Before the Hearing Commissioners
appointed by the Grey District Council and
West Coast Regional Council

Under	the Resource Management Act 1991
In the matter of	Resource consent applications by TiGa Minerals and Metals Ltd to establish and operate a mineral sands mine on State Highway 6, Barrytown (RC-2023-0046; LUN3154/23)

Statement of evidence of Jon Farren

19 January 2024

Applicant's solicitors:
Alex Booker
Anderson Lloyd
Level 3, 70 Gloucester Street, Christchurch 8013
PO Box 13831, Armagh, Christchurch 8141
DX Box WX10009
p + 64 3 379 0037
alex.booker@al.nz

anderson lloyd.

Qualifications and experience

1 My name is Jon Farren.

2 I am the Manager and Principal of the Christchurch office of Marshall Day Acoustics (MDA).

3 I hold a Bachelor of Engineering with Honours in Electroacoustics from the University of Salford in the United Kingdom. I hold full Membership of the Institute of Acoustics (UK), a requirement of membership being that I am active in the field of professional acoustics and satisfy the Institute's requirements with regard to level of qualifications and experience.

4 I have been employed as an Acoustic Consultant for 30 years, approximately 22 of which have been with Marshall Day Acoustics (MDA). I have considerable experience in the areas of planning with regard to noise, the assessment of noise and vibration, and noise control in relation to both environmental noise and building acoustics.

5 Of specific relevance to this proposal, I have assessed noise and vibration effects and performed compliance monitoring at over 30 mineral extraction sites across New Zealand, where product extraction, processing and its transportation are the dominant noise sources. My experience includes several mines on the West Coast for various operators.

6 My role in relation to TiGa Minerals and Metals Limited's (TiGa) application to establish and operate a mineral sands mine and associated activities at SH6 Barrytown (**Application and Application Site**) has been to provide advice in relation to noise.

7 My role in this proposal to date has been as technical reviewer and supervisor for all noise monitoring, modelling and analysis. Working with my colleagues, I was responsible for reviewing and providing input to the 2023 *Assessment of Noise Effects* (**Noise Assessment**) that accompanied the Application. I was also responsible for noise assessment of the previous application at this site in 2020.

8 My assessment is based upon the proposal description attached to the evidence of Ms Katherine McKenzie as Appendix 1.

9 In preparing this statement of evidence I have considered the following documents:

(a) the AEE accompanying the Application;

(b) noise peer review prepared by Tonkin and Taylor, May 2023;

(c) noise peer reviewer's response to submissions, Tonkin and Taylor, November 2023;

(d) the submissions raising noise concerns; and

(e) section 42A report.

10 I have visited the Application Site and have studied the location of adjacent dwellings and local topography in preparation of this evidence.

Code of Conduct for Expert Witnesses

11 While this is not a hearing before the Environment Court, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2023 and that I have complied with it when preparing my evidence. Other than when I state I am relying on the advice of another person, this 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 that I express.

Scope of evidence

12 I have prepared evidence in relation to:

(a) The key findings of my assessment of noise effects report;

(b) Matters raised by submitters to the Application;

(c) Matters raised in the acoustic peer review and s42A staff reports; and

(d) Proposed conditions of consent.

Summary

13 My assessment shows the Application Site can comfortably comply with the permitted activity noise levels within the proposed Te Tai o Poutini Plan, which reflects the current best practice noise criteria set out in New Zealand Standard NZS 6802:2008[1] and the World Health Organisation published guidance.

14 Mining and processing activities are predicted to comply with the Grey District Plan (GDP) daytime and night-time permitted activity noise limits of 55 and 45 dB L_{A10} respectively. The exception is during the day on Sundays when a 45 dB L_{A10} daytime limit currently applies.

15 I consider noise effects from the Application Site will result in acceptable noise amenity at the nearest dwellings with respect to the permitted activity noise levels and the existing noise environment. Overall, I consider noise effects will be less than minor.

16 I have modelled noise emissions associated with the proposed mining activities and processing operations based on measurements of similar equipment around New Zealand including a mineral sands mine near Westport.

