

Before Queenstown Lakes District Council

In the matter of The Resource Management Act 1991

And The Queenstown Lakes District Operative Private Plan
Change 52

SUMMARY EVIDENCE OF GRAEME HALLIDAY FOR

Mt Cardrona Station Limited

Dated 11 July 2017

Qualifications and Experience

- 1 My name is Graeme Halliday. I am employed as a Senior Engineering Geologist at GeoSolve Ltd, Wanaka. I have 43 years of experience in the engineering geology field in the lower South Island. I hold the qualification of Bachelor of Science (Geology and Chemistry), from the University of Auckland.
- 2 I currently work for GeoSolve, and have been based in the Wanaka area for approximately 10 years. I have worked in the engineering geology sector in the lower South Island for Tonkin & Taylor and more recently GeoSolve. I have previously worked on the Manapouri and Clyde Dam projects. Most of my more recent work has involved site investigations and geotechnical assessments at various levels for residential development, and hazard mapping for domestic and commercial developments. This recent work is relevant to the current site assessment carried out at Mt Cardrona Station.
- 3 I have been instructed by Brown and Company Planning Group to prepare evidence in relation to Plan Change 52. I attach my most recent report resulting from that work as Appendix [A]. I adopt that report as evidence for the hearing.
- 4 I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014. This evidence has been prepared in accordance with it and I agree to comply with it. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

Summary of Evidence

- 5 I undertook site mapping and observations at Cardona Station for the purpose of a geotechnical assessment. This was undertaken to provide further information to support the current plan change request. A review of Royden Thomson's geological hazard report and previously completed test pitting data across the site was completed to provide further information for the assessment. It should be noted that the issued documents are based on broad-scale geomorphological mapping and assessment of previously completed investigations. Further detailed assessments to accompany future resource consent applications will be required to confirm areas suitable for final platform locations and other site-specific concerns that may arise. This is standard practice in many areas of the Queenstown Lakes District at the detailed design and construction phase of a development.
- 6 The attached geotechnical report (rp160677) has been peer-reviewed by senior GeoSolve staff members, Hank Stoker, Senior Water Engineer and Fraser Wilson, Senior Engineering Geologist, prior to issuing.

- 7 Based upon my preliminary findings from the site assessment, along with the standard GeoSolve practice of reviewing investigation data where applicable from nearby sites as part of a desktop study, I have reached the following conclusions in respect of the Site.
- 8 The Site is expected to comprise alluvial fan deposits and alluvial deposits (silt, sand and gravel) with overlying topsoil and loess silt. A trace of the active Cardrona Fault has been identified approximately 300 m to the west of the proposed development area. The average return period for earthquakes on the Cardrona fault is 5000-10,000 years. Thus, the risk of strong ground shaking or surface rupture is considered very low. No other active fault traces are known to exist in the immediate vicinity of the site. The main seismic risk in the region is from an earthquake on the Alpine Fault, which has a 30% probability in the next 50 years. This would subject the whole Wanaka region, including the site, to strong ground shaking.
- 9 In terms of natural hazards, the QLDC and ORC maps have identified alluvial fan and active fault hazards within and nearby the proposed site. Further to this, geological mapping has identified shallow landslide and mining hazards in the site area. After review of Royden Thomson's geological and hydrological investigation and assessment and our own field observations, it is concluded that there is negligible risk to the site from flooding and debris flow due to the deeply incised nearby creeks and the lack of recent alluvial fan deposits. Active landslides on the steep slopes to the north and south of Homestead Creek and to the west of the proposed development area were observed. These are considered to be slow creeping slides and development in these areas is to be avoided. Historic mining activity has been identified in the northeast area of the site, however are not expected to pose any geotechnical implications on the plan change area (subject to localised verification and checking of plans). Liquefaction potential under seismic shaking is considered relatively low on the site, due to the combination of a deep static water table and coarse granular deposits extending to depth.
- 10 Future residential development on the site would not be impeded by any geotechnical issues observed on the site, apart from some areas north and south of Homestead Creek and to the west of the proposed development due to land sliding. Also, areas in the immediate vicinity of the Cardrona Fault Scarp approximately 300 m to the west of the proposed development. As site investigation to date has been preliminary only, future construction close to these areas will need to be assessed in detail on a case-by case basis, and specific assessments will be required and localised mitigation measures may be necessary. The site overall is considered suitable for residential use, subject to standard site-specific engineering solutions applicable at the detailed design phase of future development and construction.

- 11 Geological conditions and associated risks are acceptable for the intended use of the site, subject to the caveats mentioned above. As noted in the reports, detailed investigations will be required to finalise specific engineering requirements for future building areas.

Graeme Halliday

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11 July 2017

Appendix A Attachment: Lr-160677 Cardrona Station Plan Change.pdf