London Borough of Redbridge

Local Flood Risk Management Strategy 2024 - 2030

This document is being produced to present the content which will be delivered as a final output on the Flood Risk Management Webpages of the Redbridge Council website.

Foreword

Residents within Redbridge have faced a number of severe weather incidents in recent years. Flooding can have devastating emotional and financial impacts on residents, businesses and communities. Due to climate change flood events are likely to be more frequent and more severe.

Redbridge Council is committed to doing all we can to both reduce the risk of flooding, whilst adapting and become more resilient. This update to the Local Flood Risk Management Strategy will play a key role in helping to reduce our risk of flooding.

As the Lead Local Flood Authority, Redbridge has responsibilities under the Flood and Water Management Act (2010). These responsibilities are to lead in the management of local flood risks from all types of watercourses, ensuring co-operation between utilities, the Environment Agency, Planning and Highways teams to manage those risks. One key responsibility is to create and update its Local Flood Risk Management Strategy, of which our first was published in 2015. We have gained valuable understanding of the flood risk in our borough since then and are using the knowledge we have gained in this updated strategy, alongside updated national guidance and best practice.

Our ambition is to create a safer, cleaner, and greener Redbridge. This means prioritising the protection of residents, their homes and businesses from flooding. Our updated Local Flood Risk Management Strategy has key objectives to help us achieve this and reduce the risk of flooding by:

- Improving knowledge and understanding of flood risk in the borough
- Delivering successful and targeted flood alleviation schemes that maximise wider social, economic and environmental benefits
- Developing knowledge and access to funding to improve the resilience of communities and future developments
- Ensuring that developments appropriately mitigate flood risk by prioritising the use of sustainable drainage schemes and achieving greenfield runoff rates
- Supporting successful communication between stakeholders and the engaging communities to enable improvements to flood risk management
- Addressing the impacts of climate change by improving sustainability and working towards carbon neutral targets as part of the Council's Climate Action Plan

To achieve our objectives in the strategy and our comprehensive action plan we will need the support of residents, businesses, and partners such as the Environment Agency, Thames Water, Essex and Suffolk Water and partner boroughs. Effective collaboration and partnership is critical to flood risk management to ensure lasting and effective solutions.

We will also continue to innovate and make use of new technologies and techniques to improve our flood alleviation and flood management, working with the private and voluntary sectors, universities, and partners.

As we continue to feel the impacts of climate change and increasing extreme weather events, this strategy will be critical to ensure we are prepared and doing all we can to understand, manage and reduce our flood risk in Redbridge to protect our residents, businesses, and communities.

Jo Blackman
Cabinet Member for Environment and Civic Pride

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Abbreviations

Abbreviation	Definition
CDA	Critical Drainage Area
DEFRA	Department for Environment, Food and Rural Affairs
DWMP	Drainage and Wastewater Management Plan
EA	Environment Agency
FAS	Flood Alleviation Scheme
FCERM	Flood and Coastal Erosion Risk Management
FRM	Flood Risk Management
FRMP	Flood Risk Management Plan
FRR	Flood Risk Regulations
FWMA	Flood and Water Management Act
GiA	Grant in Aid
GLA	Greater London Authority
HRA	Habitats Regulations Assessment
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LoDEG	London Drainage Engineers Group
LPA	Local Planning Authority
MAFP	Multi-Agency Flood Plan
NaFRA2	National Flood Risk Assessment 2
NFCERMS	National Flood and Coastal Erosion Risk Management Strategy
NFM	Natural Flood Management
PFRA	Preliminary Flood Risk Assessment
RBI	Roding, Beam and Ingrebourne
Redbridge	The London Borough of Redbridge
Redbridge Council	Redbridge London Borough Council
RFCC	Regional Flood and Coastal Committee
RMA	Risk Management Authority
RoFSW	Risk of Flooding from Surface Water
SAB	SuDS Approval Body
SEA	Strategic Environmental Assessment
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Plan
TfL	Transport for London
TWUL	Thames Water Utilities Limited

1. Introduction

1.1 What is a Local Flood Risk Management Strategy?

A Local Flood Risk Management Strategy (LFRMS) is produced by the Lead Local Flood Authority (LLFA) and outlines how the LLFA plans to effectively manage flood risk for a local area. The LFRMS establishes local flood risk issues and identifies a set of strategic objectives for the delivery of flood risk management.

The LFRMS is supported by other strategic documents such as the Redbridge Strategic Flood Risk Assessment (SFRA) (2015) and Surface Water Management Plan (SWMP). Other policies and legislation also impact the LFRMS, such as the Redbridge Local Plan (2018) and the National Flood and Coastal Erosion Risk Management Strategy (NFCERMS) (2020). The NFCERMS describes what is required from all Risk Management Authorities (RMAs) involved in flood and coastal erosion risk management. An associated Flood and Coastal Erosion Risk Management Strategy Roadmap to 2026 was published in 2022 and provides a framework for operational activities and decision making to ensure flood risk management strategies and their actions complement and align with each other throughout England. The EA has also published Flood Risk Management Plans (FRMPs) covering the period 2021-2027 which set out how organisations, stakeholders and communities will work together to manage flood risk in England. The FRMPs include actions for flood risk management at a national level and at a basin level which the LFRMS aligns to.

Alongside the LFRMS a detailed Action Plan is produced which sets out a list of actions that RMAs are involved in the response and management of flooding should deliver.

This LFRMS covers the following topics:

- The roles and responsibilities of Risk Management Authorities
    - How is flood risk management shared between RMAs?
- Local Flood Risk in Redbridge
    - What are the flood risks in Redbridge?
    - Flooding history within Redbridge
    - Climate change and flood risk
- How the LLFA plans to support resilience of local communities
    - How to reduce flood risk
    - What to do before, during and after a flood
    - How to report types of flooding
- Guidance on sustainable solutions
    - Sustainable flood risk management
    - Sustainable drainage systems (SuDS)
    - Natural flood management
    - Planning policy and planning applications
- Management of flood risk in Redbridge
    - How the Council have managed flood risk
    - How the Council is planning to manage flood risk

1.2 Why do we need a LFRMS?

The Flood and Water Management Act (2010) (FWMA) establishes the roles and responsibilities for RMAs that manage flood risk. This legislation appoints the Redbridge Council Flood Risk Management (FRM) team as the LLFA for the London Borough of Redbridge. The LLFA is responsible for the management of surface water, groundwater and ordinary watercourses, defined as 'local flood risks', as per the FWMA.

Under the FWMA the LLFA has the responsibility to produce and maintain a LFRMS which is required to be updated every six years or following major changes to overarching policy and legislation, if that occurs sooner. The previous LFRMS for Redbridge was published in 2015 and this LFRMS is the new version with updates on progress since the last LFRMS publication, outlined in *Section 6*, and setting out the future plans to manage flood risk, further information on which can be found in *Section 7*.

1.3 Additional assessments

The impact of delivering the proposed LFRMS has been assessed by the completion of screening reports for both a Strategic Environmental Assessment (SEA) and a Habitats Regulations Assessment (HRA).

1.3.1 Strategic Environmental Assessment

A SEA reviews the impact of the LFRMS with regards to local environmental issues to determine if its implementation will exacerbate or have a detrimental effect on any of the identified issues. Completion of an SEA is a requirement of plans and strategies under the Environmental Assessment of Plans and Programmes Regulations (2004) (which implements the European SEA Directive (2001)). There are five stages of assessment which are:

Stage A	Setting the context and objectives, establishing the baseline and deciding on the scope.
Stage B	Developing and refining options and assessing effects.
Stage C	Preparing the environmental report.
Stage D	Consulting on the draft strategy and the SEA report.
Stage E	Monitoring the significant effects of implementing the strategy.

The SEA screening report for the LFRMS identified no detrimental effects of the proposed strategy.

1.3.2 Habitats Regulations Assessment

A HRA is completed to determine if delivery of the proposed LFRMS will cause any negative impacts for protected European sites. This is a requirement of plans and strategies under the Conservation of Habitats and Species Regulations (2017). There are three stages to undertake as part of a full HRA which are:

Task 1: Screening	To check if the strategy, plan or proposal is likely to have a significant effect on a European site's conservation objectives.
Task 2: Appropriate Assessment	To assess the significant effects of the proposal in more detail and identify ways to avoid or minimise any effects.

