

European Eel

Client:  
**Bentley**  
MMB MOTT MACDONALD BENTLEY

**Location:**  
River Tyne, Ovingham.



## RVT's Bespoke Water Treatment system supports £14million Eel protection project on the River Tyne.

### Project Overview

The International Union for Conservation of Nature (IUCN) has the European Eel classed as critically endangered on the Red List of Threatened Species. The decline in eels arriving in Europe has fallen by around 95% in the last 40 years, and because of this, the European Eels are highly protected.

Contractor Mott MacDonald Bentley were tasked by their client to install environmentally friendly fish exclusion screens at the Ovingham raw water pumping station on the River Tyne. The large-scale project aimed to support the return of eel stocks to sustainable levels through the installation of the screens, enabling safe journeys upstream for the eels and other fish species.

Compliance with the Eel (England and Wales) Regulations 2009 was of utmost importance. Failure to comply with the regulations is a punishable offence which could result in a fine, as well as reputational damage.

### Products Used

EnviroHub®  
SOUNDEX®



EnviroHub® HL50 Lamella Clarifiers and EnviroHub® TT10 Treatment Tanks on site.

## Project Facts

- ▶ European eel numbers have declined to less than one percent of historic levels.
- ▶ Scientists have not been able to pinpoint a major attribution to the European eel's decline. However, there is evidence to suggest that barriers to migratory routes are a likely cause.
- ▶ The discharge permit requirements for this project was: All water needed to be discharged into the River Tyne throughout the construction phase.
- ▶ RVT's solution included:

### Water Treatment

- EnviroHub® HL50 Lamella Plate Settlement Tanks
- EnviroHub® TT10 Treatment Tanks
- EnviroHub® TU02 Dosing Units- Some were modified specifically for the project
- Chemicals (Ferric & Caustic)
- 40m<sup>3</sup> holding Tank
- Small holding Tank
- Generators
- Pumps
- Pipework

### Monitoring

- Turbidity Monitoring Probes
- pH Monitoring Probes

### Noise Control

- SOUNDEX® Quilts

## Challenge

Mott MacDonald Bentley identified that managing flow rates of around 350m<sup>3</sup>/h during the drilling and installation of piles for the new fish exclusion screens was going to be a challenge. Once drilling of the piles had begun, this process was unable to be stopped, and would be continuous for around 8-9 hours a day. The high flow rates of water were generated as a by-product from flushing the piles, where river water was pumped into the pile during drilling.

The design called for a large number of 1220 and 660mm diameter piles within the new structure. These had to be reverse circulation drilled into the bank and riverbed, with water being pumped through pile during the drilling process to remove the material. The drilling effluent generated had to be then treated for solids removal, with visually clean water discharged immediately back into the river. Space constraints meant there was no room for attenuation ponds within the process to hold or buffer the water.

The River Tyne includes multiple designated SSSI locations (Sites of Special Scientific Interest) and is widely considered to be the best trout and salmon fishing river in England and Wales. Stringent restrictions were placed on the discharge water quality and the client and contractor committed to ensure their work did not adversely impact the ecology of the river.

Following an application to the Environmental Agency, the project was granted a discharge permit that needed to meet the following requirements: All water to be discharged into the River Tyne throughout the construction phase, and for pH levels to be between 6 to 9, and Suspended Solids to be at 50mg/l or below.

## Solution

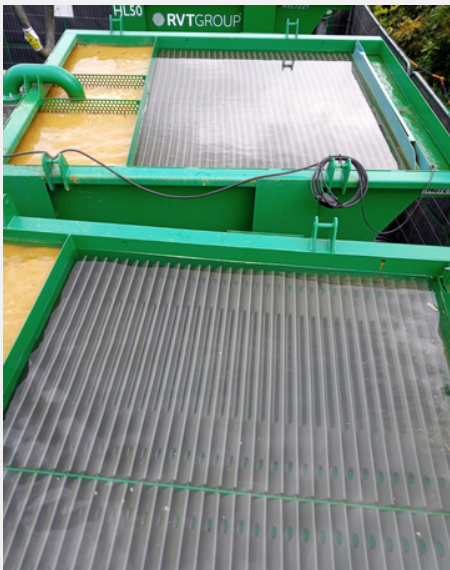
Following the initial project enquiry, RVT technical consultants engaged Mott MacDonald Bentley with multiple online meetings and site surveys to ensure the best understanding of the projects challenges.

A scope of works was agreed and equipment installed, taking into account restrictions including limited access, a small site footprint and stringent Environment Agency permit requirements.

Piling effluent was initially pumped into a large settlement tank where rocks and stones settled out. This water was then pumped on into treatment tanks via manifolded splitters to balance the flow. Incoming water was measured and flow-proportionally dosed with flocculant and caustic, bringing fine and colloidal particles together into larger flocs. Good floc formation is critical to achieving the best settlement results, and changes in different strata that the piles went through meant dosing effectiveness had to be constantly monitored.

Treated water passed out into HL50 Lamella tanks where solids settle and accumulate and the final clarified water outflowed, past a final real-time monitoring location, and into the river.

RVT's EnviroHub® HL50 Lamella Plate Settlement Tanks separating the solids and liquids, leaving clean water ready to discharge into the River Tyne.



## Solution Continued

With the project underway, higher solids and sludge volumes were encountered than anticipated, requiring collaboration to adapt the operation of the plan. Instead of requiring de-sludging on a daily or weekly basis, as is often the case, the Lamella tanks required emptying multiple times a day, with limited room on site to manage the by product. Removing accumulated silt is critical to the ongoing performance of the tanks and ensure clean water is discharged at all times.

Sludge was therefore pumped into a 40m<sup>3</sup> holding tank, with vacuum tankers on constant rotation taking this off-site for storage at a nearby redundant sewage works. Sludge was discharged into an old settlement tank where the solids further settled out and over time the clear water that accumulated on top of the tank could be pumped off and discharged.

With various noisy tasks being carried out, it was identified that noise control was required to mitigate the impact on nearby residents, anglers and an adjacent caravan park. Soundex® Acoustic Quilts were quickly deployed to reduce noise levels and also act as a visual screen for the site.

In summary, following our effective and bespoke process, the water was suitable for discharge in line with the Environmental Permit granted, and all contaminated water from the piling works met the required levels for discharge following the treatment system.

The left bottle shows the raw piling effluent, full of silt and sediments. The right bottle shows treated and settled water that was then discharged back into the River Tyne.



EnviroHub® HL50 Lamella Clarifiers and EnviroHub® TT10 Treatment Tanks arriving to site.

# Project Photos

Diagram of how the water treatment system worked:

