

Before Independent Commissioners Appointed by the 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

JOINT WITNESS STATEMENT OF:

- (1) DEBORAH RYAN;**
- (2) ROGER CUDMORE**
- (3) AUDREY WAGENAAR;**
- (4) CHARLES KIRKBY; AND**
- (5) LOUISE WICKHAM.**

AIR QUALITY

DATED: 14 NOVEMBER 2019

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Introduction

1. This Joint Witness Statement (**JWS**):
 - (a) Relates to any effects on air quality that may arise from Fulton Hogan Limited's proposal to establish, maintain and close the Roydon Quarry; and
 - (b) Reports on the outcome of expert conferencing between the five air quality experts¹ who have filed evidence in this matter.
2. The expert conference was held on 11 November 2019 at the offices of Canterbury Regional Council. John Hardie (Barrister and Mediator) facilitated the conference. Ms Wagenaar attended by phone as she is based in Canada. Ms Wagenaar also only attended for some of the conference, as her expertise is in the human health effects of air quality. Mr Kirkby attended by phone from Auckland.
3. The experts involved have read Appendix 3 of the Environment Court Practice Note and confirm compliance with it.
4. In particular (and as set out in paragraphs 1(a) and (b) of Appendix 3) the witnesses understand:
 - (a) the role of a JWS is to clearly record the issues agreed and not agreed, between them. Succinct reasons are to be captured in the JWS. This will assist all parties and the decision-makers in focussing on the matters that remain in dispute and the significance of them;
 - (b) expert conferencing is not a forum in which compromise or a mediated outcome between the experts is anticipated. Unlike mediation, the "aim" is not resolution. Rather, the aim is clear identification of and narrowing of points of difference.
5. Based on the evidence filed up to 7 November 2019, the following topics are suggested as useful starting point for discussions:

¹ Deborah Ryan (witness for CRC); Roger Cudmore and Audrey Wagenaar (witnesses for Fulton Hogan); Charles Kirkby (witness for Templeton Residents Association); Louise Wickham (witness for Canterbury District Health Board).

RCS Criteria

6. Experts agree on the annual average OEHHA value of 3 µg/m³ for chronic effects of exposure to RCS, where the annual average criterion is based on protection against silicosis derived from chronic exposure. Silicosis, which is considered an essential precursor, may lead to cancer. As a result, the annual average criterion is also considered to be protective of carcinogenic effects. There was in-principle agreement that a transparent toxicological basis was preferred for setting an acute guideline for RCS as compared with applying a factor to a workplace exposure limit. An acute 1-hour criterion is set to protect against inflammation and cell-toxicity that causes silicosis.
7. Ms Wagenaar supports the acute Texas guideline (TCEQ of 47 µg/m³ as a 1-hour average) but acknowledges that it is based on the PM₁₀ fraction. She is open to the adjustment of the guideline to make it more specific to the PM₄ fraction.

Clarification on the proposal.

8. Prior to further discussions, Ms Wickham requested clarification on the Proposal. The following was provided by Mr Cudmore.

The Proposal

- Mr Cudmore has assessed a busy year for site being 600,000 tonnes per annum (T.p.a) excavation, with an average of 500,000 T.p.a.
- This range was amended by Mr Cudmore on 13 November 2019 following clarification provided by Fulton Hogan that the typical aggregate extraction rate for site is expected to be 500,000 T.p.a, while a maximum rate of 725,000 T.p.a is anticipated.
- Wheeled Loader to fixed bin conveyor (water spray) - (no trucks normally) Excavated material moisture content is 4- 6% in summer and higher in winter.
- The conveyor has conveyor transfer points (water spray) and discharges into process plant inlet bin. The fixed processing plant uses a cone crusher to make top course (maximum 20 mm - no barmack, no AP5). The mobile plant is also 20mm max.

