LOCAL FLOOD RISK MANAGEMENT STRATEGY 2022 – 2028

Hull City Council

Hull City Council
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Executive Summary

Communities in Hull have experienced flooding in the past, including the devastating surface water flooding in June 2007, and the tidal surge in December 2013. With each flood event we learn new ways to help communities better prepare for flooding and ways to become more flood resilient. One of the ways we engage with local communities is through the Living with Water partnership. The vision of the partnership is to create a thriving city that embraces its relationship with water to secure a sustainable and resilient future. Understanding local communities' perceptions and understanding of flood risk is essential, which is why we have carried out surveys to help us better understand how we can work together towards a more sustainable and resilient future.

The purpose of this strategy is to set out how Hull City Council will approach flood risk management over the next 6 years. This strategy sets out aims, objectives, measures and outcomes, which are underpinned by the Environment Agency's long-term vision for England. The long-term vision is to create a nation ready for, and resilient to, flooding and coastal change – today, tomorrow, and up the year 2100.

Over the last 6 years, more than £220 million has been spent on flood infrastructure to reduce the risk of flooding to homes and businesses in Hull, through partnership working with other risk management authorities. Over the next 6 years we will be focusing on how we can become more resilient and better prepared for flooding given that flood risk is expected to get worse with climate change. This will involve using nature-based solutions alongside engineered flood infrastructure to build long term sustainable resilience. This strategy offers the opportunity to take a more holistic approach to managing local flood risk and to combat environmental issues associated with climate change.

Approval schedule

Version	Date	Prepared by	Reviewed by	Approved by
Draft 1	May 2021	Jessica Fox	Rachel Glossop	Rachel Glossop
Draft 2	September 2021	Jessica Fox	Rachel Glossop	Energy and Infrastructure Scrutiny Committee
Consultation version	September 2021	Jessica Fox	Rachel Glossop	Cabinet
Adopted final version	May 2022	Jessica Fox	Rachel Glossop	Rachel Glossop

Public consultation

A public consultation was held for a period of 6 weeks from 8th October – 19th November 2021. A formal consultation statement is available to view here.

Acknowledgements

This strategy was made possible by the efforts of flood risk management officers at Hull City Council over the last six years and the partnerships that have been formed during this time. Special thanks are given to the Living with Water partners at East Riding of Yorkshire Council, Yorkshire Water, Environment Agency and the University of Hull for continued support and ambitious plans to manage local flood risk. Successful partnership working has enabled multimillion pound flood alleviation and resilience schemes to be delivered and many more to be planned.

Hull City Council are committed to offering work experience to support the next generation of flood and climate experts. As part of work experience, students and alumni from the University of Hull supported the development of this document by collating information, proof-read this document and helping to design the appendices. Information was kindly provided by the University of Hull as part of the Risky Cities project to share knowledge on historical flooding in Hull.

Following the public consultation and the variety of responses received, this document has been shaped to be as accessible as possible and is supported by many examples of ongoing partnership working across the region.

Foreword

As a city built around water, Hull has challenges to face with flooding and the impacts climate change will bring. A strategic approach to managing the risk is critical to the city adapting and thriving with a vision of living with water in a resilient and sustainable way.

This Local Flood Risk Management Strategy highlights the challenges Hull faces. It provides information on the roles and responsibilities, including everyone that has a role to play, not just the authorities involved. It links the work all partners are doing to manage flood risk including plans, strategies, investment, and most importantly it aligns flood and water management to other objectives, such as health, green open spaces, high quality housing, active travel, jobs and economic growth. These are important to create a sustainable city with a healthy, resilient population that has an attractive environment in which people can live, work and play.

Councillor Dean Kirk

Portfolio holder for transportations, roads, highways and flooding

Key contact information

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Abbreviations

AMP – Asset Management Plan

ADEPT – Association of Directors of Environment, Planning and Transport

AEP – Annual Exceedance Probability

AOD – Above Ordnance Datum

BSI – British Standards Institution

CCTV – Closed Circuit Television

DCLG – Department for Communities and Local Government

Defra – Department for Environment, Food & Rural Affairs

EA – Environment Agency

ERDF – European Regional Development Fund

EU – European Union

FCERM – Flood and Coastal Erosion Risk Management

FDGiA – Flood Defence Grant in Aid

FRMP – Flood Risk Management Plan

HAP – Humber Archaeological Partnership

HCC - Hull City Council

HEYLEP – Hull and East Yorkshire Local Enterprise Partnership

iCASP - Yorkshire integrated catchment solutions programme

IDB – Internal Drainage Board

LEP – Local Enterprise Partnership

LGF – Local Growth Fund

LLFA – Lead Local Flood Authority

LRF – Local Resilience Forum

LwW – Living with Water

MAGIC – Mobilising Adaptation – Governance of Infrastructure through Co-production

MOCA – Mobilising Citizens for Adaptation

NFM – Natural Flood Management

NPPF – National Planning Policy Framework

ODI - Outcome Delivery Incentive

OM – Outcome Measure

PFR – Property Flood Resilience

PR – Price Review

RFCC – Regional Flood and Coastal Committee

RMA – Risk Management Authority

SFRA – Strategic Flood Risk Assessment

SPZ – Source Protection Zone

SuDS – Sustainable Drainage Systems

UK – United Kingdom

WEIF – Water Environment Improvement Fund

YW – Yorkshire Water

1. Introduction

Flooding is the greatest natural hazard that threatens the Humber region. Hull is at significant risk from multiple sources of flooding. Hull is also at risk from rising tides in the Humber as climate change will cause sea levels to rise.

Hull's tidal surge barrier is the most recognisable flood risk management asset that local communities recognise. Communities in Hull have experienced several flood events in recent years. Yet peoples understanding and awareness of the different types of flood risk and how they can become more resilient is limited.

Flood risk & resilience People's Panel survey - April 2021

- *33% of people understand their home is at high risk from at least one type of flood risk*
- *85% of people believe that flood risk will get worse with climate change*
- *38% of people understand that flood risk is their responsibility*
- *16% of people feel prepared if their home is flooded.*

A summary of the results from the survey can be found in appendix 10 and the full report can be viewed here.

