Before the Hearings Panel

Appointed by Environment Canterbury and Waimakariri District Council

Under	the Resource Management Act 1991
In the matter of	an application by **Taggarts Earthmoving Limited** for various resource consents for a quarry at Rangiora Racecourse (**Racecourse quarry**) under section 88 of the Act
And	the submission of **The Rangiora Ashley Community Board**

Evidence of Donovan Van Kekem

Dated: 27 April 2021

AJS-895078-1-76-V1-e

Solicitor Acting: Andrew Schulte – andrew.schulte@cavell.co.nz

cavell leitch

Ground Floor
6 Hazeldean Road
PO Box 799
Christchurch 8140
T: +64 3 379 9940
F: +64 3 379 2408
www.cavell.co.nz

Evidence of Donovan Van Kekem:

Introduction

1. My name is Donovan Van Kekem. I am the managing director of NZ Air Limited (NZ Air). I have over 17 years specialist air quality experience. I have been engaged by the Rangiora-Ashley Community Board (RACB) to assess the potential for adverse ambient air quality effects and any potential reduction in local amenity values as a result of the proposed Taggart Earthmoving Limited (Taggart, the applicant) Rangiora Racecourse aggregate quarry.

Qualifications and Experience

2. I have the following qualifications:

   1) a Bachelor's Degree in Biochemistry from the University of Canterbury; and

   2) a Post Graduate Diploma in Forensic Science from the University of Auckland.

3. I am also a current member of the Clean Air Society of Australia and New Zealand.

4. Some of my work experience which is relevant to this application is as follows:

   1) I have been involved in writing and presenting expert air quality evidence for a number of air discharge consents containing nuisance dust and odour discharges including:

      (i) The SOL Quarries Harewood gravel quarry on behalf of the applicant.

      (ii) AB Lime Winton Quarry and Landfill, replacement air discharge consents for its landfill and lime kilns on behalf of the applicant.

      (iii) Envirofert's application for a replacement air discharge consent for its large composting operation in Tuakau;

(iv) The Orini chicken egg layer farm on behalf of Mainland Poultry;

(v) The Lamond free range layer farm on behalf of submitters;

(vi) The Envirowaste Cass Street waste transfer station;

2) I have also acted as an independent processing officer for Canterbury Regional Council (CRC) assessing a number of complex air discharge consent applications, a number of which have gone through to hearing at which I have attended as an air quality expert on behalf of CRC.

3) I have conducted air quality monitoring and/or assessments at number of quarries including:

(i) SOL Harewood Quarry, Christchurch;

(ii) Brookby Quarry, Auckland;

(iii) Winstone Aggregates Belmont Quarry, Wellington;

(iv) Christchurch Readymix Amberley Quarry; and

(v) Winstone Aggregates Hunua Quarry, Auckland.

Code of Conduct

5. Although not necessary in respect of council hearings, I can confirm I have read the Expert Witness Code of Conduct set out in the Environment Court's Practice Note 2014. I have complied with the Code of Conduct in preparing this evidence and I agree to comply with it while giving oral evidence before the hearing committee. Except where I state that I am relying on the evidence of another person, this written evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in this evidence.

Scope and Structure of Evidence

6. In preparing this evidence I have read and familiarised myself with:

   a) Rangiora Racecourse Quarry Air Quality Impact Assessment (Taggart Earthmoving Limited). Report prepared for Taggart by Pattle Delamore Partners (PDP), dated 1 October 2020. Hereafter referred to as the AQIA;

   b) PDP section 92 response (2021). Taggart Earthmoving Ltd Applications –Response to S92 Requests. Letter from PDP to Incite dated 27 January 2021. Hereafter referred to as the PDP S92 Response;

   c) The report prepared by Richard Chilton on behalf of Environment Canterbury; addendum to the Section 42A Officers Report, dated 4 May 2021; and

   d) The statement of evidence prepared by Jeffery Bluett, dated 19 April 2021.

7. The scope of my evidence is limited to assessing the concerns raised by RACB with regards to:

   a) The potential for nuisance dust discharge from the proposed Taggart Rangiora Quarry to affect the amenity values of residents and users of property adjacent to the quarry; and

   b) The potential adverse effects of fine particulate (PM_{10}) discharges from the proposed Taggart Rangiora Quarry.

