

# The Environment

February 2022

**CIWEM**

THE MAGAZINE FOR THE CHARTERED INSTITUTION OF WATER AND ENVIRONMENTAL MANAGEMENT

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# GREEN SPACES WILL PROTECT BRADFORD FROM FLOODS



Bradford's deculverting scheme



The northwest metropolitan district is no stranger to extreme weather and flooding after storms. Nature-based solutions will help to defend the area against climate-related impacts. **Saira Ali** reports

**M**any factors contribute to flood risk across Bradford district. Water flows overland after short, sharp bursts or prolonged rain, which also swells local rivers and watercourses. That brings risk of fluvial, surface water, groundwater and sewer-related flooding, adding to residual risk from canals and reservoirs.

Some floods stem from one or more source. In recent years, storms Eva, Desmond, Ciara and Dennis have flooded

parts of Bradford. More frequent impacts from climate change force Bradford district to prepare for more and worse to come.

The challenge is shoring up Bradford district's ageing traditional drainage networks to withstand more frequent heavy rains. Nature-based solutions (NBS) can improve local flood resilience – and deliver multiple additional benefits.

Well-designed NBS supports people's mental and physical health, encouraging them outdoors. It brings together diverse

## BRADFORD, TOPOGRAPHY

**LOCATION** West Yorkshire, on the edge of the Pennines

**SIZE** UK's sixth-largest urban district by population at 542,000 people

**AREA** 370 sq km, spanning Airedale, Wharfedale and Worth valleys

**HABITATS** South Pennine moors is known for its flora and fauna. More than 70 per cent of the district is green space

**HYDROLOGY** The catchment spans the rivers Aire, Calder, Wharfe and Lower Ouse, steep slopes rising above flat valley floors – geography that explains why the area is so vulnerable to flood.

communities, regenerating deprived areas, attracting wildlife, and creating defences against climate change that enrich people's lives and support a strong, sustainable economy.

**Local people refer to Bradford Beck as Mucky Beck, reflecting centuries of post-industrial pollution**

### TOP OF TOWN

Bradford's Victorian legacy is evident across its urban areas, a large network of combined sewers conveying waste and surface water to treatment works. Their combined sewer overflows (CSOs) discharge excess flows into local watercourses and surface-water systems.

Overwhelmed sewers present the most common risk of flooding in many urban areas. However, watercourse connectivity, sewer capacity and poorly maintained highway gullies all contribute to surface-water flood risk.

Bradford's city-centre Transforming Cities Plan and Top of Town project aim to tackle this, replacing some road gullies with sustainable drainage systems (SuDS), using rain gardens and tree pits to manage surface-water runoff more sustainably.

Reducing surface-water runoff aims to ease pressure on Bradford's combined sewers during storms, reducing sewage discharge from CSOs into Bradford Beck and improving the catchment's water quality, amenity and biodiversity. Attractive new semi-mature trees add new habitats and wildlife areas to the city.

Top of Town is funded by Bradford City Council and the European Structural and Investment Funding programme, administered by the European Regional Development Fund. Extra money from Bradford city centre's Townscape Heritage scheme and the National Lottery's heritage fund will restore and improve public spaces.

Top of Town includes a new urban village of 1,000 homes. Better landscaping will make this more attractive. This proves that sustainable development is not just for new developments – it improves and celebrates existing districts and their cultures, making these more attractive to traders and shoppers.

Bradford is also deculverting a section of Bradford Beck, which crosses the city to the River Aire at Shipley.

Built over in the 19th century, the beck is culverted to the edge of the city centre, flowing along a brick-lined channel to Shipley, a dilapidated culvert covering it again at Shipley Fields. After centuries of post-industrial pollution, local people know it as Mucky Beck.

Initial deculverting plans sought to cut flood risk to homes in Shipley Fields, where the culvert had created a 20 per cent annual flood risk due to constricted flows and upstream blockages.

Although flood risk will only increase with climate change, the water-management benefits alone did not justify the scheme's costs. Bradford council needed to demonstrate multiple benefits to raise funds for the scheme.

Deculverting will improve the beck's water quality. Restoring its natural flow will boost ecology and biodiversity, encouraging migratory fish to return. Improving the river banks creates habitats that boost biodiversity, creating a green corridor for wildlife.

That green corridor provides an ecological connection between the Calder and Aire valleys, boosting West Yorkshire's wildlife-habitat network. Planting new trees will absorb carbon and provide flood protection – vital to protect ourselves against climate change.

Finally, realigning the beck will support the Bradford to Shipley transport-fund scheme. This aims to cut traffic and road congestion, cutting air pollution to benefit public health.

### COSTINGS

Interreg BEGIN used Ciria's BEST benefits-assessment software to estimate the financial value of using NBS-led approaches to deliver a cleaner, greener more resilient and inclusive Bradford.

This weighed up different SuDS options and ways to enhance the highway scheme from daylighting the beck. BEST calculated a benefit-to-costs ratio of up to 2.5:1: a project that costs £4.2 million brings £10.8 million worth of added benefits, over and above the highway scheme.

