BEFORE HEARING COMMISSIONERS APPOINTED BY CANTERBURY REGIONAL COUNCIL AND WAIMAKARIRI DISTRICT COUNCIL

IN THE MATTER OF	the Resource Management Act 1991
AND	
IN THE MATTER OF	Applications CRC204106, CRC204107, CRC204143 and RC205104 – to establish, operate and rehabilitate an aggregate quarry at 309 West Belt, Rangiora

OUTCOME OF EXPERT WITNESS CONFERENCING – AIR QUALITY EXPERTS

ATTENDANTS:	**Richard Chilton (for the Canterbury Regional Council)**
	Donovan Van Kekem (for the Rangiora Ashley Community Board)
	Jeff Bluett (for Taggart Earthmoving Limited)

<u>Areas of Agreement</u>

Hours of operation

1. The hours of operation have been defined by Condition 3 of the Land Use Consent: to establish, maintain, operate and rehabilitate a quarry:

> *The hours of operation for quarry activities other than monitoring and dust suppression are limited to:*
>
> *a) Monday to Friday excluding public holidays:*
>
> *i.Trucks crossing the racetracks of the Racecourse: 10am – 6 pm*
>
> *ii.All other activities: 7am – 6pm*
>
> *b) Saturday excluding public holidays: 7am – 6pm*

2. The air discharge permit refers to this definition of hours of operation. Mr Chilton considers that the same condition should be stipulated on the air discharge permit given compliance with the air discharge permit will be carried out by the Regional Council.

Location of and mitigation of dust discharged from stockpiles

3. The proposed locations of the stockpiles are fixed (as indicated in Figure 1 of Mr Taggart's evidence) due to the site's operational constrains and layout of other infrastructure on and around the site.

4. The separation distance between the stockpiles and the notional boundary of the closest sensitive receptors (the dwellings located on the northern end of West Belt) is approximately 180 m from their notional boundary (as defined in the Canterbury Air Regional Plan).

5. Given the separation distance, height and size of the stockpiles, the particle size and type of material contained in the stockpiles, it is considered good practice to provide a dust suppression system for the backfill material stockpile. The nature of the material stored in the aggregate stockpile means that there is little risk of large amounts of dust being discharged. The most effective dust suppression system for the backfill material stockpile is a water spray system which is able to be switched on automatically in trigger wind events. Mr Chilton suggests that both stockpiles require a water spray system because the run of pit material which will also contain fine material – i.e., it will not be washed sized aggregate which has a low dust potential. Mr Van Kekem agrees with Mr Chilton that some form of dust mitigation should be applied to the aggregate stockpile, with a fixed sprinkler system being a best practice option. Mr Bluett suggests that the amount of fine material will be low and that a spray system would only be required if the aggregate stockpile is shown to produce dust that is observed beyond the site boundary.

6. This detail of the backfill material stockpile water spray system must be included in the Air Quality Management Plan (AQMP).

Western boundary bund construction

7. The timing of construction of the all boundary bund is an important issue to consider for the purposes of minimising dust impacts on sensitive receptors located on Lehmans Road. It is advantageous to focus the construction period on the wetter and less windy months of the year (May to September) and to avoid warmer and winder months (October to April).

8. If construction was to take place in warmer and winder months, a detailed dust mitigation and monitoring strategy can be included in the AQMP. The mitigation should include dust monitoring, maintaining a minimum separation distance during certain wind conditions, and routine and triggered dust suppression.

9. It is planned to construct the western boundary bund over the months of May to September. If this timing proves impractical, then the dust emissions would be controlled by:
    a. Considering the Forecast for the day:
    b. Maintaining a 250 m buffer distance when wind speeds are above 5 m/s in a direction toward the nearest sensitive locations;

c. Material to be excavated must be thoroughly wetted using a water cart ahead of excavation and routinely thereafter;

d. A continuous PM_{10} monitor must operate between the bund and nearest neighbour with alarm triggers;

e. Wind monitoring must be carried out and dust generating activities cease when the wind is towards the nearest sensitive locations and the wind exceeds 7 m/s (hourly average);

f. The bunds must be immediately hydroseeded, covered or have a suitable dust suppression agent applied.

g. Vegetated cover should be established as soon as practicable, and maintained to ensure healthy cover during dry months.

