

UNDER THE Resource Management Act 1991
IN THE MATTER OF A Joint Application by Hirock Limited to
Palmerston North City Council LU 6962 and
Manawatu - Whanganui Regional Council
APP-2022203991.00 to Expand Linton
Quarry

STATEMENT OF EVIDENCE OF JON FARREN

INTRODUCTION

- 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 regarding level of qualifications and experience.
- 4 I have been employed as an Acoustic Consultant for 29 years, approximately 20 of which have been with Marshall Day Acoustics (MDA). I have considerable experience in the areas of planning regarding 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 25 quarries and mineral extraction sites, where extraction, processing and its transportation are the dominant noise sources.
- 6 My role in this proposal to date has been as technical reviewer and supervisor for all noise monitoring, modelling, and analysis. Working with my MDA colleagues, I was responsible for reviewing and providing input to the Noise Assessment (dated 26 July 2022) (**Noise Report**) that accompanied the application, and for the preparation of the noise assessment of the alternative overburden disposal areas (dated 21 December 2022).

- 7 I have read:
- 7.1 The Section 42A Report;
 - 7.2 The evidence of Mr Nigel Lloyd dated 16 May 2023;
 - 7.3 Submissions mentioning noise and/or vibration.

CODE OF CONDUCT

- 8 While this is not a Court process, I confirm I have read the Environment Court's Practice Note 2023, and I agree to comply with it. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are 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.

SCOPE OF EVIDENCE

- 9 My evidence will deal with the following:
- 9.1 the relevant District Plan noise provisions
 - 9.2 the existing ambient noise environment;
 - 9.3 key findings of my assessment of effects;
 - 9.4 acoustic-related matters raised in the peer review
 - 9.5 matters raised by submitters to the Application;
 - 9.6 matters raised in the s42A report; and
 - 9.7 the proposed conditions of consent.

SUMMARY

- 10 Hirock seeks to increase production at their Linton Quarry which will include an extension to the quarry pit and an increase in truck movements along Kendalls Line.
- 11 My assessment shows operational noise levels from quarrying activities will continue to comply with the applicable District Plan permitted activity noise rules at the nearest dwellings with the exception of 150 Kendalls Line, where a negligible 1dB excess is predicted. Historical noise monitoring at the site since 1999 shows a continuous record

of compliance at the nearest dwellings. None of the submissions to the current application mention operational noise from the quarry as being an issue.

- 12 Noise from roads is exempt from compliance from the Rural Zone noise rules. However, quarrying is a discretionary activity in the District Plan listing noise as an assessment matter, requiring its effect to be assessed on the amenity values of the adjacent residential uses.
- 13 In the absence of relevant New Zealand standards, I have adopted a guideline value of 55 dB $L_{Aeq(1hr)}$, through reference to published guidance, for assessing potential adverse noise effects from trucks.
- 14 My conservative assessment of 40 peak hour truck movements indicates that truck noise will be in the range 56 to 58 at three dwellings: 11, 33 and 150 Kendalls Line. Noise levels will reduce to below 55 dB $L_{Aeq(1hr)}$ with the provision of a 1.8 metre high noise control fence along the property boundary.
- 15 With appropriate mitigation, I consider that noise effects of the application will be acceptable in the context of providing appropriate residential amenity.
- 16 In my evidence, I have commented on the proposed conditions of consent attached the s42A report and the evidence of Council's noise peer reviewer.

DISTRICT PLAN NOISE PROVISIONS

- 17 Section 4.0 of the Noise Report discusses the applicable District Plan noise provisions that relate to operational noise of the quarry. However, I also wish to highlight the following rules which are relevant to my evidence. I have provided the full text of these rules in Appendix A.
- 18 Roads are a permitted activity (Rule R9.5.1v.) and noise from roads is exempt from compliance from the Rural Zone noise rules (Rule R9.11.1) and General Rules (R6.2.6.2 d.).
- 19 Rule R9.8.3 indicates that quarrying is a discretionary activity listing noise as an assessment matter, requiring its effect to be assessed on the amenity values of the adjacent residential uses. I consider that noise from both quarrying and trucks on local roads should be assessed. Under *Section 6: General Rules - 6.2 Noise*, the District Plan provides the example of an activity generating significant truck volumes resulting in an increase in off-site road noise that may require an assessment of noise effects.

