Defra Floods Competition

A Dutch Approach:

Integrated solutions…

…Through collaborative partnership…

…Based on advanced modelling

The floods in the UK in the winter of 2015/16 created a strong sense of sympathy from the Dutch public with the suffering communities. Dutch society's ongoing sense of urgency drives continuous evolution of approaches, methods and tools for flood management. These approaches cannot simply be copy-pasted to the UK: it is not a matter of simply 'bringing in the Dutch'. However, we believe Dutch approaches can inspire, and if translated appropriately to the UK context, they can support the development of solutions that work locally.

Our submission presents three elements of the Dutch approach to flood risk management: integrated solutions, developed through collaborative partnerships, and based on advanced modelling. We have applied these three elements to the Eden Catchment, with the aim of inspiring the Cumbria Flood Partnership and illustrating how these approaches could help develop solutions.

Royal HaskoningDHV
Enhancing Society Together

Nelen & Schuurmans

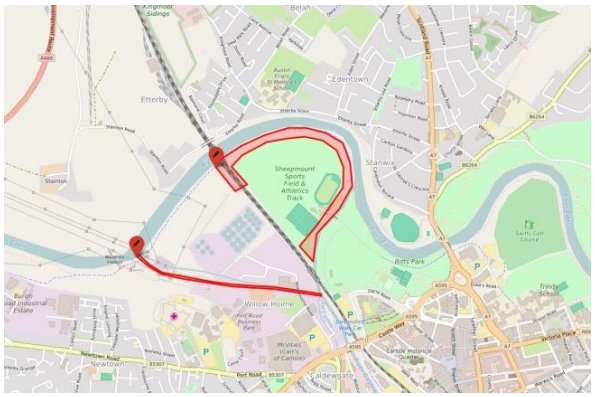
Deltares
Enabling Delta Life

TU Delft

Integrated solutions require a catchment approach, but also an ambition to achieve other objectives, within water management but also beyond. Dutch examples such as Lent and Zandmotor show that this can improve both flood risk management and spatial quality. For the Eden Catchment, it may be possible to turn some of Carlisle's challenges into opportunities. Initial assessment of the Willow Holme area suggests opportunities around critical infrastructure (water treatment works), heritage (the historic course of Hadrian's wall) and amenity (recreation grounds).

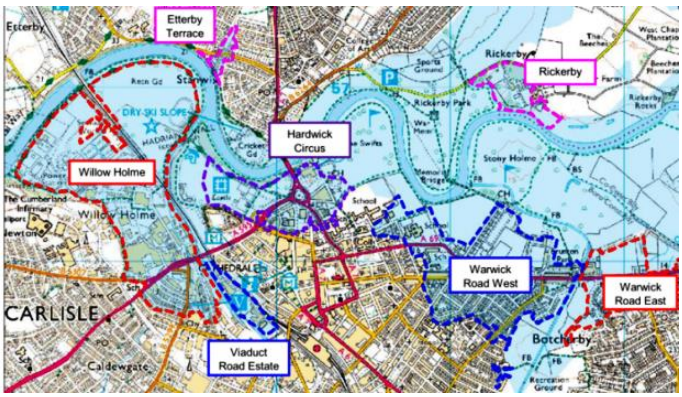
An integrated approach requires true **collaboration** from the outset. We present the MapTable tool which enables interactive collaborative optioneering. It translates modelling to a visual presentation of the risk and opportunity metrics that matter to a range of stakeholders: traditional metrics such as economic flood risk and households affected, but also the impact on critical infrastructure, and opportunity metrics related to recreation, habitats and landscape quality. This interactive process enables on-the-spot option development.

Drawing measures on the MapTable

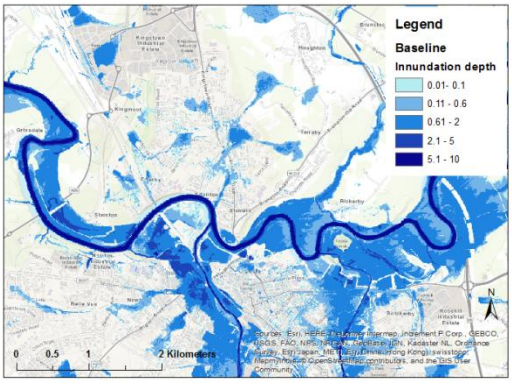


Application to Willow Holme, Carlisle

Interactive optioneering requires rapid advanced **modelling**. The 3Di modelling suite makes this possible because of its ultra-efficient structure, opening up new possibilities for visualisation and immediate scenario testing: a simulation of a six hour discharge event with two rain events for River Caldew and the relevant section of River Eden took only 3 minutes: this enables rapid interactive optioneering.



Flood extent of 5-6 December 2015 floods (Environment Agency, 2016)



Flood extent and depths as modelled in 3Di, Carlisle

We would welcome the opportunity to apply this approach in more detail to the Eden and other catchments.