

CASE STUDY MANGAMUKA GORGE SLIP REPAIR

MAGNUMSTONE™ MSE SYSTEM



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| CONTRACTOR | Downer |
| ENGINEER | WSP |
| CLIENT | Waka Kotahi |
| LOCATION | Northland |
| PRODUCTS USED | MagnumStone |

**ADVANCED
GEOSYNTHETIC
SOLUTIONS**

PROJECT

In mid-July of 2020, heavy rainfall caused eight separate slips within the Mangamuka Gorge, approximately 25 km south of Kaitaia along State Highway 1. This resulted in complete road closure, with traffic diverted via Scenic Highway 10 and the Twin Coast Discovery Route 12.

At the main slip site, over 6,000 cubic meters of material collapsed from under the road to the river below, leaving the roadway unsupported, all the way to the centerline. To further complicate the various reinstatement designs, complex geology and historic slips had to be considered. For each of the slip sections, the road and supporting embankments needed to be extensively stabilised, with adequate drainage added, before the road could be reopened.

DESIGN

The key design elements of this particular slip repair were a micro piled foundation and mechanically stabilised earth (MSE) wall, with large segmental block facing. The micro piles, with capping beam, provided sufficient ground improvement to achieve the required stability against global failure and offered bearing support to the MSE wall above. The MSE wall consisted of granular fill, compacted in layers and reinforced with StrataGrid geogrid. A positive connection mechanism between the blocks and geogrid was specified to ensure the MSE reinforcing elements would not become separated from the facing during vertical movements during a seismic event.

INSTALLATION

Time was a factor for Cirtex's involvement in installing this retaining wall. The road was due for completion at the end of July 2021 and the contractor needed a robust, fast to build, and readily available MSE wall system to stabilise the slope beneath the road. A different product had been specified, but the supplier was unable to manufacture and deliver the blocks in the required timeframe. Cirtex was approached by the contractor in April 2021, with a keen desire to look at our locally manufactured MagnumStone system.

MagnumStone was the ideal solution for this fast-moving project. Cirtex manufactures and stocks large amounts of MagnumStone blocks, so were able to deliver the MagnumStone system as soon as the contractor required it onsite. It's lighter than solid concrete blocks, meaning more blocks could be delivered per load. This fast turn-around meant less delays for construction, allowing the contractor to meet their deadline, which was great news for businesses desperate to get their freight back on the road.

Cirtex was able to help WSP Whangarei, Fulton Hogan and Far North Roding reopen State Highway 1 on July 30 as required.

The MagnumStone system provided the following features and benefits:

- Speed of construction
- Stock availability
- Strong and durable

