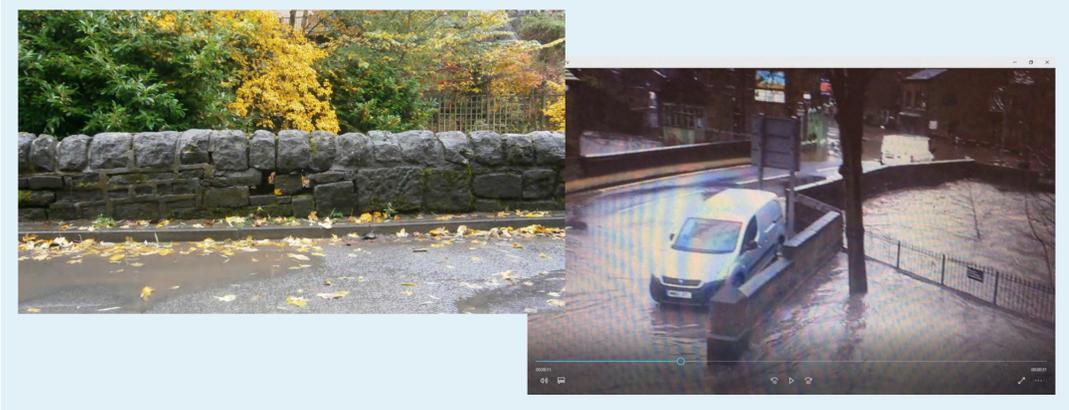


An Overview of River Modelling

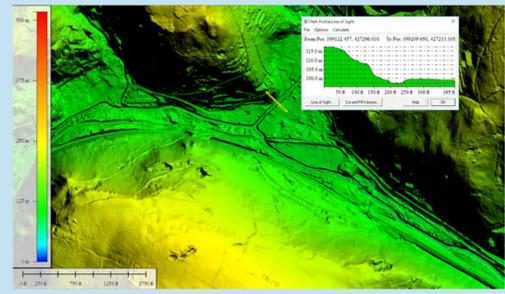
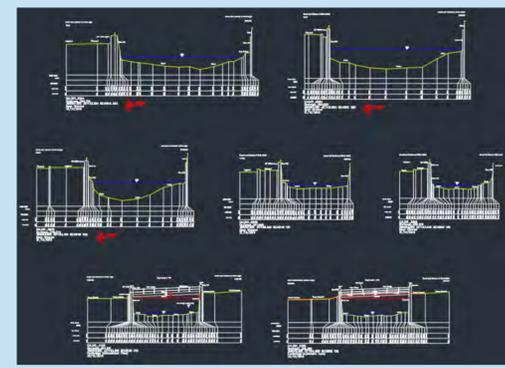
1. Understanding the problem

We determined the factors that influence flood risk by visiting the town, talking to local people and reviewing maps and other information relating to flooding including photos and videos of historic events.



2. Data Collection

Survey was undertaken to determine the dimensions of the river channel and structures such as bridges, weirs, culverts and walls.

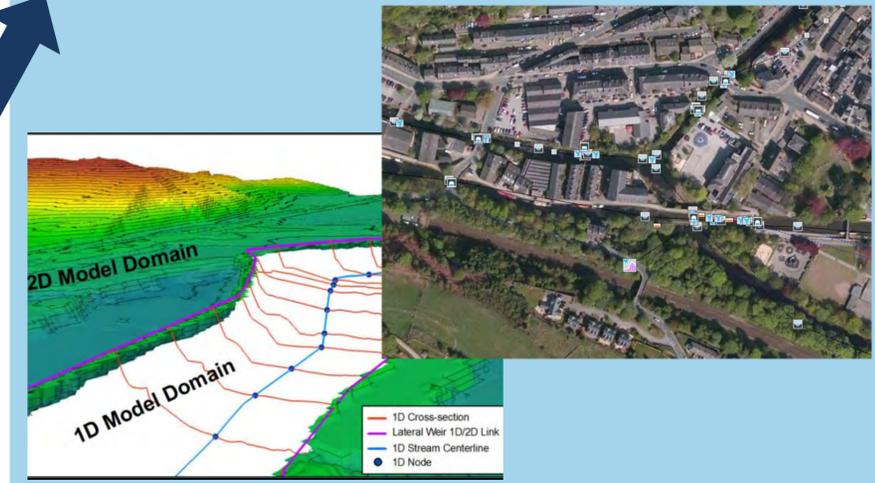


We obtained digital models of floodplain areas, to create 3D models of the ground. These are used to represent the shape and extent of floodplains.

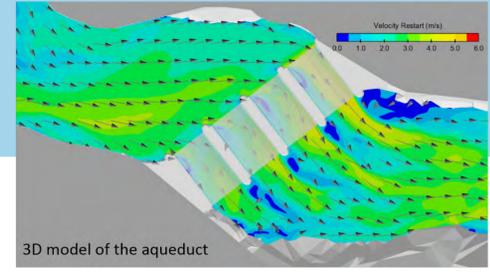
3. Define modelling approach and build models

We then used **two types** of river models to understand flood risk and assess options to reduce it on the River Calder and Hebden Water at Hebden Bridge.

The first model was a **1D-2D model** covering the River Calder, Hebden Water, their floodplains and the Rochdale Canal.



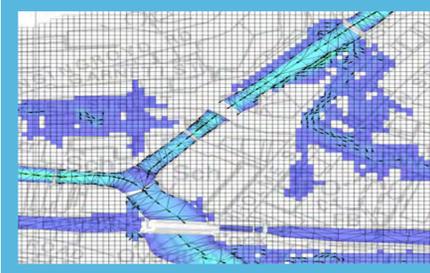
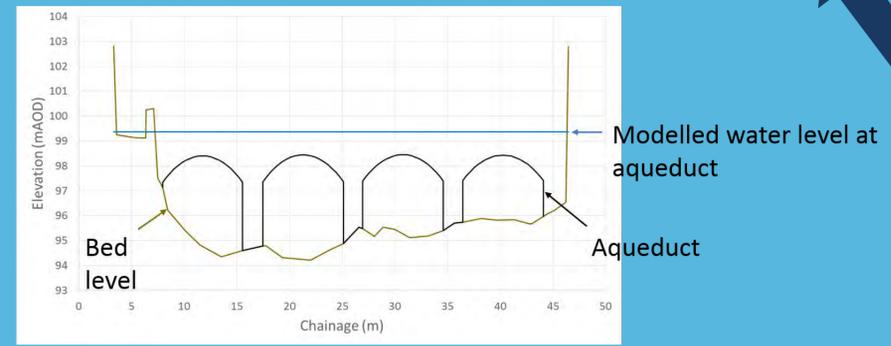
We then constructed a **3D** river model of the confluence and aqueduct area to better understand complex flows at this location. This was used to update and amend the 1D-2D model performance at this location.



5. Run models for present day and proposed options

We then used these models to understand the current flood risk in terms of the likelihood of flooding, extents, levels and flows. We then used the models to investigate the impact of a range of flood management options. We used the models to calculate river flows and levels at any location of interest.

We also used the models to predict flood levels for different options to reduce flood risk at specific locations.



Finally we used the models to evaluate the extents, velocities and depths of flooding and provide maps. We used this information to explore the results for both the existing case and for all the flood management options considered.

We used river level and flow data, rainfall data, and reports of flooding to ensure that confidence in the performance of river models is as good as possible.



4. Model performance testing

Following the construction of these models tests were done against records of actual flood events, to ensure that the model represented "real life" floods – this process is called **calibration and verification**.

Calibration: comparing our model to real life data to get it to match

