Leicester
Local Flood Risk Management Strategy

March 2015

City Mayor

Flooding on Carisbrooke Road

Contents

The main aims of the Leicester Local Flood Risk Management Strategy are to:

- coordinate flood risk management on a local scale
- raise awareness of increasing flood risk due to climate change
- provide a clear understanding of flood risks and act as an evidence base for decision making.

A joined up strategy sets out clear plans for risk management and will help to coordinate planning activities to prevent inappropriate development as well as prioritising investment more effectively.

Leicester has built up over centuries along the wide flat River Soar valley, close to the head of the river's catchment area. The ground rises steeply to the East and West and a number of large watercourses flow quickly towards the River Soar through heavily populated areas.
This topography makes Leicester particularly vulnerable to flooding following heavy downpours or prolonged periods of rain.

The twentieth century saw large scale improvements made to the River Soar and tributaries to help prevent flooding. However, climate change is likely to alter weather patterns, leading to more frequent and more intense rainfall.

Much of the possible major development in the future will be upstream of Leicester and could potentially increase the flood risk in the city through increased surface water runoff.
A consistent regional approach on surface water management and use of sustainable drainage will be essential.

Opportunities to 'make space for water' should be exploited by incorporating green open spaces and water compatible developments in areas of greatest flood risk. Green spaces or blue corridors along watercourses can increase biodiversity and make new developments more attractive and more resilient to flooding

New development at Hamilton

Foreword

The council has invested heavily since severe flooding in the 50s and 60s.
Many brooks and water courses were modified with flood walls and concrete channels. As a result of this work major flooding has since been avoided but the council still takes the increasing risk of flooding very seriously; constantly reviewing the risk with respect to climate change and new development.

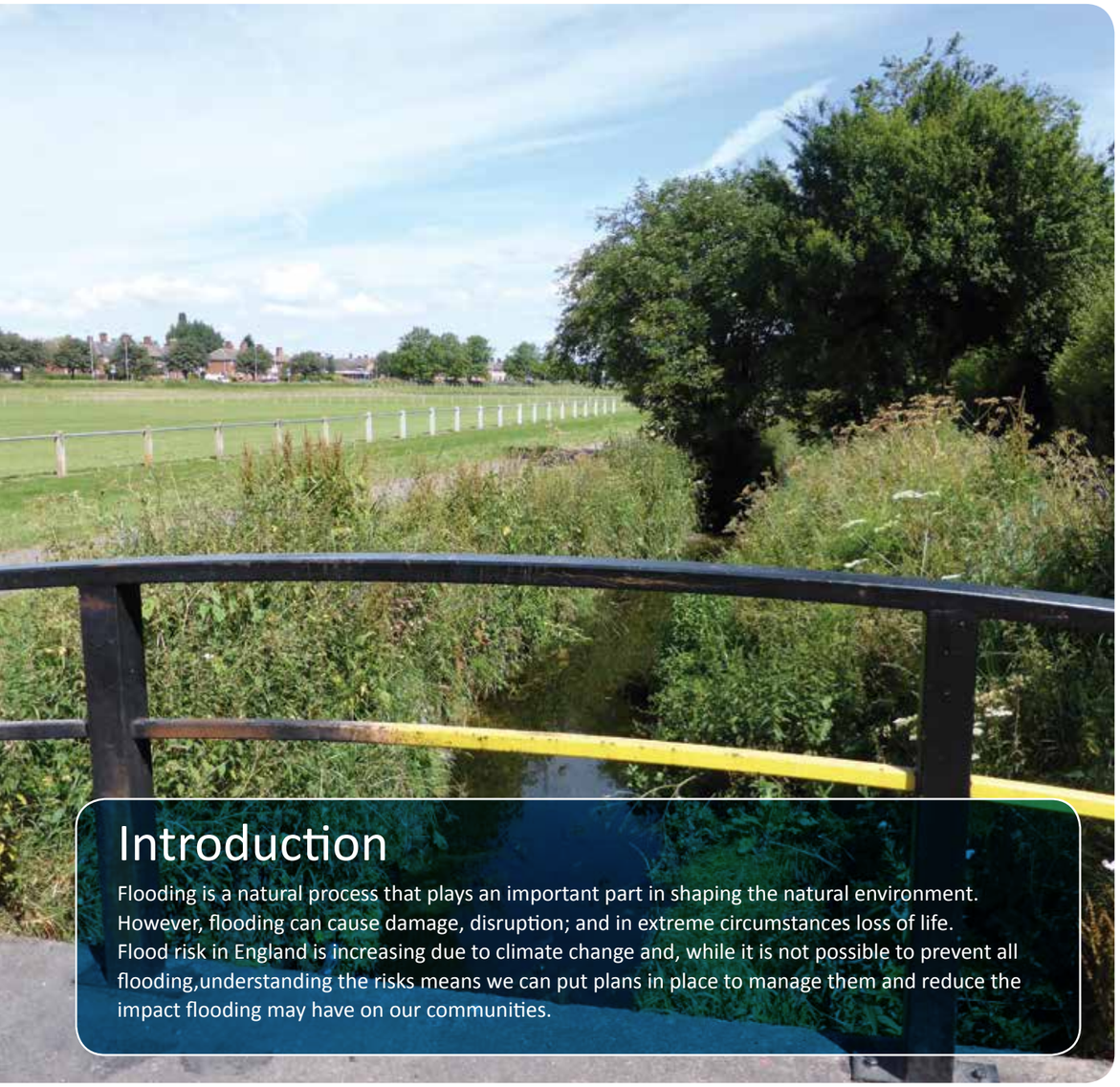
In recent years, many studies have been undertaken and a great deal of professional advice sought which has enabled us to make key decisions to support a flood risk management strategy to help manage the growing risk from flooding in Leicester and make the city more resilient to flooding events. We are committed to protecting our city using a combination of practical measures, as well as providing better information and support to help local residents and businesses protect themselves and their property.