- The mobile plant will only operate to the west of the processing plant. The mobile will be restricted to operating up to 120 days per year and the mobile plant capacity is included in the 500 T/hour maximum production rate. The mobile plant is intended as back-up to primary plant.
- Products will be stockpiled within the central processing area. Topsoil and unprocessed aggregate will also be stockpiled in, and immediately adjacent to, this area during the central processing site establishment phase – i.e. pre-operational phase.
- Trucks will enter and exit the site via a sealed access road and a sealed ring road. Those that pull off the seal such as for loading will use a truck wash. Vacuuming on sealed roads is proposed.
- 20 T trucks loads. 1,200 movements peak and 800 movements on a 60-day average. These are peak numbers.
- Of the total truck movements, around 30% will bring in cleanfill. Cleanfill trucks will drive on reject material at quarry floor level and don't run over exposed ground or cleanfill material (like most quarries). They only travel on limited area of non-reject covered areas). These trucks will go through rumble strip and wheel wash before joining sealed road (and may also be loaded with aggregate before leaving the site).
- Water sprays will be in place on the processing plant (central and mobile) and on all conveyor transfer points and plant equipment (crushers/screens). No crushing will occur within 500 m of eastern boundary or 250 m of all other boundaries.
- Bund construction: Mitigation – 1) don't strip soil without soil being damp (natural or wetted). Restrictions on wind speed and directions (towards neighbours).
- Fast seeding grass on bunds. Estimated several days of construction only when within 100m of a house. Build bund in winter to ensure soil damp.
- Topsoil comes from central processing area to construct bunds and topsoil will be stored as required near the central processing area. Mr Cudmore has confirmed that this is correct, that is stockpiling of soil extracted from the central processing area will be stored adjacent to that area.
- Polymers for piles (soil or bunds or aggregates).

Quarry areas

- 26 ha included sealed roads and reject covered areas when considering active areas that's where 6 ha is determined from. Mr Cudmore's evidence outlines the basis for this assumption.
- 100 m set back applies to the active face for the 2 nearest houses. (Curraghs and Maddisons Roads). If approval is provided by these house owners then extraction may occur closer than this setback.
- Average payload 20 T per truck

What is experts' opinion of the potential for air quality related health effects of the proposal on people beyond the site boundary including PM₁₀, PM_{2.5} and RCS?

9. The experts agree that there would be negligible health effects due to PM₁₀ at the Templeton township (700 m from proposal boundary).
10. Mr Cudmore, Ms Ryan and Mr Kirkby consider that the potential for health effects from PM₁₀ discharges on the sensitive receptors to the proposal are likely to be acceptable/low. This is on the basis that the mitigation (design and controls) proposed are employed as described in the evidence of Mr Cudmore. Ms Wickham's view is that there will always be occasions where PM₁₀ levels downwind at sensitive receptors may exceed health-based criteria due to circumstances beyond the applicant's control. She has recommended additional monitoring to assist with proactive PM₁₀ emissions management.
11. Mr Cudmore considers that the design of the quarry allows for controls on dust to be employed far more effectively than conventional quarries in Canterbury such that the loss of control of dust emissions will be very rare.
12. The experts agree that there are negligible health effects due to PM_{2.5} at all locations beyond the boundary of the proposal site.
13. All the experts agree that with the mitigation proposed, offsite levels of RCS are not expected to exceed the annual criterion and likely to be well below this criterion.
14. Ms Ryan and Mr Cudmore consider that for this proposal, exposure to short term levels of RCS are likely to pose a minor or less health risk to people offsite. This is based on an analysis of the ambient monitoring completed in

the Yaldhurst area, in particular, the analysis of the data to estimate 1-hour average RCS by scaling with PM₁₀ and PM_{2.5} measurement data. Ms Ryan and Mr Cudmore do not agree that the personal exposure monitoring data that was contained in Attachment C of Ms Wickham's evidence can be used to infer acute exposure of people to RCS for the Proposal.

15. Mr Kirkby still considers there is uncertainty. Ms Wickham considers that Yaldhurst personal exposure monitoring found elevated short-term levels of RCS in the PM₄ fraction. This is not readily explainable. She remains concerned at the potential for elevated short-term levels of RCS and has recommended additional monitoring. This will also be helpful for the public who are concerned about RCS. As offered by the applicant, the experts have agreed to a short-term monitoring study being developed for RCS and have recommended a condition to develop a monitoring plan to help to reassure the community. The intention would be for monitoring when dust emissions are highest (e.g. during summer), once full-scale quarry operations are established.

What is experts' opinion of the potential for dust related nuisance effects of the proposal on people beyond the site boundary?

16. Mr Cudmore considers that the formation of the bund as per the Proposal can be managed such that nuisance effects are not objectionable or offensive at the sensitive receptors. Ms Ryan agrees and notes that it will require vigilance and a high level of control and monitoring. Mr Kirkby agrees but remains concerned about the close proximity of some sensitive receptors.
17. Mr Cudmore, Mr Kirkby and Ms Ryan consider that operation of the quarry as per the Proposal can be readily managed such that dust nuisance effects are not objectionable or offensive at sensitive receptors.
18. Ms Wickham's evidence has focused on health effects but considers that some residents may experience dust nuisance on occasion even with best practice mitigation due to their close proximity.

