Fixing Mauao

Some design and construction challenges facing the Mauao fixup job

While repairs have been ongoing higher up the mountain on the 4x4 and Oruahine summit tracks, extensive planning and design work has been underway in preparation for repairing the base track washouts. The biggest challenge is that it is almost impossible to get the necessary machinery and materials around the base track. This has put huge constraints on what might otherwise be a more straightforward construction job.

The largest washout

The largest washout on the Mauao base track is a combination of three slips that all exit at the same point. This newly created washout gully will continue to deliver large amounts of debris down the slope in future storm events. The challenge is how to reinstate the track while limiting damage from future debris.

A 15 m long bridge will be built across this washout. The aim is to allow future debris to wash under the bridge with minimum damage to the bridge and track. The challenge is to find a solution that is the most economic for the long term; to design for most storm events while accepting that ‘minimum damage’ in this in environment is no guarantee. (There are a number of large trees further up the slope which could potentially wipe out a bridge if they came down the slope.)

The bridge will be designed to take a weight of 4 tonnes. This is not just something you plonk onto the track. To support this bridge, piles need to be drilled deep into the track through rocks and boulders. This requires the sort of drilling rig that can not currently access the site. Access is a huge problem: access for vehicles to deliver

the bridge itself and access for the machinery that is required to install the bridge. So the solution to two problems are still being assessed: 1) how to get the bridge to the site and 2) how to install the bridge when none of the necessary equipment can get there. The bridge will probably need to be delivered in sections. This still requires some logistical problem solving to ensure that the rest of the track can handle whatever vehicle movements are needed.

Track stability

The Mauao base track is basically just a pathway that has been cut into the mountainside; it was never designed for heavy machinery. The repair programme must be planned in a way that aims to keep machinery movements to a minimum over the base track. Therefore a lot of planning has gone in to limiting the distance that the landfill from each slip will transported around the base track. The repair programme as a whole has had to be planned in its entirety before any work can start.

The most significant weak spot is a stone wall that runs along the base track, about 50m from the sandy beach. This wall is still intact but storm damage has eroded and undermined it at the base. The conventional method of reinforcing the erosion with boulders and landfill has had to be ruled out because of the access issues. (Ocean access is not as simple as it might seem, nor cheap. The sort of barge that is suitably sized to transport the material and machinery required to repair the stone wall, for example, is not available locally, would come at a cost of $30K per day, and would still not guarantee easy access to the site.)

Once the stone wall is fixed the smaller slips can be addressed fairly quickly – about a week of work per slip (except for the bridge). Debris from each slip will be cleared and placed in a location where it can be reused. A method for fixing the stone wall

has now been designed and tendered. Work will start in the next month, take up to three weeks and cost around $30K, after which time the remaining slips can be addressed. Hopefully the base track can reopen after August.