

**IN THE MATTER** of the Resource Management Act 1991

**AND**

**IN THE MATTER** of a resource consent application  
(RC185627) by Fulton Hogan Ltd

**STATEMENT OF EVIDENCE OF STEPHEN GORDON CHILES  
FOR CANTERBURY DISTRICT HEALTH BOARD IN RELATION TO ACOUSTICS**

**14 October 2019**

## QUALIFICATIONS AND EXPERIENCE

1. My full name is Dr Stephen Gordon Chiles. I am self-employed as an acoustician through my company Chiles Ltd. I have been employed in acoustics since 1996, as a research officer at the University of Bath, a principal environmental specialist for the NZ Transport Agency, as a consultant for the international firms Arup, WSP, and URS, and for the specialist firms Marshall Day Acoustics and Fleming & Barron.
2. I am subcontracted by Southern Monitoring Services to provide the Environmental Noise Analysis and Advice Service, advising the Ministry of Health and Public Health Services on environmental noise.
3. I have degrees of Doctor of Philosophy in Acoustics from the University of Bath, and Bachelor of Engineering in Electroacoustics from the University of Salford. I am a Chartered Professional Engineer and a Fellow of the UK Institute of Acoustics.
4. I have made acoustics assessments and designs for numerous developments including infrastructure, industrial, commercial, recreational and residential activities. With respect to quarrying, I have previously been engaged by quarry operators, neighbours and Councils to advise on noise effects from various sites.
5. I am convenor of the New Zealand industry reference group for the committee responsible for approximately 200 published "ISO" acoustics standards. I was Chair of the 2012 New Zealand acoustics standards review, Chair for the 2010 wind farm noise standard, and a member for the 2008 general environmental noise standards.
6. I confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014. This evidence is within my area of expertise except where I state that I am relying on facts or information provided by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

## SCOPE OF EVIDENCE

7. My evidence relates to noise effects from on-site and off-site activity associated with Fulton Hogan Ltd's application for land-use consent RC185627 made to the Selwyn District Council ("SDC") to establish and operate the proposed Roydon Quarry.
8. On behalf of the Canterbury District Health Board ("CDHB"), I reviewed the acoustic assessment for the proposed quarry prepared by Marshall Day Acoustics ("MDA"), in January 2019 prior to notification of the application. I identified various issues where environmental noise associated with the proposal might affect public health and I contacted MDA to discuss potential controls. However, those matters were not addressed by Fulton Hogan prior to notification, so I advised CDHB to raise them in its submission. These matters are set out in paragraph 23 of the CDHB submission.
9. I attended conferencing of acoustics experts on 7 August 2019, with Jeremy Trevathan (SDC), Jon Farren and Gary Walton (Fulton Hogan), Richard Jackett (New Zealand Motor Caravan Association) and Michael Smith (Templeton Residents Association). Dr Trevathan and Mr Farren did not wish to prepare a Joint Statement prior to their own statements of evidence, so no agreed statement was produced from that conferencing.
10. I am familiar with the general area around the proposed quarry and I also conducted a specific site visit looking at surrounding local roads on 29 September 2019.
11. In addition to the MDA assessment and further information, I have read the evidence of Dr Trevathan dated 2 September 2019 and of Mr Farren dated 23 September 2019. I have relied on the MDA measured and predicted sound levels in my evidence. I have referred to the traffic evidence of Andrew Metherell dated 23 September 2019.
12. Since I raised the noise issues set out in the CDHB submission, Fulton Hogan has reduced the scope of its land use consent application as described in the evidence of Kevin Bligh dated 23 September 2019, and in particular as defined by the proposed conditions for RC185627 in Annexure B to Mr Bligh's evidence. In my evidence I will generally not address noise issues that have now been resolved by those proposed conditions.

13. My evidence will address:
  - a) On-site activity, sound level predictions, noise limits and hours of operation,
  - b) Controls for tonal alarms, and
  - c) Noise effects and controls for off-site heavy vehicle movements.
14. All references in my evidence to conditions are with respect to the numbering and text in Annexure B to Mr Bligh's evidence for land use consent application RC185627.

### **EXECUTIVE SUMMARY**

15. Noise limits and other controls for on-site activity are proposed in consent conditions. These controls address most matters raised in the CDHB submission with respect to noise from on-site activity, and in my opinion should result in reasonable sound levels at neighbouring properties adequate to protect public health. An exception is that in my opinion use of tonal alarms should be prohibited on the site due to the increased annoyance and disturbance that sound can cause. The proposed conditions currently appear to include a loophole that would allow some use of tonal alarms on the site.
16. In my opinion the proposed conditions do not adequately manage noise effects from off-site trucks using local roads. I recommend that all trucks should be required to access the quarry via SH1 at Dawsons Road at all times. I also recommend that the road between SH1 and the site should be upgraded to minimise noise, and that trucks with audible engine brakes should be prohibited from entering the site.

### **ON-SITE ACTIVITY**

17. The MDA sound level predictions for on-site quarry activity appear to have been made using what I consider to be an appropriate method and the results are in a range I would expect based on other quarries. In my opinion, the sound sources and nature of the operation are well understood given the existence of other comparable established quarries around Christchurch.

18. The proposed noise limits for on-site activity set out in condition 43 are consistent with guidance in New Zealand Standard 6802:2008 and on this basis in my opinion they are adequate to protect public health. These noise limits are coupled with other restrictions that reduce potential noise effects, such as limitations on hours of operation in condition 19 and minimum setbacks in conditions 31 and 32.
19. Condition 44 excludes sound from vehicles at the site access from the noise limits. In my opinion this is unavoidable given that noise limits in condition 43 apply at any point within other sites. I consider that the potential noise effect arising from this exclusion is addressed by separation of the site access from the nearest house as required by condition 14.