Task 3: Derogation	To consider if proposals that would have an adverse effect on a European site qualify for exemption.

The HRA screening report for the LFRMS identified no detrimental effects of the proposed strategy.

1.4 The LFRMS objectives

A set of strategic objectives are produced for the LFRMS which provide flood risk management targets for the LLFA for the subsequent six-year period of the LFRMS. These are outlined in *Figure 1-1*. These strategic objectives are designed to support the delivery of the core objectives of the NFCERMS which are:

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

Strategic Objective A

To improve knowledge and understanding of flood risk in Redbridge and wider catchments.

Strategic Objective B

To deliver successful and targeted flood alleviation schemes which maximise wider social, economic and environmental benefits.

Strategic Objective C

To develop knowledge and access to funding to improve the resilience of communities and future development.

Strategic Objective D

To ensure development appropriately mitigates flood risk by prioritising the use of SuDS and by aiming to achieve greenfield runoff rates.

Strategic Objective E

To support successful communication between stakeholders and the effective engagement of communities to enable improvements to flood risk management.

Strategic Objective F

To address climate change impacts by improving sustainability and working towards carbon neutral targets.

Figure 1-1 Redbridge LFRMS Strategic Objectives

2. Roles and responsibilities

2.1 How is flood risk management shared between authorities?

A variety of organisations assist with the management of flood risk in the Redbridge borough and these are grouped under the term Risk Management Authorities (RMAs). RMAs include Government organisations and private companies, all with differing responsibilities dependent on the different sources of flooding which are explained in *Section 3*. *Table 2-1* identifies which RMA is responsible for the management of the different types of flood risk.

Table 2-1 Responsibilities of RMAs in managing flood risks

Flood Risk Responsibility	**Risk Management Authority**		
	Redbridge LLFA	Environment Agency	Thames Water
Fluvial flooding from main rivers		✓	
Tidal flooding		✓	
Ordinary watercourses (non-main rivers)	✓		
Flooding from public sewers			✓
Groundwater flooding	✓		
Reservoir flooding		✓	
Surface water flooding	✓		

Table 2-2 details the RMA responsible for managing different types of drainage.

Table 2-2 Responsibilities of RMAs in drainage management

Drainage Responsibility	**Risk Management Authority**		
	Redbridge Council	Transport for London	National Highways
Highway drainage and asset management of major A-roads		✓	
Highway drainage and asset management of motorways			✓
Highway drainage and asset management of other public roads	✓		

2.1.1 Redbridge Council

Redbridge Council is the principal RMA for managing local flood risk within Redbridge. Its many responsibilities and duties in managing flood risk are shared between various internal departments. **Redbridge Highways** are responsible for highway drainage, for example resolving blocked drains or gullies, on the public roads not managed by Transport for London (TfL).

As the **Lead Local Flood Authority (LLFA)**, the Flood Risk Management (FRM) team have the following responsibilities, outlined under the Flood and Water Management Act (2010) (FWMA):

- Prepare and maintain a Local Flood Risk Management Strategy (LFRMS), consulting local organisations and the public.
- Perform works to manage local flood risk in its authority area.
- Maintain an asset register, which is a record of features that have a significant effect on flooding in the area.
- Undertake flooding investigations when a significant flooding incident has occurred. The threshold for an investigation is shown in *Figure 2-1*.
- Regulate and maintain the flow of ordinary watercourses. This includes issuing consent for developments and structures that may affect an ordinary watercourse.
  Ordinary watercourses are those watercourses not designated as main rivers, by the Environment Agency (EA). A map of main rivers can be found here.
- Provide technical advice as a statutory consultee on surface water drainage proposals for major development to Redbridge's Local Planning Authority (LPA).
- To assist Redbridge in its lead role in emergency planning and recovery after a flood event.

Flood Investigation Criteria:

We log and investigate all reported flooding. We carry out a detailed investigation and may publish a report when:

- **A single property floods internally on repeated occasions (at least three times) within two years of the initial flood incident**
- **Five or more properties are flooded internally during a single flood incident in the same location**
- **A major highway or major rail link becomes impassable, or minor highway or minor rail link becomes impassable to emergency vehicles**
- **Critical infrastructure is affected by flooding**
- **The source of flooding is ambiguous**

Figure 2-1 Redbridge's Flood Investigation Criteria under Section 19 of the FWMA (2010)

Flood investigation criteria definitions:

Internal flooding: where water enters the habitable part of a residential property. This excludes garages, outhouses, storage areas and gardens.

Major highway: TfL operated roads, Strategic Road Network, Principal Road Network and Distributor Roads.

Minor highway: Unclassified road network including local access roads and private streets.

The LLFA also has further responsibilities under the Flood Risk Regulations (2009) (FRR):

- Determining whether there is a significant flood risk in its authority area, identifying where the risk is located (flood risk areas) and detailing this within a Preliminary Flood Risk Assessment (PFRA).
- Prepare in relation to each relevant flood risk area (1) a flood hazard map, and (2) a flood risk map.
- Prepare a flood risk management plan in relation to each relevant flood risk area.
- Co-operate with any other relevant authority which is exercising its function under the FRR.

2.1.2 The Environment Agency

The Environment Agency (EA) is the national flood risk authority for the UK.

Main rivers are a statutory type of watercourse in England and Wales and are under the EA's regulatory control. The EA has permissive powers to carry out maintenance on main rivers and is responsible for ensuring that the riparian owner carries out their duties on a main river. The EA also has strategic overview of all sources of flooding and coastal erosion as defined under the FWMA. There are three main rivers flowing through Redbridge: the River Roding, Seven Kings Water and Cran Brook. The map of the EA's designated main rivers can be viewed here.

The EA has further responsibilities which include:

- Delivering flood risk warnings in partnership with the Met Office.
- Producing flood risk maps and data.
- Managing the construction and maintenance of flood defences on main rivers.
- Providing consent for, and enforcement of, works near or within main rivers.
- Producing guidance on Flood Risk Management Plans (FRMPs).
- Supporting other RMAs by providing resources and allocating Government funding for projects.

2.1.3 Thames Water

Thames Water Utilities Limited (TWUL) is the clean water and sewerage provider for Redbridge. TWUL has responsibility for the management of flood risk in relation to water supply and wastewater facilities. TWUL must also manage the flood risks posed by potential failure of their infrastructure and ensure sufficient maintenance of public sewers is carried out to reduce this risk.

2.1.4 Category One responders

Category One responders have responsibilities under the Civil Contingencies Act (2004) when a major flooding incident is declared. They are directly involved in the management and delivery of the response. Category One responders in Redbridge include:

- Redbridge Council
- Emergency Services
- EA

Dependent on the circumstances, other organisations in addition to those listed may be involved in the response to the incident. Redbridge Council is required to produce a Multi-Agency Flood Plan (MAFP), owned and maintained by the Emergency Planning team. The MAFP provides strategic

direction and outlines the delivery of the emergency response and co-ordinates the actions of responding agencies before, during, and after significant flooding incidents.

Redbridge's Emergency Planning team work with Emergency Services as part of the Council's Category One Responder role. The LLFA will engage with the Emergency Planning team regarding flooding incidents and support updates as required to Redbridge's Multi Agency Flood Plan.

2.1.5 Transport for London

Transport for London (TfL) has the duty to manage the public transport network for London. Under this role TfL also has the responsibility to manage certain highway drainage and roadside ditches under the Highways Act (1980).

In Redbridge the roads that TfL are responsible for are the A406, the A1400 and the A12 which can be seen here.

2.1.6 Landowners

Private landowners are responsible for the drainage on and from their own land and property and should implement measures to protect them from flooding. Any measures put in place must not increase the flood risk to surrounding land and property.

Private landowners with land or property next to a river, stream or ditch have responsibilities as 'riparian landowners'. Water must be able to flow without obstruction, pollution or diversion that may affect the rights of others. There is also a duty placed upon private landowners to keep any structures, such as culverts or trash screens free of debris. If there are flood defences located on the land of private landowners, communication with the relevant RMA about maintenance is important as they may play a significant role in flood protection. Redbridge Council has the responsibilities of a riparian landowner in some locations on main rivers due to land-ownership and has the responsibility to maintain Redbridge Council-owned assets.

Additional guidance on owning and managing a watercourse can be found here.