17 My calculations assume a conservative worst case with all mining plant and equipment operating at the same time at the closest practical points to existing dwellings. In practice, and for most of the time, I anticipate noise levels will be lower than predicted when mining is occurring in other parts of the site away from the boundaries and when operating within the excavated area where the perimeter pit wall will act as a noise barrier.

18 Whilst noise on public roads is exempt from compliance with the District Plan permitted activity noise limits, my assessment is that truck movements between 0500 and 0700 hours will result in a just perceptible change in noise level of 3dB. During successive hours of the day, the relative increase in noise level from quarry trucks is reduced, with a corresponding diminishing noise effect.

[1] New Zealand Standard NZS 6802:2008 *Acoustics - Environmental Noise*

Key findings in the noise assessment

The existing environment

19 The noise assessment identifies several dwellings[2] in the vicinity of the proposal where I have considered the potential noise effects. The existing daytime noise environment[3] is dominated by traffic noise from State Highway 6 and surf noise.

20 The Noise Assessment, which was included as Attachment H to the Application, outlines the existing noise environment in some detail, including comprehensive noise monitoring at noise sensitive locations around the site. This included both unattended noise monitoring over a period of three weeks and attended noise monitoring adjacent to the nearest dwellings over several days.

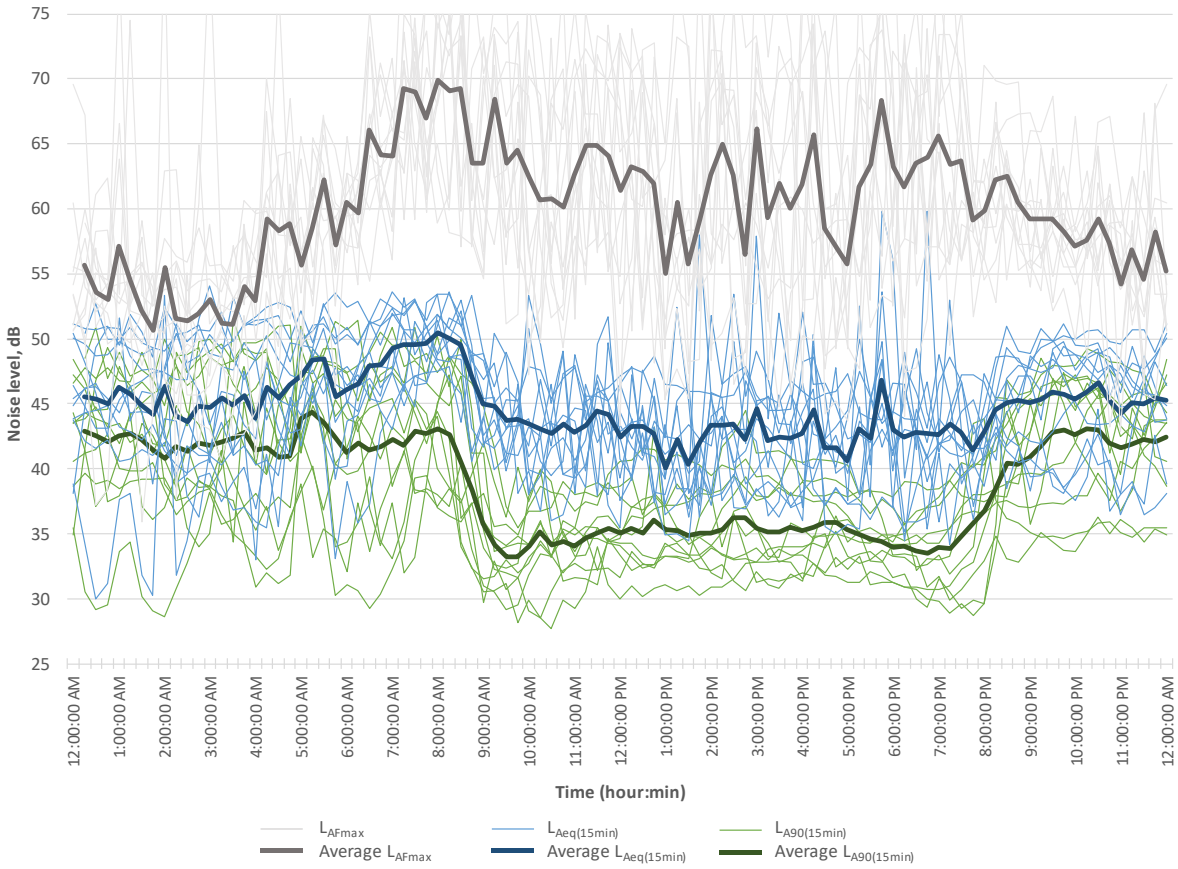
21 The noise measurement locations were selected to represent the dwellings closest to the site, taking into account both their setback distance and elevation in relation to the Application Site and SH6.

