

**BEFORE THE HEARING COMMISSIONERS
AT QUEENSTOWN**

IN THE MATTER of the Resource Management Act 1991
(**RMA or the Act**)

AND

IN THE MATTER of the proposed the Queenstown Lakes
District Plan pursuant to Part 1 of the First
Schedule to the Resource Management
Act 1991

ON BEHALF OF RCL Queenstown PTY Ltd

STATEMENT OF EVIDENCE OF JEREMY WILLIAM TREVATHAN

2 February 2017

INTRODUCTION

Qualifications and experience

1. My name is Dr Jeremy William Trevathan. I am an Acoustic Engineer and Director of Acoustic Engineering Services Limited (AES), an acoustic engineering consultancy based in Christchurch
2. I hold the degrees of Bachelor of Engineering with Honours and Doctor of Philosophy in Mechanical Engineering (Acoustics) from the University of Canterbury. I am an Associate of the New Zealand Planning Institute, and a Member of the Acoustical Society of New Zealand.
3. I have over ten years' experience in the field of acoustic engineering consultancy and have been involved with a large number of environmental noise assessment projects throughout New Zealand. I have previously presented evidence at Council and Environment Court Hearings, and before Boards of Inquiry. I have acted on behalf of applicants, submitters and as a peer reviewer for Councils.

Code of Conduct Statement

4. I have read the Code of Conduct for Expert Witnesses contained within the Environment Court Practice Note 2014, and (although this matter is not before the Environment Court) I have complied with it in the preparation of this evidence. This evidence is within my area of expertise and I confirm I have not omitted to consider material facts known to me that might alter or detract from the opinions I have expressed.

Purpose of Evidence

5. I have been asked to prepare evidence by RCL Queenstown PTY Ltd ("RCL") in regards to the submission they made on the Jacks Point Zone of the Proposed District Plan. In particular, I have been asked to consider the suitability of the RCL site for the establishment of a school or recreational facilities. The focus of my evidence is on the scenario of a school as this is likely to be a more noise sensitive activity than recreational activities.

BACKGROUND

6. I am very familiar with the site the surrounding area, having been involved with *Skydive Queenstown Limited (ENV-2012-CHC-116)* in 2012 – 2014.
7. From an acoustic perspective the only potential issue relating to the establishment a school on the site is with regard to the noise generated by the Skydive Queenstown operation.

8. I understand that Skydive Queenstown operate under a 1997 Resource Consent which permits a total of 35 flights per day by a maximum of two aircraft. The company currently operates Cessna Supercub 900 aircraft which take about 25 minutes to complete a flight. Noise is generated by these aircraft as they taxi, take-off, land and idle between flights. Noise from all of these aspects was quantified during the 2012 - 2014 Environment Court proceedings, and recorded in the evidence and joint statements of the noise experts, including myself.
9. As part of the 16 May 2014 Decision on the case, the Court recorded their view that the use of 'idling mitigation' procedures by Skydive Queenstown was appropriate with regard to section 16 of the Resource Management Act, to reduce noise generated by aircraft idling between flights at the eastern end of the runway experienced by Jacks Point residents on Hackett Road [paragraph 89]. However, I understand from discussions with residents in the intervening period that these procedures have not necessarily been consistently followed. I have therefore assumed that 'idling mitigation' is not being implemented by Skydive Queenstown, for the purposes of this evidence.

APPROPRIATE NOISE LEVELS FOR EDUCATIONAL FACILITIES

10. The noise generated by Skydive Queenstown may be quantified using a number of acoustic metrics. In this evidence I discuss the LAeq level which relates to the energy average noise level over a 15 minute period, and the Ldn level which is the average noise level over a 24 hour period, with a 10 dB penalty applied to any sound occurring during the night time period.
11. For the Queenstown Skydive operations, if one flight typically occurs in any 15 minute period and the maximum permitted 35 flights occur during the daytime period on any day, the LAeq (15 min) noise level is 4 dB greater than the Ldn noise level (as per paragraph 106 of the 16 May 2014 Decision).

World Health Organisation

12. The World Health Organisation document *Guidelines for Community Noise*, records that:
 - (a) For schools, the critical effects of noise are on speech interference, disturbance of information extraction (e.g. comprehension and reading acquisition), message communication and annoyance.
 - (b) To be able to hear and understand spoken messages in classrooms, the background sound pressure level should not exceed 35 dB LAeq during teaching sessions. For hearing impaired children, an even lower sound pressure level may be needed.

- (c) For outdoor playgrounds, the sound pressure level of the noise from external sources should not exceed 55 dB LAeq, the same value given for outdoor residential areas in daytime.

Australian / New Zealand Standard AS/NZS2107:2016

13. Australian / New Zealand Standard AS/NZS2107:2016 *Acoustics – Recommended design sound levels and reverberation times for building interiors* contains guidance with regard to appropriate noise levels within indoor learning areas which are generally in line with the World Health Organisation guidance discussed above. No guidance is provided with regard to appropriate noise levels in outdoor playgrounds.

Designing Quality Learning Spaces – Acoustics

14. The recently published Ministry of Education document *Designing Quality Learning Spaces – Acoustics (version 2.0, September 2016)* provides mandatory design criteria for indoor areas within new public schools, which are consistent with these other documents. No guidance is provided with regard to appropriate noise levels in outdoor playgrounds.

