

Case study #08

August 2024

ResilientTogether is a Defra-funded project that aims to build a Smart Catchment to enhance flood resilience. Our Innovation Case Studies showcase new and creative approaches to building a smarter, more resilient catchment.

Reservoir Gate Inclinometers

Reservoir gate monitoring using tilt sensors



Figure 1. Reservoir gate inclinometer

ResilientTogether

ResilientTogether is creating a Smart Catchment, through innovative technologies and techniques, to reduce flood risk to people and places, enhance the water environment in the Pix Brook catchment and improve community resilience in the face of climate change.

The project achieves this through a close-knit partnership that collaborate to deliver six inter-related work packages. This case study comes from the Flow Monitoring work package, which aims to build an intelligent telemetry network to improve understanding of flows within the catchment and establish near real time flow monitoring.

Challenge

Standalone Farm reservoir alters the natural flow of the Pix Brook by limiting flows from Letchworth into the lower catchment. The three reservoir gates operate by moving up and down to maintain a safe reservoir water level and permit a continuous flow of water downstream. To test if the gates were performing as programmed, an independent method was needed. This could help inform the project team if operating the gates differently would be of value to the downstream catchment.

Innovative Solution

To monitor the gates, Radio Data Networks Ltd (RDN) retrofitted a monitoring system using a wireless inclinometer. High precision tilt sensors were fitted on each of the reservoir gates to track their movements. Non-invasive and battery powered, the system records gate level every two minutes and displays gate data on a dashboard in real-time alongside river level data.

This data is being compared with the changing water levels in the reservoir, rainfall and pass forward flows to inform how the operation of the gates aligned with the safety needs of the reservoir and downstream flow optimisation.

Since its installation in 2023, the system has gathered information to understand how the gates are operating compared with their design. This data has been used to inform where gate may need maintenance and how its operation can be optimised. Cameras have since been installed to enable cross referencing information on gate movement.

Overall, the inclinometer provides better data and greater assurance that the reservoir gates are operating as originally designed.



Figure 2. Reservoir gates

Benefits

1. Retrofitted

Compared to the cost of a new gate structure, the cost of this retrofitted system is fractional for the benefits observed. The units are also easy to install to the existing structure and do not have an impact on its operations.

2. Evidence gate movement

Gain an understanding of reservoir gate movement and if they are working as expected. Improvements to programming can benefit the catchment.