22 In Appendix A, I have reproduced Figure 2 from the Noise Report showing the location of the nearest dwellings and the noise measurement locations. In Figure E1 below I have replicated Figure 3 from the noise report which shows the ambient noise levels measured over a 3 week period. Periods with rain or windspeeds in excess of 3 m/s were discarded due to their influence on ambient noise.

[2] Section 2.1 of the Assessment of Noise Effects Report

[3] Section 3.0 of the Assessment of Noise Effects Report

Figure E1 Ambient noise logger data at Position 1 during suitable weather conditions



23 During the day, the most notable features of the existing noise environment are traffic along SH6 and surf noise. At night, when vehicle numbers decrease, the surf becomes the dominant noise source.

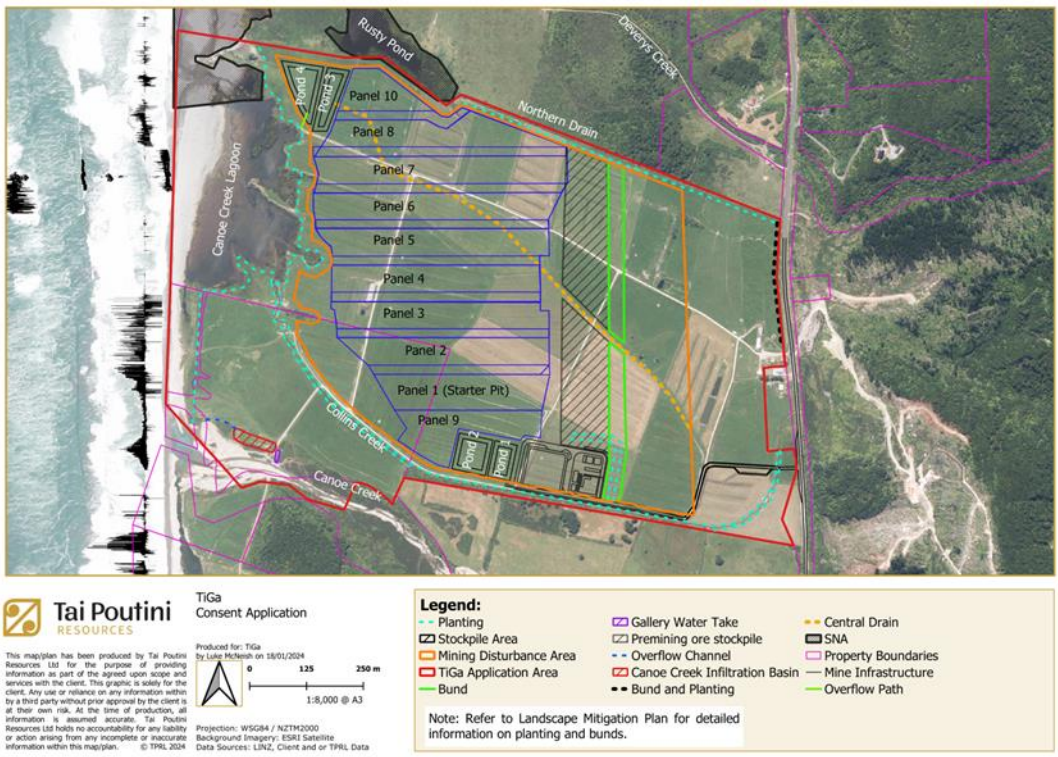
24 The average daytime noise level at dwellings close to the road is 55 dB L_{Aeq}. For dwellings further away or more elevated from SH6, the daytime noise level is 40 to 50 dB L_{Aeq}.