- 20 Also of note in respect of traffic noise is Rule R9.11.2 which requires new habitable rooms to be protected from traffic noise when being built within 20 and 80 metres of State Highway 57. The threshold for providing appropriate noise mitigation is 57 dB $L_{Aeq(24hr)}$ and, if above this value, designs are required to ensure the internal noise levels are less than 40 dB $L_{Aeq(24hr)}$. I note this threshold matches that from NZS 6806¹ which seeks to balance health effects with benefits that roads bring to people and communities. Rule R9.11.2 uses a 24-hour “average” noise parameter which is used almost exclusively for high flow roads in order to appropriately describe noise effects with a repeatable diurnal character.
- 21 Whilst R9.11.2 signals an acceptable level of traffic noise in specific circumstances, I do not consider the criteria from Rule R9.11.2 to be directly applicable in this instance. This rule applies to new habitable rooms next to State Highways where a higher traffic noise environment could be reasonably anticipated. Furthermore, the Rule does not explicitly consider noise amenity in outdoor areas which is an appropriate consideration in my opinion.
- 22 As a result, I have proposed an alternative methodology for assessing noise effects from trucks.

EXISTING NOISE ENVIRONMENT

- 23 Noise measurements show the operational quarry has a history of compliance at the nearest residential receivers. Noise surveys have been conducted around the site by Jepsen Acoustics and Electronics Ltd over several years and I have attached their 2020 report as Appendix B with the historical summary of measurements provided as Table A1.
- 24 In terms of quarrying noise effects at nearest residences, the most relevant positions are MP2 and MP4. The measurements indicate the site has consistently complied with the applicable noise limit of 50 dB L_{A10} at these locations since monitoring began. This means 1999 for MP2 and 2006 for MP4.
- 25 My analysis of the measured data is that the broader existing ambient noise environment, in the absence of quarry noise, is typically in the range 40 to 50 dB L_{Aeq} for several of the dwellings along Kendalls Line.

¹ *New Zealand Standard NZS 6806:2010 Acoustics - Road-traffic noise - New and altered roads*

- 26 However, for those dwellings relatively close to State Highway 57, namely 6, 11 and 15 Kendalls Line, traffic noise is a prominent feature of the existing ambient noise environment. For example, I anticipate daytime SH57 traffic noise levels will be in the order of 53 to 57 dB $L_{Aeq(1hr)}$ at these dwellings.

ASSESSMENT OF NOISE EFFECTS

- 27 The Noise Report sets out the details of my assessment including the selection of appropriate noise criteria, noise predictions and assessment of effects.
- 28 There are two primary noise considerations relating to the proposed activity which I will discuss further below:
- 28.1 Noise from ongoing quarrying operations; and
 - 28.2 Potential noise effects associated with increased truck movements.

Quarrying noise

- 29 Whilst the applicant proposes to increase the area to be mined, there will be a similar level of activity noise to the existing consented operation. Noise sources include both mobile and static mechanical plant and I have predicted their noise emissions to the nearest dwellings to the site. Quarry activities are largely screened from the closest dwellings by 7 to 10 metre-high bunds which serve as effective noise barriers. This is described in greater detail in Section 5.0 of the Noise Report.
- 30 My assessment shows quarrying noise levels will be substantially below the District Plan permitted activity daytime noise limit of 50 dB L_{Aeq} except for the dwelling at 150 Kendalls Line where I predict the noise will be 51 dB L_{Aeq} – which is a negligible 1 dB above the applicable limit. I understand the owners of this dwelling have provided affected party approval to an earlier iteration of the consent application to expand the quarry, and have not submitted on the current consent application when it was limitedly notified to them in March 2023.