8. My evidence will address the following matters:

   a) A critical assessment of the PDP AQIA and S92 Response;

   b) Comments on the Mr Chilton's Report;

   c) Comments on the expert evidence of Mr Bluett;

   d) Comments on the recommended conditions of consents; and

   e) Conclusion.

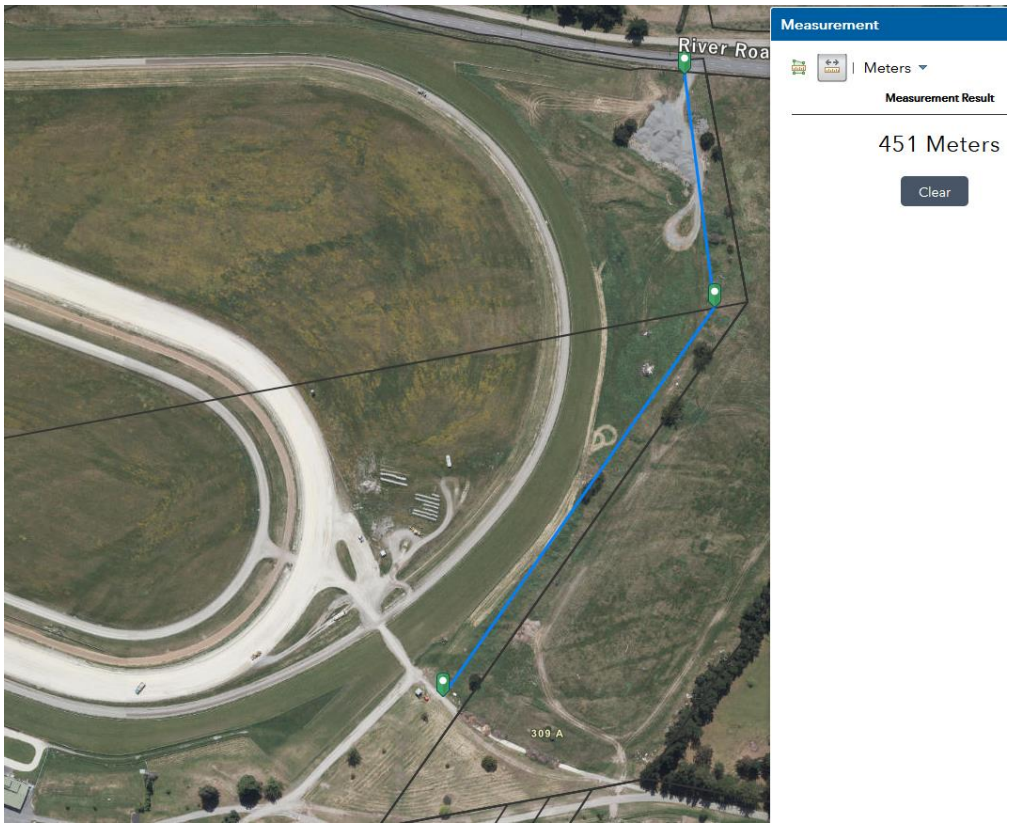
9. There are a number of aspects of the application, the s42A reporting officer report, and the Applicants evidence with which I agree. However, to remain concise, I have focused on the elements I do not agree with or consider have not been addressed fully. It is not my intention to be negative or critical of any individual associated with the application or their assessment but rather to discuss the facts pertinent to my area of expertise.

A critical assessment of the PDP AQIA and S92 Response

10. In Figure 2 and its description on Page 3 of the AQIA, PDP refer to the "indicative" location of proposed aggregate and VENM stockpiles. As these are a source of dust emissions from the site (potentially a significant source depending on the amount of material handling activities at these locations) the locations need to be accurately defined.