25 At night, average noise levels do not change substantially and remain relatively elevated at around 50 dB L_{Aeq} at all positions. In my experience, elevated night-time ambient noise levels from surf noise is a common feature of the ambient noise environment on the West Coast.

Noise generated by the proposal

26 The proposal includes daytime mining activity[4] and involves mobile earth moving machinery traversing the site in stages or "panels" as indicated in Figure E2. I have assessed mining noise on a conservative worst-case basis that assumes all mining plant and equipment is operating at the same time at the closest practical point to the existing dwellings. Noise levels will be lower than predicted when mining is occurring in other parts of the site away from the boundaries. Noise levels will also be lower than predicted once mobile plant is operating within the excavated area up to a depth of 14 metres and the pit wall at the perimeter will act as a noise barrier.

Figure E2 Site plan showing mining panels



27 Processing will occur 24 hours a day. To minimise noise emissions, particularly at night, the Applicant is proposing to enclose the processing plant in a building and has positioned this building as far as practical from noise sensitive locations.

28 I have predicted noise levels for all activity on site based on source data[5] collected at numerous mine sites including another West Coast mineral sands mine with similar plant and equipment. The key noise sources can broadly be described as

[4] Section 2.2 of the Assessment of Noise Effects Report

[5] Section 5.2 of the Assessment of Noise Effects Report

mobile earthmoving equipment - such as excavators, loaders and trucks – and static mechanical plant including processing equipment and pumps.

29 The predicted noise levels are based on several operational scenarios where all equipment is operating continuously and simultaneously in order to represent a worst-case situation. In reality, not all equipment will be operating at the same time and noise levels will at times be lower than predicted.

District Plan permitted activity noise limits

30 The predicted noise levels[6] comfortably comply with the daytime and night-time permitted activity noise limits of 55 and 45 dB L_{Aeq} in the Te Tai o Poutini Plan (TTPP) which I consider to be the most appropriate for the project. These limits reflect the recommended criteria set out in New Zealand Standard NZS 6802:2008 and the World Health Organisation published guidance.

31 Noise levels from the mining and processing activities are predicted to comply with the operative Grey District Plan (GDP) daytime and night-time permitted activity noise limits of 55 and 45 dB L_{A10} respectively. The exception is during the day on Sundays when the "night-time" limit of 45 dB L_{A10} limit currently applies.

32 Noise mitigation proposed by the Applicant includes a processing plant building and the 4.5 metre high Eastern Bund, which will act as an effective noise barrier for mining activities that occur to the west of the bund. The Applicant is proposing to adopt a Noise Management Plan (NMP)[7] for the site to ensure day-to-day minimisation of off-site noise effects through aspects such as employee induction with noise training, vehicle speed limits, maintenance of vehicles etc.

Trucks on public roads

33 Trucks will transport material from the site using State Highway 6, commencing operations at 0500 hours. Whilst noise on public roads is exempt from compliance with the District Plan permitted activity noise limits, as a discretionary activity, it is appropriate to consider the potential noise effects[8], particularly for the night-time period when trucks will be operating between 0500 and 0700 hours.

34 Waka Kotahi data shows that State Highway 6 vehicle movements steadily increase past the site from 0500 hours and I calculate average existing minimum traffic noise levels are in the order of 50 dB $L_{Aeq(1\ hour)}$. The proposed truck activity will result in a 3 dB noise level increase between 0500 and 0600 hours – a 3 dB

[6] Section 5.3 of the Assessment of Noise Effects Report

[7] A Draft NMP is provided as Attachment H1 to the AEE -

[8] Section 5.5 of the Assessment of Noise Effects Report

change is just perceptible. As the existing traffic volumes on SH6 increase between 0600 and 0700 hours, and the successive hours of the day, the relative increase in noise level from quarry trucks is reduced, with a corresponding diminishing noise effect.