3. Local Flood Risk

3.1 What are the flood risks in Redbridge?

Redbridge is vulnerable to multiple types of flooding, including:

- Flooding from surface water
- Flooding from rivers/ tidal flooding
- Flooding from groundwater
- Flooding from sewers
- Flooding from artificial sources, as a result of infrastructure failure or human intervention

Descriptions of types of flood risk and their impact on infrastructure in Redbridge are summarised below. For detailed information on the types of flooding please refer to the Surface Water Management Plan (2024) (SWMP) which has been updated in parallel with this Local Flood Risk Management Strategy (LFRMS).

3.1.1 Flooding from surface water

Flooding from surface water, also termed pluvial flooding, occurs when the volume of rainwater exceeds the capacity of existing drainage systems and is not able to drain into the ground via infiltration, resulting in ponding and overland flows. This often occurs during periods of intense rainfall and is exacerbated in urban areas by the large coverage of impermeable surfaces. This is the type of flooding that Redbridge residents are most likely to experience. Details on how to report any flooding experienced are outlined in *Section 4.3*. The SWMP outlines areas across the borough at high risk of surface water flooding, which can also be viewed on the online mapping tool. It should be noted that the risk of flooding from ordinary watercourses is also mapped within surface water flood risk datasets.

3.1.2 Flooding from rivers / tidal influences

Flooding from rivers, also termed fluvial flooding, occurs when the capacity of a river is exceeded so banks are breached, resulting in out-of-bank flow of the excess water. The River Roding, Seven Kings Water and Cran Brook are the three designated main rivers within Redbridge and are managed by the Environment Agency (EA). Other rivers, categorised as ordinary watercourses (refer to *Section 2.1.1*), such as Sheep Water in Hainault Forest Country Park, are the responsibility of the Lead Local Flood Authority (LLFA).

For the purposes of development planning mapping, areas are categorised by the EA as being in one of three flood zones: 1, 2 or 3. Approximately 20% of the area of Redbridge is located in flood zone 2 and approximately 10% is located in flood zone 3, as identified by the EA. Flood zone 3 is then further divided into flood zone 3a and 3b by the Local Planning Authority in discussion with the EA and the LLFA. The criteria for the allocation of land to flood zones are summarised in *Table 3-1*.

Table 3-1 Criteria for flood zone designations

Flood Zone	Criteria
1	Land at less than 0.1% chance of flooding each year
2	Land with between 0.1% and 1% chance of flooding each year
3a	Land with greater than 1% chance of flooding each year
3b	Functional Floodplain. Land where water must flow or be stored during a flood. This is delineated by Redbridge using methodology outlined in the Strategic Flood Risk Assessment (2015) and combines areas with a 5% chance of flooding each year and flood storage areas. [1]

The fluvial flood zone extents can be seen on the online mapping tool and further information is explained within the Redbridge Strategic Flood Risk Assessment (SFRA).

Extremely high tides or storm surges which increase the amount of water being funnelled into the River Thames can cause tidal-related flooding. The lower part of the River Roding is inter-tidal and Redbridge is protected by the Barking Creek Barrier at the Roding's confluence with the Thames, in conjunction with the wider flood defences system along the River Thames' estuary. These flood defences are designed to protect the borough from tidal and fluvial flooding events up to, and including, a 0.1% chance of occurring in a given year (1 in 1000-year event).

3.1.3 Flooding from groundwater

Flooding from groundwater occurs when the underground water table rises above the ground. This type of flooding normally occurs following extensive periods of heavy rain but, dependent on variations in local geology, may not be as quick as surface water flooding in responding or reducing due to variations in local geology. The susceptibility of areas of Redbridge to flooding from groundwater can be seen on the online mapping tool.

3.1.4 Flooding from sewers

Flooding from sewers occurs when the volume of rainfall exceeds the capacity of the sewer network. This can be because the rainfall event exceeds the designed limits of the sewer or as a result of a failure elsewhere in the system. This results in the sewers backing up, surcharging and creating overland flow. The majority of sewers in Redbridge are separate surface water and foul sewer systems with one major combined sewer, but all are managed by Thames Water Utilities Limited (TWUL) who are responsible for blockages within the sewage network. Blockages of gullies, or highway drains, can occur and are the responsibility of Redbridge Council or TfL, dependent on location. See *Section 2.1* for further information on these responsibilities. The gullies managed by Redbridge Council are cleaned in accordance with an agreed schedule and attended to where required in the case of a specific incident.

[1] *Planning Practice Guidance (PPG) was updated in 2022 which changed Flood Zone 3b from land with greater than 5% chance of flooding to land with greater than 3.3% chance of flooding. For planning applications, the definition of Flood Zone 3b in the latest version of the Redbridge SFRA will apply. It should be noted that this definition will likely change when the SFRA is updated.*

Sewer flooding is further explained in the Redbridge SWMP along with information on the number of sewer flooding incidents within Redbridge.

3.1.5 Flooding from artificial sources

Flooding from artificial sources occurs due to a failure of built infrastructure. Reservoirs or maintained lakes and canals are potential sources of artificial flooding. Certain areas of Redbridge are susceptible to flooding in the event of a failure of defences at one of the lakes in Wanstead Park, Eagle Pond, Hainault Forest Lake or Valentines Park Lake, with further information provided on the Reservoir Flood Map Search Facility from the Department for Environment, Food & Rural Affairs (DEFRA) Data Services Platform. These susceptible areas include those along the River Roding in the west and Seven Kings Water in the east which can be seen in the EA's mapping of flood risk from reservoirs.

3.2 Recent flooding history within Redbridge

Severe flooding occurred in Redbridge in June 2016, around Westwood Recreation Ground. Surface water flooding occurred due to the intensity and duration of the rainfall event in combination with previously saturated ground. The volume of surface water caused the drainage network to be overwhelmed which caused flooding. There was also fluvial flooding as Seven Kings Water overtopped its banks. The extent of flooding triggered a Section 19 investigation, the criteria for which are detailed in *Figure 2-1*, to identify the source of flooding and led to investigations into possible flood alleviation schemes for the area. More information on this can be found in *Section 7.2.*

Heavy showers and thunderstorms in July 2021 resulted in widespread flooding in Redbridge. The drainage network was overwhelmed by the volume of water resulting in surface water flooding, highways were flooded as well as the external and internal flooding of more than 100 properties. This flooding event also triggered a Section 19 investigation which found that overall the sewer network did not have sufficient capacity to cope with an event of that magnitude. It was suggested that a range of mitigation methods were investigated, including sustainable drainage systems (SuDS), to enable better protection of properties from future flooding.

Heavy rainfall in mid-November 2022 caused Seven Kings Water, a designated main river, to flood Westwood Recreation Ground in south-east Redbridge. The flooding affected a number of adjacent properties, internally and externally, and roads. As a result of this flooding, the LLFA is undertaking a Section 19 investigation. This will help to inform the flood alleviation works that are being planned to both mitigate the flooding risk in this area, and bring local environmental benefits.

3.3 Climate change and flood risk

The UK can expect to see more frequent climate extremes as a result of climate change brought about by global warming. More frequent heavy rainfall events are increasingly likely, particularly in winter, which increases the risks posed by pluvial and fluvial flooding in Redbridge. Along with changes to flood risk, climate change could also influence the behaviour of rivers with a greater difference in maximum and minimum flows from more frequent periods of extended warm weather and more frequent and intense periods of rainfall.

It will therefore be of increased importance for Redbridge Council to adapt to and mitigate these risks, as set out in policy LP19 and LP21 of the Local Plan (2018) and in the Climate Change Action Plan for Redbridge (2021). This can be achieved through the promotion of zero carbon development and

ensuring that development does not increase flood risk. The LLFA will play an important role in delivery of these aims, which strategic objectives D and F of the LFRMS address, as outlined in *Figure 1-1.*

Methods and measures for managing flood risk are both important and necessary in Redbridge but it is important these are not at odds with the identified climate targets. More specific actions outlined in the Action Plan for this LFRMS seek to unite these two themes and identify where the LLFA can support the council in its environmental targets:

Action F1

Review Redbridge Council's climate change targets and put in place measures where flood risk management work can align or support these.

Action F2

Take steps to review carbon emissions associated with flood alleviation schemes with the aim of being carbon neutral, considering and reducing the embodied carbon of infrastructure.