Sir Peter Soulsby
City Mayor

One of the many great challenges facing the city over the coming years will be that of climate change and the role it plays in altering our environment, which could increase the flood risk.

I have been working closely with partners to help create a safe environment in which to live and work. This strategy will help us manage the risk of flooding and become more resilient. We are constantly monitoring the impact the city makes on the environment as well as looking at how the city will be able to react and prepare for natural events.

Councillor Rory Palmer
Deputy City Mayor



Introduction

Flooding is a natural process that plays an important part in shaping the natural environment. However, flooding can cause damage, disruption; and in extreme circumstances loss of life. Flood risk in England is increasing due to climate change and, while it is not possible to prevent all flooding,understanding the risks means we can put plans in place to manage them and reduce the impact flooding may have on our communities.

Braunstone Brook and playing fields

Leicester City Council is a lead local flood authority (LLFA) and is responsible for producing, maintaining, applying and monitoring a local flood risk management strategy (LFRMS).

This strategy forms the framework within which we engage local communities in developing local flood risk management decisions, and explains how we will support them to become better informed about flood risk issues generally.

Legislation and drivers

Flood risk regulations

The flood risk regulations (FRR) came into force in 2009. The FRR were created to bring the European Commission Floods Directive (Directive 2007/60/EC) into domestic law in England and Wales. The FRR also provide a framework to assess and manage flood risk in order to reduce adverse consequences for human health, the environment (including cultural heritage) and economic activity.

Leicester City Council has completed or is working towards the completion of the FRR requirements that:

- A preliminary flood risk assessment is published by June 2011
- Flood risk and hazard maps are produced by June 2013
- A flood risk management plan is developed by June 2015

Small stream in Abbey Meadows area

Flood and Water Management Act

The Flood and Water Management Act (FWMA) gained Royal Assent in 2010 and makes specific provision for the recommendations provided by Sir Michael Pitt in his independent review of the flooding experienced across much of England and Wales in 2007.

Under the FWMA, Leicester City Council is designated as the LLFA and has been allocated a number of key responsibilities with respect to local flood risk.

Evington Road

What is Leicester's role as an LLFA?