Consent conditions and noise effects

35 I have provided[9] suggested wording for conditions of consent that, if granted, will ensure noise is adequately controlled throughout the life of the mine. The conditions address noise limits, a control on vehicle movements, prohibition of tonal reversing alarms, noise monitoring and the implementation of a Noise Management Plan.

36 My assessment of the existing noise environment, noise generated by the proposal, and controls implemented through the proposed conditions of consent, is that noise effects will be less than minor at nearest dwellings with respect to the permitted activity noise levels and existing noise environment.

Noise effects on wildlife

37 To assist Dr Bramley in assessing potential noise effects on wildlife, I have prepared an additional noise contour plot for the situation when mining is occurring in Panel 10, which is the closest mining activity that will occur to the lagoon to the north of the application boundary. A snapshot of the noise contour plot is provided as Figure E3 with the larger version provided in Appendix B.

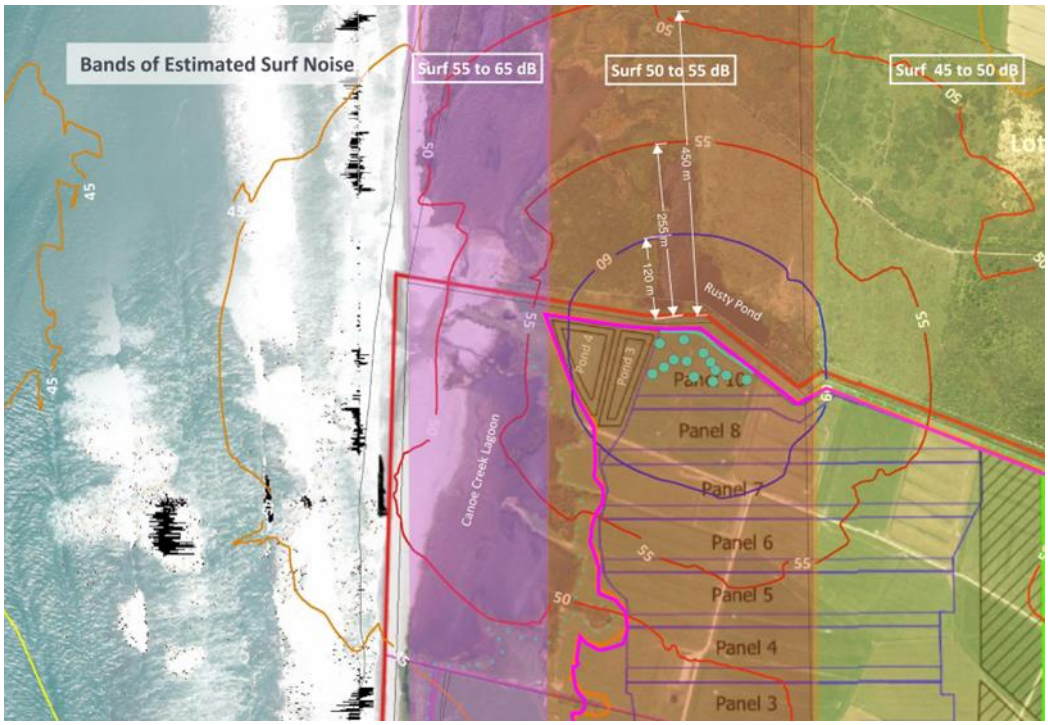
38 In Figure E3, I have superimposed my estimate of the range of surf noise that can be expected in the vicinity of the site and lagoon areas, based on my measurements of existing ambient noise. I expect that depending on the surf activity at the time, surf noise will be in the order of 55 dB L_{Aeq} or greater within approximately 200 metres of the mean high-water line[10]. Surf noise contains a broad range of frequencies and, as a result, is effective at 'masking' other sounds.

39 As with all my noise modelling, I note the mining noise is a conservative worst case with all plant operating at the same time at existing ground level. I expect the mining noise levels presented in Figure E3 to the north of the application site will be lower in practice, once mining starts to occur below ground level. In my opinion, a 5 dB reduction would be achieved relatively quickly in Panel 10 which means the 60 dB L_{Aeq} mining noise contour to the north would become 55 dB L_{Aeq} and so on.