11. On Page 4 of the AQIA, PDP describe the site access road as being 140 m long with 50 m of this being sealed. These distances are also repeated in Mr Chilton's report and the evidence of Mr Bluett. By my measurement, the site access road would be approximately 450 m long (see Figure 1 below). This is if it runs along the eastern boundary of the site as described in the application and annotated in Figure 2 of the AQIA. In addition to this 'access road', from my understanding of the proposed staged aggregate extraction and VENM backfilling, there will also be internal haul roads which could be 700 m long or more. As vehicle movements on unsealed roads is often one of the primary sources of dust emission from quarry activities (in the absence of sufficient dust mitigation measures), the entire length and location of all unsealed site roads needs to be accurately described and assessed.

Figure 1 Site access road



12. It is not clear in the application whether or not the VENM stockpile will consist of overburden extracted from the site only or will also contain imported material to be utilised in backfilling. The amount of handling (or double handling) of this material (which generally has a higher proportion of fine more dusty material (soils, sand, clay, etc) should be provided to determine the potential scale of dust emissions which could occur from this activity. Likewise, specific mitigation measures for this activity are rather vague and are not included in the draft Air Quality Management Plan (AQMP) supplied as Appendix 2 of Mr Bluett's evidence.

13. In Section 1.4 of the AQIA the "anticipated" hours of operation are stated. The hours of operation need to be clearly defined so the duration of potential dust discharging activities can be accurately assessed. From a review of the proposed draft Consent Conditions I haven't been able to locate any detail on operating hours. It would be appropriate to get clarity on these and any days of the week which will not involve works, i.e. Sundays and or public holidays, etc.

14. By my measurement, the main site access road will be approximately 120 m from the gazetted Rangiora Airshed (see Figure 2). On Page 41 of the AQIA PDP state that the airshed is approximately 200 m from the nearest dust generating activity, this appears to be incorrect. I consider that the main access/haul road, which is proposed to have up to 240 truck movements per day, will be one of the key potential dust discharge sources on-site. This inaccuracy in the separation distance between dust generating activities and the airshed is important for the issues raised in Paragraphs 15 - 22 below.

Figure 2 Distance to gazetted airshed

15. Regulation 17 in the National Environmental Standard for Air Quality (NESAQ) requires a consenting authority to decline an application for resource consent if the activity:

"*would be likely, at any time, to increase the concentration of PM_{10} (calculated as a 24-hour mean under Schedule 1) by more than 2.5 micrograms per cubic metre in any part of a polluted airshed other than the site on which the consent would be exercised*"

16. The Rangiora airshed (highlighted yellow in Figure 2) is approximately 120m from the nearest dust discharging activity (the main site

access/haul road). This airshed is currently defined as 'polluted' as described in the NESAQ.

17. I agree with Mr Chilton's comments in Paragraph 58 of his report that the action of heavy vehicle wheels on the surface of unpaved roads can be a source of fine particulate (PM_{10}). As such I consider that the proposed heavy vehicle movements (up to 240 per day) on the unsealed main site access road which is approximately 120 m from the airshed is a potential source of PM_{10} emissions.

18. The NESAQ Regulation 17 requirements are clear in that should Taggart's proposed site operations result in a 24 hour average PM_{10} concentration of more than 2.5 $\mu g/m^3$ in any 24 hour period at any point within the gazetted airshed, then the Consent application should be declined.

19. I have also reviewed the Yaldhurst dust monitoring study[1] which the applicant has used to support its assertions that the proposed Taggart Quarry will not result in an exceedance of this NESAQ requirement. Based on the information I have reviewed there is evidence that at distances beyond 120 m from the Yaldhurst quarry zone there were multiple occasions where measured 24 hour average PM_{10} concentrations were well in excess of 2.5 $\mu g/m^3$ above that measured at the background monitoring station.

20. Whilst I agree that there is a substantial scale difference between the Yaldhurst quarry zone and the proposed Taggart Rangiora Racecourse Quarry, I consider that the presence of a significant PM_{10} emission source (the main access road) within 120 m of the gazetted airshed has the potential to result in an exceedance of the NESAQ Regulation 17 limit.

21. I do not think that the applicant has supplied sufficient evidence to demonstrate that this exceedance will not occur. The applicant has referenced that the <u>four month</u> average concentrations measured at Sites 2 and 6 in the Yaldhurst study were approximately 4 $\mu g/m^3$ above the background site. Whilst this may be true, the NESAQ Regulation 17 requires that at no time <u>any 24 hour</u> PM_{10} average increases by more than 2.5 $\mu g/m^3$.

