



1 Deans Head after works are complete. 2 Wall removal. 3 Deans Head before works.

DEANS HEAD AND SHAG ROCK RESERVE LAND REMEDIATION

Aurecon for Land Information New Zealand

Project Location: Christchurch



The 2010/11 Canterbury Earthquake Sequence caused significant land damage in the Port Hills of Christchurch. Deans Head and the adjacent Shag Rock Reserve required land damage remedial works to reduce the risk of rockfall, cliff collapse and landsliding onto the lifeline route of Main Road below. The design comprised the total removal of 50,000m³ landslide material from Deans Head, most was carted off site but some was combined with the rockfall debris already in Shag Rock Reserve to form a catch ditch and bund protecting the road from future rockfall and cliff collapse. The site was considered to be subject to multiple high hazards and risks.

Achieving the remediation works efficiently for the client (Land Information New Zealand), with the safety of all involved parties as the top priority, was exceptionally challenging as the instability of the slopes rendered them too unsafe for direct inspection. To help identify and quantify the material to be removed and monitor the progress of the earthmoving activity, Aurecon engineered a cutting-edge digital solution. This used a unique application of unmanned aerial vehicles (UAVs) and photo grammetry along with the lead contractor's (Protranz Earthmoving Ltd) ability to use remote controlled excavators and the use of Aurecon's modern laser scanning and automated theodolite surveying methods. Similar techniques have been used overseas to monitor the condition of dam walls, but this was the first of its kind used in New Zealand to compare complex 3D terrain models for access to high hazard areas of a site. The UAVs were used in real time to inspect the cliff face and mass movement area to identify changes in the stability.

Images of the slopes were processed into a weekly 3D model, which was compared to the previous week to calculate the subsequent volume change and track the earthworks progress. This enabled access to restricted areas and monitor cliff stability. Specific environmental designs encompassed particular lizard and rare moth habitats within the final landscaping plans and remote controlled excavators were used to recover and restore the unique habitat. The client and local community were very pleased with the result which was delivered with no injuries to people on site, it was on time and within the budget.

Judging & Copyright Statement

This project is an entrant in the 2016 INNOVATE NZ Awards of Excellence competition. The winners will be celebrated at our Awards Gala Dinner on Saturday, 12th August 2017 in Taupo.

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