[9] Section 7.0 of the Assessment of Noise Effects Report

[10] LINZ NZ Coastline – Mean High Water dataset, 23 June 2023

Figure E3 Panel 10 noise contour plot and estimated surf noise overlay



Matters raised in the noise peer review

40 My noise assessment was peer reviewed by Lindsay Leitch and Darran Humpheson of Tonkin and Taylor (T+T) dated 5 May 2023.

41 The peer review is in overall agreement with my noise predictions, noise level criteria and assessment of truck noise on public roads. Below I will discuss recommended changes to proposed consent conditions as part of my review of the Council Officer's Report.

42 In Section 4.1.2 of the peer review, T+T indicate differences in both the schedule of plant and their noise levels compared to the 2021 application that was submitted for this site. I confirm these identified differences are intentional and reflect the latest data we have collected from a similar West Coast mineral sand mine over the last 18 months.

43 In November 2023, T+T provided additional correspondence to GDC in response to submissions received that broadly align and agree with the comments in my evidence.

Matters raised by submitters

44 I have reviewed the submissions that mention noise and vibration and several raise concerns about noise that can be broadly categorised as follows:

(a) The effects of noise from truck movements;

(b) The nature/character/volume of mining noise sources; and

(c) The effectiveness of noise mitigation.

45 I have addressed each of the broad concerns in my evidence but would like to specifically comment on the following detailed submissions.

Bevan Chignell

46 This submission is primarily concerned with the potential noise effects on wildlife and human health but also intermittent and ambient noise.

47 The effects of noise on wildlife are addressed in the evidence of Dr Gary Bramley.

48 The submitter traverses several aspects of noise generation and refers to several research documents including quotes from the World Health Organisation (WHO). I agree the WHO guidance is an appropriate reference, as this contains the collective wisdom from numerous peer reviewed studies on the potential health effects of noise. The WHO guidance forms the basis of the noise level criteria I have recommended and mirrors those suggested in the New Zealand standards and both the Grey District Plan and TTPP. I note the peer reviewer also supports these criteria.

Barrytown School Board of Trustees (BoT)

49 I agree with the broad statements in the BoT submissions that noise has a critical effect on children's educational development. With this in mind, my company was engaged by the Ministry of Education to develop appropriate acoustical criteria[11] for schools to ensure learning outcomes are not affected by noise. I am very familiar with the MoE requirements and regularly apply them through the course of my work.

50 The school is located over 4km from the proposed site and over 100 metres from State Highway 6. In my opinion, mining and processing activity will be inaudible during normal school hours. Noise from heavy vehicle movements will not be discernible from other similar heavy vehicles that use State Highway 6. I consider potential noise effects at the school will be negligible.

Officer reports

51 I have reviewed the s42A report prepared by Mr Mark Geddes for Grey District Council which largely relies on the noise peer review and additional email

[11] Designing Quality Learning Spaces (DQLS) Acoustics Version 3.0, December 2020

correspondence between Mr Geddes and Mr Humpheson dated 26 September 2023.

52 I agree with the discussion in Paragraph 199 in response to the submission of G and G Langridge that noise from site activities is unlikely to adversely impact livestock. And in Paragraph 200 that noise from truck movements on State Highway 6 will be less than minor.

53 The Officer's Report and noise peer review has suggested alternative wording to several of the proposed conditions of consent which I agree, for the most part, add further clarity. However, I would specifically like to comment on the following conditions.

54 In proposed Condition 17.3(e), I do not agree that the applicant should be responsible for reporting defects on the State Highway – in my opinion this is the responsibility of Waka Kothai (NZTA) as part of their routine conditioning monitoring. Whilst I understand the Applicant is willing to accept a condition along these lines, I consider the requirement should be located within the Transport Management Plan.

55 Proposed Condition 17.4 requires noise monitoring at 3 monthly intervals. Whilst I agree that more regular monitoring is appropriate during the early phases of mine operation, the consistent nature of the noise sources on site means that noise emissions are unlikely to change substantially once the site is established.