- Undertaking a lead responsibility for managing the risk of flooding from surface water, groundwater and ordinary watercourses
- Developing a strategy for local flood risk management in Leicester
- Maintaining a register of flood risk assets
- Investigating significant flooding incidents
- Promote sustainable drainage (SuDS)
- Cooperating with other flood risk management authorities (Severn Trent, Environment Agency, Network Rail)

Responsibilities

In addition to LLFAs, the other risk management authorities in England and Wales are:

The Environment Agency

The Environment Agency is responsible for taking a strategic national overview of the management of all sources of flooding and coastal erosion. The agency also has operational responsibility for managing the risk of flooding from **main rivers, reservoirs, estuaries, and the sea;** as well as being a coastal erosion risk management authority. Leicester City Council works in partnership with the Environment Agency on flood risk management. The council has developed their LFRMS in conjunction with the Environment Agency with the aim of developing an integrated and sustainable approach to flood risk management in the city.

Leicestershire county and district councils

These are key partners in planning local flood risk management and can carry out flood risk management works on minor watercourses, working with lead local flood authorities and others, including making decisions on development in their area which ensure that risks are effectively managed. Leicester City Council is working closely with Leicestershire County Council, Blaby District Council, Harborough District Council, Oadby and Wigston Borough Council, and Charnwood Borough Council.

Highway authorities

Highway authorities are responsible for providing and managing highway drainage and roadside ditches and must ensure that road projects do not increase flood risk. Leicester City Council is the highway authority for Leicester. The city also works with the Highways Agency and Leicestershire County Council on highways.

Water and sewerage companies

Water and sewerage companies are responsible for maintaining public sewers. Severn Trent Water Ltd is the company that serves the area containing Leicester. The company is not responsible for managing flood risk. This is the local authority's concern. Severn Trent has a duty to drain their area and is also required to investigate flooding from other causes and blockages.

City Mayor Executive	Sets the priorities and approves policy for the city regarding flood risk management and planning and development.
Local resilience forum	This is a multi-agency forum that coordinates work on risk assessment, contingency planning, training and exercises to enhance our preparedness for emergencies.
Regional flood and coastal committees (RFCC)	Primarily responsible for ensuring there are coherent plans to identify, communicate and manage the risk from all sources of flooding. RFCCs also have a key role in allocating government grants for flood risk management to efficient, targeted and risk-based projects.
Ward councillors	Councillors coordinate regular ward meetings to give residents the opportunity to work with council departments and other agencies on anything that's affecting their ward, such as flooding.
Land and home owners	People who own land which adjoins a watercourse (also known as riparian owners) have a responsibility to make sure that the flow of water is not obstructed (for example, by clearing vegetation) and maintaining existing flood defences.
Developers	Developers are responsible for properly considering flood risk so that they do not put occupants of new developments at risk or increase the risk for existing neighbours.
Residents	Everyone has a role to play in reporting flooding problems and ensuring that they are themselves prepared for flooding, should it occur.

LFRMS in the national context

It is important to appreciate where an LFRMS sits in the context of the national flood and coastal erosion risk management (FCERM). They are different flood risk strategies and policies at European, National and local level.

- Catchment flood risk management plan (CFRMP)
- National flood and coastal erosion risk management plan (FCERM)
- EU water framework directive
- EU floods directive

The city council's new Dock building with landscaping to manage drainage

How we will fit in locally

To fit with national strategy, local organisations such as the city council will need to:

- work in partnership to make sure plans and strategies are consistent with, and developed in conjunction with related strategies
- appraise and adopt, as appropriate, the full range of measures that may be available to manage risks
- consider the wider carbon costs or benefits of adopting different FCERM measures and reduce the carbon costs of the measures used
- contribute to the achievement of sustainable development, balancing the needs of society, the economy and the urban, rural and natural environment

Flooded garden

- ensure that the costs of measures are clear and understood and that the measures selected reflect expected climate change
- meet legal requirements to assess the impacts of strategies
- record the measures being implemented and provide local information to support the Environment Agency in developing the national understanding of risk and to meet the requirements of the flood risk regulations

Existing flood risk strategies for Leicester

Catchment flood management plan (CFMP)

The River Trent CFMP (Environment Agency, 2010) pinpoints areas with a grade of low, moderate or high flood risk. It also gives examples where flood risk is being managed effectively and recommends options to manage areas where there is a need to take further action to keep pace with climate change.

