

Project Info



February 2019



CC5™ Bulk Rolls



800m²



Vertical layers



Shelly Beach,
South Africa



Adferiad



CC was used to provide an erosion protection solution to a slope face to prevent material falling onto the access road below



Completed installation at Southcoast Mall in South Africa

Project Introduction

In February 2019, Concrete Canvas® (CC) GCCM* was specified as a slope protection solution for a project at the Southcoast Mall in Shelly Beach, South Africa.

The access road around the north west corner of the Southcoast Mall is adjacent to a steep cutting. This cutting experiences significant erosion caused by rain with detritus tending to collect on the access road below it, restricting vehicular access.

The core aim of the project was to minimise disruption to tenants of the Mall who require use of the access road.

The works were carried out by Adferiad for Redefine Properties, with Consultancy services provided by Sutherland Engineers.

*Geosynthetic Cementitious Composite Mat



Challenges

There were several challenges associated with this project that had to be addressed. Firstly, there was a significant amount of subsoil water that permeates through the face of the cutting, which needed consideration when specifying a solution.

Another consideration was the surface water run-off from the land between the Mall property and the adjacent highway. In order to manage this run-off, a cut-off drain was required at the transition from the shallow cutting to natural ground level.

The existing slope was very steep at a gradient of approximately 1:0.5 initially, then flattening off until it reaches the natural ground line about 20m above the access road. The material between the steep section of the cutting and natural ground line is highly erodible with ground water weeping through the face of the slope almost continuously during the rainy season. The slopes were sparsely vegetated as a result and continuously prone to scour.

Finally, the project had to be carried out at the peak of the rainy season as it needed to be completely as quickly as possible. Therefore, the wet weather conditions had to be taken into consideration when specifying a solution.

Specifying Concrete Canvas® GCCM

A number of alternatives were considered as a solution to the erosion problem, including raising the dry-stack wall or applying sprayed concrete to the cut face. Concrete Canvas® was also considered as it is quick to install and requires fewer vehicles and plant machinery on site. Collectively, this meant the use of CC would be much less disruptive to the access road and its users throughout the duration of the project.

Ultimately, CC5™ was specified for the lining of the slope and was also deemed suitable for lining of the inaccessible cut-off drain.

Site Preparation

Prior to installation, the slope was de-vegetated and prepared, and anchor trenches were dug at the crest and toe. A layer of 210g/m² Bidum A4 geotextile was then laid from the crest anchor trench to the toe v-drain termination.

The geotextile acted as a filtration and separation layer to allow water to permeate through the fabric and run down the back face of the CC5™ whilst ensuring there was no migration of fines contained within the flow. This filtered subsoil water was then transferred to a drainage layer that spanned approximately 1m from the toe of the slope to a shallow V-drain. This allowed the daylighting of subsoil water collected in the filtration system into the drain.



Proximity of access road to slope



Regular scour meant vegetation couldn't grow in many areas



Without a solution, there was risk of slope material blocking the road



Slope face was trimmed for a smoother profile



Anchor trenches were prepared at the crest



Cut-off drain prepared between cutting and natural ground level



CC was laid over a geotextile layer which acted as a filtration layer



Overlapping CC layers were thermally bonded and screwed



Round head pegs were used to secure CC to the slope face



Hydration was given three times to ensure saturation in the hot conditions



A vegetation mat was laid at the top of the slope to encourage regrowth



Completed section of slope installation



Completed CC slope protection installation in Shelly Beach, South Africa

Installation of CC5™

CC5™ was laid vertically down the face of the slope on top of the geotextile with subsequent layers overlapping by 100mm. The overlaps were thermally bonded to seal the joint and then screwed together with stainless steel screws at 100mm spacing positioned 30mm from the edge of the upper layer at the overlap.

The CC installation was terminated at the crest of the slope within the 300mm deep anchor trench and pegged at the overlaps with 300mm long galvanised, round-head pegs. The anchor trench was then backfilled with a non-erodible cement-stabilised gravel and compacted with a mechanical rammer. At the bottom of the slope, the material edges were folded over to form a 100mm wide knuckle termination and then fixed on the top edge of the V-drain with mechanical fixings. It was ensured that the CC5™ material conformed to the variable profile of the slope face by inserting further ground pegs through the overlaps where required.

CC was hydrated by spraying water onto the surface three times at 45 to 60-minute intervals until saturation. A final hydration was provided at the end of each day's installation.

Conclusion

A total of 800m² of CC5™ was installed over a period of four days by a team of six installers by rope access from the top and ladder access from the bottom of the slope. The project has been deemed a success and, as a result, CC is being considered for other projects by both client and consultant alike.