms. It typically includes the identification of flood mitigation measures and should provide advice on actions to be taken before and during a flood. These are typically produced to support a planning application for development.
Flood Risk Asset / Structure	A flood risk asset is a built structure, embankment or natural feature that acts to reduce flood risk to an area. Each asset varies in terms of its type, condition, length, and maintenance.
Flood Zone	Flood Zones have been created by the Environment Agency (and LPA in the case of Flood Zone 3b) to be used within the planning process to help determine the likelihood of somewhere flooding from fluvial sources, ignoring the presence of defences. Flood Zone definitions are set out in the National Planning Policy Guidance.
Fluvial flooding (River flooding)	Flooding resulting from water levels exceeding the bank level of a river or stream.
Flood and Water management Act (FWMA)	Flood and Water Management Act 2010. The FWMA implements the recommendations from Sir Michel Pitt's Review of the floods in 2007 and places a series of responsibilities on the council. The main aim of the Act is to improve flood risk management.

Term / Acronym	Definition
Green Infrastructure (GI)	Green Infrastructure (GI) refers to a strategically planned and managed network of green spaces and other environmental features vital to the sustainability of an area. It is defined as 'network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities'.
Groundwater flooding	Flooding that occurs when water levels in the ground rise above surface levels. It is most likely to occur in areas underlain by permeable geology.
Internal Drainage Boards (IDBs) / Internal Drainage Districts (IDDs)	An Internal Drainage Board / District is a public body that has been established under statute in areas of special drainage need. An IDB / IDD holds permissive powers to undertake work to deal with matters affecting water levels, land drainage and flood risk within a defined boundary. The coastal region of South Gloucestershire is covered by the Lower Severn IDB.
Lead Local Flood Authority (LLFA)	Lead Local Flood Authority – Local Authority (upper or unitary council) responsible for taking the lead on local flood risk management. In this area it is South Gloucestershire Council.
Likelihood	The probability of something occurring.
'Local' flood risk	Local flood risk is defined as flooding from surface water, groundwater and ordinary watercourses. If other sources of flood risk (river or sea risk for example) interact with local sources, it is common for everything to be considered together. This Strategy considers all types of flooding.
Local Levy	Local levy is a funding pot governed by the Regional Flood and Coastal Committees for flood alleviation schemes.
Local Planning Authority (LPA)	The local government body that is empowered by law to exercise urban planning functions for a particular area.
Local Resilience Forum (LRF)	LRFs are multi agency partnerships made up of representatives from local public services, including the emergency services. These agencies are known as category 1 responders, as defined under the Civil Contingencies Act (2004).
Multi-Coloured Manual (MCM)	The UK Multi-Coloured Manual is a reference document to assess flood risks and its impacts, as well as the benefits of flood risk management measures
Main River	The Environment Agency is the lead authority on Main Rivers. Main Rivers are a Defra statutory designation and are identified on the Environment Agency's 'Main River Map'. The Environment Agency has permissive powers to carry out work on Main Rivers.
National Receptor Dataset (NRD)	The NRD is a dataset derived from Ordnance Survey AddressBase data, providing property level information on property type, floor area and Flood Hazard Research Centre's Multi-Coloured Manual codes.
National Planning Policy Framework (NPPF)	The revised National Planning Policy Framework sets out government's planning policies for England and how these are expected to be applied.