New Zealand Standard NZS6805:1992

15. New Zealand Standard NZS6805:1992 *Airport Noise Management and Land Use Planning* suggests that no new schools should be established where aircraft noise is greater than 65 dB Ldn (3 month average). Where aircraft noise levels are between 55 and 65 dB Ldn (3 month average) new schools “should be prohibited unless a district plan permits such uses, subject to a requirement to incorporate appropriate acoustic insulation to ensure a satisfactory internal noise environment.” The most restrictive control on new noise sensitive activities I am aware of is 50 dB Ldn – which appears in the Regional Policy Statement relating to Christchurch International Airport, for example.

2012 - 2014 Skydive Queenstown Limited Environment Court proceedings

16. During the 2012 to 2014 *Skydive Queenstown Limited* Environment Court proceedings, it was my evidence that provided noise levels from the Skydive Queenstown operation did not exceed 55 dB Ldn on any day, noise effects on residential receivers would be acceptable. The other noise experts supported a position that provided noise levels from Skydive Queenstown operation did not exceed 55 dB Ldn when considered as a 7 day average, noise effects on residential receivers would be acceptable.
17. No evidence was provided as to noise levels or effects on the sports field already established adjacent to the western end of the Skydive Queenstown runway, however the measured noise levels provide in

evidence suggest this area is subjected to noise levels in the order of 52 dB Ldn / 56 dB LAeq (15 min).

Queenstown District Plan

18. The Queenstown District Plan daytime noise limit in residential areas (where schools are typically situated) is 50 dB LAeq (15 min). In the proposed District Plan the limit is also generally 50 dB LAeq (15 min) for residential areas.

Existing schools

19. I was the lead acoustic design engineer for the Remarkables Primary School which opened in 2010, and is subjected to aircraft noise levels between 55 and 65 dB Ldn associated with the Queenstown International Airport. The indoor teaching spaces have been designed to ensure appropriate aircraft break-in noise levels are in line with the guidance discussed above. Outdoor areas are however exposed to elevated levels of aircraft noise. That school has now operated very successfully for 6 years.

Conclusions

20. Based on the above, I consider that:
 - (a) With regard to noise levels within teaching spaces, provided buildings are designed to insulate against aircraft break-in noise such that the WHO / AS/NZS2107 / Ministry of Education guideline values are achieved, appropriate learning outcomes would be expected, and there would therefore not be any potential adverse reverse sensitivity effect on Skydive Queenstown operation.
 - (b) With regard to levels in outdoor playground areas, in areas which experience noise levels of less than 50 dB LAeq (15 min) (46 dB Ldn) negligible adverse effect on children in outdoor play areas would be expected. In areas where aircraft noise levels of up to 55 dB LAeq (15 min) (51 dB Ldn) are expected, only a minor adverse effect would be expected on children in outdoor play areas. Accordingly, any potential adverse reverse sensitivity effect on Queenstown Skydive would be minimal.

AIRCRAFT NOISE LEVELS EXPERIENCED OVER THE RCL LAND

21. I have reviewed the noise levels generated over the RCL by the Skydive Queenstown operation, based on the information produced in evidence during the 2012 - 2014 Environment Court proceedings. As above, I have assumed that Skydive Queenstown are not implementing 'idling mitigation' measures, even though the Court suggested that this would be appropriate with regard to section 16 of the RMA.

22. Based on this analysis I have attached as Appendix 1 to this evidence an image which shows the approximate areas of the RCL land where noise levels of less than 50 dB LAeq (15 min), and 50 to 55 dB LAeq (15 min) are experienced.
23. In line with my discussion in paragraphs 10 to 20 above, in the area where noise levels are less than 50 dB LAeq (15 min) (46 dB Ldn) the development of school buildings and outdoor play areas would be appropriate, with no particular controls. Buildings will inherently provide an adequate noise reduction, even with windows open for ventilation. As above, external levels comply with all relevant guidance by some margin.
24. In the area where noise levels of 50 to 55 dB LAeq (15 min) are experienced (46 to 51 dB Ldn), I consider that development of school buildings and outdoor play areas would still be appropriate, however the layout and design of any such development should be reviewed by an acoustic engineer to ensure buildings provide an adequate level of sound insulation (including consideration of how they will be ventilated while this is achieved), and that the layout of the site optimises the screening provided to outdoor play areas by buildings and other structures.
25. In other areas of the RCL land it would still be possible to construct school buildings which provide an appropriate internal environment, as very high levels of sound insulation can be achieved with specialist constructions. However there would be an increased risk of reverse sensitivity effects if outdoor play spaces were located in these areas.

CONCLUSION

26. I have considered the scenario of a school development on the RCL land at Jacks Point.
27. A body of guidance is available with regard to appropriate noise levels both within school buildings, and in outdoor play areas. Remarkables Primary School in Frankton also provides a relevant point of reference, with regard to a recently-established school which is exposed to elevated aircraft noise levels.
28. My analysis indicates that there is an area of the RCL site which is suitable for the development of school buildings and outdoor play areas, with no particular controls.
29. Other areas of the site may also be appropriate for use as a school, provide adequate controls were put in place regarding sound insulation for buildings, and the location and arrangement of outdoor play areas.

Jeremy Trevathan
2 February 2017

Annexure 1

Areas of the RCL site which experience aircraft noise levels of less than 55 dB LAeq (15 min)