The CFMP aims to:

- Provide an accurate and community focused flood warning service
- Investigate upstream storage for 'at risk' urban centres including the six small watercourses running through Leicester
- Support production and implementation of an integrated drainage strategy for urban areas (EA, STW and LCC)
- Explore opportunities for creating green corridors along watercourses through urban centres
- Investigate flood resilience for infrastructure such as roads (for example the A50 and A47, and several 'B' roads around Leicester)

Preliminary flood risk assessment (PFRA)

The city council published the Leicester PFRA in 2011. The PFRA identifies the Leicester principal urban area as a nationally significant flood risk area. The main sources of risk identified were from main rivers and surface water.

Surface water management plan (SWMP)

Part one of the SWMP for Leicester was published in 2012 and identified city wide flood risk from surface water flooding and ordinary watercourse flooding. The SWMP produced flood extent and hazard maps in accordance with the flood risk regulations (FRR).

Part two of the SWMP consisted of a level two strategic flood risk assessment (SFRA) of the city using information provided by partner organisations and developed during part one. The SFRA is essential in linking flood risk to development and planning in Leicester.

Part three of the SWMP is underway and will involve more detailed assessments of flooding in several high priority flooding hotspots in the city for which management options will be developed.

Types of flooding

River flooding (fluvial) happens when the water overtops the river bank and floods nearby areas. River flooding can occur from main rivers (such as the River Soar, Saffron Brook, Willow Brook and Braunstone Brook) or from ordinary watercourses (these tend to be smaller rivers and streams such as Gilroes Brook, Hol Brook and Ethel Brook). Rivers can flood naturally or as a result of blockages and debris build up.

Surface water flooding occurs when the amount of rain falling on an area is too great for the drains or the ground to cope with. Surface water flooding can be difficult to predict and can cause flash flooding. There is a history of surface water flooding in parts of Leicester and there are areas where greater potential for surface water flooding has been identified.

Flooding from sewers is caused when pipes fill up and cannot take any more water. This can happen when the pipes are too small or have not been designed to carry sewage and lots of rain water or when there is a blockage in a pipe. Sewer flooding has occurred in Leicester and is reported to and acted on by Severn Trent Water Ltd.

Groundwater flooding occurs as a result of water rising up through the ground from underground stores such as aquifers or natural springs. This type of flooding tends to occur after a very long period of sustained high rainfall and can affect low lying areas. In Leicester this includes areas on the flood plain of the River Soar where it passes through.

Flooding from canals and reservoirs is caused by overtopping and breaks in canal banks, weirs, sluices and locks. Canal flooding has occurred in Leicester and has been recorded by the Canal and Rivers Trust (formerly British Waterways).

Flooding from the sea occurs as a result of very high tides, storm surges or high waves flooding low lying areas along the coast in estuaries. Leicester is too far inland to suffer from this type of flooding.

