



# LOCAL FLOOD RISK MANAGEMENT STRATEGY 2022 – 2028

Appendix 4 Flood adaptation and resilience



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## Overview

Hull is at risk from many water-related shocks and stresses. As part of the Council's response to the increasing risk of flooding, we are continually finding new ways to adapt and become more resilient. A growing challenge we face is developing and growing as a city whilst managing flood risk and mitigate the impacts of climate change. It will not be possible to prevent all flooding from happening, but we can improve our resilience to it through adaptation.

Flood adaptation and resilience will:

- Build long-term sustainable solutions to reduce flood risk
- Work with water to gain the benefits of it rather than working against it
- Make space for water to reduce the risk of flood water entering people's homes
- Reduce the effects of flooding on people's lives, homes, businesses, and the natural environment
- Reduce recovery time after a flood.

## Flood infrastructure

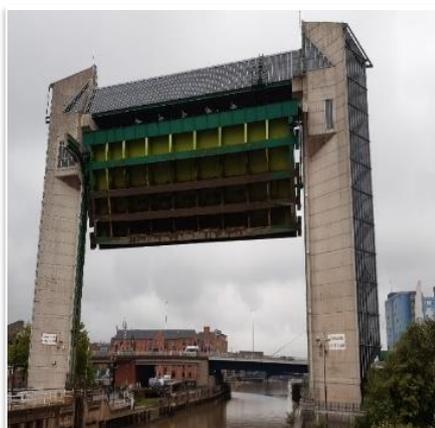
There are a wide range of measures used to manage local flood risk, including:

- above ground structures, such as barriers, walls and embankments
- underground structures, such as culverts, screens and gullies
- sewers and pumping stations
- sustainable solutions, including nature-based solutions and sustainable drainage solutions
- property flood resilience such as flood doors, air brick covers and flood proof construction techniques
- innovation to improve understanding of flood risk, such as research projects or surveys.

A list and map showing all the existing flood risk management assets in Hull, including the RMAs responsible for managing them is provided in appendix 5.

Each type of flood infrastructure is typically designed to reduce the risk of flooding from one specific type of flood risk for a specific standard of protection. For example, the tidal barrier is designed to reduce the risk of tidal flooding for a 1 in 200-year event / 0.5% AEP. However, given the increasing risk of flooding, flood assets are being looked at to see if they can be used differently to also manage other sources of flood risk. This includes looking at the potential for traditional flood defences to deliver multiple environmental benefits as well as flood risk benefits.

Hull tidal surge barrier



Bransholme pumping station



River Hull defences



Aquagreens



## **Maintenance of flood infrastructure**

Maintenance of flood risk assets is important to make sure that the assets are performing as they should to keep the flow of water moving, or to hold water in locations where minimal damage will occur. If assets are not maintained then they are likely to deteriorate into a state of disrepair, which would lead to costly replacements. Each RMA has maintenance programmes for the assets they are responsible for.

HCC is responsible for the maintenance of:

- ordinary watercourses in the city
- watercourses that run alongside land owned by HCC, which makes HCC the riparian owner
- assets that HCC have entered an agreement with other RMAs
- sections of main rivers that HCC have culverted.

A rolling maintenance scheduled is used to maintain HCC flood risk assets, including:

- ✓ Once a month each watercourse is inspected to check for blockages.
- ✓ Twice a year, each watercourse has the vegetation along the banks cut back
- ✓ Where practical, after vegetation has been cut back, wildflower seeds are planted along the top of the riverbanks to promote a thriving area for wildlife.
- ✓ Watercourse works are planned to avoid bird-nesting season to minimise the disruption to established habitats, and where it's possible, an area of refuge is left for animals.
- ✓ To allow for remote monitoring of assets, CCTV and telemetry helps to detect any blockages or abnormally high-water levels.

As well as the rolling maintenance programme, additional maintenance is carried out if:

- A weather warning is issued – trash screens are inspected to make sure there are no blockages preventing water from being conveyed through the drainage system.
- A telemetry alarm is triggered then the watercourse is inspected.
- An incident of fly tipping is reported within HCC managed watercourses that poses a flood risk.

## Flood alleviation schemes

Over £220 million has been spent on flood infrastructure through partnership working to reduce the risk of flooding and improve resilience in Hull between 2015 - 2021. Below is a summary of completed schemes.



### Albert Dock Wall

- Led by Environment Agency
- 1km of increased flood wall height
- Cost £6 million
- Funded by FDGiA and LGF
- Benefitting businesses along the Humber Estuary from tidal flooding



### Property Flood Resilience

- Led by Hull City Council
- PFR installed at 4 homes in the city
- Cost £25,000
- Funded by FDGiA and HCC
- Benefitting homes from multiple sources of flooding



### River Hull natural flood management study

- Led by Hull City Council
- Feasibility study to determine opportunities for NFM measures in the River Hull catchment to reduce the risk of river flooding from the River Hull
- Cost £92,000
- Funded by FDGiA

© Environment Agency



### River Hull defences

- Led by Environment Agency
- Over 3km of improved flood defences
- Cost £62 million
- Funded by FDGiA, LGF and ERDF
- Reducing risk of river flooding from the River Hull



© Environment Agency

### Humber Hull frontages

- Led by the Environment Agency
- 7km of higher flood walls and improved flood gates
- Cost £42 million
- Funded by FDGiA and Highways England
- Reducing the risk of tidal flooding from the Humber Estuary



### Hull Aquagreens

- Led by Hull City Council
- 7 new Aquagreens built across the city
- Cost £200,000
- Funded by HCC, Yorkshire Water, Local Levy, EA Environment Programme
- Reducing the risk of localised surface water flooding



### Improved access to maintain assets

- Led by Hull City Council
- 3 new safe working access platforms installed
- Cost £80,000
- Funded by FDGiA
- Reducing the risk of river flooding from ordinary watercourses

© East Riding of Yorkshire Council



### Surface water storage areas

- Led by East Riding of Yorkshire Council
- 3 large schemes with numerous storage lagoons
- Cost £57 million
- Funded by FDGiA, ERDF and LGF
- Reducing the risk of surface water flooding in Hull

© Yorkshire Water



### Bransholme pumping station

- Led by Yorkshire Water
- capable of pumping large amounts of surface water into a storage lagoon to reduce pressure on the sewer system
- Cost £16 million
- Funded by Yorkshire Water
- Reducing the risk of sewer flooding in east Hull