Mr Van Kekem and Mr Chilton agree that the above mitigation measures are appropriate, except that Mr Van Kekem considers that the dust monitoring should be for TSP rather than PM_{10}.

Impact of PM_{10} discharged from the proposed quarry on Rangiora airshed

10. There was some confusion between the conferencing parties about the distance between the site access road and the Rangiora Airshed boundary. Upon review of the current site layout plans, Jeff Bluett agrees with Donovan Van Kekem and Richard Chilton that the distance between the site access road and the Rangiora Airshed boundary is approximately 120 m.

11. The total length of the site access road is approximately 540 m from River Road to the most eastern point of the trotting track. The entire length of the site access road will be used during all eight stages of excavation. The site access road is the largest potential source of PM_{10} emissions from the proposed activities.

12. The amount of PM_{10} likely to be discharged from the site access road is identified as a critical AQ issue given the proximity of the site access road to the boundary of the Rangiora Airshed and the requirement of Regulation 17 of the National Environmental Standard – Air Quality (NESAQ). This is because Regulation 17 requires a consent authority to decline an application for a resource consent to discharge PM_{10} if the discharge to be expressly allowed by the consent would be <u>likely, at any time</u>, 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 air shed, This issue is discussed in more detail in paragraphs 21-23 below.

Suppression of PM_{10} emissions from site access road:

13. Jeff Bluett and Richard Chilton consider that if PM_{10} emissions from the access road are adequately mitigated, Regulation 17 of the National Environmental Standard – Air Quality (NESAQ) it is unlikely to breached. Donovan Van Kekem considers that the access road has the potential to result in an exceedance of the limit in Regulation 17.

14. However, all experts agree that given the separation distance between the site access road and the Rangiora Airshed boundary (120 m), suppression of particulate emissions from the unsealed roadway surface would be beneficial to ensure compliance with Regulation 17 of the NESAQ.

15. Increasing the buffer distance between the site access road and the boundary of the Rangiora Airshed would be the most effective mitigation measure. However, the location and length of the accessway road are fixed (as indicated in Figure 1 of Mr Taggart's evidence) due to the site's operational constraints and layout of other infrastructure on and around the site.

16. The second most effective way of addressing the potential particulate emissions from the road is to seal it along its full length. This is the preference of Mr Chilton and Mr Van Kekem. However adequate particulate emission reduction could also be achieved by other methods such as regularly watering the road surface with a tanker truck and/or from a series of k-line sprinklers which could be run at regular timed intervals and could be automatically triggered by wind conditions

17. Sealing the road gives the highest level of certainty. If this option was implemented, the experts agree that there would be no need to monitor air quality at the Rangiora Airshed boundary using an NES_{AQ} compliant instrument to demonstrate compliance with Regulation 17 of the NESAQ.

Internal haul roads:

18. The proposed staged excavation of the site is shown in Figure 2 of Mr Taggart's evidence. Assuming the internal haul road for each stage runs from the trackside entrance of the site access road to the furthest point in each stage, the maximum length of the internal haul roads for each excavation stage will be approximately:

- Stage 1 – 700 m
- Stage 2 – 420 m
- Stage 3 – 330 m
- Stage 4 - 290 m
- Stage 5 – 160 m
- Stage 6 – 220 m
- Stage 7 – 340 m
- Stage 8 – 480 m.

19. The maximum total length of site access and internal roads will be approximately 1250 m. There is sufficient water available on site to apply the recommended water application rate (1 litre/m^2/hour) for the full length of the site access road and the longest internal haul road for 11 hours per day.

Health effects (PM_{10}, $PM_{2.5}$ and RCS)

20. Mr Bluett and Mr Chilton agree that any off-site concentrations are expected to be well within the relevant human health guidelines and standards, with implementation of effective dust control measures on dry days. Mr Van Kekem considers that there is low potential for the quarry to exceed health based ambient air quality criteria. The three experts agree that a monitoring of dust is required to ensure their efficacy of dust control measures. Mr Chilton and Mr Bluett consider that this dust monitoring should be for PM_{10}. Mr Van Kekem considers that the dust monitoring to measure the efficacy of on-site dust mitigation measures should be for TSP and, where required (if the access road remains unsealed), NESAQ compliant PM_{10} monitoring would be required to demonstrate compliance with the NESAQ Regulation 17 requirements.