## **TONAL ALARMS**

20. Vehicles and equipment often need audible alarms for safety purposes, such as when reversing, although in some instances visual alternatives are practical. Where an audible alarm is necessary there are two main types: tonal or broadband. Both types can fulfil the safety function, and either can be used on a particular item of equipment or vehicle. Equipment and vehicles often come fitted with a tonal alarm, but I understand these can be readily changed to a broadband alarm.
21. In my experience, neighbours find the distinctive sound of tonal alarms significantly more annoying and disturbing than the “blander” sound of broadband alarms. In my opinion the use of broadband alarms on all vehicles and equipment on this site is practicable and should represent normal good practice.
22. SDC and Fulton Hogan have made alternating changes to proposed condition 46, in relation to tonal alarms. Some changes appear to limit the scope of the condition. I understand Fulton Hogan will have control over every vehicle and item of equipment entering the site. While a universal ban on tonal alarms may require some management effort with respect to equipment and vehicles owned by third parties, in my opinion that effort is necessary to avoid adverse noise effects.

23. I recommend that condition 46 be redrafted and simplified to read: *"Tonal alarms must not be used on the site."* This wording directly addresses the potential noise effect and allows Fulton Hogan to implement the requirement in the most efficient manner. It avoids creating loopholes, which I do not consider to be justified on the basis of vehicle and equipment ownership.

## **OFF-SITE TRUCKS**

24. A positive feature of this site compared to some other quarries is the proximity to State Highway 1 (SH1), allowing trucks to quickly access a core section of the existing road network. In my opinion the noise effects of quarry trucks being distributed from SH1 as an existing high-volume road should be acceptable and should not require further assessment. This should remain the case even when the second part of the Christchurch Southern Motorway opens and results in a reduction in traffic on this section of SH1.
25. Condition 22 requires all quarry truck movements between 0600h and 2000h to access the site via SH1 at Dawsons Road. I recommend that to avoid adverse noise effects on residents living by local roads this requirement should apply at all times.
26. Noise from trucks on local roads around the quarry has potential to cause disturbance. While these are legal roads and are already subject to other existing truck movements, the quarry could result in different patterns of truck movements. For example, under the proposed conditions a number of trucks could all leave the site on the same local road shortly after 0600h in the morning.
27. In their respective statements of evidence, Mr Farren and Dr Trevathan discuss sound levels from trucks in terms of the average levels over a one-hour period. However, residents are likely to perceive and be disturbed by trucks as momentary individual noise events. This will be particularly so if there are imperfections in road surfaces inducing truck body noise, or if there is audible engine braking noise. I observed numerous defects on most of the surrounding local roads including on Jones Road in both directions from the site and on Currags Road. These road surface defects are likely to induce truck body noise.

28. The reasons given in paragraph 75 of Mr Metherell's evidence for some quarry trucks using a local road, rather than all trucks distributing from SH1, include both local deliveries and driver preferences. In my opinion, driver preference is an irrelevant factor if certain routes can be used to avoid adverse noise effects. In this example there is a choice of using one of two parallel roads, where one is an existing high volume road (SH1) and the other is a local road (Jones Road) with surface features and geometry likely to give rise to disturbing truck body noise adjacent to a residential area. I consider that even for local deliveries to Templeton all trucks should still use SH1.
29. In my opinion the approach to managing truck routing proposed in condition 38 is not adequate to avoid unnecessary truck movements on local roads in the vicinity of the quarry. A requirement for all trucks to enter and leave the site via SH1 at the Dawsons Road roundabout would provide certainty in truck routing and in my opinion would avoid adverse noise effects. This could be automatically monitored with a permanently installed number plate recognition camera at the site access and another one on Dawsons Road.
30. Fulton Hogan proposes to upgrade the roads between the site and SH1. This includes a new roundabout between Jones Road and Dawsons Road. Roundabouts can result in vehicle sound characteristics associated with braking and accelerating, particularly for heavy vehicles. The proposed design of the road improvements appears to be based on safety and efficiency. In my opinion the design should be developed to also minimise adverse noise effects.
31. To minimise noise effects of heavy vehicles travelling between the site and SH1 at the Dawsons Road roundabout, I recommend the following controls:
- a) Site access to only allow heavy vehicles to turn right-in and left-out on Jones Road,
  - b) A reduced speed limit between the site and SH1 (to say 40 km/h) either posted for all traffic or voluntarily imposed by Fulton Hogan on all quarry traffic (this could also be monitored by number plate recognition cameras),

- c) Upgrading of Jones Road and Dawsons Road to achieve a smooth surface without discontinuities in wheel paths,
  - d) Road geometry, landscaping, signage and lighting to encourage gradual speed changes at the new roundabout and potential T-intersection between Dawsons and Jones Roads.
32. Audible engine brakes are often reported to be a significant cause of noise disturbance, particularly at roundabouts. I understand there is only a small percentage of (mainly older) trucks in the New Zealand fleet that do have audible engine brakes but in my experience they cause disproportionate noise disturbance. The issue can arise when a truck's original exhaust silencer is removed and replaced with an inadequate alternative. There are silencers available that can be retrofitted to trucks with noisy engine brakes to resolve the problem.
33. I recommend that a consent condition should be imposed prohibiting trucks with audible engine brakes from entering the site. As Fulton Hogan will control every vehicle entering the site this should be a practical part of site induction for new drivers and vehicles.

**Dr Stephen Chiles**

**14 October 2019**