

# Improving the channel bed within a culvert

## Project Summary

**Title:** Lodge Burn Flood Alleviation Scheme

**Location:** Coleraine, Northern Ireland

**Technique:** Artificial bed construction

**Cost of technique:** £££

**Overall cost of scheme:** ££££££

**Benefits:** ££

**Dates:** May 2008 – Dec 2012

## Mitigation Measure(s)

Improving the channel bed within a culvert

## How it was delivered

Delivered through: The Rivers Agency

Poundstretcher culvert in Coleraine. All images © Rivers Agency copyright and database rights, 2013



## Background / Issues

Regular localised flooding of the Lodge Burn, within the town of Coleraine, led to the design and implementation of an extensive programme of flood alleviation works. While Lodge Burn largely flows in an open channel through its lower reaches, there were two culverts in Coleraine which were identified as potential factors for increased local flood risk, given their poor state of repair. The scheme included the refurbishment of the old masonry culvert under the Poundstretcher store in Coleraine, given the presence of numerous barriers to flow and fish passage within the culvert.

The Lodge Burn Flood Alleviation Scheme (FAS) proposed works to improve conveyance and provide 1 in 100 year standard of protection through Coleraine by refurbishing the two existing culverts (including the Poundstretcher culvert), the construction of flood walls and the diversion of services that currently increase flood risk. Concomitantly, the scheme also included the provision of environmental enhancements in Lodge Burn through river restoration measures in Anderson Park as well as the implementation of mitigation measures in the culverts aimed at promoting Good Ecological Status (GES).



Overview of Lodge Burn Flood Alleviation Scheme

## Step-by-step

The Poundstretcher culvert was in poor structural condition and contained obstructions to river flows. This culvert was, therefore, renovated in-situ to improve flow conditions and fish passage. Refurbishment works included:

### 1st Phase (autumn 2008 to spring 2009)

- Consultation and design development phase, including a detailed flood feasibility and economic appraisal study

### 2nd Phase (summer 2009 to summer 2010)

- Detailed design and procurement

### 3rd Phase (autumn/winter 2010)

- Procurement and mobilisation

### 4th Phase (January 2011 to January 2012)

- Installation of gravel bed in culvert channel – gravels were secured by drilled baffles (approximately 0.1m high) placed across the culvert.
- Installation of baffles along the length of culvert to provide stability for gravels.

- Creation of low flow channel using a two-stage cross-section secured by baffles to allow flow and fish passage during dry periods.
- Gravel and rock material was sourced from a local quarry and matched to that naturally found within the river.



Poundstretcher culvert during refurbishment works (these are not services within the culvert but are bracing structure and the flow bypass pipe)

## Benefits

- In addition to wider benefits related to increased flood protection, restoration of in-channel habitats and improved Water Framework Directive compliance associated with the larger Lodge Burn FAS, the proposed works also delivered a good example of improvements to fish passage – enabling migratory fish to pass into and through the culvert (coarse fish are not present) – where deculverting is not considered a viable option due to urbanisation and land use constraints.



Artist impression of restored Lodge Burn at Anderson Park (Downstream of Poundstretcher culvert)

## Lessons Learnt

- In projects where culvert refurbishment is involved ground conditions may present added challenges to construction. In the Lodge Burn scheme ground conditions in some areas of the works have been more challenging than expected. The project team also encountered some further instability in the steep slope adjacent to the river prior to commencement of works which necessitated more extensive enabling works than were expected, resulting in delays to project completion.

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