[1] Yaldhurst Air Quality Monitoring Programme – Summary Report: 22 December -21 April 2018. Report prepared by Mote Limited for Environment Canterbury 2018.

22. Therefore, as a minimum, I consider that this main access road should either be sealed in its entirety or be moved further from the airshed boundary. I note that Mr Chilton also recommends that it be sealed, but he shares the same inaccuracy about the length of the road (as discussed in Paragraph 11 above).

23. The separation distances between the proposed bund construction activities and Receptors R1 – R4 (as identified in the AQIA) are very small (quoted as 40 m, 20 m, 30 m, and 60 m respectively, in the AQIA). These small separation distances present a high risk for acute dust nuisance effects to occur at these residences, albeit for a short period of time. I consider that additional separation and/or mitigation measures to that proposed need to be applied to this activity in particular.

24. I note that in Paragraph 12.29 of Mr Bluett's evidence that he states that the following mitigation measures will be in place to protect these receptors:

    An Internal buffer distance of at least 100m when winds are blowing from the east or NE and are above 5m/s; and

    A continuous dust monitor will be installed close to the western boundary with Lehmans Road. The monitor will be used to trigger a tiered mitigation response which will be detailed in the AQMP. A tier one alert will ensure that the internal buffer distance is in place and that additional water suppression occurs. A tier two alert will be a stop work notice and an investigation into the dust sources and mitigation processes.

    However, I cannot find any reference to the proposed internal buffer distance of 100 m in the application documents or draft AQMP. Nor can I find any detail in the 'Tier 1 and Tier 2' controls referenced.

25. The applicant originally proposed to undertake boundary real time TSP monitoring as a trigger to implement additional dust mitigation measures or stop work. Subsequent to recommendations in Mr Chilton's report the proposed boundary monitoring has been amended to PM_{10} monitoring instead of TSP monitoring (in Mr Bluett's evidence).

26. However, the applicant has stressed throughout its technical assessments that PM_{10} emissions from the proposed works will be a

minor/inconsequential component of the dust emissions. This assertion appears to be based primarily on the fact that there is no material processing proposed as part of the operation.

27. Therefore, I consider that the proposed use of boundary PM_{10} monitoring as a trigger for additional dust mitigation/stop work conditions is contrary to the applicant's assertions that PM_{10} emissions will be a minor contributor to dust emissions from the site. As the applicant considers that the primary component of particulate emissions will be TSP (particulates greater than 30 µm in diameter), then TSP monitoring would be a more appropriate tool for providing feedback to site staff of potential adverse off-site effects.

28. I agree with Mr Chilton that nephelometer dust monitors do not perform well when monitoring TSP (or have not in the past). However, there are other dust monitors available which perform well when monitoring TSP (i.e. an E-BAM). As such, I consider that monitoring TSP would be the most applicable dust monitoring for the use of real time feedback to site operators.

29. Notwithstanding the above, I consider that PM_{10} monitoring on the boundary of the gazetted airshed should also be a requirement of the Consent (should it be granted). I note that this is a requirement in the Fulton Hogan Royden Quarry Consent documentation. The proposed Royden quarry is also situated adjacent to the polluted Christchurch gazetted airshed and as such must not result in an exceedance of the NESAQ Regulation 17 requirements. In my opinion, the wording in the Royden quarry Consent Conditions relating to such PM_{10} monitoring and reporting should be used as the basis of draft Consent Conditions for the proposed Taggart Rangiora Racecourse Quarry.

30. I note that the Royden quarry Consent Conditions require the quarry to cease operations if the PM_{10} monitoring and associated reporting demonstrates that the quarry operations have resulted in an exceedance of the NESAQ Regulation 17 requirements. I also consider that such a Condition should be included in the Taggart Consent should it be granted.

31. Given the stringent requirements under the current NESAQ regulations I consider that it is not appropriate for a quarry to be situated so close to a polluted airshed.

32. With regards to the comments that Mr Chilton and Mr Bluett have made regarding the number and location of the dust monitors, I consider that monitors should be situated between any current quarry operations and the nearest off-site receptors. Wherever onsite potential dust emitting activities (i.e. material handling, vehicle movements over unsealed surfaces, etc) are occurring within 250 m of an off-site receptor then a TSP dust monitor should be operated between the activity and the receptor(s).