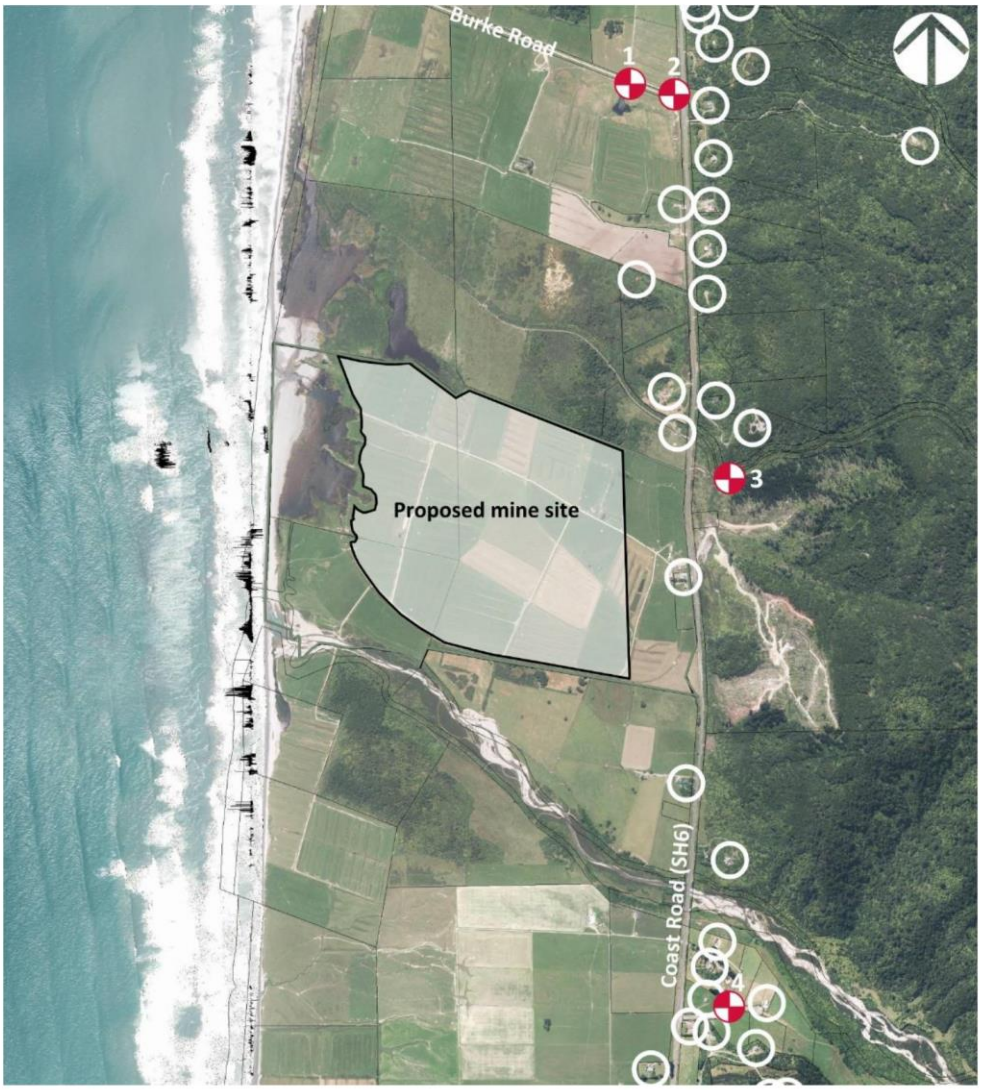
56 In my view, 3 monthly monitoring for the first 12 months of operation is acceptable and I understand the Applicant has agreed to this. However, given the relatively low noise levels that are anticipated from the site, I consider 12 monthly monitoring to be more appropriate on an ongoing basis.

Jon Farren

Dated this 19 day of January 2024

Appendix A – Noise monitoring and assessment locations

Figure 2: Proposed mine site, nearest dwellings (circled in white) and noise measurement positions



Appendix B – Panel 10 noise contour plot and estimated surf noise overlay