31 For reference, I have copied Table 6 from the Noise Report summarising the predicted noise levels.

Table 6: Predicted noise levels from quarry activity at closest sensitive receiver locations, i.e. existing dwellings

ID (Appendix B)	Address	Distance to quarry	Proposed (Cumulative)	Change in noise level compared to the current activity
			L _{Aeq,15min}	
2	150 Kendalls Line	140m	51 dB	+2dB increase
4	75 Kendalls Line	900m	44 dB	No change
5	42 & 124-136 Kendalls Line	1.1km	44 dB	No change
15	310 Hewitts Road	340m	44 dB	No change

1) Properties without existing dwellings have not been taken into account
2) Dwellings further than 1.1km are subject to noise levels less than 44dB L_{Aeq,15min}

Trucks on Public Roads

32 As noted in Paragraph 18, noise generated on roads is a permitted activity in the District Plan. Also, the District Plan specifically excludes vehicles on public roads from assessment against the permitted activity noise standards. This is consistent with many other District Plan across New Zealand, and I agree this is appropriate. The District Plan provides guidance in Section 6 General Rules, on how activities that are excluded from noise performance standards should be assessed.

33 As the application is a discretionary activity, I consider it appropriate to consider potential adverse noise effects resulting from truck movements on nearby residential properties. In my opinion this is consistent with assessment criteria highlighted in Rule R9.8.3 c.² which states:

c. The extent to which the effects of noise, dust and other environmental disturbances on the amenity values of the area, particularly on adjacent residential uses can be avoided, remedied or mitigated.

34 I understand the existing consent for the site permits 54 truck movements per day and the application seeks to increase this to 200 movements per day on average. At peak times this could be 250 truck movements per day with a maximum of 40 per hour. I understand the anticipated truck numbers allows for future growth which is expected to occur gradually over time.

² Full text of the Rule is provided in Appendix B

- 35 In other words, if consent is granted, there will not be a sudden step change in truck numbers from 54 to 200 and accordingly there will be no step change in noise level – the noise environment will transition over time.
- 36 There are no applicable New Zealand standards that apply to truck noise in this context. In Section 4.0 of my Noise Report, I consider published guidance from the World Health Organisation and other sources as to how noise affects residential amenity. In my opinion a noise level of up to 55 dB $L_{Aeq(1hr)}$ is appropriate for acceptable outdoor residential amenity and forms a useful reference for consideration of potential adverse noise effects.
- 37 I note that in line with a best practice approach to assessing noise levels, 55 dB $L_{Aeq(1hr)}$ provides for an appropriate outdoor amenity level during the day - noise levels will be substantially lower inside the dwelling. As no truck movements are proposed at night, sleep disturbance is not a consideration.
- 38 In my analysis, I have compared peak hour truck movements to the 55 dB $L_{Aeq(1hr)}$ guideline value noting that for most of the time, truck movements will be below these peak values and as a result, noise levels will be less.
- 39 I have used a guideline value of 55 dB $L_{Aeq(1hr)}$ assessed at the façade of the dwelling as being appropriate for assessing potential adverse noise effects. I consider the 'dwelling façade' as the appropriate place to assess noise effects in this instance, rather than use the more conventional 'notional boundary'³ because at several properties, the notional boundary is right on the road edge and is not representative of the noise experienced in a dwellings' outdoor living areas, especially those on the north side of Kendalls Line.
- 40 Those dwellings receiving the highest noise levels appear to have outdoor living areas immediately to the east or the north of the dwelling. As a result a notional boundary assessment location is not representative of the potential traffic noise effects that will be received.
- 41 In his evidence, Mr Lloyd now proposes a *distance-from-road* approach to assessing truck noise. I will discuss this further in Paragraph 61.
- 42 In Figure 3 and Table 7 of the Noise Report I have estimated truck noise levels⁴ at the façade of each dwelling for both the proposed average and peak truck movements. I have reproduced Table 7 below and attached Figure 3 as Appendix C.