Flood risk management has developed over the last 10 years and it has been shaped by England's experiences to flood events. National legislation and policies set out how we should manage flood risk in England. In the past, flood risk management has mainly used engineered structures to keep water away from important infrastructure, like roads and homes. However, even with engineered structures there is always a residual risk. Therefore, to become more resilient to flood risk, we need to find ways to work with water and realise the benefits rather than working with the mindset of 'keeping water out'. This involves everyone having a role in awareness of flood risk and the steps they could take to reduce the impact of flooding. It will not be possible to always keep water away from places we don't usually see it, so we can use nature-based solutions to store water alongside using traditional flood defences to make space for water.

Hull has over 800 years of history living with water. This has led Hull to having a rich maritime history, it is home to many pioneering people, and has established itself as a key export hub for trade across the world. The water around Hull has helped Hull grow into the city we see today. Hull has always been reliant on water. It still is today, but the way in which we see, understand, and manage water is changing. As individuals, communities and as a society we are constantly evolving and learning. It is becoming increasingly clear that now is the time to adapt to the increasing flood risk brought on by climate change, not in 20 or 50 years. We all have a part to play in building flood resilience now so that we are better prepared for an uncertain future.

Hull, June 2007 (photo credit: Hull Live)

Over 8000 homes flooded

91 out of 99 schools flooded

1300 businesses affected

Hull has seen significant investment into flood risk management over the last 10 years. Partnership working between risk management authorities has seen an investment of over £220 million. This strategy brings together the different types of flood risk to the attention of local residents so that people have a greater awareness of local flood risk and so communities can better prepare.

Hull City Council must develop, maintain, apply and monitor a local flood risk management strategy (LFRMS) to fulfil its role as Lead Local Flood Authority (LLFA). This is a requirement by the Flood and Water Management Act 2010. Hull City Council do not have a statutory responsibility to prevent flooding from happening, however this document sets out how Hull City Council (HCC) will act with others to

reduce the risk of flooding and the impacts flooding can have in the short and long term.

In addition to preparing a LFRMS, HCC must also prepare a Flood Risk Management Plan (FRMP). FRMPs are required for areas identified by the Environment Agency to be at significant flood risk. This is a requirement of the Flood Risk Regulations 2009.

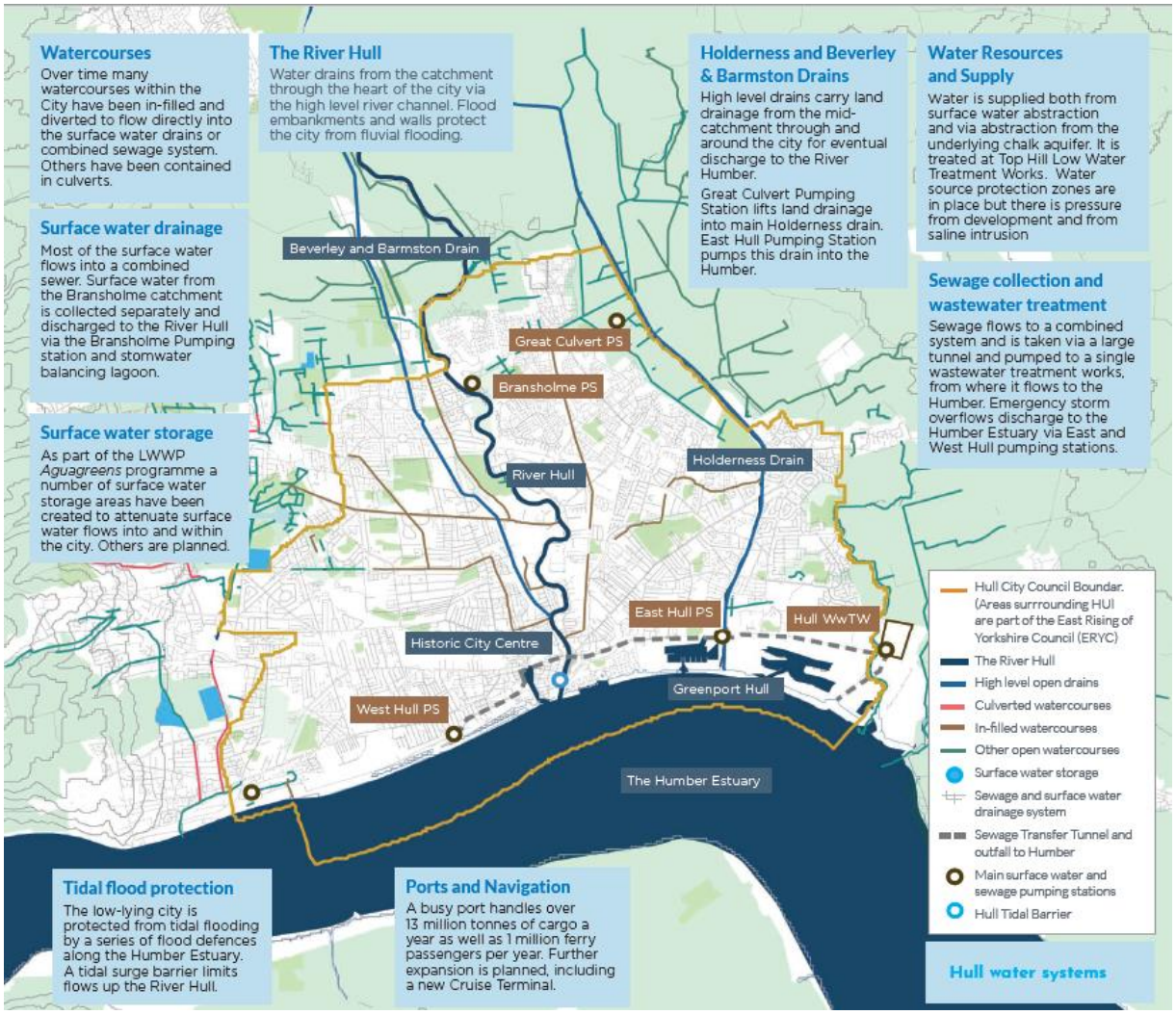
HCC must prepare a FRMP to show how the risk of surface water is being managed. The catchment area of Kingston upon Hull and Haltemprice covers two different administrative boundaries so for the purpose of this document, only the area within Kingston upon Hull's boundary is discussed. However, it must be noted that partnership working is ongoing with neighbouring risk management authorities to address flood risk on a catchment scale, regardless of political boundaries. Information on how East Riding of Yorkshire Council are managing flood risk can be found here.

