

# Remove culverts

## Project Summary

**Title:** Tanner's Brook Restoration  
**Location:** Southampton, England  
**Cost of technique:** ££££££  
**Overall cost of scheme:** ££££££  
**Benefits:** ££££££  
**Dates:** 2012 - 2013

## Mitigation Measure(s)

Remove Culverts

## How it was delivered

Delivered by: Environment Agency  
 Partners: Southampton Council, Arup, Southampton Golf Club



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## Background / Issues

Holly Brook is a tributary of Tanner's Brook, a heavily urbanised watercourse which flows through Millbrook and into Southampton Water. Both watercourses are heavily modified in their lower reaches due to urban development and are subject to fluvial flooding at various locations. The Holly Brook channel has been straightened and culverted in some sections.

Flow in the Holly Brook is predominantly uniform glides with a meandering planform and localised riffles and pools – overall it has limited geomorphological diversity. Further downstream it is constrained by urban development.

In Southampton Golf Club the channel had been culverted, resulting in poor drainage. The 27 hole golf course is characterised by a highly managed undulating landscape with frequent copses of mature trees throughout the course.

Holly Brook is currently culverted through the middle of the course, with the exception of a short stretch through a large woodland copse in the very centre of the course (designated as a Site of Importance for Nature Conservation). To the north of the golf course, the brook flows naturally through a mature woodland copse. To the south, the brook is culverted underneath Southampton Sports Centre.



Holly Brook deculverting design

## Step-by-step

The main constraints at the site (the requirements of the golf course and wet woodland habitat) played an important role in determining how deculverting works on the Holly Brook were undertaken.

The culvert was excavated and a two-stage channel was profiled to maximise the potential for marginal aquatic habitat to establish. Online ponds and backwaters were also excavated for the same reason. The channel was left to naturally develop, which has resulted in natural riffle formation, immediately increasing the in-channel morphological diversity.

To reduce the impact on wet woodland habitat the channel alignment was optimised through the production of an arboricultural method statement and increased involvement of an arboriculturalist onsite to refine channel alignment. To reduce the impact of the construction works on the landscape character of the area and users of the golf course and sports centre, the works were undertaken in winter.



(1) Seasonally waterlogged location of subsequent naturalised channel; (2) Seasonally waterlogged location of subsequent naturalised channel; (3) Vertical edged pond; (4) Raised timber boardwalk over waterlogged ground.

## Benefits

- Creation of wet woodland, lowland fen, river channel and pond habitats.
- Creation of new habitat areas including log piles and deadwood, of value to reptiles and invertebrates.
- Creation of a new naturalised brook, of particular value for fish.
- Improved drainage and aesthetics of the golf course.
- Increased standard of flood protection at the Dale Valley Road area due to increased flood storage as a result of the open channel and ponds.
- Improved water quality and hydromorphology of Holly Brook in accordance with WFD requirements.



(1) Weirs creates acoustic feature along channel. Increasing in-channel morphological diversity; (2) Natural riffles forming. Increasing in-channel morphological diversity; (3) Online pond/ Backwater. Ecological value of marginal aquatic habitat, banks and riparian zone improved; (4) Two stage channel enhances ecological value of marginal aquatic habitat, banks and riparian zone.

## Lessons Learnt

- Winter working and preceding saturated ground conditions resulted in soil not being reusable, and increased expenditure from its export and import of suitable material for the flood embankment. It is therefore important to consider soil storage arrangements and working schedules when planning river restoration work.

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