³ A line 20 metres from any side of a dwelling, or the legal boundary where this is closer to the dwelling. This definition is from NZS 6802:2008.

⁴ Calculated as an equivalent free field sound pressure level, dB L_{Aeq} .

Table 7 from Noise Report – predicted future noise levels from quarry traffic at dwelling façades with updated noise levels at 11 Kendalls Line

ID (Figure 3)	Address	Distance to centreline of Kendalls Line, metres	Noise level, dB	
			Peak hour	Average hour
			L _{Aeq,1 hr}	L _{Aeq,16 hrs}
2	150 Kendalls Line	24	56	52
4	75 Kendalls Line	45	53	48
5	42 & 124-136 Kendalls Line	45	53	48
7	39 Kendalls Line	79	50	45
9	33 Kendalls Line	19	58	53
10	6 Kendalls Line	40	54	49
11	23 Kendalls Line	134	44	39
12	15 Kendalls Line	39	54	49
13	11 Kendalls Line	33 25	55 56	50 51
14	4 Kendalls Line	103	45	40

Notes:

1) Properties without existing dwellings have not been taken into account (i.e. ID 1,3 and 6)

- 43 I wish to point out an error in this table. The dwelling at 11 Kendalls Line is approximately 25 metres from the road centreline, not 33 metres as indicated. This means that truck noise levels are 56 dB L_{Aeq(1hr)} which is 1 decibel higher than indicated. A 1 decibel change is negligible and does not alter the noise effect at this dwelling. As I discuss further below, this dwelling is already captured by the applicant's offer of mitigation to properties experiencing 55 dB L_{Aeq(1hr)} and above, and this situation remains unaltered.
- 44 My assessment shows that peak hour truck noise levels are above 55 dB L_{Aeq} at three dwellings. The predicted values are 56 and 58 dB L_{Aeq} at 11, 150 and 33 Kendalls Line respectively. As noted above, the owners of 150 Kendalls Line have provided affected party approval to an earlier iteration of the consent application and have not submitted on the current consent application.
- 45 At all other dwellings, peak hour truck noise is at or below the guideline value of 55 dB L_{Aeq(1hr)}. On average, truck noise levels will be at or below 50 dB L_{Aeq(16hr)} at all dwellings except 11, 33 and 150 Kendalls Line.

Assessment of noise effects

- 46 As a result of my analysis, I consider that noise effects from quarrying operations will be minimal at most dwellings.
- 47 I expect potential truck noise effects will transition gradually over time. Even at peak traffic movements, most dwellings will receive a noise environment of 55 dB $L_{Aeq(1hr)}$ or less due to the trucks on public roads, and I consider that noise effects will be acceptable in the context of providing appropriate residential amenity.
- 48 I note the applicant has agreed to a condition of consent that offers noise mitigation to properties where the predicted truck noise level is 55 dB $L_{Aeq(1hr)}$ or higher. Noise levels will reduce to below 55 dB $L_{Aeq(1hr)}$ with the provision of a 1.8 metre high close boarded timber fence along the property boundary with Kendalls Line.

S42A REPORT

- 49 The s42A report by Ms. Natasha Cacilia Adsett comments on noise and vibration effects largely based on information and advice provided by Council's noise peer reviewer, Mr. Nigel Lloyd of Acousafe.
- 50 As a result, many of my comments on Mr Lloyd's evidence also address the points raised in Ms Adsett's report.

PEER REVIEW

- 51 I have reviewed Mr Nigel Lloyd's s42A evidence dated 16 May 2023 and would like to comment on several points.
- 52 There a several areas of agreement between my evidence and Mr Lloyd's, including my interpretation of the District Plan noise provisions, my quarry noise modelling methodology, and my consideration of truck noise on Kendalls Line. Below I highlight the areas where we do not agree.