The Environment Agency (EA) must prepare a FRMP to show how the risk of flooding from main rivers and the sea is being addressed. This can be found in the Humber Flood Risk management Plan.

2. Understanding flood risk

Hull is one of five global cities with a Water Resilience Profile. The City Water Resilience Approach (CWRA) details five steps to guide cities through initial stakeholder engagement and baseline assessment, through action planning, implementation and monitoring of new initiatives that build water resilience.

Hull is at risk of multiple sources of flood risk, including surface water, groundwater, rivers, sea, sewer and reservoir flooding. The infographic below provides an overview of Hull's water systems, more information is local flood risk is provided in Appendix 3.



Overview of Hull's water system. (Source: City Water Resilience Assessment - Hull and Haltemprice Water Resilience Profile, Arup,)

Leadership and strategy

- Strategic vision
    - Kingston upon Hull is one of the largest ports in the Humber Estuary, which is of huge economic importance. Hull also plays a large role in international renewable energy manufacturing, consequently the strategic vision of flood risk management incorporates interaction at multiple levels.
- Coordinated governance
    - The Living with Water partnership supports a coordinated governance, which is essential, because it is not always easy to understand where water within the system has come from or where it will go next.
- Effective regulation and accountability
    - the identification of risk management authorities (RMAs) and additional people / organisations that have a role in flood risk management (as listed in Appendix 2) set out roles and responsibilities. However, water does not respect political or other boundaries and so it is important that everyone works together for flood risk management to be effective.

Planning and finance

- Adaptive and integrated planning
    - The Council collects, monitors, and evaluates accurate data, such as the Strategic Flood Risk Assessment (SFRA), to inform the Local Plan and in turn: development. Data on flood events is collected and shared in the form of Section 19 reports, including lessons learned which inform future flood risk management and recovery (links to completed Section 19 reports are provided in Appendix 3).
- Sustainable funding and finance
    - Flood risk management requires significant investment into new flood infrastructure and maintenance of existing assets. Most funding for schemes is applied for from the Government. An overview of funding for flood risk management is provided in Appendix 2. As flood risk management is changing towards more adaptation and nature-based solutions, other sources of funding are constantly being sought.

- Effective disaster response and recovery
    - Coordination of disaster response and recovery relies on strong leadership and sufficient investment available to help from the top-down. The Humber Local Resilience Forum plays a critical role in flood response and recovery. It is also essential to empower and support communities to take a leading role in disaster preparedness and response.

Infrastructure and ecosystems

- Effective asset management
    - Hull's drainage asset map (provided in Appendix 5) shows all the known flood assets and their ownership. The Council, like other RMAs, operates a rolling maintenance schedule to maintain assets in good conditions. The availability of funding for maintenance is restricted and so coordination across RMAs is key.
- Protected natural environment
    - Hull is located on a chalk aquifer, which supplies Hull with drinking water, and is also a source of groundwater flood risk. To protect the quality of groundwater, Source Protection Zones (SPZ) are identified which monitor and limit water abstraction to reduce pollutants entering the aquifer.
- Equitable provision of essential services
    - The movement of fresh and wastewater across the city is vital to reduce the risk of water hazards. During times of flooding, RMAs work together to limit the spread of potentially hazardous water and support health services to deal with any related issues.

Health and wellbeing

- Healthy urban spaces
    - Every development in Hull must adhere to water-related policies set out in the Local Plan which promote water-sensitive and adaptable development. One aspect of this is the installation of sustainable

drainage systems (SuDS) on new development and retrofitting SuDS onto existing development and open green spaces.

- Prosperous communities
    - Not all communities across the city have the means to be equally aware, prepared or be able to respond and recover in the same way. Communities that are at the greatest risk of flooding as identified through hydraulic modelling are targeted first to help the most at-risk communities, which may also be the most deprived.
- Empowered communities
    - Communities that are aware and engaged with their local water environment is essential to aid community preparation, response and recovery to potential flood events. This includes individual, household, and community level measures.

There are 6 areas of opportunity that have been identified by a wide variety of stakeholders as part of the CWRA to support effective flood risk management in Hull. These are:

1. Embedding a new shared narrative and culture change around water resilience
2. Pro-active and resourced participatory engagement
3. Water resilience for livelihoods: jobs, skills and the local economy
4. Mainstreaming and implementing water sensitive urban design
5. Community-scale retrofit for water resilience and wellbeing
6. Social and cultural capital for community water resilience

The full report can be viewed here.

Our approach

Hull City Council has taken the initiative of addressing flood risk in a holistic way which is designed to adapt people's perceptions and actions towards flooding. This includes taking advantage of Hull's close proximity to and relationship with water.

This is recognised through the formation of the Living with Water Partnership, which is a partnership between Hull City Council, East Riding of Yorkshire Council, Yorkshire Water, Environment Agency and University of Hull. The primary aim of the living with water partnership is:

'to create a thriving city that embraces its relationship with water to secure a sustainable and resilient future.'

LwW has 5 strategic priorities:

- 1. Reduce flood risk
- 2. Build resilience
- 3. Collect and share knowledge
- 4. Improve places for people
- 5. Regenerate the economy

"The need to address water challenges is greater than ever, but so is the opportunity to rediscover the positive role of water: it's potential to shape a successful, resilient and sustainable city" – Lee Pitcher, General Manager of the Living with Water partnership, Yorkshire Water.

3. Managing flood risk

What are we going to do?

The EA has called on people to embrace a range of resilience actions including better protection to flooding and coastal change. This strategy details how we propose to adapt and improve our resilience to a wetter and uncertain future in Hull. This strategy is underpinned by the EA's vision set out in the Flood and Coastal Erosion Risk Management (FCERM) Strategy for England:

> *'A nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100' – EA national FCERM strategy*

The EA's vision is supported by three long term ambitions:

1. Climate resilient places
2. Today's growth and infrastructure resilient in tomorrow's climate
3. A nation ready to respond and adapt to flooding and coastal change.