Delivery of flood alleviation schemes is an important component of managing the impacts of climate change. Flood alleviation schemes mitigate the current effects of flooding but will also mitigate the increased risk of flooding due to climate change.

4. Advice for residents

It is important that strategies for managing flood risk are in place to reduce current and future risk to residents and property. This is the purpose of the Local Flood Risk Management Strategy (LFRMS) and the overarching National Flood and Coastal Erosion Risk Management Strategy (NFCERMS) and informs the actions of the Action Plan. As set out in the NFCERMS, to achieve reductions in flood risk we need to increase our resilience and adaptability to flood risk.

Resilience is defined as

the ability to cope with a flooding event with a quicker recovery and return to normal afterwards.

Adaptability is defined as

the important ability to plan for changes that may influence flood management such as developments in climate science, growth, investment, and changes in the local environment.

Flood risk management requires a collaborative approach and the actions of individuals are an important component, particularly in managing personal risk from flooding and at a local level.

4.1 How to reduce flood risk

As a natural phenomenon, it is not possible to completely remove the risk of flooding, but it is possible to reduce the risks posed to life and to property.

It is important to know what level of risk from flooding you may be at; residents and property owners can check the long term risk of their area here. In the event of a possible flood in the area, residents can check the immediate risk to their property here.

The EA can also be contacted for this information at **0345 988 1188** or by textphone **0345 602 6340**.

The EA offers a free flood warning service for river flooding which, if available for your area, can be signed up for here. The Flood Forecasting Centre, a joint service between the EA and the Met Office, also provide Flood Guidance Statements for all sources of flood risk, including surface water. Further information, including how to sign up to receive these Statements, can be found here. Residents should also check their insurance policy and confirm that it covers flooding. The Association of British Insurers provides information on flood insurance for homes and businesses.

Individual actions, such as paving over front gardens, can have a detrimental impact on flooding inside or close to a property by increasing surface water runoff. The National Flood Forum website sets out methods for protecting property along with the typical costs involved. The Blue Pages website provides further information on property-level protection measures along with the standards and accreditation available for such measures which it is important for residents to check before employing any flood protection devices.

4.2 What to do before, during and after a flood

The Environment Agency (EA) has guidance on what actions individuals can and should take before, during and after a flood. This is summarised in *Figure 4-1* but the full set of advice can be found here.

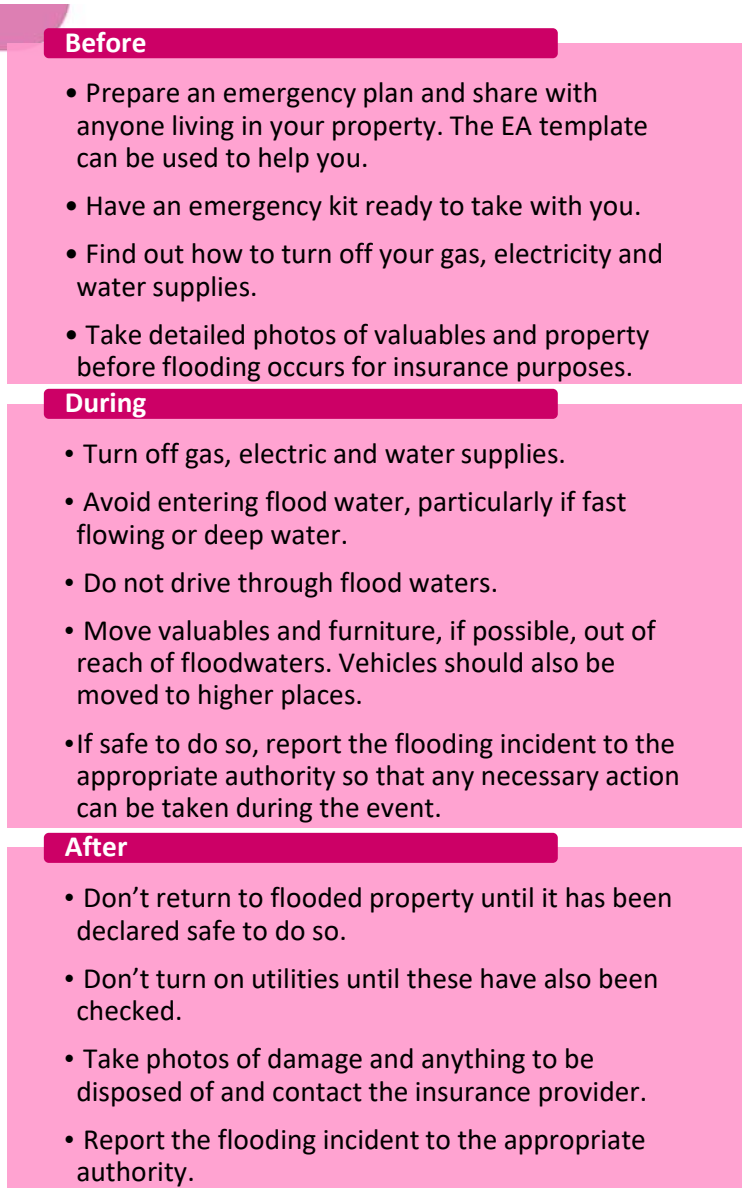

Figure 4-1 Summary of EA advice on actions to take in the event of flooding.

Further information and advice on what to do before, during, or after a flood can be found on the Redbridge Flooding webpage.

4.3 How to report types of flooding

It is important to report incidents of flooding so that a record can be kept and appropriate action can be taken. Records of flooding help to establish whether there is a recurring issue and what may be the best measure(s) for mitigating future incidents. The appropriate authority to report different types of flooding to are listed below in *Figure 4-2*.

See *Section 3.1* for an explanation of the different types of flooding.

For blocked sewers, sewer flooding and burst water mains	**Thames Water** **TWUL online reporting tool** **0800 316 9800**
For blocked drains or gullies on highways managed by Transport for London (TfL)	**TfL** **Street and road issues - TfL** **0343 222 1234**
For blocked private drains and flooding caused by private drains	**Landowner / property owner**
For flooding from surface water, ordinary watercourses and groundwater flooding	**Redbridge LLFA** **Redbridge: Flooding/blocked drain** **0208 554 5000**
For blocked drains or gullies on roads managed by Redbridge Council	**Redbridge Highways** **Redbridge: Flooding/blocked drain**
For flooding of main rivers or from the sea	**Environment Agency 24/7** **0800 80 70 60**

Figure 4-2 Details on how to report different types of flooding

5. Guidance on sustainable solutions

5.1 Sustainable flood risk management

The forecasted changes to the climate will bring a greater risk of flooding, due to more frequent and intense periods of rainfall. In London, rising sea levels will affect the frequency of closure of the Thames Barrier, which will expand the need for better upstream management of floodwaters. Lead Local Flood Authorities (LLFAs) and the Local Flood Risk Management Strategy (LFRMS) are key to delivering the necessary flood risk mitigation and improving local resilience to flooding.

Flood Alleviation Schemes (FASs) should be sustainable and achieve a balance between reducing risks to people and the environment with positive outcomes socially, economically, and environmentally. Successful FASs can be effective in providing urban greening, biodiversity benefits and carbon sinks.

Sustainable flood risk management in Redbridge should aim to:

- Target areas at the greatest risk of flooding to make future investment as effective as possible.
- Utilise sustainable drainage systems (SuDS) and the design of urban spaces effectively to reduce pressure on sewer systems.
- Share knowledge with the public as to how they can get involved and can protect themselves, property and business.
- Make plans adaptable to climate change, by incorporating the potential for future risk

For flood risk management to be successful and sustainable, it is crucial that alongside the LLFA and residents, developers engage with, and prioritise, sustainability within decisions on flood risk management in future developments. Strategic Objective D and Strategic Objective E will be key for achieving this.

5.2 Sustainable Drainage Systems

SuDS are designed to manage runoff as close to the source as possible to mimic the natural drainage process by promoting the infiltration and attenuation of water, subsequently reducing the load on sewer systems.

Further information on SuDS, including their benefits, can be found on the Local Government website.

Examples of SuDS include:

- Rainwater harvesting (through water butts or blue roofs)
- Infiltration (through soakaways)
- Attenuation of water either above ground (through raingardens, ponds or green roofs) or below ground (through geocellular storage)
- Conveyance through swales (shallow, broad, vegetated channels)

The SusDrain website provides further information and explanations of the different types of SuDS, along with diagrams and pictures.