<u>Areas of Disagreement</u>

TSP or PM_{10} monitoring for western bund construction

21. Continuous air quality monitoring is required for bund construction and aggregate excavation activities. The air quality monitoring equipment which is regularly used at quarry sites is based on light scattering technology (nephelometry). Nephelometers are widely used because they are appropriate for the purpose of managing dust emissions form a site, relatively low cost and can be readily relocated due to have a low power demand which can be supplied by solar panels. By way of instrument design, nephelometers are able to measure PM_{10} more effectively than TSP. To measure TSP effectively requires larger more expensive equipment that has a higher power demand. In summary, for quarry sites it is more practical and affordable to measure PM_{10} than TSP.

22. Donovan Van Kekem considers that continuous TSP monitoring is needed to assess and manage the impact of dust emissions from the western bund construction. He also considers that TSP monitoring would be the most applicable monitoring methodology for any boundary monitoring which is stipulated in the AQMP. Donovan Van Kekem considers that TSP monitoring should be undertaken on the boundary whenever dust discharging activities are occurring within 250 m of a neighboring sensitive receptor (between the discharge event and the receptor).

23. Richard Chilton and Jeff Bluett agree that PM_{10} monitoring is a robust and useful proxy for managing the potential effects of construction dust as long as appropriate trigger levels for deployment of mitigation are set - as detailed in Mr Chilton's S42a report and discussed below. Mr Chilton and Mr Bluett note that nephelometers configured to measure PM_{10} are routinely used for dust management for quarries and other dust generating activities in Canterbury and elsewhere in New Zealand. He also notes that it is anticipated for in the Ministry for the Environment Good Practice Guide for Managing Dust, which stipulates a dust management trigger level specifically for PM_{10}.

24. Mr Van Kekem considers that whilst the use of nephelometers are preferred by quarry operators due to cost and practicality considerations, there are mobile beta attenuation monitors which

accurately monitor TSP. Mr Van Kekem notes that the Ministry for the Environment Good Practice Guide for Managing Dust states that light scattering methods can underestimate PM_{10} and TSP concentrations compared with beta attenuation monitors and that TSP triggers have been used successfully in road construction projects and quarries.

Setting PM_{10} Trigger levels for additional particulate mitigation

25. Donovan Van Kekem suggests that the dust monitoring trigger levels (used to define when additional mitigation measures are required to control particulate) would best be set in the conditions of consent. However, they could be included within the AQMP only if the AQMP Consent Conditions were to require that any change in the trigger levels would require an independent review by a SQEP and subsequent recertification of the AQMP by Council.

26. Richard Chilton and Jeff Bluett agree that these trigger levels are best set through the AQMP, which allows them to be reviewed and refined in response to actual conditions and the brand of instrument being used. With a suitably rigorous approach for reviewing the trigger levels, it facilitates a more dynamic and potentially more effective management approach as opposed to requiring a change of consent conditions if it transpires that the PM_{10} trigger levels need to be revised.

27. Notwithstanding the above, Mr Chilton described in his s42 Addendum report the wording of conditions that is consistent with recent s42A report recommendations by CRC for Road Metals and SOL quarries where the trigger levels were set within the consent document.

Compliance with NESAQ (PM_{10} emissions from site access road) and whether monitoring is required

28. Mr Bluett, Mr Chilton and Mr Van Kekem consider the need to monitor PM_{10} in order to determine compliance with Regulation 17 of the NES_{AQ} could be avoided if:

    a. the site access road was relocated further the west; or

    b. the entire length of the 540 m site access road were sealed.

29. However, Jeff Bluett and Richard Chilton also consider that emissions from the access road with dust suppression are unlikely to breach Regulation 17 of the National Environmental Standard – Air Quality (NESAQ), with implementation of effective dust control measures and on dry days. Donovan Van Kekem considers that should the access road remain unsealed the access road has the potential to result in an exceedance of the limit in Regulation 17.

30. Mr Van Kekem and Mr Chilton agree that if water suppression is relied upon for dust control on the site access road, then the effectiveness of this option would need to be demonstrated through air quality monitoring.