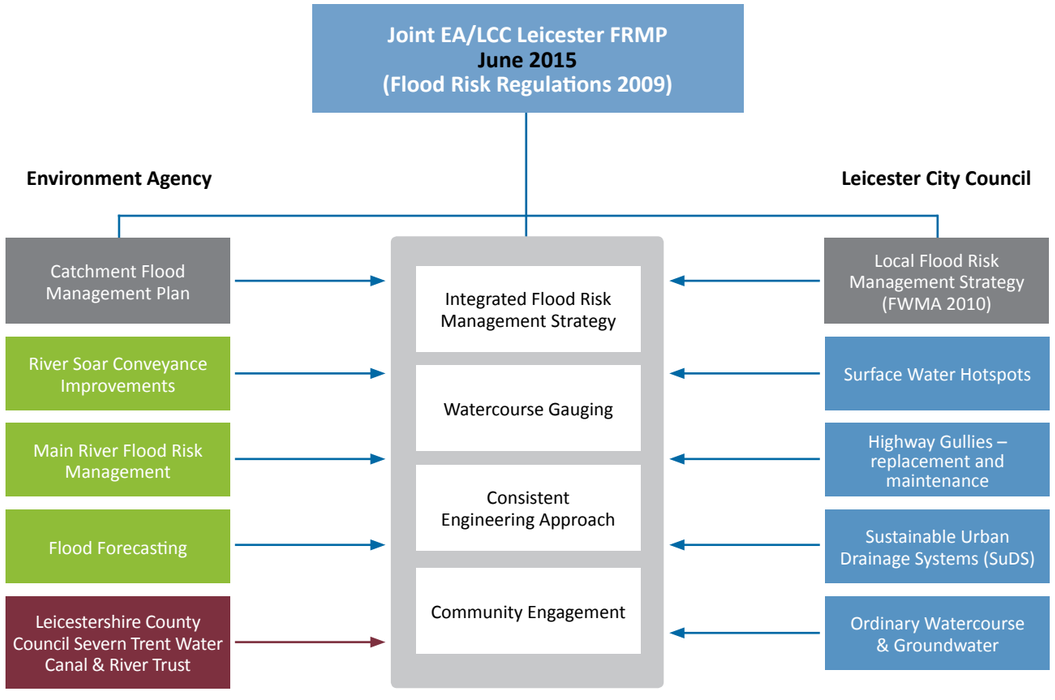
The joint strategy approach

Recent partnership event in a local area at risk of flooding

Much of the local flood risk knowledge and technical expertise lies not only within the city council but with partner organisations including the Environment Agency. The city council and the Environment Agency have identified flood risks to Leicester that are complicated and interlinked.

It is crucial that Leicester works alongside the Environment Agency to ensure effective and consistent management of local flood risk.
It is important to take an holistic approach to flood risk management across the city that will include flooding from main rivers, surface water and ordinary watercourses.

The integrated strategy will inform the flood risk management plan for Leicester, which is required to be delivered in June 2015 under the FRR.



Recommendations from the surface water management plan

Wetlands at Abbey Meadows

Ref	Objective
S01	**Communicate with partners -** Build good communication links with neighbouring authorities, flood risk management authorities as well as internal and external partners.
S02	**Communicate with the public -** set realistic expectations and outcomes with regard to managing local flood risk. Engage with local communities.
S03	**Social -** Reducing risk to life, and disruption and stress caused by flooding incidents.
S04	**Economic -** lessen chances of prevent financial loss as a result of flooding.
S05	**Environmental -** support the implementation of the water framework directive by naturalising channels and de-culverting water courses. Increasing biodiversity of open spaces linked to natural water courses and areas contributing to the management of flood risk. Improve water quality and improve the quality of public open space wherever the opportunity arises.

LFRMS objectives - In practice

The table below shows the measures that will be put in place to achieve the strategic objectives and guiding principles set out in the national strategy.

Objective	Actions
Reduce the number of properties at risk from flooding	• Delivery of flood defence / alleviation schemes (eg. Working with the EA on the River Soar) • Manage flood risk by designing drainage systems that can safely accommodate rainfall and flooding that exceeds their drainage capacity (design for exceedance) • Ensure sustainable drainage systems (SuDS) schemes show flood path on drawings
Help residents, property and business owners in the area become more resilient to flood events	• Implement a communications strategy to engage with the local communities • Build up flood risk awareness within the local communities and provide details of what individuals can do to deal with flooding • Assist communities in establishing their own flood action plans; encourage the public to better defend their properties • Highlighting the benefits of early action e.g. reduced insurance premiums, available grants and peace of mind • Set up an information portal for persons affected by flood risk providing better and more comprehensive information
Reduce the area of highway under water for a given storm event and minimise traffic disruption from flooding	• Better maintained drains and gullies based on flood risk data • Design for blue corridors (temporary store of floodwaters) • Alter kerb alignment to manage flow overland
Increase the area of green space in the area contributing to mitigating the flooding risk	• Change land management practices • Wetland creation and biodiversity improvements • SuDs schemes
Reduce the number of pollution incidents affecting watercourses in the city	• Help to inform the local community of the causes of pollution and measure that can be taken to prevent it occurring • Collect information on reported pollution incidents • Manage rainfall run off by source control