Truck noise at 6, 11 and 15 Kendalls Line

- 53 In relation to the dwellings at 6, 11 and 15 Kendalls Line, Mr. Lloyd notes in his Paragraph 24 that: *"..the character of passing trucks on Kendalls Line for these dwellings will be significantly different from the more distant State highway noise..."*
- 54 I disagree with this statement. As I note in Paragraph 26, not only are State Highway traffic noise levels in the range 53 to 57 dB $L_{Aeq(1hr)}$ at these dwellings, which is higher

than their respective peak hour quarry truck noise levels, but the dwellings currently experience the noise “character” from approximately 500 heavy vehicles a day using State Highway 57⁵. In my opinion, the noise character from Kendalls Line trucks is not significantly different to the heavy vehicle noise already experienced by these dwellings.

55 Also, in relation to these dwellings, in Paragraph 25 Mr Lloyd notes that “*Care needs to be taken (6.2.2) where it states that proposed truck noise “will not noticeably affect existing residential amenity” at these three dwellings. Passing truck noise will clearly be noticeable*”. Whilst I agree the trucks will be noticeable, I do not consider they will noticeably affect existing residential amenity as evidenced by the higher noise levels they currently experience from the State Highway.

Comments on submissions

56 At Paragraph 63 I comment on submissions to the application, but in relation to Richard and Donna Day at 11 Kendalls Line, I confirm that Mr Lloyd is correct (his Paragraph 34) that the distance from the dwelling is approximately 25 metres, not 33 metres as indicated in my report. I have already discussed this in Paragraph 43.

Quarry truck noise mitigation

57 I agree with Mr Lloyd where he states in Paragraph 48 that the best control measure is a noise control barrier as this would protect outdoor amenity. The guideline noise level of 55 dB $L_{Aeq(1hr)}$ referred to in the Noise Report specifically relates to the protection of outdoor amenity and it is my intention that any mitigation should be developed with this in mind. During the submission and pre-hearing meeting process, other treatments such as double glazing were mentioned but, in my opinion, this is an inappropriate solution that may not provide the perceived benefits and does not offer protection for the whole property.

58 My analysis is that a noise control barrier, such as a 1.8 metre high close boarded timber fence along the property boundary with Kendalls Line, would bring peak hour truck noise levels to below 55 dB $L_{Aeq(1hr)}$ at all dwellings where current predictions are above 55 dB $L_{Aeq(1hr)}$. In my opinion, a noise control fence is the most appropriate noise control treatment for the current situation.

59 In his Paragraphs 49 to 51, Mr Lloyd appears to form the view that because a 3 decibel difference is only just noticeable, that dwellings with peak hour noise levels less than 55 dB $L_{Aeq(1hr)}$ should also be considered for mitigation by the applicant. However, I note the 3 decibel rule works both ways, such that using that same logic, the Applicant could

⁵ *Beca’s traffic assessment states 4,978 vehicles per day during 2018 with 10% heavy vehicles along SH57 which equates to approximately 500 heavy vehicles per day.*

reasonably say that no mitigation is required to properties up to 3 dB over the 55 dB $L_{Aeq(1hr)}$ guideline value, as there won't be a noticeable difference in noise.

60 However, the Applicant has not adopted this logic and instead has proposed to offer mitigation to those properties where predicted levels are 55 dB L_{Aeq} and above. I consider this to be a more reasonable and pragmatic approach noting that the 55 dB L_{Aeq} guideline is supported by published guidance.

61 Mr. Lloyd proposes a *distance-from-road* approach for identifying properties for mitigation, stating that a distance of 50 metres from the road centreline would be reasonable. Whilst I acknowledge the intent to simplify the process, I do not agree with the proposed 50 metre distance, nor with this approach generally, and prefer a guideline noise level for the following reasons:

61.1 A noise level is preferred as an objective reference for designing the noise mitigation required; and

61.2 An objective noise level also provides a mechanism to evaluate the effectiveness of any installed mitigation, should that be necessary.