This LFRMS applies the EA's national vision of implementing flood risk management locally in Hull, and details how we aim to reduce the impacts of flooding now and in the future.

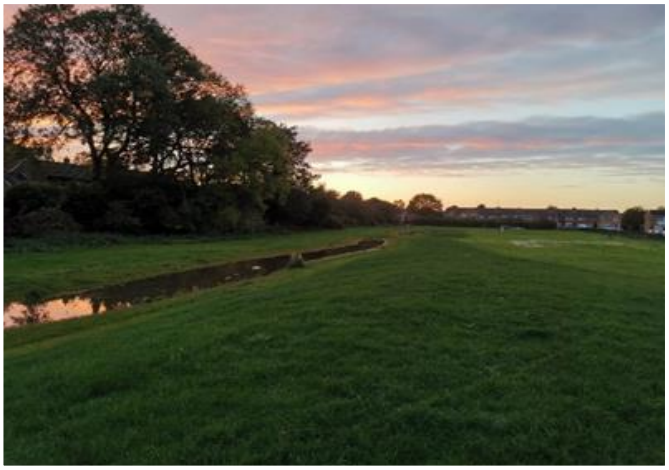
This strategy is centred around 5 strategic aims to support the national FCERM strategy:	1. Assess the current state of flood risk in Hull
	2. Incorporate flood resilience measures into local planning policy
	3. Exchange and enhance local knowledge and expertise
	4. Work in partnership with other risk management authorities
	5. Deliver flood alleviation schemes to better protect communities, homes, businesses and land in Hull.

How are we going to do it?

The following tables include:

- ✓ Aims, which support the EA's three long term ambitions
- ✓ Objectives to delivering each aim
- ✓ Measures showing how the objectives will be achieved
- ✓ Outcomes expected from each aim

As a country and a city, we are in the process of recovering from the effects of the coronavirus pandemic. There is an opportunity to work with the Governments mantra of 'building back better' by putting flood and climate resilience, and nature recovery at the heart of future plans. With this in mind, the following tables set out how flood resilience in Hull will continue to improve over the next 6 years (2022 – 2028).



Gleneagles Aquagreen, Hull

Storing surface water during heavy rainfall events;

Reducing the risk of surface water flooding;

Improving community green spaces;

Protecting and enhancing habitats for wildlife;

Partnership working and community engagement.

Table 1 - aim 1: assess the current state of flood risk in Hull

Objective	Measure	Outcome
a) Identify and address gaps in knowledge.	• Work in collaboration with the LwW partnership to understand the local interactions of all sources of flood risk in the city. • Use the Smart Cities technology to monitor and record environmental data for water management.	➢ Develop and maintain good working relationships with research institutions. ➢ Maintain a state-of-the-art understanding of flood risk. ➢ Use the understanding to be able to target actions to reduce and mitigate the risk more efficiently and effectively.
b) Investigate and report on flood events in Hull.	• Respond to reports of flooding and gather evidence. • Write a Section 19 report as defined in Section 19 of the Flood and Water Management Act 2010.	➢ Add to the evidence base of flood data. ➢ Learn from past experiences to improve future response to flooding.
c) Review existing flood alleviation schemes and identify future schemes.	• Assess local RMAs asset register to establish where future schemes may be required. • Collaborate with other RMAs investment programmes.	➢ Use data and evidence to be able to have a strategic plan of investment for a resilient and sustainable city in the future.

Table 2 - aim 2: incorporate flood resilience measures into local planning policy

Objective	Measure	Outcome
a) Work with the unique hydrological situation in Hull when allocating sites for future development.	• Ensure that there is a detailed Level 2 Strategic Flood Risk Assessment for the city. Use this to identify the flood risk zones and flood alleviation schemes alongside potential sites for development before allocating future use of sites. • As statutory consultee on planning applications, provide advice and guidance to deliver SuDS.	➢ Identification of suitable areas for appropriate, sustainable, and resilient development. ➢ Well-designed, flood resilient properties that the end user will understand and value. ➢ Use and implementation of local policies and guidance, such as the surface water management plan and this strategy. ➢ Ability to adapt to climate change.
b) Aim to create a blue-green city with SuDS to provide multiple benefits: water quantity, water quality, habitat and ecology, amenity and health and climate adaptation.	• Include policies in relevant strategies and plans, e.g., the Local Plan, to retrofit blue/ green infrastructure across the city, including creation of new AquaGreens. • Install SuDS features on council buildings / council owned land to showcase what can be achieved.	➢ Better amenity value of the urban environment for people, wildlife, and plants. ➢ Achieve multiple environmental benefits in single locations.

c) Consider areas of archaeological importance and the potential for unrecorded archaeology	• Identify the potential for buried, waterlogged archaeological and palaeoenvironmental remains of significant interest and fragility that can be associated with river valleys, floodplains, estuaries, coastal and wetland areas. • Work with local archaeological teams, including the Humber Archaeological Partnership when developing new flood schemes.	➢ Reduce the risks for developments by including mitigation measures if significant archaeological remains are found. ➢ Maximising archaeological understanding and the impacts new flood alleviation measures could have on the historic environment. ➢ Ensuring developments are consistent with National Planning Policy.

Table 3 - aim 3: exchange and enhance local knowledge and expertise

Objective	Measure	Outcome
a) Take a primary role in organising, leading, and participating in community outreach events.	• Use local knowledge, modelling and research with universities to identify gaps in knowledge and collate existing/ ongoing research. • Continue working with universities on better ways to communicate flood messaging and learn from this to tailor engagement with different audiences, such as MOCA, MAGIC and the Baseline Survey. • Utilise the LwW community hub to host engagement events	➢ A city able to adapt and live with too much or too little water. ➢ Better awareness and understanding of local flood risk and resilience measures to enable people and the environment to cope with a changing climate. ➢ Addition of local flood-related information from residents and communities.
b) Take an active role in sharing and gaining knowledge through educational outreach activities.	• Work with LwW to organise, attend and support community engagement events. • Attend area committee meetings to raise awareness and understanding of local flood risk, and to listen to communities' experiences of flooding.	➢ Improvement in communication between Hull City Council and local communities to improve relationships and increase trust.

