

**Before Independent Hearings Commissioners Appointed by Canterbury
Regional Council and Selwyn District Council**

In the matter of The Resource Management Act 1991

And

In the matter of Applications by **Fulton Hogan Limited** for all
resource consents necessary to establish, operate,
maintain and close an aggregate quarry (**Roydon
Quarry**) between Curraghs, Dawsons, Maddisons
and Jones Roads, Templeton

**SUMMARY STATEMENT OF AUDREY KATHLEEN WAGENAAR ON
BEHALF OF FULTON HOGAN LIMITED**

HUMAN HEALTH

DATED: 13 NOVEMBER 2019

Counsel Acting: David Caldwell
Email: david.caldwell@bridgesidechambers.co.nz
Telephone: 64 21 221 4113
P O Box 3180
Christchurch 8013

Introduction

1. My name is Audrey Kathleen Wagenaar. I have been engaged by Fulton Hogan Limited to provide evidence on the potential for human health effects to occur, resulting from off-site exposures associated with the proposed Roydon quarry (the **Proposal**).
2. In this summary of my evidence, I outline the key matters discussed in my evidence in chief (dated 23 September 2019), including my review of the public submissions related to potential health effects, the relevant s42A reports and relevant background reports related to the evaluation of health effects at other quarries in New Zealand. I also set out what I consider to be the most relevant and reliable literature, guidelines and criteria applicable to the Proposal.
3. Lastly, I summarise the key aspects of my supplementary rebuttal evidence (dated 30 October 2019 and 5 November 2019) and present the overall conclusions of my evidence.

Submitter and/or Officer comments as to separation distances

4. Following my review of the submissions (summarised in **Annexure 2** of my evidence), I note that a number relate to potential health effects which I have classified by general theme in paragraph 21 of my primary evidence. I use this to inform my selection of relevant health guidance and air quality guidelines and standards. Based on this review, I discern the following matters of principal concern and which are within the scope of my expertise (paragraph 4 of my evidence) and related to air quality:
 - (a) Changes in air quality affecting human health;
 - (b) Concerns about specific contaminants, namely particulate matter and respirable crystalline silica (RCS); and
 - (c) Concerns of existing respiratory or other health conditions potentially being exacerbated by residing in close proximity to the proposed Roydon quarry.
5. I provide a detailed description of the relevant guidelines and standards containing air quality criteria. This includes 24-hour and annual criteria for PM₁₀ and PM_{2.5}; and 1-hour, 24-hour and annual criteria for RCS, as discussed in paragraphs 24 to 34 of my primary evidence.

Air quality criteria

6. Based on my review of the health-based air quality criteria and in considering the hierarchy recommended by the Ministry of Environment (2016) (for selection of air quality criteria in the absence of a New Zealand air quality standard or guideline), the criteria which I consider most relevant to the Proposal for assessing discharges of PM₁₀, PM_{2.5} and RCS, is set out in **Table 1** (paragraph 35) of my primary evidence.

Existing health studies for other New Zealand quarries

7. A discussion on the existing health studies that I have reviewed for other quarries in New Zealand is set out in paragraphs 36 to 49 of my evidence in chief. The Yaldhurst Air Quality Report dated 19 June 2018 prepared by Mote Measurement Networks (Mote 2018) relates to a study on RCS for Environment Canterbury. I have specifically reviewed the 24-hour and annual maximum and average PM_{2.5} and PM₁₀ concentrations, and the annual maximum and average values for RCS measures between December 2017 and April 2018, with respect to the views Mr Cudmore reaches in his evidence statement.
8. Having reviewed the Mote (2018) study in conjunction with Mr Cudmore's expert opinion that the Yaldhurst gravel quarry RCS concentrations are likely to be higher than those measured off-site in the vicinity of the proposed quarry, I expect that there will be extremely low to negligible effects on human health associated with potential exposure to RCS, as a result of the Proposal.
9. Mr Cudmore's assessment concludes exposure to particulate matter in the immediate off-site vicinity of the proposed quarry is expected to be within applicable air quality standards and guidelines.
10. In my view, the health risks associated with the proposal are acceptable because ambient air quality concentrations are expected to be below the health-based air quality guidelines for particulate matter. The guideline values for particulate matter are concentrations that correspond to a tolerable level of risk, rather than a completely negligible risk, as discussed in paragraph 48 of my evidence statement.

Rebuttal evidence

11. In my supplementary rebuttal evidence, I address the human health issues raised in the evidence of 1) Dr Fitch on behalf of N and A McGrath and of 2) Louise Wickham on behalf of the Canterbury District Health Board. My supplementary rebuttal evidence (30 October 2019) with respect to Dr Fitch's evidence is complimentary to Dr Jorgensen's rebuttal evidence and focuses on the applicability of human health air quality criteria for the protection of equine health. I support Dr Jorgensen's suggestion that the human health air quality criteria would be sufficiently robust to also protect equine health, if as indicated by Dr Fitch, that the equine model is potential model for the human syndrome.
12. The key focus of my 5 November 2019 supplementary rebuttal evidence is addressing Ms Wickham's concerns with the recommendations in Section 4.6 of the MfE (2016) Good Practice Guide for Assessing and Managing Dust (MfE Guidelines), on the use of the Texan Commission on Environmental Quality (TCEQ) air quality criteria.
13. I note that the use of the TCEQ criteria for screening needs to be evaluated on a chemical-specific basis in terms of whether suitable documentation is available. It is my opinion that sufficient documentation is available to use the 1-hour TCEQ value for RCS. Through demonstrating this analysis in my evidence (dated 5 November) and based on my understanding of Ms Wickham's proposed approach to worker exposure limits (paragraph 13), I am satisfied with the utilization of TCEQ criteria.

Conclusions of my evidence in chief and rebuttal evidence

14. Based on my review of the applicable ambient air quality data, the data available in Mote (2018) and the expert evidence of Mr Cudmore, I conclude the potential health risks of the Proposal associated with off-site exposure are expected to be:
 - (a) extremely low to negligible for respirable crystalline silica; and,
 - (b) acceptable (low to negligible depending the concentrations off-Site) and not dissimilar to background concentrations in other areas of New Zealand for PM_{2.5} and PM₁₀.
15. In addressing, Dr Fitch's evidence, I support Dr Jorgensen's suggestion that the human health air quality criteria would be sufficiently robust to also

protect equine health, if as indicated by Dr Fitch, that the equine model is potential model for the human asthma syndrome.

16. In addressing Ms Wickham's evidence, my evaluation of the wording in the MfE Guidelines is that, if a robust criterion is available from TCEQ with suitable documentation, this would be a preferred approach over the modification of a New Zealand Workplace Exposure Standard, and this I consider consistent with international best practise. I consider Section 4.6 supports the selection of the 1-hour TCEQ value for RCS.

Audrey Wagenaar

13 November 2019