The action plan

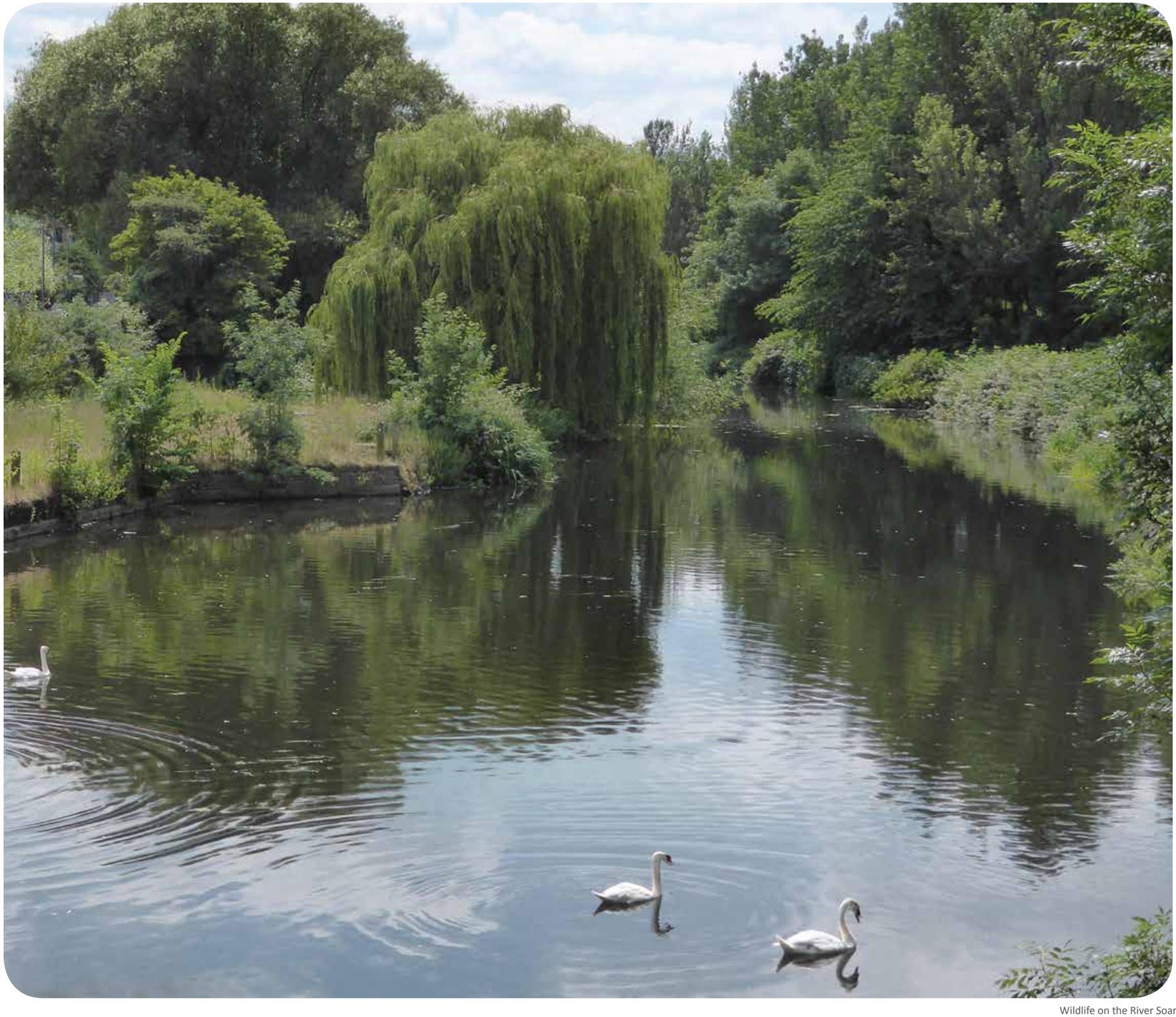
As part of the LFRMS an action plan is emerging. The plan is split into short term, medium term and long term actions. All actions are achievable and can be implemented by Leicester City Council in collaboration with our partners. Funding could come from any combination of our own resources, partnership funding or developers. Some amounts are still to be agreed or cannot be confirmed so far ahead of time.

In collaboration with the EA, we have already secured £7.83m from Defra for the River Soar conveyance project. The following are examples of the projects the authority proposes to deliver.

