CONCRETE CANVAS®

CHANNEL LINING

Project Info

- 01 / 06 / 19
- CC8™ Bulk Rolls
- 3750m²
- Transverse layers
- Bower Quarry, Halkirk, Caithness, Scotland
- QTS Group Ltd
- CC8™ used to line a series of crest drainage channels to prevent earthworks failure within the slope

Completed channel lining installation at Bower Quarry, Scotland

In June 2019, Concrete Canvas® (CC) GCCM* was specified by Network Rail to line a series of crest drainage channels near the village of Halkirk, which is in the county of Caithness in the Highland council area of Scotland.

The cutting beside the Far North Railway Line in Halkirk was subjected to water ingress by surface runoff from the adjacent saturated agricultural field.

The aim of the project was to direct the surface runoff into a lined channel in order to mitigate the potential for failure within the cutting by rotational slip.

Over 1000 linear metres of trapezoidal channel were excavated and measured 500m in depth, 600mm wide at the base with 45-degree side slopes. The works were carried out by QTS Group Ltd on behalf of Network Rail.

BBA certified CC8™ material was specified for the project and delivered to site in bulk rolls. The bulk rolls were deployed using a spreader beam mounted on tracked plant machinery from the adjacent field. The material was unrolled into the channel transversely and cut to specific profile length. The CC8™ layers were overlapped by 100mm in the direction of water flow and were then screwed together at 200mm intervals using 30mm stainless screws.

*Geosynthetic Cementitious Composite Mat

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Unlined crest drainage channel

Channel excavation

CC installed prior to erosion mat

Erosion mat installed on field side

Unlined arterial drainage channel

CC lined arterial drainage channel

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Unlined channel showing scour

CC lined channel

CC junction & culvert interface

Headwall detail

Completed CC lined channel

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Completed CC lined crest drainage channel

On the track side the material was terminated into a 150mm crest anchor trench and fixed to the substrate using 250mm ground pegs prior to being backfilled with material. The CC8™ material extended 300mm up the opposite side slope and anchored into the slope by 200mm using 250mm ground pegs. A permeable erosion mat was then installed from the crest of the field side slope and terminated 100mm below the CC8™ material, allowing surface runoff from the adjacent saturated field to migrate into the CC lined channel.

Following each day's work, the CC was hydrated using a 1000L bowser and hose with a diffused spray nozzle from the adjacent field. The material cannot be overhydrated and has a working time of 1-2 hours after hydration which meant it could still be installed in the rain without any programme disruption. The ability to deploy the material from the adjacent field also meant there was no need for costly line possession, allowing for installation without any disruption to rail services.

In total, 3,750m^2 of CC8™ were installed by a team of five in inclement weather conditions in a remote area of Northern Scotland within 8 weeks. The client was pleased with the installation as it will prevent cutting saturation, which could potentially cause rotational earthwork failure within the slope and subsequent line closures.

"QTS have successfully carried out numerous Concrete Canvas installations over the last eight years and we have found it extremely user friendly and easily adaptable to any site conditions."

Mel Kay
Operations Manager, QTS Group

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