31. Mr Bluett is of the opinion that if the dust from the site access road is adequately mitigated through the use of water suppression, it is likely that the requirements of NESAQ Regulation 17 will be complied with and monitoring at the boundary of the site to check compliance with the NESAQ would not be practical or required. The key reasons for Mr Bluett's opinion are:

    a. The Yaldhurst quarry dust monitoring study demonstrates that beyond 160 m downwind, the PM_{10} emitted from a quarry has very little impact on background PM_{10} concentrations; and

    b. The Yaldhurst quarry activity is approximately ten times larger than the proposed quarry, therefore provides a very conservative assessment of air quality from the proposed quarry.

    c. A study undertaken by Waka Kotahi the New Zealand Transport Agency[1] demonstrated that the plume of PM_{10} discharged from an untreated unsealed road surface could travel more than 80m. However, the same study demonstrated that if the surface of the unsealed road was treated with a chemical dust suppressant, the plume did not travel more than 30m. If the recommended rate of application of water to the road surface is complied with on the site access road, a similar level of dust suppression is likely to be achieved as if a chemical suppressant was used and the plume will have negligible impact on the Rangiora airshed.

32. Given the background levels of dust, the size of the PM_{10} source, the limitations of the dust monitoring equipment and small increase in PM_{10} concentrations which needs to be isolated from background concentrations, monitoring compliance with Regulation 17 of the NESAQ would not be straightforward.

33. Mr Chilton and Mr Bluett think it is scientifically impractical to monitor compliance with Regulation 17 at this site due to the low threshold concentration of Regulation 17 (2.5 µg/m³, 24-hour average) relative to the precision thresholds of NES_{AQ} reference standard monitoring instruments. Mr Van Kekem suggests this should be achievable using similar consent conditions to those imposed on the Royden Quarry.

34. In summary, Mr Van Kekem favours full regulatory NES_{AQ} monitoring like that required by the decision for the proposed the Roydon Quarry consent. (this decision is subject to appeal). Mr Chilton favours nephelometer monitoring to ensure dust levels are low and mitigation is effective. Mr Bluett's view is that, if the particulate discharged from site access road is effectively mitigated with water, it is likely that the requirements of NESAQ Regulation 17 will be complied with. In addition to this due to the impracticality of monitoring compliance with Regulation 17 at this site there will be very little useful information gained from monitoring compliance with Regulation 17.

Timeline for finalising the Air Quality Management Plan

[1] Bluett, J., de Aguiar, M. and Gimson N (2017) Impacts of exposure to dust from unsealed roads. New Zealand Transport Agency research report 590.

35. There was disagreement among the conference attendees on whether a full draft of the AQMP is required to enable each expert to reach a conclusion on the likely scale of impacts of the dust discharged from the proposed activities.

36. Jeff Bluett considers that the relevant air discharge consent conditions (numbers 3, 5 and 6) and the general site consent conditions (numbers 15, 16 and 17) provide sufficient detail on the structure and content of the AQMP and the CRC certification process to be able to make an informed conclusion that the likely scale of impacts of the dust discharged from the proposed activities will be less than minor. Mr Chilton, while preferring to have a draft AQMP as part of the consenting process, accepts that the matter can be adequately address through conditions setting out the matters for consideration in the AQMP and that this is a widely used approach.

37. Donovan Van Kekem considers that the proposed consent conditions are thorough and appropriate, and accepts that the proposed peer review and certification process is likely to ensure that the AQMP is prepared in accordance with industry standard and good practice. He agrees that the quarry could operate without generating adverse nuisance dust effects. However, Mr Van Kekem considers that without being able to view the proposed SOPs for dust management and mitigation (amongst other elements in the proposed AQMP), he is not in a position to be able to provide his professional opinion as to whether these are appropriate for the proposed quarry operations in the existing receiving environment. Mr Van Kekem noted that the mitigation proposed has a direct bearing on the potential for off-site effects. Hence he considered he is unable to determine the potential for adverse off-site effects on the sensitive receptors which his client represents.

Conditions

38. Jeff Bluett and Donovan Van Kekem agree with Richard Chilton's suggested amendments to the consent conditions. However, Mr Van Kekem also considers that the conditions should require TSP monitoring, PM_{10} monitoring in relation to the airshed, and that the consent should set trigger limits for deployment of additional dust control (or an AQMP Consent Condition requiring SQEP review and Council recertification for any change in the trigger limits), as discussed above. Jeff Bluett and Richard Chilton do not consider these to be necessary.

Signatures:

Date: 3 May 2021

Date: 3 May 2021

Date: 3 May 2021