

River Seaton Valley Restoration

River Seaton – Seaton to Hessenford/Cornwall/UK

Cornwall Council, Cormac and Environment Agency

BIG Biodiversity Challenge Award Category: *Biodiversity Legacy Award*

Project overview

The River Seaton was undermining the toe of a masonry retaining wall on Hessenford road (B3274). An innovative working with natural processes approach was taken to tackle the highway safety issues, strengthen the retaining wall and achieve multiple catchment and ecological benefits.

What were the biodiversity conditions on site, prior to the enhancement?

The river was classed as having poor ecological status, thought in part to be due to historic bunds disconnecting it from the wet woodland floodplain, a priority habitat identified within the NERC Act. Over time the constriction of floodplain capacity increased erosional pressure within the river, affecting the in-river ecology. Gravel substrates were more unstable and readily washed through the river. Stable fish spawning beds were reduced in extent and quality. There may also have been an impact on water quality, potentially affecting the status of the bathing water Seaton beach to the south.

What were the reasons behind this project?

Initially this project was commissioned by purely as a highway retaining wall strengthening and safety improvement scheme. A river diversion was considered during the feasibility study phase, this option was preferred by the Environment Agency. A river design was developed by Cormac/Cornwall Council working collaboratively with the Environment Agency to: create more space for the river to move without affecting the road, remove the historic bunds which disconnect the river from the floodplain and increase erosion, reduce the risk to existing mature trees and improve in-channel habitat quality.



View of highway original retaining wall and river (Cormac).



View of highway defects and original river position (Cormac).

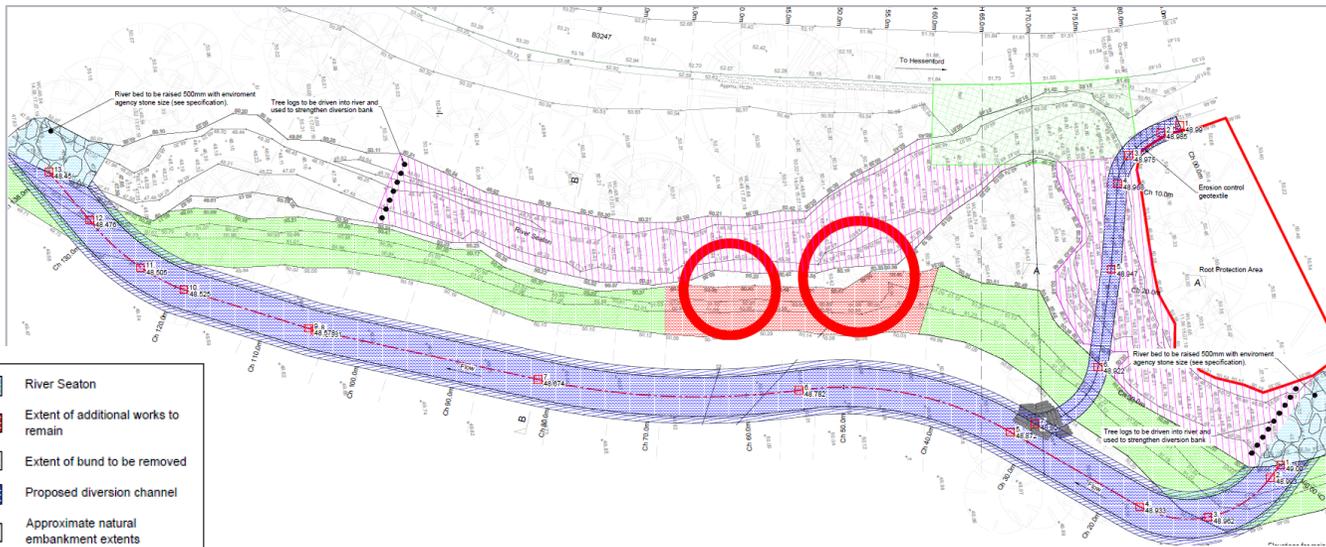
What were the biodiversity measures taken?