33. Section 5.4 in the AQIA describes the proposed dust mitigation measures, this Section contains a lack of detail, particularly for an application of this scale and nature.

34. The draft AQMP supplied as Appendix 2 in Mr Bluett's evidence also contains a lack of detail in the proposed dust mitigation measures. In Paragraph 5.5 of Mr Bluett's evidence he states that:

    "A comprehensive air quality management plan (AQMP) has been drafted which when implemented will provide an effective, transparent, responsive and continuous improvement process for dust management. Implementation of the AQMP will ensure any adverse dust effects will be less than minor."

    I disagree that the draft AQMP supplied is 'comprehensive'.

35. Paragraph 11.2.5 in Mr Bluett's evidence states:

    "Standard Operating Procedures (SOPs) for mitigating dust from the site's seven key sources of dust. These include a three-tiered approach to dust mitigation measures for each separate dust source and automated and manual water suppression systems;"

    I cannot find any such three-tiered management approach or SOPs in the draft AQMP provided. A comprehensive AQMP is a critical tool in managing dust discharges from a quarry of this size in a sensitive location such as that proposed.

36. The development of a dust management plan is one of the recommended assessment tools in the Ministry for the Environment Good Practice Guide for Managing and Assessing Dust (2016) (MfE GPG Dust). As the applicants' conclusions on the potential for adverse off-site effects is dependent on the efficacy of the mitigation measures proposed, the proposed methodology for implementing this mitigation is important. The dust mitigation methodology should be consistent with industry best practice. Without sufficient detail I cannot comment on whether or not the proposed mitigation is consistent with best practice.

37. In Section 5.4.5 of the AQIA there is reference to concrete walls or impervious fences to be built around the temporary VENM and aggregate storage stockpiles. I agree that the use of such structures to minimise wind flow across the surface of the proposed stockpiles is effective and consistent with industry good practice. However, given the proposed size of the stockpiles I consider that these structures may need to be very large and may be impractical. More detail on these structures would be helpful.

38. With regards to the water available for dust suppression I have the following comments.

39. In Paragraph 6.7 of Mr Bluett's evidence it appears that he has incorrectly calculated the amount of water required for the purposes of dust suppression for the proposed two hectares of working area. Two hectares is 20,000 m^2. At the MfE GPG Dust conservative water application rate of one litre per square metre per hour, the required water volume for a 12 hour day would be 20,000L x 12 hours = 240,000 L (240 m^3) per day. Should this conservative volume of water be required for a whole seven day week, then 1,680 m^3 would be required per week. This is more than the 126 m^3 per week which Mr Bluett calculated. Mr Bluetts calculation also does not take into account the unsealed area of the haul roads.

40. Notwithstanding the above, the applicant has supplied alternate water requirement calculations in the AQIA and updated these in the S92 Response. These calculations more closely approach the allowable water take limits but are still within the bounds of that Consented. Mr Chilton has commented on the water requirement calculations and made his own

calculations. He is comfortable that the available water resource will be sufficient.

41. Based on my own estimates, taking into account the proposed maximum working area of 2 ha and a maximum haul road length of 1,000 m, I am also comfortable that the available consented water resource will be sufficient for peak dust suppression requirements.

Comments on Mr Chilton's Report

42. I agree with much of the content of Mr Chilton's Report. However, there are some aspects with which I disagree.

43. I disagree that the applicant has supplied sufficient evidence to demonstrate that the proposed activity will not result in adverse nuisance dust effects beyond the boundary of the site. This is primarily due to the lack of detail on the proposed mitigation measures. The application documents and associated AQMP provide headings rather than actual procedures. Whilst I consider that should the applicant use a high level of dust mitigation and associated monitoring that it could operate the proposed quarry without adverse dust amenity effects. The lack of detail on that proposed leaves me uncertain.