Term / Acronym	Definition
National Flood and Coastal Erosion Risk Management Strategy (NFCERMS)	The Flood and Water Management Act 2010 required the Environment Agency to develop, maintain and apply a strategy, describing what needs to be done by all authorities involved. This is the National Flood and Coastal Erosion Risk Management Strategy (NFCERMS) for England. This is referred to as the 'national strategy'.
Non-public (private) sewer	A sewer owned by a person or company that is not Water Company owned.
Ordinary Watercourse	The Lead Local Flood Authority is the lead authority on Ordinary Watercourses, except where they are located within the Internal Drainage Board area, which in South Gloucestershire are managed by the EA. All watercourses that are not designated Main River are considered to be Ordinary Watercourses and are the responsibility of landowners. Note, Ordinary Watercourse does not imply a "small" river, although it is often the case that Ordinary Watercourses are smaller than Main Rivers.
Partnership	The term partnership is used to refer to joint work and joint leadership of investigation or implementation of work undertaken by the Risk Management Authorities.
Preliminary Flood Risk Assessment (PFRA)	The PFRA provides a high-level summary of significant flood risk, based on available information, describing both the probability and consequences of past and future flooding. A PFRA must consider flooding from surface runoff, groundwater and ordinary watercourses, and any interaction these sources may have with Main Rivers.
Permissive Powers	These are powers set out by legislation to enable Risk Management Authorities to carry out works where it deems necessary and appropriate.
Planning Practice Guidance (PPG)	The Planning Practice Guidance is a series of guidance documents, in web format, written to support the application of the NPPF.
Pitt Review	Comprehensive independent review of the 2007 summer floods by Sir Michael Pitt, which provided recommendations to improve flood risk management in England.
Priority Catchments	This strategy has ranked areas of South Gloucestershire based on clusters of properties at risk. These are identified by the latest flood mapping. The 10 areas ranked highest are referred to as 'Priority Catchments'.
Property Flood Resilience (PFR)	PFR is a term used to refer to resistance measures that slow down or stop the ingress of water to a property and resilience measures which minimise damage and speed up recovery after flooding has occurred. Examples include door-boards, airbrick covers, non-return valves, porous plaster and raising electrics.
Riparian Owner	If you own land or property next to a watercourse i.e. a river, stream, culvert or ditch (that is not owned by others), then you are a 'riparian landowner' and have riparian rights and responsibilities.
Risk	In flood risk management, risk is defined as a product of the probability or likelihood of a flood occurring, and the consequence of the flood.
Risk Management Authorities (RMAs)	All authorities with duties or powers to carry out work on the drainage network, as described in the Flood and Water Management Act 2010.

Term / Acronym	Definition
Risk of Flooding from Surface Water (RoFSW)	The Risk of Flooding from Surface Water mapping is a national map showing flood risk from surface water across the whole of England. The mapping is available for the 1 in 30-year (3.3% AEP), 1 in 100-year (1% AEP) and 1 in 1,000-year (0.1% AEP) return period events.
Sewer flooding	Flooding caused by a blockage or overflow in a sewer or urban drainage system.
RFCC	Regional Flood and Coastal Committee (RFCC) are groups of elected members responsible for scrutinising and signing off the work programme. South Gloucestershire is covered by the Wessex RFCC.
Strategic Environmental Assessment (SEA)	A Strategic Environmental Assessment is a systematic decision support process, aiming to ensure that environmental and possibly other sustainability aspects are considered effectively in policy, plan and program making
Strategic Flood Risk Assessment (SFRA)	Strategic Flood Risk Assessments are a required part of the local planning process as set out in the NPPF. An SFRA helps various parties consider flood risk when making planning decisions about the design and location of any development or flood risk management features and structures.
SGC	South Gloucestershire Council
SMP	Shoreline Management Plans (SMPs) provide a long-term framework for dealing with coastal flooding and erosion over a large area. SMPs take into account risks to people and the developed, historic and natural environment. They also take climate change into account in planning long-term coastal management.
SuDS	Sustainable Drainage Systems. A drainage system designed to control surface water runoff close to where it falls and mimic natural drainage as closely as possible.
Surface Water	Rainwater (including snow and other precipitation) which is on the surface of the ground (whether or not it is moving), and has not entered a watercourse, drainage system or public sewer.
Surface Water Management Plan (SWMP)	Surface water management plans are projects to investigate local flooding issues such as flooding from sewers, drains, groundwater, and runoff from land, small watercourses and ditches.
The council	South Gloucestershire Council (unless stated otherwise)
'The strategy'	This document, the Local Flood Risk Management Strategy for South Gloucestershire (2022 – 2027)
WFD	The Water Framework Directive 2000/60/EC is an EU directive which commits European Union member states to achieve good qualitative and quantitative status of all water bodies.