Modelling Case Study

# Hydraulic Modelling

## Flood consequences and solution assessment for extreme floods

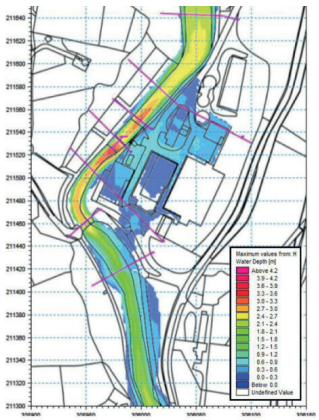
Pontsticill Water Treatment Works

## Client

**Dŵr Cymru Welsh Water**

## Services Provided

- **Flow assessment from impounding reservoir**
- **Integrated 1D and 2D hydraulic model produced**
- **Investigation of previous flood events**
- **Fluvial and overland flooding evaluated**
- **Flood extents, depths and velocities analysed**
- **Modelling of solution options**
- **Flood protection measures recommended**



Flood Maps produced by Waterco

## Scheme Details

Waterco was instructed by Dŵr Cymru Welsh Water (DCWW) to update existing flood risk information to determine the areas of the site at risk from a 1% Annual Exceedance Probability (AEP) event, including allowance for climate change. Our brief also included an assessment of options to protect the site against the identified risk. DCWW accepted the proposed solutions and extended our brief to include the preparation of the design package.

A hydrology assessment was completed for the catchment and the impounding reservoir spillway. This used the revitalised FSR/FEH rainfall-runoff method and catchment descriptor information from the latest FEH CD-ROM software. The attenuation effect of the reservoir on the peak inflows was calculated to create an outflow hydrograph for the 2%, 1% and 1% with climate change AEP events.

A 1D river network model of the Taf Fechan river including weir and bridge structures was linked to a detailed 2D spatial model developed from LiDAR data and site specific level data. Overland flow was also modelled using the 2D spatial model.

Detailed analysis of the results predicted flood depths, velocities and flow routes across the site. Solution options were also modelled, including: erection of a flood wall, the removal of a bridge, removal of a weir and bypass of a weir. As well as estimating costs, we also considered the design, construction and operation of each option.

## Outcomes

In addition to a Flood Consequences Assessment Report, hydrology assessment and flood modelling, we provided a cost benefit assessment of the solution options. Our recommended solution was to install a new river channel bypass to the gauging weir for use during high flows, raise one bank, and clear some vegetation to protect against fluvial flooding. Other measures to protect against overland flow included protecting building thresholds and enlarging the flow route draining the site. We arranged site surveys and completed the Planning and Flood Defence Consent applications, so the work could be completed as programmed.

The completed scheme provided passive flood protection and enhanced the biodiversity of the river habitat.

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