5.3 Natural Flood Management

Natural flood management (NFM) is the use of natural processes to reduce the risks from flooding. Whilst both NFM and SuDS seek to reduce flood risk by trying to achieve more natural rates of drainage, NFM takes a wider, whole-catchment approach with fewer engineering interventions than SuDS as it tends to deal with flood risk across a larger area.

NFM utilises four mechanisms to reduce flood risk:

1. **Increasing flood storage**
   This involves creating areas where water can be temporarily stored during a flood and then released slowly over time. Examples include reconnecting rivers to the natural floodplain or creating storage ponds.
2. **Increasing catchment and channel roughness**
   Increasing the resistance to water flows reduces the flow rate and can attenuate the peak of the flood. Examples include increasing planting beside the channel and restoring meanders in rivers.
3. **Increasing absorption**
   This mechanism involves increasing the amount of water being absorbed by the ground or being taken up by vegetation. This contributes to increased evapotranspiration which refers to the combined processes moving water from the surface into the atmosphere. This can be achieved by changing land management practices, for example, to enable soils to absorb more water.
4. **Slowing flow**
   De-synchronising the peak flows of tributaries, by slowing the flow of water in one tributary relative to another, reduces the amount of water arriving at the main river downstream at a point in time which reduces flood risk. This can be achieved by increasing the distance water must flow by restoring meanders in rivers.

The evidence base for the efficacy of NFM has been growing rapidly due to its implementation across a wide range of locations in the UK. NFM is typically most effective in the upper catchment of rivers, as a form of early intervention. The urban nature of Redbridge makes the implementation of widescale NFM projects challenging, but there are opportunities for smaller scale projects such as the planting of more vegetation by rivers and in parks, particularly in combination with SuDS. The use of more natural techniques for flood management is important as they can provide environmental and ecological benefits and offset the need for more invasive hard-engineering techniques.

5.4 Planning policy and planning applications

When submitting a planning application, developers are expected to fulfil the requirements on SuDS set out in a number of policies, including:

- National Planning Policy Framework (Paragraphs 159-169)
- Flood Risk and Coastal Change Planning Practice Guidance
- London Plan Policies SI 12 and 13
- Redbridge's Local Plan Policy LP21
- Non-Statutory Technical Standards for Sustainable Drainage Systems

The LLFA has a statutory duty to review the proposed drainage elements of major planning applications. Major planning applications are those defined as follows:

- Developments comprising 10 or more dwellings.
- A site area for the development of dwellings of 0.5 ha or greater.
- Buildings with a floor space of 1000 m^2 or greater.
- Developments on a site of 1 ha or greater.

The LLFA comments on the proposed surface water drainage strategy of the development along with proposed measures for the management of flood risk to the site.

The LLFA will also consult the EA with respect to any development within 8m of a main river.

The LLFA will review:

- If the drainage hierarchy set out in the London Plan (2021) is being adhered to and that the most sustainable drainage features possible have been proposed.
- If the proposed runoff rates are equal to or lower than greenfield runoff rates, or as close as reasonably practical with sufficient justification.
- If sufficient calculations supporting greenfield, existing and proposed runoff rates for 1 in 1 year (100% chance of occurrence each year), 1 in 30 year (3.3% chance of occurrence each year) and 1 in 100 year (1% chance of occurrence each year) rainfall events are provided, with an appropriate climate change allowance.
- If the proposed attenuation storage volume meets or exceeds the required attenuation storage volume for the site.
- If maintenance tasks of proposed SuDS (including actions and frequencies) and a maintenance provider have been stated.

All of this information, along with sufficient evidence where necessary, should be submitted when making a planning application.

The applicant is also required to complete and submit the Redbridge SuDS Proforma and, dependent on the size of the development and Flood Zone it is in, a flood risk assessment. More information on the requirements for flood risk assessments can be found here.

In January 2023 the Government announced the implementation of Schedule 3 of the Flood and Water Management Act 2010, expected to come into effect in England during 2024. Schedule 3 will require the implementation of SuDS and approval from the SuDS Approval Body (SAB) for all new developments over 100m^2. SAB approval will be required separately and additionally to planning permission. It is anticipated that the LLFA will take on the role of the SAB.

6. What the Council have done to manage flood risk

6.1 Flood alleviation schemes

6.1.1 Flood Alleviation Schemes (2016-2019)

Redbridge have delivered a number of schemes to attenuate flows to the drainage network. In 2016, a carpark was constructed at Manford Way, an area susceptible to flooding from surface water. Permeable paving was used as a method of water retention and to slow delivery of run-off to the surface water sewer, whilst retaining the car park for use.

The Woodford Bridge scheme was constructed between 2018 and 2019. There was a problem with the drainage network surcharging in this location, which affected 7 shops. A drainage chamber was constructed to attenuate flows before discharging to the nearby watercourse, to better protect the properties at risk.

At The Glade, works were undertaken in 2019 to resolve an issue of the sewer network surcharging. A deep manhole was installed to act as a method of attenuation and slow flows to the sewer network, which aims to reduce the flood risk for 10 properties at this location.

6.1.2 Clayhall Flood Alleviation Scheme (2022)

The Surface Water Management Plan (2011) (SWMP) for Redbridge identified Clayhall as a Critical Drainage Area (CDA). A feasibility study was carried out to investigate the surface water mechanisms and assess the flood risk in the area between Claybury Park in the north-east and the River Roding in the south-west. Several options were investigated such as bunds, raising of curbs and storage areas.

The scheme was completed using funding from the Environment Agency (EA) and created a flood storage area by raising the level of an existing footway using 200 tonnes of clay. The scheme aimed to reduce the risk of flooding to more than 100 homes and succeeded in protecting previously at-risk properties during the flooding of July 2021.

6.1.3 Hainault Forest Natural Flood Management Scheme (2022)

Works were carried out in Hainault Forest Country Park between September and December 2022 to reduce flood risk and make improvements to biodiversity in the area. The techniques used were Natural Flood Management (NFM) measures. Existing ditches were re-naturalised with meanders and leaky dams added. Where trees were coppiced or felled as part of the work, these were utilised in the leaky dams. Scrapes were created next to pathways and scrub removed to encourage wetland creation. These measures increase the storage of water, reduce the rates of flow and provide increased and improved habitats for wildlife in the forest.

This NFM approach was chosen as opposed to a more engineered scheme that involved more invasive felling, flattening, and digging out within the forest. The benefits of using NFM measures over hard engineering techniques mean reduced embodied carbon in the construction of the scheme through the use of natural and in-situ materials. They are also more sympathetic to the existing environment and easier to integrate into landscapes; improving habitats and benefitting biodiversity. NFM

measures are also more adaptable to changing conditions as the natural features can be reshaped or changed more easily than hard engineering techniques. The works were completed successfully in late 2022 with funding from the Environment Agency (EA).

6.1.4 Highway Sustainable Drainage Schemes (2022-2023)

Between November 2022 and January 2023, Redbridge carried out works at three locations to deliver sustainable drainage systems (SuDS) along highways. Schemes were constructed at Atherton Road, Chalgrove Crescent, and Deynecourt Gardens to provide a total attenuation volume of 37.1m^3. The SuDS constructed are to reduce the volume of surface water runoff being delivered to the drainage network and therefore improve its capacity.

6.2 Strategic updates

6.2.1 Strategic Flood Risk Assessment (2015)

A Strategic Flood Risk Assessment (SFRA) is carried out by the Local Planning Authority (LPA) to assess the current and future risk of flooding to an area, from all sources. The study takes into account climate change and the potential impacts that development and changes to land use may have on flood risk. It is intended for supporting the LPA, the EA, developers, and other stakeholders in planning decisions so that flood risk is effectively managed. The Redbridge SFRA can be viewed here. The Redbridge SFRA is to be updated in due course and will be made available once published.