c) To establish Hull as an exemplar of best practice in regional flood resilience.	• Share local flood risk information via social media and newsletters to residents of Hull. • Create flood community champion groups across the city, who can use their networks to raise awareness on personal flood awareness and resilience. • Organise workshops with local schools with activities focused on flood risk and resilience. • Play an active role in research projects at universities. • Share learning, research, and success in flood resilience, including through the CWRA. • Encourage and collaborate with experts to establish innovative, world-leading approaches to flood risk management. • Support education and training of flood risk professionals including through the Masters in Flood Risk Management programme at the University of Hull.	➢ Creation of a generation of climate champions. ➢ Creation of skills, knowledge and jobs in the flood and climate change sector. ➢ Addressing gaps in knowledge and contributing to state-of-the-art science. ➢ Maximised benefit from local assets to optimise flood resilience. ➢ Additional recognition achieved with increased support, resources, and funding. ➢ Increased civic pride, further enhancing business and citizen action.

d) To build capacity to support flood resilience, recognising the capacity of individuals and communities to adapt and respond to flood risk are not the same.	• Engage and involve citizens and businesses to increase flood risk awareness and resilience through targeted interventions, such as short courses and educational events in partnership. • Acknowledge that individuals and communities have a role to play in reducing flood risk as well as in reducing potential effects of flooding. • Ensure flood risk awareness and resources are widely available across communities, including knowledge of flood warnings, support to create flood plans and promote awareness and installation of PFR. • Continue to take a holistic approach to flood risk management, broadening further the range of Council departments involved, including urban planning, education and social welfare.	➢ Siloes broken and greater collaboration achieved. ➢ Multiple benefits realised from building flood resilience in Hull City Council. ➢ Individuals, communities, and businesses that are more resilient to flooding and climate change.

Table 4 - aim 4: work in partnership with other risk management authorities

Objective	Measure	Outcome
a) Work with LwW partners in a co-ordinated way to assess risk, allocate funding and seek joint mitigation to address risks.	• Share data and modelling on local flood risk. • Engage with other RMAs in assessing all sources of flood risk.	➢ An integrated flood risk model for the city to help inform decision-making and policy. ➢ Openness and transparency of flood risk management on a catchment scale.
b) Contribute to local, regional and national working groups/ partnerships/ committees. c) Work in partnership to prepare for and respond to future flood events.	• Play an active role in the Hull and East Yorkshire catchment partnership. • Attend and contribute to Yorkshire Regional Flood and Coastal Committee (RFCC) meetings. • Play an active role in ADEPT, particularly through the Floods Working Group. • Be a key partner in developing and delivering the Humber 2100+ strategy.	➢ Solutions that are community led and are sustainable long term through community ownership. ➢ Sharing of expertise and local understanding of the unique hydrological situation in Hull. ➢ Sharing of best practices currently used in flood risk management in a wider context. ➢ Partnership working between different RMAs.

	• Play an active role in the Humber resilience forum. • Maintain communication with emergency planners.	➢ Effective and efficient partnership working with emergency planners and responders to plan for current and future flood risk.

Table 5 - aim 5: deliver flood alleviation schemes to better protect communities, homes, businesses, and land in Hull

Objective	Measure	Outcome
a) Improve the physical environment by creating multi-benefit spaces across the city that include flood alleviation schemes.	• Identify sites within the city suitable for flood alleviation schemes in relation to specific sources of flood risk. • Utilise HCC owned land to adapt green spaces into multi-purpose spaces, including the construction of surface water storage areas, such as AquaGreens.	➢ Co-created flood schemes, which the community take ownership, utilise, and help maintain. ➢ Installation of PFR and the take up of SuDS in gardens / communities.
b) Work in partnership to deliver flood alleviation schemes. c) Incorporate flood risk management into wider policies and strategies delivered by HCC, such as Climate Change, Open Spaces, Housing and Highways Strategies or plans.	• Sustainably manage 'ordinary watercourses' to maximise flood risk management and environmental benefits. • Co-ordinate project capital and maintenance programmes with ERYC, EA, and YW. • Seek and secure funding contributions to deliver flood alleviation schemes.	➢ Increased opportunities for funding for flood alleviation schemes, which deliver multiple benefits. ➢ Partnership working between different RMAs. ➢ Application of an integrated approach to flood risk management.

d) Create a maintenance plan to manage flood risk management assets.	• Utilise the Living with Water Partnership to collaborate maintenance programmes. • Create a rolling maintenance schedule to keep assets in good condition. • Work with other RMAs to align maintenance programmes. • Explore options of using nature-based solutions instead of traditional maintenance techniques.	➢ A city-wide joined up maintenance programme. ➢ Maximising the potential for nature-based solutions for flood and ➢ climate resilience.
e) d) Ensure designated sites of nature conservation importance are protected	• Where relevant, undertake habitat regulations assessments if there is a likelihood that proposals arising from the Hull FRMS (and other relevant plans or projects) may affect designated site(s).	➢ Protect the integrity of the National Site Network by implementing any necessary mitigation and compensation measures.

Implementation

This strategy sets out the Councils approach to address flood risk management in Hull over the next 6 years. There are many measures needed to achieve the outcomes of each strategic aim to build long term and sustainable flood resilience across the region. Some measures require action that exceeds the 6-year plan provided in this strategy, especially measures associated with adaptation to climate change, and so these measures will be included in future LFRMS reviews and updates.

A list of projects proposed to be completed between 2022 – 2028 is included in Appendix 6. These projects incorporate above ground structures, such as pumping stations, nature-based solutions, and innovation. The projects have been developed within timeframes which match the Governments investment period for the main source of FDGiA, and also Ofwats AMP cycle. Appendix 6 provides information on the projects completed between 2015 – 2021 along with the costs and sources of funding.

Most of the projects proposed in Appendix 6 have been developed in partnership with other RMAs and so funding has already been identified and allocated. Most funding for flood risk management schemes is sourced from the Government in the form of Flood Defence Grant in Aid. Through the Living with Water partnership, funding has been allocated through Ofwat to fund retrofitting SuDS across the city to reduce the risk of surface water and sewer flooding. When required, additional sources of funding are sought after, especially for schemes that deliver multiple benefits in addition to reducing local flood risk. A summary of additional sources of funding is provided in Appendix 2.

