

**Before the Queenstown Lakes District Council**

In the Matter of                      the Resource Management Act 1991

And

In the Matter of                      the Queenstown Lakes Proposed District Plan

**Chapter 36 (Noise)**

**Summary Evidence of Christopher Day  
(Submitter 433 and Further Submitter  
1340)**

Dated: 1 December 2016

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## INTRODUCTION

1. My name is Christopher William Day. I am a Director of Marshall Day Acoustics Ltd (**MDA**) with 40 years experience in acoustics and environmental noise. I have been providing advice to Queenstown Airport Corporation Limited (**QAC**) on airport noise related matters since 1992.
2. This evidence provides a short summary of my Statement of Evidence of 18 November 2016 and includes brief comments on the evidence of Mr Hunt and the summary evidence of Dr Chiles.

## EVIDENCE OF MR HUNT

### *Appendix 13*

3. In paragraphs 11 to 17 Mr Hunt identifies that the sound insulation constructions specified in Appendix 13 would not be adequate for Hotels located at high noise levels inside the Air Noise Boundary (**ANB**). I agree with Mr Hunt and consequently the proposed visitor accommodation (**VA**) rule (which was based on PC35) need to be amended to eliminate the reference to Appendix 13 of the Operative District Plan (**ODP**).
4. Appendix 13 was developed primarily for buildings where the external environment would not be any noisier than 68 dB  $L_{dn}$ , this being the noisiest possible environment for buildings containing ASAN in proximity to Queenstown Airport (due to zoning constraints etc). Based on extensive measurements MDA has made in houses around Auckland, Wellington and Queenstown Airports, I am confident the Appendix 13 constructions will ensure a house located at 68 dB  $L_{dn}$  will achieve 40 dB  $L_{dn}$  inside, but I agree that Appendix 13 would not be an appropriate construction method for areas of higher external noise levels.
5. The PC35 rules provide two options for ASANs in this noise environment (up to 68 dB  $L_{dn}$ ): to either build to Appendix 13, or alternatively demonstrate the design can achieve an internal noise level of 40 dB  $L_{dn}$ . The Appendix 13 option was included to provide residential developments with a 'standard construction' that would avoid the need for an acoustic design certificate otherwise being required in every case. I agree with Mr Hunt that Appendix 13 would not be appropriate for Visitor Accommodation in the high noise area (ANB).

6. I recommend the Appendix 13 option is deleted from the proposed AMUZ VA rule leaving the requirement to demonstrate that an internal sound environment of 40 dB  $L_{dn}$  will be achieved indoors as the primary (only) option.
7. From MDA's experience with addressing noise related issues for a number of airport hotels, it is my view, contrary to Mr Hunt's, that there are no technical difficulties designing to achieve 40 dB  $L_{dn}$  for a Hotel at Queenstown Airport. I note that Dr Chiles agrees that VA in the Airport Zone can be appropriately designed to mitigate noise effects.

*NZS6805 (para 18)*

8. In paragraph 18, Mr Hunt misquotes the New Zealand Standard where he states; *"the recommendations of NZS6805 prohibit noise sensitive development such as visitor accommodation"*. From my reading of NZS6805, the Standard does not mention visitor accommodation in any way.

*Length of Stay*

9. In paragraph 19, Mr Hunt disagrees that *"restricting the number of days ..... achieves any reduction/mitigation of effects"*. Mr Hunt's approach implies that a person exposed to aircraft noise 365 days a year experiences the same extent of adverse effects as somebody who experiences noise for only one night of the year. This is illogical in my opinion.
10. Mr Hunt also states, *"I cannot see how MDA can be sure that guests will only stay for one or two nights"*. Dr Chiles is fairly relaxed about the length of stay, and suggests no limitation is required, *"so long as any visitor accommodation in the Queenstown Airport Zone is not used for long-term residential type use"* (paragraph 9b of his summary evidence). In my opinion, greater control on duration of stay is appropriate and necessary in order to ensure that the VA is in practice 'short stay'. In my opinion, this would be very easy to implement in the booking system and very easy to enforce from the records.

### *Noise Induced Awakenings*

11. In paragraph 40, Mr Hunt predicts indoor single event noise levels of 67 dB to 75 dB SEL for VA in the AMUZ and that this will cause an unsatisfactory level of awakenings of 5% to 7% of people using VA within the ANB. I disagree with this opinion on two grounds.
12. Firstly a level of 7% of people experiencing awakenings would not necessarily be regarded as significant. A threshold of '10% of the population affected' is often used in setting noise standards. For example NZS 6805 proposes 55 dB  $L_{dn}$  as the threshold below which, the noise level is regarded as satisfactory for residential accommodation. Research by Miedema shows that 11% of the population are highly annoyed at 55 dB  $L_{dn}$  (i.e. approximately 10%). The adjacent Remarkables Park Zone has residential and visitor accommodation located between the 55 dB and 65 dB  $L_{dn}$  aircraft noise contours where 11% to 28% of the population are predicted to be highly annoyed by the Miedema findings.
13. Secondly, as stated in paragraph 39, Mr Hunt has used the performance of the Appendix 13 construction to achieve the indoor sound levels of 67 to 75 dB SEL. As stated earlier, the Appendix 13 construction would not be used for VA accommodation inside the high noise areas and lower internal noise levels (and lower % awakenings) would be achieved.

### **EVIDENCE OF DR CHILES**

14. In paragraph 9(a) Dr Chiles agrees that VA could be located within the Airport Zone with appropriate mitigation but then goes on to state that VA should remain within the definition of ASAN.
15. On reflection, I agree with Dr Chiles that 'short stay' VA is noise sensitive as it needs to achieve a reasonable internal noise level for sleeping. However, it is important to note that 'short stay' VA is considerably less noise sensitive than long term visitor accommodation and residential activity for the reasons described in my evidence and summarised below. For these reasons, the reverse sensitivity planning rules applying to highly noise sensitive activities (prohibition in some areas etc) should not apply to 'short stay' VA. I would like to delete paragraph 24 from my primary evidence and replace it with the sentence; 'Short stay VA is significantly

less noise sensitive than 'long stay' VA and residential, but still requires sound insulation in high noise areas to protect sleep.

#### *Night Hours and Noise Limits*

16. Noise rules in District Plans often have different noise limits and sometimes different cut-off times for day/night for different zones. Mr Kyle has provided a useful summary of the noise limits that apply in zones around Queenstown Airport in his summary evidence. The general approach to setting noise limits is to provide more stringent limits in quiet areas and more lenient limits in areas already affected by higher noise levels. For example 'non-productive' rural areas might have noise limits of 50/40/70 dB ( $L_{Aeq}$  day/ $L_{Aeq}$  night/ $L_{Amax}$  night) and noisier areas close to airports or the city centre might have 55/45/75 dB limits.
17. Mr Hunt and Dr Chiles recommend the more stringent noise limits and cut-off times should apply to the AMUZ (50/40/70 dB and 0800-2000hrs) without any justification of why this area and the immediately surrounding area is particularly quiet. The cut-off time (i.e. day time hours) of 0800 to 2000 hrs is a most unusual time frame that I have not seen in other District Plans and in my opinion is unduly restrictive.
18. I prefer the Chapter 36 section 42A reporting officer's evidence that 55/45/75 dB and 0700 to 2200hrs are appropriate limits for activities in the AMUZ.

#### **SUMMARY**

19. Short stay VA is less sensitive to noise than long stay VA because of; (i) visitor expectation of aircraft noise, (ii) the short duration of noise exposure and (iii) no outdoor areas for high noise exposure.
20. On this basis, VA should be allowed in the Airport Zone subject to restrictions on the length of stay, outdoor areas and sound insulation rules.
21. The noise limits for activities in the AMUZ received in surrounding zones should be consistent with the noise rule recommended by the section 42A reporting officer (Ruth Evans) for Chapter 36 (Noise), specifically Rule 36.5.15, as per her reply evidence on behalf of QLDC, dated 22 September 2016.

22. The rules for the LSCZ should be consistent with the rules for other zones surrounding the Airport in respect of the mitigation of aircraft noise, and should contain the revised provisions for mechanical ventilation, as per QAC's evidence for Chapter 36 of the PDP.

**Chris Day**

**December 2016**