

Project Info



02 / 08 / 17



CC8™ Batched Rolls



170m²



Transverse layers



Kirk Burn culvert,
Laurencekirk, Scotland



Briggs Building Ltd.
with BEAR Scotland



CC8™ was used to
remediate a dilapidated
culvert and prevent
erosion caused by high
water flow rates.



The completed culvert lining installation in Laurencekirk, Scotland.

In August 2017, Concrete Canvas® GCCM* (CC) was used to remediate a dilapidated culvert in Laurencekirk, Scotland.

The original corrugated steel culvert, known as the Kirk Burn culvert, was 1.8m in diameter and had sustained significant degradation and erosion due to heavy water flows and abrasion. As a result, the existing 25mm bitumen coating inside the pipe had broken down through constant flow erosion and weathering.

For this project, installing a new culvert was cost prohibitive and would involve temporary road closures of the nearby A90, which is a major north-to-south road in eastern Scotland, running from Edinburgh to Fraserburgh. Other traditional alternatives, such as re-spraying the culvert with bitumen, are generally prohibited by the Scottish Environment Protection Agency (SEPA) due to environmental concerns. The use of Concrete Canvas was proposed by BEAR Scotland, and SEPA were satisfied that there would be no adverse environmental impact as the CC has a low alkalinity and low wash out.

Briggs Building Ltd, who had successfully installed the CC GCCM material for a similar application with BEAR Scotland the previous year in Newtonhill, was appointed to carry out the remediation works at the Kirk Burn culvert for Transport Scotland, with Consultation Services provided by BEAR Scotland.

*Geosynthetic Cementitious Composite Mat





Flow erosion had caused the existing bitumen lining to break down



Water diverted into a 450mm HDPE Ridgidrain pipe



An Everbuild PVA adhesive & bonding agent was applied to crenulations



Semi-dry grout was applied to fill the corrugations



Batched rolls of CC8 were laid transversely across the width of the culvert



CC was fixed with tech screws & grout applied to prevent water ingress



Completed relined culvert on upstream side

Prior to installation, the river was dammed using sandbags 10 meters upstream from the culvert and water was diverted into a 450mm HDPE Ridgidrain pipe which allowed fish to safely pass through the culvert for the project duration.

The contractor pressure washed the culvert to remove any sediment and debris, and removed any loose bitumen sections inside the culvert. An Everbuild Feb General Purpose PVA adhesive and bonding agent was then applied to the crenulations prior to filling them with a grout mix to provide a suitable fixing surface and to minimise void spaces underneath the CC.

Due to restricted site access, batched rolls of CC8™ were delivered to site and unrolled by hand transversely across the width of the culvert. The adjacent CC layers were overlapped by 100mm and shingled in the direction of water flow. The CC overlaps were then screwed together and into the filled crenulations with 30mm stainless steel tech screws at 200mm centres and left unsealed, creating weep paths to prevent the build-up of any hydrostatic pressure behind the CC. The top edges of the CC were sealed with a line of grout to prevent water ingress behind the material. An anchor trench was dug on the upstream side to capture the CC edges and fixed with 300-500mm gabion stones before backfilling with material to prevent water ingress. The contractor used the water running in the HDPE pipe to hydrate the CC material with a hose pipe at the end of each day.

In total, 170m² of CC8™ were installed in 5 days by a crew of 4 people. The client was impressed with the ease and speed with which CC was installed, along with its minimal environmental impact and increased lifespan compared to bitumen.