6.2.2 Surface Water Management Plan (2011 & 2024)

A SWMP assesses the risk of flooding from surface water and the interactions with other types of flooding. The previous SWMP was produced in 2011 and an updated version is due to be published in 2024 alongside this new LFRMS. The new version includes the catchment-based approach to managing predicted flood risks rather than the previously defined CDAs (Critical Drainage Areas). The six CDAs identified with the most properties at risk were: Ilford, Seven Kings Water, Goodmayes, Gants Hill, Barkingside, Newbury Park West, and Cranbrook. The reason for this change is to enable a better understanding of what drains where, based on topography, watercourses and the surface water sewer network across Redbridge. It also increases the potential for partnership working with neighbouring boroughs through basins and their catchments not being constrained by political boundaries.

6.3 Technical updates

6.3.1 Drainage and Wastewater Management Plan (2023)

The Redbridge Lead Local Flood Authority (LLFA) attended workshops contributing to the development of Thames Water's updated Drainage and Wastewater Management Plan (DWMP), which is due to be published in 2023. The DWMP sets out how wastewater systems, and surrounding drainage networks, are to be managed to deal with future pressures, such as climate change and population growth. More information on the Plan and its consultation process can be found here.

Differences in the catchment management of networks, changes to storm overflows and sewer flooding targets, and the allocation of funding for achieving those targets in the updated DWMP will have implications for future water management within Redbridge. This must be accounted for in future flood risk management plans.

6.3.2 New National Modelling (2022-2023)

The EA have begun the process of updating the current hydrological modelling they hold across England. Local Authorities have been engaged to help fill knowledge gaps and add additional information, for example the addition of new flood alleviation schemes (FASs) to provide more accurate modelling.

Redbridge LLFA collaborated with the EA to provide information on areas with frequent flood events, such as Clayhall, along with updated information on completed FASs. These improvements to the national modelling will provide a better representation of existing assets along with improved hydrological outputs which will contribute to more informed and effective flood risk management.

6.4 Partnership working

6.4.1 North East London Strategic Partnership

LLFAs have been grouped by the Greater London Authority's (GLA) Drain London project to enable co-working and the sharing of best practice on flood risk management. Redbridge is in the North East London Strategic Partnership along with the London Borough of Barking & Dagenham and the London Borough of Havering. The group meets quarterly with other Risk Management Agencies (RMAs) to collaborate on the delivery of their LLFA requirements and is also represented on the Thames Regional Flood and Coastal Committee (RFCC).

6.4.2 Thames Regional Flood and Coastal Committee

Under the Flood and Water Management Act (2010) (FWMA) the EA established RFCCs to bring together members appointed by Local Authorities and independent members for three purposes:

- To ensure coherent plans are in place identifying, communicating, and managing flood risk across catchments.
- To encourage efficient, targeted and risk-based investment in flood risk management that represents value for money and benefits local communities.
- To provide a link between the EA, LLFAs, and other relevant RMAs to share and widen the knowledge base.

Redbridge is within the Thames region and is therefore represented on the Thames RFCC. Main committee and sub-committee meetings are held quarterly which allows discussion and updates between partners on flood schemes and on the spending figures for funding allocations (including local levies).

6.4.3 Roding, Beam and Ingrebourne Catchment Partnership

The Roding, Beam and Ingrebourne (RBI) Catchment Partnership brings together local organisations and community groups involved in the improvement and protection of the catchments for the Rivers Roding, Beam and Ingrebourne for people and wildlife. Redbridge LLFA is a partner organisation as the River Roding and part of its catchment lies within Redbridge. Through regular meetings the RBI Catchment Partnership aims to identify new opportunities and share news about existing projects between the partner organisations.

More information about the actions the RBI Catchment Partnership are taking are detailed here.

6.4.4 London Drainage Engineers Group

The London Drainage Engineers Group (LoDEG) is an organisation that represents the interests of those with responsibilities for flood risk management and highway drainage within the 33 London Boroughs. Meetings are held quarterly and attended by LLFAs, the EA, Thames Water, Transport for London (TfL), Thames Flood Advisors, GLA and others. The meetings provide a platform for sharing and informing on flood risk management practice and enable collaboration and potential resolution of issues between relevant RMAs.

7. How the Council is planning to manage flood risk

7.1 New Action Plan

Part of the production of the Local Flood Risk Management Strategy (LFRMS) involves the creation of a new and updated Action Plan. This sets out specific actions linked to the strategic objectives of the LFRMS that the Lead Local Flood Authority (LLFA) will aim to achieve over the next six-year period (2024-2030).

The Action Plan contains the actions and specific details on their delivery, the lead Risk Management Agency (RMA), any partner RMAs, the current status of the action and the timescale for delivery. Further information on the relevant legislation and policy is also included.

As part of the process, workshops with internal and external stakeholders were held to obtain feedback on the LFRMS and Action Plan. The internal stakeholders were representatives of Redbridge Council departments and external stakeholders were relevant RMAs outside the Council (the Environment Agency (EA), Thames Water Utilities Limited (TWUL) and neighbouring borough LLFAs), statutory consultees of the Strategic Environmental Assessment and Habitats Regulations Assessment (Heritage England and Natural England), the EA, and Thames Flood Advisors.

7.2 Flood management schemes

The below areas provide a current picture of the areas Redbridge are currently working on to reduce flood risk. The LFRMS and its action plan, previous Section 19 reports, the Surface Water Management Plan (SWMP) and other flood investigations will continue to identify and prioritise flood risk management schemes across the borough. Yearly programmes of flood management schemes will be presented in annual Capital Programme report to Cabinet and the Cabinet Member as per the Council's decision-making process and updates will be provided to Council Leadership including the relevant committees as necessary.

7.2.1 Risk of Flooding from Surface Water modelling update (2023)

The EA has made a tranche of funding available for LLFAs to complete improved surface water modelling and mapping in key areas. This will improve the knowledge of local flood risk from surface water for LLFAs, allowing more effective flood risk management and long-term planning.

Clayhall was identified as a hotspot for surface water flooding in the Surface Water Management Plan (SWMP) (2011) and a Section 19 report has been undertaken to investigate incidences of flooding within the local catchment (in addition to other catchments affected in the same July 2021 flooding event). Based on recent flooding reports and the completion of the Clayhall Flood Alleviation Scheme (FAS), it was suggested that modelling should be updated, and a subsequent bid was submitted to the EA, which was successful. The new surface water modelling will be incorporated into the EA's National Flood Risk Assessment ('NaFRA2') project creating new, more refined national Risk of Flooding from Surface Water (RoFSW) maps that are due to be released in 2024.

Updated modelling of the surface water risk in the Clayhall area will provide more accurate information on the local flood risks, which will allow for more informed decisions on potential FASs and planning decisions.

7.2.2 Green and Resilient Spaces Fund development grants

The Greater London Authority (GLA) awarded £4m of funding to 19 Green & Resilient Space projects in March 2022. This fund is aimed at large-scale, innovative enhancements to green and blue spaces to help tackle climate and ecological emergencies. Further details on the fund can be found on the Green and Resilient Spaces Fund site.

As part of this, two projects in Redbridge have received development grants to support designs, surveys, and community engagement with the schemes.

The Westwood Recreation Ground project is investigating the ecological and environmental improvements that tree planting, within the recreation ground, could bring. It is hoped that improvements to the environment of the green space will have potential secondary flood alleviation benefits, through improved infiltration rates. The project also aims to improve green links to Seven Kings Park and a local school. Different schemes are currently under investigation to determine the best option to put forward for further funding.

The Wanstead Park Wetlands project is a feasibility study into Natural Flood Management (NFM) methods being used to improve habitat and water levels of the lake within the park. Investigations are being carried out into what opportunities may exist for sustainable drainage systems (SuDS) to be used for environmental improvements.

7.2.3 Claybury Park Natural Flood Management scheme

Redbridge Council have submitted a bid to the EA for funding to carry out a project in Claybury Park. Similar to the works successfully completed in Hainault Forest, the scheme would utilise NFM techniques. The aim is to reduce surface water flood risk along with improving the biodiversity and ecology in the area.

Claybury Park is susceptible to flooding, particularly during winter months. There was a flooding incident in Winter 2021 which affected the park and also flooded neighbouring properties. This scheme is planned to combat these surface water flows and mitigate the likely increases to flows as a result of climate change, by increasing the water storage and flow attenuation capabilities of the park.

The works are planned at the southern edge of the park, towards Fulwell Avenue. Existing channels would be dug out and re-naturalised through adding meanders and construction of leaky dams along their length. Woodland close to the channels would be thinned and scrapes created to help with wetland creation. Groundworks would also be carried out to direct water towards woodland and away from paths. With the funding, work would be carried out and completed in late 2023.