Monitor and review

This document supersedes the previous LFRMS for Hull, which was published in 2015. This updated strategy will have an interim review and update in 2025 and a full review and update in 2028. HCC will continue to work to apply for funding to carry out the schemes proposed to achieve the outcomes listed in Tables 1-5.

4. Flood Risk Management Plan

Overview

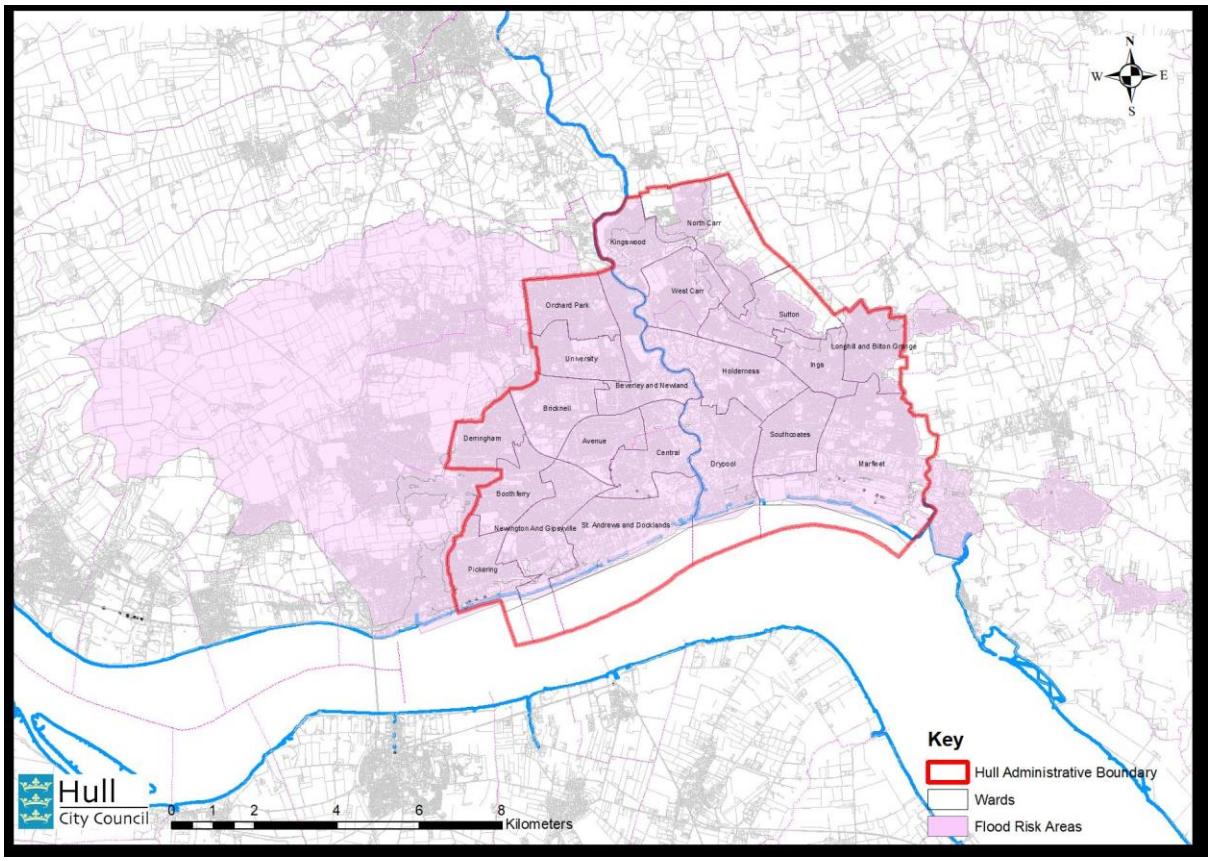
Hull is 1 of 63 designated flood risk areas in England at significant risk of flooding from surface water. This flood risk management plan outlines how HCC plans to manage the risk of surface water flood risk for the people, economy, and environment in Hull.

Hull is also 1 of 116 designated flood risk areas at significant risk of flooding by rivers and the sea. The EA are responsible for preparing a FRMP to outline how they plan to manage this. This can be found in the Humber FRMP.

HCC have prepared the following documents to help manage surface water flood risk:

- Surface Water Management Plan
- Strategic Flood Risk Assessment
- Preliminary Flood Risk Assessment

Hull & Haltemprice flood risk area



Summary of the flood risk area map:

- The flood risk area of Hull and Haltemprice covers most of Hull, a large part of East Riding of Yorkshire on the western side of the city, and a smaller area of East Riding on the east side of the city.
- The flood risk area reflects the topography and integrated surface water flood risk as described in Appendix 3.
- The largest surface water flood event in Hull happened in June 2007.

Measures

The aims, objectives, measures and outcomes set out in Tables 1 – 5 include managing the risk of surface water flooding along with all other sources. However, to comply with the Flood Risk Regulations 2009, a specific set of measures have been created for surface water flood risk.

The first set of measures were created during the production of the first cycle of FRMPs in 2015. Some of these measures are now complete and others are ongoing. All measures are set out below and were created in partnership with other RMAs. The ongoing and new measures will be incorporated into local flood risk management and will be ongoing over the next 6 years and longer if required (2022 – 2028).

COMPLETED MEASURES

- ✓ Work in partnership to develop and publish the River Hull Integrated Catchment Strategy:
  - A multi-agency catchment scale strategy to address flood risk in the River Hull catchment.
- ✓ Update and publish a Strategic Flood Risk Assessment to provide guidance to developers on site-specific flood risk issues for planning applications, and to help inform HCC on the allocations of sites in the Local Plan.
- ✓ Provide guidance documents to help developers deliver sustainable drainage solutions through the planning system:
  - Drainage impact assessment guide
  - Sustainable drainage guide
  - Living with Water supplementary planning document.
- ✓ Create policies in Hull's Local Plan for water management:
  - Policy 37 Flood Defences
  - Policy 38 Surface Water Storage and Drainage
  - Policy 39 Sustainable Drainage
  - Policy 40 Addressing Flood Risk in Planning Applications
  - Policy 41 Groundwater Protection.
- ✓ Support the delivery of the EA's medium-term plan 2015 – 2021 (see full list completed schemes in appendix 3).
- ✓ Strengthen preparedness for response
  - Better understand local communities' awareness and preparedness for flooding
  - Set up a pilot flood warden group in Sutton
  - Encourage communities to create personal flood plans and make flood kits (see appendix 5 for tips on preparing for a flood).
- ✓ Update asset register (see appendix 2).