Flooding source	Short term actions (within 1-2 years)	Medium term actions (within 2-5 years)	Long term actions (5 or more years)
Joint river, watercourse and surface water run-off	• **Rainfall and river gauging project** – data from actual events to verify models and risks. **£30k**	• **Joint integrated strategy** modelling project with EA. **£120k**	• **Joint flood defence schemes surface** water and main river network – Willowbrook and tributaries, Braunstone Brook, Saffron Brook and Melton Brook. **To be confirmed**
Ordinary watercourses	• **Ordinary watercourses scheme feasibility works** for Holbrook and Gilroes Brook. **£74k**	• **Holbrook and Gilroes Brook scheme** funding bids and delivery. • **Scheme feasibility studies** for Ethel Brook and Portwey Brook. **To be confirmed**	• **Ethel Brook and Portwey Brook scheme** funding bids and delivery. • **Modelling of flood risk** for other minor watercourses. **To be confirmed**
Surface water run-off	• **Complete surface water hotspot scheme feasibility** for Northfields and submit funding bid. • **Liaison with Leicester Royal Infirmary (LRI)** over their flood risk management measures. **£30k**	• **Northfields scheme delivery** • **Detailed modelling** of remaining surface water hot spots, options development and scheme feasibility appraisals. **To be confirmed**	• **Flood alleviation measures** delivery programme **To be confirmed**
River Soar	• River Soar **conveyance** project **(Defra funded)**	• River Soar corridor **defences** **To be confirmed**	
All forms, including groundwater.	**Ongoing programmes:** • Highway drainage maintenance, road gully replacements, highway improvements, watercourse and ditch maintenance. **£400k** • Community engagement, business resilience. • Asset inventory management, investigations and consenting. • Emergency management preparedness. **Total £200k** • De-culverting of watercourses, wetland creation and bio-diversity improvements **To be confirmed**		
All forms (Spatial planning)	• Promote sustainable drainage (SuDS) • Issue formal developer guidance for SuDS schemes. **£36k**	• Alignment of planning policies with LFRMS and control of surface water run-off. • Implement SuDS legislation. **£40k**	• Flood risk management strategy embedded within planning and economic development activity

Glossary

Term	Definition
Aquifer	An underground layer of water-bearing rock. It is permeable, meaning that liquids and gases can pass through them.
Blue corridor	Route for flood waters
CFMP	Catchment flood management plan
Conveyance	Allowing for the uninterrupted transport of water
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
Erosion	Process where materials are broken down by earth processes
Estuary	Mouth of a river where it discharges into the sea
FCERM	Flood and coastal erosion risk management
Fluvial flooding	Flooding caused by river system exceeding its bank full level
Flood alleviation	To reduce the risk of flooding
Flood defence	Barrier to limit the extent/ occurrence of a flood event
Flood resilience	Take measures to reduce the impact of a flood event and guarding against flooding
FRMP	Flood risk management plan
FWMA	Flood and Water Management Act
FRR	Flood risk regulations
Green corridors	Strip of land that provides habitats and movement of wildlife
LCC	Leicester City Council
LFRMS	Local flood risk management strategy
LLFA	Lead local flood authority
Main river	A watercourse shown on the main river map, for which the EA has responsibility
Ordinary watercourse	A watercourse that is not a main river and is the responsibility of the lead local flood authority
Permeable/ impermeable	Allowing water to pass through/not pass through
PFRA	Preliminary flood risk assessment
Pluvial flooding	Flooding from rainfall or other precipitations
Reservoir	A body of water that is used as storage
Riparian owners	People who own land which adjoins a watercourse
SAB	Sustainable drainage system approval body
SEA	Strategic environmental assessment
SFRA	Strategic flood risk assessment
STW	Severn Trent Water
SuDS	Sustainable drainage system
SWMP	Surface water management plan
Sewerage	The infrastructure (receiving drains, manholes, pumping stations, storm overflows etc.) that carry sewage (the waste carried by water)
Statutory consultees	Organisations that by law must be consulted on LFRMS
Wetland	Area of land that can hold water temporarily or permanently



Wildlife on the River Soar

Flood risk management

Leicester City Council
90 Leycroft Road
Leicester LE4 1BZ

Web: Leicester.gov.uk/flooding
email: flooding@leicester.gov.uk

New bridge to improve access to the Dock development

City Mayor