7.2.4 Sustainable drainage schemes in schools

Redbridge Council is working collaboratively with Thames Water and the Department for Education on sustainable drainage systems (SuDS) in three schools in Redbridge: Caterham High School, King Solomon High School and Jewish Ilford Primary School. All three schools experienced flooding in July 2021 and October 2021 and the installation of SuDS would work to alleviate the risk of flooding along

with improvements to the environment, through planting. Initial construction of schemes would likely be completed in 2023 with the potential for further works based on the receipt of further funding.

7.2.5 River Roding Flood Alleviation Scheme

The River Roding project will build a flood storage area on the River Roding, upstream of the M25, at Shonks Mill Bridge, and refurbish two sections of existing flood embankments in Woodford. The purpose of the project is to allow the river to flow naturally most of the time, but in times of high flow store water to reduce the risk of flooding downstream. Upon completion the project will better protect over 500 properties from flooding. The project is being led by the EA with support from Redbridge Council, along with other stakeholders. Construction is planned to start in early 2024 with completion in 2025.

7.3 Key stakeholders

Internal and external stakeholders have been engaged throughout the development of the LFRMS and Action Plan to provide their comments and suggestions for any potential amendments. The actions identified in the plan were discussed along with the roles and responsibilities to be taken and whether the necessary resources were available. Through workshops and the consultation process, the feedback from these stakeholders has been incorporated into the LFRMS and the Action Plan where agreed with the LLFA.

7.3.1 Internal stakeholders

The internal stakeholders for the LFRMS consist of Redbridge Council departments and representatives. These departments were invited to consult on the LFRMS in workshops and during the consultation process and include Emergency Planning, the Local Planning Authority, Highways, Housing, and Ecology.

7.3.2 External stakeholders

External stakeholders are those individuals and organisations involved in the delivery of flood risk management within Redbridge but not working within Redbridge Council. These organisations include the EA, TWUL, and Transport for London (TfL) who are responsible for certain flooding risks but also representatives from partnerships like the Thames Regional Flood and Coastal Committee (RFCC) that Redbridge LLFA is a member of.

As the member of a number of partnerships, engagement with other partners is important for Redbridge LLFA in understanding the interaction between the implementation of the LFRMS and Action Plan and the flood alleviation works of existing partnerships. Co-operation between stakeholders and partnerships is necessary to ensure that any actions are complementary and not additional to requirements based on actions that may already be planned. Refer to *Section 6.4* for further information on the partnerships that Redbridge LLFA is part of.

7.4 How will these actions be funded?

Funding from a variety of sources will be used by the LLFA in the delivery of LFRMS actions and any associated FASs. Strategic Objective C specifically focuses on funding, with the aim to widen knowledge and access for community groups and individuals, to increase the range and scale of flood management activities.

The Department for Environment, Food and Rural Affairs (DEFRA) is a major source of funding for LLFAs through its Flood and Coastal Erosion Risk Management (FCERM) Grant in Aid (GiA) fund. To receive this funding for a proposed FAS, the LLFA must complete an appraisal process to assess if the proposed FAS will provide:

1. Benefits to properties at risk of flooding
2. A reduction of indirect impacts from flooding (for example mental health impacts)
3. Wider environmental benefits
4. Improved amenities to an area

This GiA funding can be applied for to finance some or all stages of a FAS, including the preparatory feasibility modelling studies, design, and construction phases. Alongside GiA funding, the LLFA can apply for Local Levy funding. This funding is managed by the Thames RFCC and raised through a levy on Local Authorities, and is supported by the EA.

Funding is occasionally available from TWUL for projects that reduce pressures on TWUL-owned sewer networks. The EA also offers funding for projects that offer additional environmental benefits, such as water quality improvements. These funding opportunities may not be targeted directly at FASs but can be utilised for their delivery. It is therefore important that LLFAs monitor, and are aware of available funding opportunities, including those that the secondary benefits of a FAS may be eligible for.

The Department for Levelling Up, Housing and Communities (DLUHC) has revenue that the LLFA is allocated, although an internal business case would typically be required to be submitted for this funding as it is not ringfenced solely for LLFA use. The revenue funding enables the LLFA to undertake its flood risk management duties and can be used to part-fund smaller scale SuDS schemes as well as FASs.

Funding can be one of the primary barriers to the development and delivery of FASs which means that funding from third parties, termed Partnership Funding, can be an important avenue of support. This could be from community groups, charity organisations or from land or property owners involved in a scheme. The FCERM GiA fund encourages the use of such Partnership Funding in order to reduce the financial burden on public funding. Redbridge's LLFA is committed to working with partners to drive the continuation of sustainable flood risk management projects to benefit the wider community, and increased funding avenues will support this.

8. Summary

8.1 Summary of the LFRMS

The Local Flood Risk Management Strategy (LFRMS) sets out how flood risk management will be delivered by the Lead Local Flood Authority (LLFA) with relevant partners and Risk Management Authorities (RMAs) for the next six years (2024-2030). Six new strategic objectives have been produced with 45 corresponding actions to achieve the delivery of the LFRMS. These are:

A. To improve knowledge and understanding of flood risk in Redbridge and wider catchments.
B. To deliver successful and targeted flood alleviation schemes which maximise wider social, economic, and environmental benefits.
C. To develop knowledge and access to funding to improve the resilience of communities and future development.
D. To ensure development appropriately mitigates flood risk by prioritising the use of sustainable drainage schemes (SuDS) and by aiming to achieve greenfield runoff rates.
E. To support successful communication between stakeholders and the effective engagement of communities to enable improvements to flood risk management.
F. To address climate change impacts by improving sustainability and working towards carbon neutral targets.

The new strategic objectives set out by Redbridge LLFA reaffirm targets for mitigating flood risk and outlining more specific methods, such as employing SuDS, to be included in the process. The LLFA is seeking to emphasise the importance of protection and improvement of the environment in the methods of delivery of flood alleviation and the overall LFRMS, and the engagement of the public and stakeholders is crucial to ensure commitment to this.

8.2 Next steps

The next steps following the publication of the LFRMS are for the LLFA and the involved RMAs to begin, or continue, delivery of the flood risk management actions as set out in the Action Plan. Where additional funding is required to progress these actions, priority must be given towards identifying where further resources are necessary.

8.3 Monitoring and reviewing

It is recommended that the LFRMS is updated every six years or, if sooner, following major changes which may have an impact on flood risk management. These could be:

- Significant changes to the LLFA's understanding of flood risk or flood monitoring practices.
- Significant changes in Government or Redbridge policy, guidance or legislation.

Progress on the delivery of the LFRMS is tracked internally by the LLFA using an internal version (for use by the LLFA only) Action Plan allowing achievements to be measured against targets. It is recommended that such internal reviews are performed at least annually and should conclude with an annual report on progress to the relevant Redbridge Scrutiny Committee. It should be noted that

the Action Plan will be reviewed following publication of full details about the SuDS Approving Body (SAB). For further information on the SAB see Section 5.4.

Appendix A – Habitats Regulations Assessment

[Separate document]

Appendix B – Strategic Environmental Assessment

[Separate document]

Appendix C – Consultation Strategy

[Separate document]

Appendix D & E – Action Plans

[Separate document]

Appendix F – Legislation

International	
EU Water Framework Directive (2000)	The EU Water Framework Directive (WFD), published in 2000, makes it a requirement for Member States of the EU to improve and maintain the state of all waters, including surface waters and groundwater. All waters are to achieve a "good" ecological status by 2015 or, at the latest, by 2027. The WFD request that water management plans are developed using a river basin approach. The WFD was adopted into UK law in 2003 and will become part of new UK law following the UK's departure from the European Union.
EU Floods Directive (2007)	The EU Floods Directive dictates how Member States should approach the flood risk management of all types of floods. A three-stage process was to be followed. For the initial cycle, by 2011 Member States had to produce Preliminary Flood Risk Assessments (PFRAs) to identify areas where water courses and coast lines are potentially at risk of flooding. By 2015, mapping of flood risk areas showing the extent, assets and number or inhabitants at risk were created. By 2015, Flood Risk Management Plans (FRMPs) for areas at high risk of flooding were produced, including measures to reduce flood risk. Updated FRMPs were produced for 2021-2027. The EU Flood Directive was implemented in UK law through the Flood Risk Regulations (FRR) (2009) and will be a continuing law following the UK's departure from the EU. The cycle restarted in 2016 and Redbridge's LLFA have been involved in updates since.
IPCC Climate Change Report (2021)	The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report aims to assess the physical science basis of climate change. The headlines from the 2021 report include predictions of +1.5^{O}C temperature change in the next two decades and that climate change is presently affecting every populated region of the globe.
National	
Civil Contingencies Act (2004)	The Civil Contingencies Act is a legislative framework for civil protection in the UK that establishes the roles and responsibilities on organisations that play a role in preparing for and responding to emergencies. Under the Act, Local Authorities and the EA are Category 1 responders. Some of the Local Authority's duties include putting in place emergency plans, sharing and co-operating with other local responders to enhance efficiency.

