

**“This flood defence project in Hexham highlights the clear sustainability benefits which can be achieved when clients and contractors work in partnership, in this case engaging to help understand the benefits and reduce the concrete carbon footprint of the Environment Agency. The testing comparisons will help build confidence in these new products.”**

Robert Gossling, former head of commercial engineering solutions at Tarmac

**Solutions**

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## Sustainable Construction

### Hexham Flood Alleviation Scheme

**In a UK first, Tarmac worked with BAM and the UK’s Environment Agency to successfully trial the use of two low carbon concrete mixes in permanent works at the Hexham Flood Alleviation Scheme in Northeast England.**

The Hexham Flood Alleviation Scheme, which installed approximately 600m of new flood walls and grass embankments, was introduced to reduce the flood risk posed by the River Tyne. In December 2015, during Storm Desmond, approximately 90 properties were flooded from the River Tyne, and with the future risks posed by climate change, it is essential to build defences to prevent future damage. However, it is also vital that we develop sustainable solutions that tackle the effects of climate change while minimising the emissions we generate.

A duo of ultra-low carbon concretes, developed by Tarmac to new specifications and compressive strength class C32/40, now form the base and walls of a new flood defence structure designed to protect the town and mitigate against flood damage.

The trial was delivered and funded by the Environment Agency’s Collaborative Delivery Framework Hub A, a collaboration between the Environment Agency, Arup, and BAM, as part of a wider project to deliver flood defence schemes across Northeast England.

The culmination of an 18-month project, from planning to delivery, it is the first time that low carbon concretes developed by Tarmac have been used in permanent works. Both mixes offer a significant reduction in CO<sub>2</sub> emissions per cubic metre of concrete delivered to site. The concretes were manufactured at nearby Tarmac readymix concrete



plants in County Durham and Teesside and were tested for fresh and hardened properties, as well as a number of longer-term durability tests.

The flood defence scheme at Hexham was completed in summer 2023 and will be monitored via a rigorous testing regime, to demonstrate the long-term durability and suitability of the concrete mixes. The data collected will also provide further insights into the future use of low carbon solutions.

If successful, trials of new ultra-low-carbon concrete alternatives will enable future Environment Agency flood defences to be built more sustainably, with lower embodied carbon. They will also support the delivery of new sustainable concrete products to the wider construction industry.

Robert Gossling, former head of commercial engineering solutions at Tarmac, said: “Against the backdrop of a climate emergency, the use of these mixes marks another important step for the UK concrete and cement industry along its path to net zero. We’re committed to demonstrating innovation in low carbon solutions, and we hope that the success of this trial will help accelerate adoption of this and other types of new, sustainable concretes – delivering long-term benefits for the industry.”