Appropriateness of applying any reduction factor to air quality impacts measured by the Yaldhurst study – to estimate air quality effects from the Proposal and the likely magnitude of that factor;

19. The experts agree that the effects of the Proposal on air quality will be less than those from the existing Yaldhurst quarries. Mr Cudmore considers that more than an order of magnitude reduction can be achieved through the Proposal design and controls and has applied a reduction factor of 0.1 (i.e. a ten-fold reduction) to the incremental PM₁₀ concentrations he assessed to be caused by the multiple quarry sites at Yaldhurst (data provide via the Yaldhurst Study). The other experts would like to review Mr Cudmore's PM₁₀ emission calculations (attachment B rebuttal dated 6 November 2019) in more detail to inform their position on the likely scale of reduction in the emissions and thereby incremental impact on PM₁₀ levels beyond the boundary compared to Yaldhurst.

Proposed Monitoring – views on conditions/adequacy

20. The experts have reviewed and commented on the attached conditions. There was good agreement on the majority of monitoring and mitigation proposed. Mr Cudmore has provided additional background PM₁₀ BAM monitoring data to assist the other experts to assess trigger limits for PM₁₀ that can be usefully applied to managing particulate matter emissions on-site.
21. Ms Wickham and Mr Kirkby would like the clarified detail provided by Mr Cudmore (e.g. scale/throughput, areas of open ground, etc.) to be included in the air discharge consent conditions (as this is the basis of assessment). Ms Ryan agrees that with a high level of weighting being put on the design and mitigation by the applicant, in particular, as the basis for achieving the NES Regulation 17, that these aspects need to be embedded any consent, if granted.

What are the experts' position on the value of air dispersion modelling of estimated particulate emissions from the proposal quarry?

22. The experts agree that air dispersion modelling of large fugitive source like quarries has large variability and uncertainties in the assumptions and outputs. Mr Kirkby and Ms Wickham consider that modelling could add value as a comparative analysis with the existing Yaldhurst quarries. Ms Wickham considers this is especially the case when then there is wealth of monitoring data against which the modelling can be calibrated. Mr Cudmore and Ms Ryan consider that the calculation of emissions from Yaldhurst and the Proposal using USEPA emission factors is helpful to understand the relative

PM₁₀ emissions from Yaldhurst compared to the Proposal and that dispersion modeling would be unlikely to provide any greater certainty as to the quantum of the effects on concentrations..

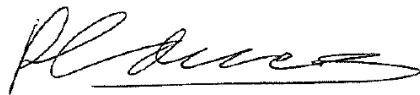
What are the experts' position on the method(s) used for the assessment of the proposal?

23. Ms Ryan, Mr Kirkby and Mr Cudmore consider the assessment was completed using appropriate methods and in accordance with good practice. Ms Wickham agrees that the use of US EPA emission factors, and focus on mitigation and control, are in accordance with best practice. However, Ms Wickham considers that other aspects of Mr Cudmore's approach lack conservatism (e.g. narrow focus on specific wind directions) and that modelling could have provided useful information to inform the assessment (e.g. priority of dust sources).

Likelihood of compliance with Regulation 17 and offsets.

24. The experts disagree on the likelihood that the proposal can comply with the significance threshold limit in Regulation 17 of the NES for air quality of an increase of 2.5 µg/m³ in PM₁₀ concentrations as a 24-hour average at any time in a polluted airshed. Mr Cudmore considers that the Proposal can comply. Ms Wickham does not consider it is likely. Ms Ryan and Mr Kirkby consider that it is difficult to be unequivocal that as per Regulation 17(1) that the discharge would not be likely, at any time, to increase the concentration of PM₁₀ by more than 2.5 µg/m³ in any part of the polluted airshed.

Signed 14 November 2019



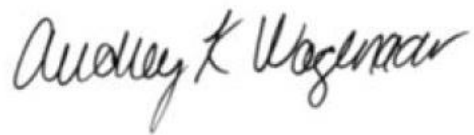
Roger Cudmore



Charles Kirkby

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Deborah Ryan

A handwritten signature in black ink, clearly legible as 'Audrey K. Wagenaar'.

Audrey Wagenaar

A handwritten signature in black ink, appearing to be 'L. Wickham' followed by a horizontal stroke.

Louise Wickham