ONGOING & NEW MEASURES

Hull City Council	- to explore options for surface water flood risk improvement schemes utilising SuDS;
	- to incorporate flood risk management into policy planning (SFRA that guides people, builders and developers);
	- to implement community outreach considerations, including flood buses with key stakeholders and use of social media outlets.
Environment Agency	- continue to improve and expand flood warning service;
	- continue modelling, research and investigations to improve flood risk understanding and capital investment needs;
	- explore options for flood risk improvement schemes;
	- work with Humber Local Resilience Forum (LRF) to continue to manage and improve emergency plans and implementation through training and exercises;
	- work in partnership with RMAs and other organisation to explore flood risk improvement options that also have environment and socio-economic benefits;
	- continue to review maintenance procedures for existing assets.
Living with Water	- work with the Yorkshire Pathfinder project and continue to implement Living With Water interventions;
	- improve community engagement and communication between organisations by sharing knowledge, best practice and information.

5. Working towards a resilient future

In Hull, people are at the heart of driving change. Over the coming years, a big part of our approach to flood risk management will be to change people's perceptions about water. There are many ways to communicate flood risk and so we are using innovative ways to do this. Partnerships are an important part of what we do, and as well as the Living with Water partnership we have many great examples of partnership working on a local and a global scale.

Engagement	within the community to increase personal flood resilience;
	through schools to educate the climate champions of the future;
	with stakeholders to bring together industries, such as insurance, to improve flood recovery.
Research	monitoring and collecting local environmental data;
	leading and supporting research projects;
	exchanging knowledge with global partners.
Projects	delivering nature based solutions to support wider environmental objectives;
	promoting a better relationship between people and the environment;
	constructing new and maintaining existing flood alleviation schemes to reduce local flood risk.

Engagement

Community engagement is an important part of communicating flood risk because:

- it helps to find and share local knowledge to improve our understanding of local flood risk;
- it brings communities together;
- we can support local flood community champions;
- we can offer advice on becoming more flood resilient.

Visiting schools and offering flood-themed lessons and activities helps to teach children about flood risk. Engagement with schools is important because:

- it provides the opportunity to link up research projects with learning activities;
- it enables schools to be more resilient to flood-related events, therefore less disruption for children's learning and education;
- it provides children with the skills, knowledge and expertise around water management and climate adaption, which help not only in their personal lives but also with future training and careers;
- we can support local schools with flooding and flood-related learning resources;
- it promotes a positive relationship between children and the environment;

- it teaches children about the risks of water;
- children share what they've learnt with their parents;
- today's children will be the future's flood champions.

Flood Snakes & Ladders

- using flood stories from local children in Hull to teach about the impacts of flooding

Economic and Social Research Council

CUIDAR
Cultures of Disaster Resilience among children and young people

Lancaster University

Stakeholder engagement is another important part of communicating flood risk because:

- it helps us to identify gaps between industry and communities;
- it allows us to feed into the way industries, such as insurance, deal with flood recovery;
- it brings together different industries to support interdisciplinary approaches to flood risk management.

Examples of stakeholder engagement include:

Workshops with the insurance industry & planners

Royal Institute of British Architects design competition

The Waterline Summit

Research

Research helps us to better understand local flood risk and learn about new ways to approach flood risk management. HCC leads, supports, and shares research with many organisations with the aim of working towards a more resilient and sustainable future. Some examples include:

- Living with Water baseline survey
  - To understand local understanding and levels of flood resilience.
  - Recommendations from the survey include more community engagement and sharing of information and resources; and supporting the most vulnerable people before, during and after a flood event.
- The University of Hull
  - Supporting research through a Masters degree in Flood Risk Management and Living with Water PhD cluster at the Energy and Environment Institute - themes of research include natural flood management, flood prediction and local flood histories.
  - Develop and support research projects including Risky Cities, Water Cultures, Mapping Flood Recovery Gaps, SuDS*Lab*-UK, On the Edge, INSECURE and Ark – National Flood Resilience Centre.
  - Flood Innovation Centre – a centre focused on flood-related research to help local small-medium businesses develop flood-based products.
- Yorkshire Pathfinder Project
  - working with partners and communities across Yorkshire to raise awareness of local flood risk
  - promoting flood resilience measures, including property flood resilience
- Yorkshire integrated catchment solutions programme (iCASP)
  - Approaching flood risk on a catchment scale in Yorkshire
  - Research projects in Hull include catchment telemetry integration
- City Water Resilience Framework
  - Hull was 1 of 5 global cities chosen to explore the water related shocks and stresses that cities face.
  - The framework identifies ways to promote resilience and barriers preventing resilience.

- Smart Cities
  - Hull is one of the first cities in the UK to have its own Smart City platform that will connect, centralise, and distribute real-time information in a simple and secure way. This will allow information and data collected to be used more efficiently and effectively.
  - The centralised platform will bring together different datasets including real-time environmental information, such as weather forecasts, flood warnings and river levels, from Council owned assets as well as open access data from other agencies. The platform combines all the information into a single viewing platform, which will improve decision making and help drive future flood risk management policy.

Global outreach is also an important way to share knowledge and expertise. Hull has a twin city in Freetown, Sierra-Leonne, which has been badly affected by flooding in recent years. To help share flood risk management approaches our flood experts visited Freetown to share knowledge and experience with planning and disaster management teams on how to better protect, invest and prepare for flood risk.

Hull has also hosted international delegations, including officials from the County Administrative Board of Västra Götaland, Sweden. This visit allowed Swedish officials to understand flood risk management in England and compare it with Sweden. Equally, Hull flood officers were able to learn more about flood risk management in Sweden.

Glossary

Adaptation – take appropriate action to prevent or reduce the likelihood and impacts of flooding, both now and in the future. Adaptation saves money, time and lives later.