44. Whilst I agree with the applicant and Mr Chilton that the quarry activities are unlikely to result in an exceedance of health based ambient air quality criteria (for PM_{10}, $PM_{2.5}$ and respirable crystalline silica (RCS)), I disagree that there is sufficient evidence to demonstrate that the activity will not result in an exceedance of the NESAQ Regulation 17 requirements, which have a much compliance threshold (i.e. 2.5 $\mu g/m^3$ as compared with 50 $\mu g/m^3$).

45. With regard to the proposed draft Consent Conditions, I agree with all of Mr Chilton's suggestions for amended draft Consent Conditions, with the exception of the requirement for PM_{10} monitoring as opposed to TSP monitoring. As discussed above, I consider that the applicant should undertake TSP monitoring for the purposes of providing real time feedback as to the efficacy of its dust mitigation measures and for stop work conditions. I also consider, should the consent be granted, that PM_{10}

monitoring is required to demonstrate compliance with the AQNES Regulation 17 requirements. I consider that the wording of the PM_{10} monitoring Conditions should be consistent with that in the Fulton Hogan Royden Quarry Consent.

Comments on Mr Bluett's Evidence

46. I have commented on aspects on Mr Bluett's evidence that I agree with/disagree with throughout this evidence. I have the following further comments.

47. With regards to the number of dust monitors which are to be operating at any one time, I consider that this should be determined by the proximity of works to any given off-site sensitive receptor. Where a dust generating activity is within 250 m of a receptor, then a monitor should be operated between the discharging activity and the receptor.

48. With regards to whether or not the dust trigger levels should be conditioned in the Consent or be stipulated in the AQMP only, I note that in some of the recent quarry air discharge Consents the monitoring trigger levels have been included in the Consent Conditions. In my opinion I see no reason why they shouldn't be included in the Consent Conditions.

49. I also consider that as a minimum the whole site access road should be sealed (for its entire ~450 m length) or better still moved to a location more central to the site and further from neighbouring receptors/the gazetted airshed.

50. In my professional opinion the proposed stormwater flood channel and bund construction along the western boundary of the site is a high risk activity with respect to dust discharges. Bunds are usually formed from overburden and as such the material contains a higher proportion of fines. The surface stripping (up to 0.5 m in depth) of the proposed stormwater flood channel, will also involve moving top soils. If this material is dry and adverse wind conditions exist there is an elevated potential for adverse dust impacts on the very close sensitive receptors (as close as 20 m away) from this activity.

51. I consider that stringent mitigation measures should be applied to this activity. The material needs to be damp during handling, ideally works are restricted to wind directions blowing away from the nearest receptors, and once the bund/stormwater channel are formed, they need to be sealed to stop fugitive discharges, ideally with hydroseed or mulch. Undertaking these works during winter months will greatly reduce the risk of off-site dust effects. Such mitigation measures should be included in the AQMP or Consent Conditions.

Conclusion

52. I have reviewed and commented the AQIA, Section 92 Response, and Mr Bluett's evidence in support of the proposed Taggart Rangiora Racecourse Quarry.

53. I have also reviewed and commented on the technical review report produced by Mr Chilton and proposed draft Consent Conditions.

54. In summary, whilst I agree that the proposed quarry could operate without generating adverse nuisance dust effects which would affect the amenity values of the surrounding sensitive receptors, I consider that the applicant has not provided sufficient detail in the AQIA or AQMP for me to be certain of this.

55. I also consider that the proposed unsealed haul road along the eastern boundary has the potential to result in an exceedance of the NESAQ Regulation 17 requirements. In my opinion this road needs to be sealed or moved to reduce the potential for an exceedance of the NESAQ. Alternatively, or in addition to, a Consent Condition requiring PM_{10} monitoring at the boundary of the gazetted airshed will be required to demonstrate that the proposed quarry will not result in an exceedance of the NESAQ.

56. Given the stringent requirements under the current NESAQ regulations I consider that it is not appropriate for a quarry to be situated so close to a polluted airshed.

57. I agree with the applicant and Mr Chilton that there is a low potential for the proposed quarry operations to result in an exceedance of health base ambient air quality criteria.

58. With regard to the proposed draft Consent Conditions, I have made recommendations to changes which, in my opinion, will better protect the surrounding environment from adverse air quality effects.

Date: 27 April 2021

Donovan Van Kekem