WEST CUMBRIA RIVERS TRUST NATURAL FLOOD MANAGEMENT (NFM) CASE STUDY:
ROW END WATER STORAGE AREA

ABOUT THE PROJECT

This project was delivered by West Cumbria Rivers Trust as part of their DEFRA funded Glenderamackin Natural Flood Management (NFM) Project, in partnership with the Environment Agency and landowners. This project involved the construction of a permanent water storage pond with additional freeboard located in St Johns in the Vale. The primary reason for project was to create habitat, for example gravel areas for nesting lapwing, but the landowner was keen to create the water storage area to temporarily store more water during a large storm event. The overall cost of the project was £24,918 and was funded by the DEFRA NFM programme.

360 degree view of Row End:
https://roundme.com/tour/616160/view/1955986

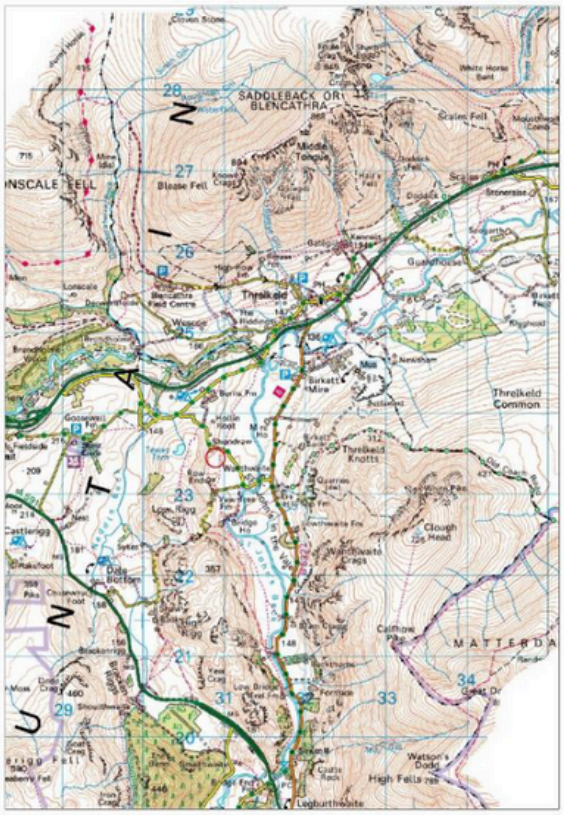

Image of map provided by West Cumbria Rivers Trust

DESIGN AND CONSTRUCTION METHODS

The following permissions were required for the project:

- Ordinary Watercourse Consent
- Agricultural/EA Permitted Development
- Heritage Impact Assessment
- Habitat Regulations Assessment

The water storage area was created with additional freeboard using a bund and appropriately sized outflow pipes to temporarily store more water during a large storm event. The outline design and topographical/drone survey was carried out by Environmental Consultants AquaOuS, and the full design was carried out by WCRT in liaison with an experienced contractor. A large pond was dug into the field fed by two agricultural streams (making this an online feature). The pond measures approximately 57m x 75m with varying depths for habitat and an island. The estimated permanent capacity of the pond is 3000m³.

- The bed of the pond consists of clay, peat and gravelled areas for habitat variety.
- The bund provides an additional 1m freeboard. We've done our calculations and can confirm that Row End will store 4300m³ of water .

- Outflow of the pond consists of a 4" diameter pipe with a stone lined high level overflow on top. There is a 3" metal 'T' piece outflow attached to the pipe which controls the outflow of the pond during low flows. There is a sump downstream of the outlet (measuring 3m wide x 3m long x 1m deep) acting as a settlement pond during storm events to prevent damage to any downstream culverts (storm brake pond).
- The bund has a run-in clay core centre set into a natural boulder clay base – providing strength required during a storm event. The bund is wide and well landscaped into the surrounding slopes to improve aesthetics and add strength which is an example of buried engineering.

Photos 1 – 4 showing the field before the works, during the works and afterwards. Images: West Cumbria Rivers Trust

EFFECTIVENESS

The volume of water stored is approx. 4300m³ during a storm event. The feature is continuously being monitored and modelled during a range of storm events by MSc student and lecturer at Durham University through the use of time lapse cameras, water level loggers and drone/topographical surveys.

MULTIPLE BENEFITS

There are also multiple benefits of the project:

- Habitat creation and increased biodiversity – The pond has 1 large island for nesting birds (20m wide x 20m long x 1.5m high), a great proportion of which will remain out of the water during a storm event. Clean gravels have been added at 4 sites around the pond for lapwing and oyster catcher breeding sites.
- The whole area has been seeded with an approved wildflower seed. A meadow mix was used on a key section of the bund around the outfall for additional strength.
    - Early observations following construction in June 2020:
        - Mosquitos one of earliest colonisers!
        - During construction, site provided raw materials for many species such as masonry bees, house martins and fresh water for numerous species (drought conditions).

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Environment Agency
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