The natural stone structural embankment (green cross-hatch) to retain the highway and river diversion implemented are natural and softer engineering solutions compared with the alternative option considered, steel sheet piling. Steel has higher embedded carbon compared to locally sourced quarried stones and geotextiles. The historic man-made bunds (green hatch) were removed as part of the works. Now there is significantly more flood water attenuation in this area providing benefits downstream and at Seaton beach. The water filtration through the soils will help to clean river water. The wet woodland habitat that has been created is more suitable for the natural ecology of the area.

The specified new riverbed material has been specifically designed for fish spawning, enhancing the habitat. A large number of trees were cut down to enable the works but preservation of high value trees (red areas) was achieved by working with the tree inspector and altering the path of the river diversion during the design. The same number of trees have been replanted as were felled. The felled trees were installed within the river diversion and piled up to create habitat for woodland insects providing food for animals further up the food chain.

Similar works are liable to be required in the future at other locations along the length of Hessenford Road, these represent significant environmental enhancement opportunities. This scheme is considered to be part of a long-term package of works that can be linked to other partnership opportunities in the future. As with this scheme, the local community and councillors will be consulted.

Cornwall's Environmental Growth Strategy 2015 to 2065 has a target that '30% of our land and seas are well managed for nature by 2030'. This working with natural processes approach has successfully managed the highway safety issue and achieved multiple catchment benefits.



Plan of the river diversion (Cormac)

Further information

The tree works were undertaken separately to the main river diversion works because of the conflict between the bird nesting season (March - October) and salmonid fish spawning season (October - May).

The contracting team and tree inspector set out the river diversion route avoiding the high value trees and marking out root protection areas.

The new hydraulically designed channel diversion was constructed, lined with hessian matting and coir rolls to encourage vegetation growth and provide scour protection. Construction protection measures included: fish capture, habitat recreation by selecting the bedding material, managing silt disturbance and pollution.

Excavated river diversion material was re-used to infill the original channel.

The woodland is owned by Cornwall Council, is enjoyed by the local community being popular with walkers and is monitored by the local ranger. The area identified for improvement has become a wet woodland and the re-planted trees are becoming established. The River Seaton is an Environment Agency asset managed by their specialists. Fish spawning at the site is being monitored for improvement.



Fish capture & rescue (Cormac).

The legacy of this scheme is connecting the river to more of the floodplain, enhancing the local habitat, promoting opportunities for biodiversity and potential for extension through partnership works.

key lesson learnt: Fully review the specification, after the successful install, plastic netting was noted in the hessian matting, an unnecessary design component. The diversion channel re-entered the existing river too perpendicular to the flow, a leaky dam constructed from felled trees was needed to address scour issues.



River diversion during construction (Cormac).



View towards highway embankment and infilled river Seaton during construction (Cormac).

Project Team

Client / funders

The client was Cornwall Council, with the scheme funding allocated from the council's highway retaining wall maintenance budget.

Other design team members

- Cormac Solutions Structures Design Group
- Cormac Contracting
- The Environment Agency, numerous specialists

Volunteer organisations

- Cornwall Wildlife Trust

What was the motivation for carrying out the enhancement?

The retaining wall feasibility study completed by Cormac on behalf of Cornwall Council, considered a river diversion and sheet piles. The piling option would have avoided the need to divert the river, remove fewer trees and have lower costs. However, by utilising a partnership approach with the Environment Agency this was discounted in favour of a river re-naturalisation approach providing:

- Benefits for wildlife
- Removed historic manmade bunds creating a wet woodland, flood plain connectivity and water filtration
- Reduced maintenance
- Safer for road users as the fall into the river was replaced with a shallow embankment
- Further enhancement works if the scheme is extended.



Photos taken in May 2022 (Cormac).

Top: Completed river diversion and highway embankment.

Bottom: View of completed works from the top of the highway embankment.