Aquagreen – a type of engineered nature-based solution to manage surface water flood risk by storing surface water above ground. Aquagreens are typically bunds and swales, which are planted, to enhance an areas aesthetic and amenity value for local communities, enhance biodiversity and improve water quality.

Asset register – a map showing flood risk management assets.

Build back better - re-building properties, businesses and infrastructure after a flood or coastal change event in a way as to reduce future damages and improves resilience, rather than putting back what was there before.

Capital investment – money available for funding new flood alleviation schemes.

Carbon sequestration – soaking up carbon from the atmosphere and storing it.

Catchment - the area from which precipitation contributes to the flow from a borehole spring, river or lake. For rivers and lakes this includes tributaries and the

areas they drain. In river basin management this can refer to larger management catchments and smaller operational catchments.

Climate change - the large-scale, long-term shift in the planet's weather patterns and average temperatures.

Critical infrastructure - infrastructure which is considered vital or indispensable to society, the economy, public health or the environment, and where the failure or destruction would have large impact. For example, hospitals, schools, main roads, and utility services.

Culvert – a section of watercourse that has been moved underground using pipes.

Flood defences/ infrastructure - a flood or coastal defence which contributes to a reduction in flood risk and can include flood and sea walls and embankments, pumping stations, upstream flood storage areas, natural features like river channels, as well as structures like sluices, harbour walls, trash screens or culverts.

Flood and coastal erosion risk management (FCERM)- managing the risk of flooding and coastal erosion to people, property and the natural environment through minimising, predicting, and managing the risk.

Flood risk – the probability of an event happening and the impact of it occurring.

Flooding - a natural event where there is an overflow of water from the ground, river, or the sea, or where there is a build-up of water from run-off in urban or rural areas.

FloodRe - a joint initiative between the Government and insurers aiming to improve the availability and affordability of flood insurance for households at high flood risk.

Environmental net gain - an approach to development that aims to leave the natural environment in a measurably better state than it was in before the development. Net gain is an umbrella term for both biodiversity net gain and wider environmental net gain. The aim of wider environmental net gain is to reduce pressure on and achieve overall improvements in natural capital, ecosystem services and the benefits they deliver.

Flood Risk Regulations (2009) - regulations which transpose the European Floods Directive (2007) into UK law. The aim of the regulations is to reduce the likelihood and consequences of flooding.

Flood risk management plan (FRMP) - Flood risk management plans explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs. They also set out how risk management authorities will work with communities to manage flood risk over a 6-year cycle.

Index of multiple deprivation - statistics on relative deprivation per areas in England.

Innovation – the practical implementation of ideas that result in an improvement.

Investment - the funding of flood and coastal defences and maintenance of river channels. In the context of this strategy, it also refers to funding or improving other measures such as natural flood management, and the preparedness to help communities recover after a flooding or coastal event.

Local authority local plan - a plan that sets out the local planning priorities and policies for an area, prepared by the local planning authority (LPA), usually the council or the national park authority.

Local enterprise partnerships (LEP) - a locally owned partnership normally between local authorities and businesses. They play a role in deciding local economic priorities and undertake activities to drive economic growth and create local jobs.

Local resilience forum (LRF) - local resilience forums are multi-agency partnerships made up of representatives from local public services, including the emergency services, local authorities, the NHS, the Environment Agency, and others. These agencies are known as Category 1 Responders, as defined by the Civil Contingencies Act.

Main rivers - rivers which are shown on the Main River Map. They are usually the larger rivers and streams. The Environment Agency are responsible for carrying out maintenance, improvement, or construction work on main rivers to manage flood risk.

Natural flood management (NFM) - the use of natural processes to reduce the risk of flooding or coastal change. For example, by restoring bends in rivers, changing the way land is managed so soil can absorb more water and creating saltmarshes on the coast to absorb tidal wave energy. It is one of the nature-based solutions which can be used in conjunction with more traditional engineering techniques.

Nature based solutions – the use of natural processes to deliver multiple environmental benefits, including flood risk using NFM and other benefits, such as biodiversity and water quality.

Ofwat - Water Services Regulation Authority for England and Wales.

Ordinary watercourses - rivers not on the EA Main River Map. Lead local flood authorities, district councils and internal drainage boards are responsible for carrying out flood risk management work on ordinary watercourses.

Partnership funding - Defra's current policy which provides a system of funding that applies to FCERM projects seeking central government funding in England. The main objective of partnership funding is to offer communities the opportunity to invest in and benefit from local FCERM measures, that could not be afforded from central government funding alone.

Property flood resilience (PFR) - measures people can take to help keep flood water out of their home or business; or limit the damage if it does. Examples include flood gates over doors, tiled floors or raised plug sockets.

Resilience - the capacity of people and places to plan for, better protect, respond to, and recover from flooding and coastal change. Places can achieve this by making the best land use and development choices, better protecting people and places, responding to and recovering from flooding and coastal change whilst all the time adapting to climate change.

Revenue – this is an income that can be used to fund the maintenance of capital schemes.

Riparian landowners - people who own a stretch of watercourse that runs on or under their land; or is on the boundary of their land, up to its centre. Riparian landowners have legal responsibilities for the stretch of watercourse they own.

River basin management plan (RBMP) - plans, developed by the Environment Agency, which set out how organisations, stakeholders and communities will work together to improve the water environment.

Sustainable drainage systems (SuDS) - approaches to manage surface water that take account of water quantity (flooding), water quality (pollution) biodiversity (wildlife and plants) and amenity are collectively referred to as SuDS. SuDS mimic nature and typically manage rainfall close to where it falls. SuDS can be designed to transport (convey) surface water, slow runoff down (attenuate) before it enters watercourses or drainage systems. They provide areas to store water in natural contours and can be used to allow water to soak (infiltrate) into the ground or be evaporated, lost, or transpired from vegetation (known as evapotranspiration).

Telemetry – the remote collection of data for monitoring, such as water levels within watercourses.

UK Climate Change Projections (UKCP18) - climate predictions produced by the Met Office which provides the most up-to-date assessment of how the climate of the UK may change over the 21st century.

Unitary authorities - a type of local authority which is responsible for providing the local services across the whole of a county or borough. The three main types are, unitary authorities in shire areas, London boroughs and metropolitan boroughs.