The Pitt Review (2007)	Following the extreme flooding that took place in the summer of 2007 a comprehensive review led by Sir Michael Pitt, known as the Pitt Review, was commissioned by the UK Government. The Pitt Review provided 92 recommendations to improve flood risk management in England, notably that County Councils, large metropolitan boroughs, and Unitary Authorities should take the lead on the management of flood risk. The Pitt Review recommendations were accepted by the Government and initiated the creation of the FWMA.
Flood Risk Regulations (2009)	The FRR implements the EU Floods Directive in England. Flood risk management, as set out by the framework, requires the production of PFRAs, the identification of flood risk areas, mapping of such areas and FRMPs.
Flood and Water Management Act (2010)	The FWMA aims to provide better, more sustainable management of flood risk and coastal erosion along with improving the sustainability of water resources. The FWMA defines structures and responsibilities for managing flood risk, notably with the introduction of LLFAs which impart the role of managing local flood risk to County Councils, large metropolitan boroughs, and Unitary Authorities. The EA is appointed to hold the strategic overview role of all sources of flooding, in addition to managing the flood risk from main rivers and the sea. The FWMA also places a statutory duty on the EA to develop a NFCERMS for England, which all LFRMSs must align with.
Flood and Coastal Erosion Risk Management Policy (2020)	The FCERM Policy Statement reflects the Government's long-term ambition to increase the resilience to flood and coastal erosion risk nationwide.
National Flood and Coastal Erosion Risk Management Strategy (2020) Flood and Coastal Erosion Risk Management Strategy Roadmap to 2026	The NFCERMS sets out a framework for RMAs involved in managing flood risk in order to increase the nation's flood resilience. The publication of the NFCERMS was followed by an initial 1-year action plan showing actions needed. In 2022 a roadmap was published containing longer-term, practical actions to 2026.
National Planning Policy Framework (2021, revised)	The National Planning Policy Framework (NPPF) sets out the planning policies to provide sustainable development and is published by the Department for Levelling Up, Housing and Communities (DLUHC). The NPPF provides guidance on developing Local Plans in line with national planning policies. These policies include avoiding and managing risks from flooding, in line with the role of LPAs to prepare local plans and to decide on planning application permissions. The NPPF is supported by

	Planning Practice Guidance (PPG), including the Flood Risk and Coastal Change PPG, which is revised as necessary.
Environment Act (2021)	The Environment Act is the UK's new framework of environmental protection since departing from the EU. It is intended to provide legal regulations on nature protection, water quality, clean air and other environmental protections. The Environment Act provides the Government with powers to set new binding targets, including for air quality, water, biodiversity, and waste reduction, and also establishes a new environmental watchdog – the Office for Environmental Protection.
Environmental Improvement Plan (2023)	The Environmental Improvement Plan (EIP) is the first revision of the 25 Year Environment Plan (25YEP). The 25YEP was published by the UK Government in 2018 and set out 10 goals to help the natural world: (1) clean air, (2) clean and plentiful water, (3) thriving plants and wildlife, (4) reducing the risks of harm from environmental hazards, (5) using resources from nature more sustainably and efficiently, (6) enhancing beauty, heritage and engagement with the natural environment, (7) mitigating and adapting to climate change, (8) minimising waste, (9) managing exposure to chemicals and (10) enhancing biosecurity. The EIP reinforces the 25YEP and sets out the plan to deliver the framework and vision previously set out.
Regional	
Mayor of London's Climate Change Adaptation Strategy (2011)	This Mayor of London's Climate Change Adaption Strategy sets out the framework for improving the quality of life in London and for protecting the natural environment. It provides an action plan for making London more sustainable by using three 'pillars': retrofitting London, greening London and cleaner air for London. The strategy presents the understanding of main climate change effects on London as well as analysing the effects on cross-sector issues including health, economy, and infrastructure. The strategy also provides a 'roadmap to resilience' outlining actions, with lead and partner organisations. Since then, the Greater London Authority (GLA) have also produced a London Environment Strategy (2018).
London Regional Flood Risk Appraisal (2018)	The London Regional Flood Risk Appraisal (RFRA) provides an overview of all sources of flooding in London and addresses both its probability and consequences. The evidence of the London RFRA subsequently informs the London Plan and should inform local-level flood risk assessments and local plans.
London Sustainable Drainage Action Plan (2021)	The London Sustainable Drainage Action Plan addresses a specific need to promote the awareness, and the retrofitting, of sustainable drainage systems right across London. It contains a

	series of actions to make London's drainage system work in a more natural way with the main focus on the retrofitting of sustainable drainage to existing buildings, land and infrastructure. Sector-specific sustainable drainage (SuDS) guidance has been developed as part of the London Sustainable Drainage Action Plan.
The London Plan (2021)	The London Plan is a general Strategic Development Strategy for London. Producing a Strategic Development Strategy is a requirement of the London Mayor established under GLA legislation. The London Plan establishes an integrated economic, environmental, transport and social framework for the development of London for the next 20-25 years.
Thames river basin district River Basin Management Plan (2022)	The aim of river basin management plans is to enhance nature and the natural water assets. The Thames river basin district River Basin Management Plan (RBMP) describes the framework used to protect and improve the quality of waters in the Thames river basin and is used by RMAs for making water management decisions within the Thames river basin. It also includes the local environmental objectives that RMAs use to make planning decisions and an assessment of the current condition of each water body, including the reasons why, if not, it is not in good condition.
Thames Estuary 2100 (2023)	The Thames Estuary 2100 (TE2100) Plan was first published in 2012. It was developed by the EA and provides strategic direction for managing flood risk in the Thames Estuary to the end of the century. The TE2100 plan is an adaptive strategy and is reviewed on an interim basis every five years and on a full basis every ten years. The new and updated version of the plan was published in 2023. The plan considers different long-term options for managing tidal flood risk depending on changes in factors which determine the level of flood risk, including sea level rise.
Local	
Strategic Flood Risk Assessment (2015)	A SFRA is required by the NPPF and provides a strategic overview of all forms of flood risk within a designated area. A SFRA assesses the risk from all sources of flooding, the cumulative effect that development or changing land use could have, and the effect of climate change on the risk of flooding. A SFRA should also identify opportunities to reduce the causes and effects of flooding, including potential areas of land for flood risk management infrastructure. The SFRA provides guidance for the Local Plan, individual planning applications, future flood management, emergency planning and how to adapt to climate change.

Local Plan (2018)	The Local Plan is developed by the LPA and sets out a vision and framework for the future development of the area. Redbridge Council's Local Plan sets out policy and guidance to manage growth and guide development within the Redbridge borough. It addresses needs and opportunities in relation to housing, the economy, community facilities and infrastructure, as well as conserving and enhancing the natural and historic environment, mitigating, and adapting to climate change and achieving well designed places. The plan is made up of the combination of strategic policies, addressing important priorities for the Redbridge borough, and non-strategic policies.
Surface Water Management Plan (2024)	A SWMP is a plan produced by LLFAs that presents the surface water flood risk for an area and forms a strategy on how to manage this with local partners. A SWMP considers flooding from sewers, drains, groundwater, and surface runoff from land, small watercourses and ditches that occur as a result of heavy and / or prolonged rainfall. The SWMP also includes a long-term action plan to manage surface water flood risk which will influence land-use planning, emergency planning and future developments. SWMPs also aim to identify SuDS opportunities to manage surface water flood risk which contributes towards the WFD requirements. The SWMP for Redbridge has been updated in parallel with this LFRMS.