



CASE STUDY

SAFEGUARDING CRITICAL INFRASTRUCTURE THROUGH INTEGRATED RIVERBANK STABILISATION

CLIENT: CONFIDENTIAL

LOCATION: UK

Highlights:

- Geotechnical Engineering Detailed Design
- Early Contractor Involvement (ECI)
- Geoenvironmental Desktop Study
- Topographical, GPR and Bathymetric Surveys



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THE CHALLENGE

In 2024, Arthian was brought in to tackle a problem that was escalating daily: a 150-metre stretch of riverbank was eroding so rapidly that critical electrical infrastructure perched just behind the crest was at genuine risk. What began as a routine inspection quickly revealed a site full of complications, each one demanding careful engineering judgement and creative problem-solving.

The land behind the riverbank was far from forgiving. Years of previous activity had left the ground heavily rutted, and the underlying soils were extremely soft and highly compressible. Even the lightest construction plant risked sinking, and with no existing access route, simply reaching the riverbank safely became a challenge.



THE CHALLENGE, CONTINUED

Running parallel to the river was an ageing but still operational Scottish Water rising main sewer, a sensitive asset that could not be disturbed. Any works in its vicinity required meticulous planning, strict load control, and close coordination with the asset owner. As if that weren't enough, the surrounding land was prone to flooding during high tides and heavy rainfall, meaning the project team had to design for a landscape that could change dramatically within hours.

Layered on top of the engineering and logistical hurdles was a complex regulatory environment. Because the works involved in-channel activity, the entire remediation fell under Marine Scotland's jurisdiction. Securing a marine licence was essential, and that meant detailed environmental assessments, early engagement with regulators, and a design that could stand up to scrutiny from multiple stakeholders.

This project required a multi-disciplinary approach, agile thinking, and a team capable of navigating technical, environmental, and regulatory constraints simultaneously.

THE SOLUTION

The Arthian team delivered a comprehensive scope of works to handle the problem, which included:

Scoping and Building the Knowledge Base

Arthian began by carrying out a comprehensive geo-environmental desktop study, followed by detailed topographical and geotechnical surveys. This early investigative work gave the team a clear understanding of the site's constraints and allowed the design to be shaped around real-world conditions rather than assumptions.



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THE SOLUTION, CONTINUED

Engineering Access Where None Existed

To overcome the treacherous ground conditions, Arthian designed a geosynthetic-reinforced access road capable of supporting construction traffic without overstressing the soft soils. This measure also provided a safe route for future maintenance. Close collaboration with Scottish Water ensured all works near the rising main were fully consented and safely managed.

Stabilising the Riverbank with Minimal Environmental Impact

For the most vulnerable sections of riverbank, Arthian developed a scour protection solution using Ridgeway Rockbags. These flexible, environmentally considerate units provided immediate stabilisation while avoiding the heavy footprint of traditional hard-engineering methods. Working hand-in-hand with the Contractor, Arthian helped establish a safe and efficient installation methodology tailored to tidal windows and site constraints.

Navigating the Regulatory Landscape

Arthian prepared and secured the Marine Licence from Marine Scotland on behalf of the Client, coordinating all supporting environmental documentation and ensuring the design met regulatory expectations. Throughout detailed design, Arthian continued to provide environmental compliance guidance.

Protecting the Environment Throughout Construction

Arthian delivered full ecological and environmental oversight, including ecology support, invasive non-native species (INNS) surveys, and acting as Environmental Controller of Works (EnCoW). This ensured construction progressed responsibly, safely, and in line with all environmental commitments.



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