West Bradford's Green-Blue Gateways project to improve junctions will deliver much-needed investment in SuDS and blue-green infrastructure, remodelling

## CHILDREN, GREEN SPACES AND HEALTH



**BRADFORD WANTS TO** find new ways to engage with local communities. How do local people feel about Bradford? What do they understand about health and wellbeing? How can we shape shared public spaces to enhance people's lives and benefit the environment?

Studies show that access to green spaces benefits people's health and wellbeing, particularly people from deprived social groups. And so improving green spaces – quantity, quality and access – can tackle health inequalities that hit people from deprived areas hardest.

We also want to value and include children and young people. We have developed projects with Bradford Institute of Health Research, the Active Bradford network and programmes JU:MP, Well Bradford, WYCA Streets for People and Better Place Bradford to link green spaces to local communities in ways that benefit children.

Better Place Bradford is a project involving Better Start Bradford. It encourages children to love being outdoors, to support their social, emotional and mental wellbeing. Solutions include adding natural play spaces to neighbourhoods and planting trees in gardens, public green spaces and along roadsides to cut air pollution. ◉

roadside verges and giving over redundant land for habitats.

Bradford's blue-green infrastructure projects explore multiple funding sources to generate the greatest outcomes.

Transforming Cities Fund (TCF), National Lottery money and EU funding has boosted public funds, scaling up



what the city can demonstrate this achieves. The challenge has been to work across departments and organisations, breaking down the silo mentality. An integrated approach can deliver high-quality urban design and identify new opportunities for NBS.

We need partnerships to adapt our city to climate change, boost biodiversity and create habitats in ways that support other projects and strategies across the district. This is essential, to create stepping stones of green spaces across Bradford and beyond.

A cleaner, greener, more resilient and inclusive Bradford means addressing some major challenges; improving health



outcomes particularly for children, tackling air quality, responding to the climate emergency, creating stronger communities, and levelling out social inequalities. Green-blue infrastructure supports all of these aims. ●

*Saira Ali is team leader for landscape, design and conservation for City of Bradford Metropolitan District Council's Department of Place. She was named 2021 Ciria SuDS champion rising star and winner of RIBA's Future Place programme*

## BRADFORD'S BLUE-GREEN CHALLENGES

**BRADFORD COUNCIL'S EU** Life-critical project looks at climate-change mitigation in a local park, finding new ways to engage local people to co-create solutions. The partners include Friends of Horton Park, Bradford University and researchers from Bradford Health Research Institute.

Managing, improving and enhancing our existing green spaces, identifying new opportunities and setting priorities demands a strategic approach. This also supports bids for funding and directing resources to those most in need.

It can be tricky to deliver green-blue spaces to the high-density, inner-city neighbourhoods that need them most – that include some of the country's most deprived wards, that lack access to good-quality outdoor public space.

Building viable developments in these areas is already a challenge. House prices are generally low. To deliver green-blue spaces Bradford Council and national and regional public agencies must work in partnership to enable new projects.

We need to understand districts' wider green-blue networks and improve existing streets to give local people safe and easy access, to promote active travel to and from existing spaces. These things are starting to happen.

Acting on evidence set out in the Intergovernmental Panel on Climate

Change's Special Report on Global Warming of 1.5°C of October 2018, Bradford council declared a climate emergency in January 2019.

Bradford sees clear links between economic recovery and creating a lower-carbon future. And so its spatial priorities focus on green infrastructure; biodiversity, open spaces and homes, workplaces and neighbourhoods designed to support clean growth.

One challenge with blue-green infrastructure is maintenance, and who pays for it. Local authorities always struggle to fund large capital-investment schemes but because blue-green assets offer multiple benefits, it can be tricky to work out which public service – and so whose budget – pays to maintain them.

For example, a successful city-centre rain garden takes surface water from the highway, reduces surface water and local flooding of sewers, makes the area look more attractive and create new habitats that attract species and create wildlife corridors to other green spaces.

Given how all these benefits support so many organisations' objectives, who should pay for the upkeep? And so Bradford is creating a new funding stream for nature-based solutions. Pressure on local authority budgets means finding creative new ways to amass the funds.

Perhaps what we really need is to secure funding from new developments

to provide new open spaces and improve existing ones. This needs to be a priority to expand, manage and maintain our green-blue spaces.

Bradford council has produced a South Pennine Moors supplementary-planning document that identifies ways to provide alternative natural greenspace and improve existing areas with better management and visitor access.

This sets out a mechanism to calculate what planning contributions to secure from new developments to manage and mitigate impacts on green spaces. It provides guidance for applications covering all zones of influence.

One way the district can respond to environmental challenges is by highlighting the importance of protecting trees and woodland, and how planting in new developments can support this.

Integrating and protecting trees and woodland within a development's design and layout can help to make nature a priority and allow diverse ecosystems to flourish, while helping to adapt to and mitigate climate change.

In a similar way, green infrastructure can hold and store water in areas at risk of flooding. The council's Strategic Flood Risk Assessment supports this view. Creating space for water manages flood risk, improves water quality, creates access to waterways, supports regeneration, creates wetland habitats and improves the landscape for work, rest and play. ●

# EVEN TS

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