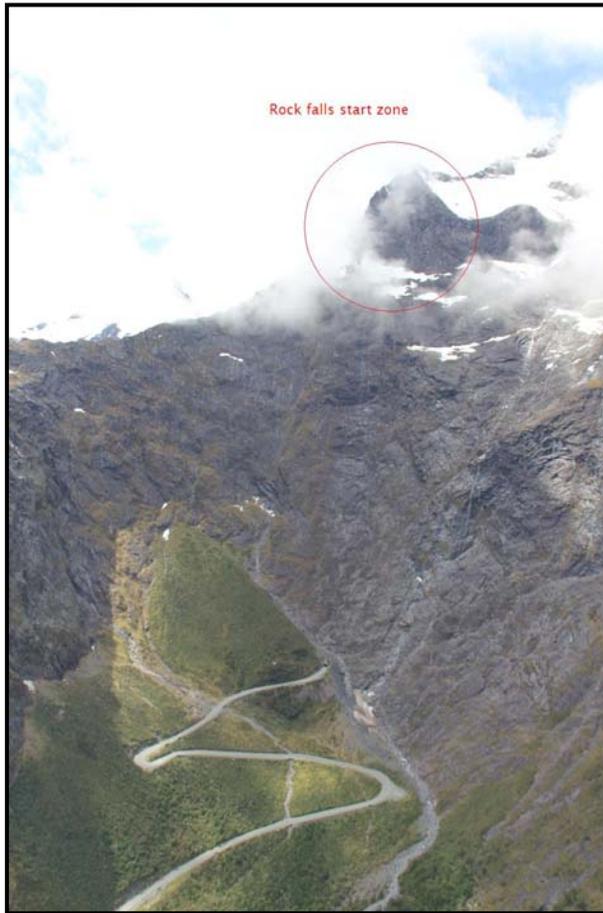


## Milford Road Rockfall The Pinnacle



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*Pieces of rock that hit the Milford Road at the western entrance to the Homer Tunnel after a section of the "Diamond Pinnacle" high above the tunnel entrance broke off in November 2012.*

During routine inspection on 11 November 2012 the NZ Transport Agency's Milford Road contractor came across rocks on the road at the western portal of the Homer Tunnel. Further investigation showed that a large section of rock had broken away from a feature known to climbers as the 'Diamond Pinnacle' on a bluff high above the road.

What remained of the pinnacle on the bluff was a 20-plus metre, 2000 tonne column of rock which presented stability concerns.



*Rope access lines that have been secured to the rock face allow workers to move safely around the rock fall site.*

Experienced geotechnical experts began to undertake aerial inspections of the bluff. Our primary concern was the safety of the travelling public and our

contractors. We assessed a number of options to manage the stability issue on the Bluff, while at the same time, we were conscious the peak summer tourist season was about to start.

The NZ Transport Agency and their team of experts, worked through the issues and decided we did not, at that point, have sufficient knowledge of the rock mass to develop a strategy to fully stabilise it; this would take some time and additional data. At the same time, coming into summer, we were not detecting further movement in the rock mass. So we developed a monitoring and active traffic management regime, with this we were satisfied that we could safely open the road for access to Milford, albeit with some restrictions.

The priority at this point was protecting road users. We were able to provide improved 24/7 access to users by mid-February following the construction of the temporary portal extension to provide protection from rockfall.



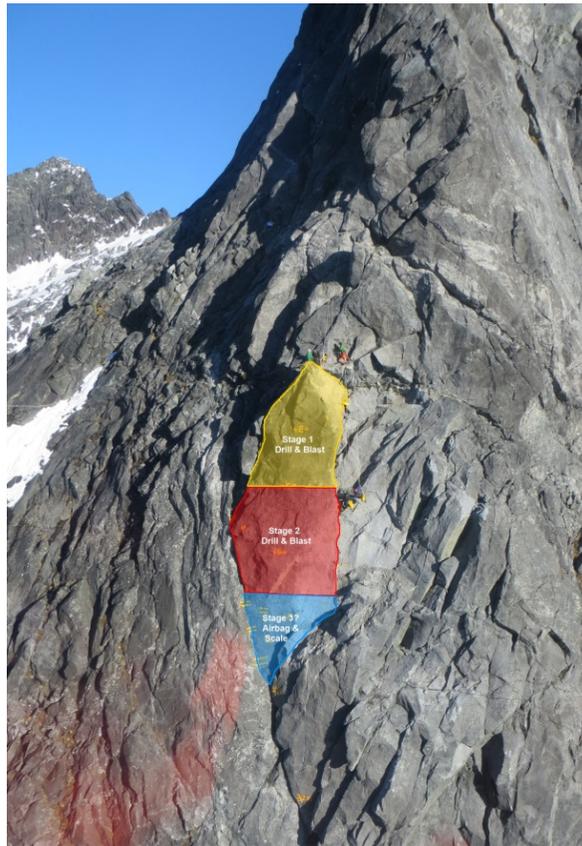
*A temporary portal extension at the western entrance to the Homer Tunnel that opened in February 2013 helped the road return to close to normal operations.*

The monitoring and inspection continued with additional checks after heavy rain and earthquakes. At the same time we also commissioned an aerial survey of the rock mass, to develop a 3D picture, followed up by a detailed rope access inspection on the bluff.

Throughout this time the NZ Transport Agency and their team of experts have been working towards a permanent solution. We were aiming to manage the bluff through winter and undertake any significant rock removal by blasting or other means in the spring. However within the last two weeks, our rope access inspection team indicated that the pinnacle was in worse condition than previously understood. Last week final onsite inspections confirmed that the pinnacle is only 15% to 20% connected to the mountain and it is likely to fall down with ice build-up behind it through winter. We are now in a position where we cannot wait until the spring to remove this feature as we cannot guarantee safety with it in-situ through the winter.



*High altitude geotech experts carrying out rock face marking work.*



*The unstable rock feature will be removed in the three stages shown above.*

We have looked at all practical options to remove this feature and concluded that drilling and blasting is the only feasible and effective option. Once we start drilling we cannot be assured of reasonable stability within the pinnacle feature, so for safety reasons we cannot allow traffic through the tunnel after this work has started. To work at this height it is essential that we complete the work before the onset of winter, which gives us a limited working window of opportunity.

Therefore, it is necessary to close the road around and through the tunnel while this work is being undertaken, which will mean no road access to or from Milford through the tunnel for this period. We expect the first drill, blast and stabilise cycle to take around 10 to 14 days, but this work is weather dependent, and a further drill, blast, stabilise cycle may be required.

Throughout this process the NZ Transport Agency has always considered first and foremost the safety of road users, tourists and those working in the area. This will continue to be our top priority.

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