



**GEORGE
LESLIE**



CASE STUDY CAMPS RESERVOIR

PROJECT OVERVIEW

The Camps Reservoir project involved constructing a new 140 metre U-shaped reinforced concrete floor and wall over the existing spillway. This comprised of a 400mm slab and 450mm walls ranging from 1.2m to 2.4m in height.

Over 130 rock anchors were installed prior to construction, which would tie the new works to the previous spillway.

Access to the reservoir was limited due to a weight restricted bridge near Crawford, making HGV deliveries unviable. The remote location and restricted bridge access required the use of a wind farm access road and satellite traffic management offices.

EXECUTIVE SUMMARY

The project delivered a complex spillway reconstruction in a challenging environment, requiring innovative logistical planning, on-site concrete batching, and sustainable construction methods.

Low carbon concrete, recycled reinforcement steel, HVO fuel, Hush Pods and eco welfare contributed to a major emissions reduction - from an estimated 1,270 tCO₂e using traditional methods to 375 tCO₂e. Digital tools such as 3D/4D modelling and augmented reality improved planning, safety, and communication, ensuring high quality delivery in a difficult setting.

OUR SUSTAINABILITY ROUTE



**Nature Based
Solutions**



**Recycled
Aggregates**



**Low Carbon
Steel**



**Low Carbon
Concrete**



**Battery
Units**



HVO Fuel



**Welfare Eco
Cabins**



**Green
Energy**

PROJECT BACKGROUND

There were concerns around the structural integrity of the existing chute, especially with high velocity flow. It was assessed that there was a credible and significant risk that, during an extreme flood event, the spillway chute could collapse, leading to a breach of the dam.

The existing spillway The project required over 800 m³ of concrete. Given that the nearest batching plant was more than 30 miles away - with a 45–60 minute transit time - the team, in collaboration with our supply chain, built an on site batching plant. This allowed “on demand” batching, reduced waste, and ensured suitable workability of the low carbon concrete mix. Reinforcement was fabricated from 98% recycled steel, totalling 85 tonnes.

Over 20,000 tonnes of aggregate were imported to form the main crane pad and access on the reservoir embankment, resulting in more than 1,000 vehicle movements. A joint approach with Scottish Water led to a sustainable reuse strategy: the lower half of the access route was retained for future works, while the upper half was deposited locally.

Concrete trials addressed the steep spillway slope, preventing concrete slippage. Adjustments to mix design, formwork, and pour sizes resulted in zero failed pours and zero failed concrete tests.



DIGITAL IMPACT

A 3D model was developed to assist in applying digital solutions to the project as well as aid learning for future projects.

3D visualisations were invaluable during construction to provide the workforce with clarity on what they are constructing and discussions on methodology to deliver the project quicker and easier.

Providing a visualisation of the works layout, at a given time in the construction programme through the production of a 4D model gave the site team a tool for them to use throughout project delivery. The model contained sufficient detail to aid methodology and logistical planning, awareness of hazards and ultimately helped to improve health and safety on site.

The project tested other digital solutions such as Augmented Reality, using Trimble Site Vision to assess potential future opportunity and help during collaborative discussions with our Client.



SUSTAINABLE BENEFITS

Carbon emission reductions were achieved through:

- Low carbon concrete using GGBS, reducing emissions from 320 tCO₂e to 205 tCO₂e.
- Recycled reinforcement steel, lowering emissions from 187 tCO₂e to 67 tCO₂e.
- HVO fuel, reducing fuel related emissions from 577 tCO₂e to 8 tCO₂e.
- Reduced transport emissions through on site batching and local reuse of aggregates. Concrete transport emissions dropped from 8 tCO₂e to 0.15 tCO₂e, and aggregate emissions fell from 176 tCO₂e to 95 tCO₂e.

Additional sustainability measures included the use of GreenSpace cabins, Hush Pods, and HVO powered welfare generators, along with reusable metal and plastic track mats to minimise aggregate demand.

Total emissions were reduced from 1,270 tCO₂e to 375 tCO₂e, representing a major environmental improvement over traditional approaches.