62 I comment on Mr Lloyd's recommended consent conditions as part of my broader review commencing at Paragraph 68.

SUBMISSIONS

63 I have read the submissions that relate to noise and vibration. I also attended the pre-hearing meeting and heard the view of submitters first hand. Many of the concerns raised have been addressed in my evidence but I would like to make the following additional comments.

64 As noted in Paragraph 56, peak hour truck noise levels at 11 Kendalls Line (Richard and Donna Day) are now predicted to be 56 dB $L_{Aeq(1hr)}$ which is 1 decibel higher than set out in Table 7 of my Noise Report. The dwelling is already captured by the Applicant's proposed offer of noise mitigation and so the outcome does not change. I consider a 1 dB difference to be negligible and there is no change in noise effect as a result.

65 In their submission, the Days (11 Kendalls Line) and Vautiers (15 Kendalls Line) also note noise from truck acceleration, deceleration, and engine braking as being an issue. I expect the volunteered speed limit of 50 km/hr will reduce this effect somewhat, and I note the Applicant provides training for all drivers coming to site which specifically requires them to avoid engine braking.

- 66 The Days have also suggested a reduction in speed to 30 km/h, 400 metres from the SH57 intersection. In comparison to the 50 km/h already proposed by the Applicant, my assessment is that a reduction to 30 km/h will result in a negligible change in noise level.
- 67 Truck vibration is also noted by the Days. In my experience, vibration from quarry trucks is very low on well-maintained roads that are free from holes and corrugations. I expect the recent surface upgrades to Kendalls Line, and the proposed condition requiring the road condition to be surveyed, will minimise vibration generation. I discuss vibration in further detail in Paragraph 78.

PROPOSED CONSENT CONDITIONS

- 68 Below I comment on the proposed consent conditions as attached as Appendix A to the s42A report. Where appropriate, I also address comments made by Mr Lloyd.
- 69 Condition 12 provides the general operational noise limits for the quarry with an exemption for 150 Kendalls Line and I agree these are appropriate. The third paragraph references construction noise and should be deleted as this is provided elsewhere as Condition 15.
- 70 Condition 13 applies to operational noise limits for 150 Kendalls Line. If this Condition is to be retained, the 50 dB L_{Aeq} noise limit should be increased to 51 dB L_{Aeq} which is the anticipated noise level at this property. As above, the third paragraph references construction noise and should be deleted to avoid duplication with Condition 15.
- 71 Condition 14 proposes a 60 dB $L_{Aeq(15min)}$ noise limit at or within the boundary of any other site. Whilst this condition has been part of previous consents for the site, I do not consider it to be necessary. Mr Lloyd's paragraph 54 is concerned my proposed deletion of the 60 dB site boundary limit will not provide protection to land adjacent to the quarry if there are no dwellings nearby. In my opinion, the adjacent land does not require protection as there are no resulting adverse noise effects. If a future rural residential dwelling was to be established as-of-right closer to the quarry, the dwelling would be protected by proposed condition 12. If required, the applicant could feasibly implement further noise mitigation, such as a bund, to achieve compliance.
- 72 In relation to Condition 18, I do not agree with the proposed *distance-from-road* approach for the reasons I outline in Paragraph 61. I prefer a condition that offers noise mitigation to residents on an objective basis based on a predicted peak-hour truck noise level of 55 dB $L_{Aeq(1hr)}$ or higher, when assessed at the façade of the dwelling⁶. This would mean

⁶ Assessed as an equivalent free field sound pressure level

mitigation is offered to 11, 33 and 150 Kendalls Line. I expect that noise mitigation would be in the form of a 1.8 metre high close boarded timber fence along the property boundary with the exception of the entrance.

73 Condition 18 requires the consent holder to offer mitigation to residents on at least three occasions. This is unnecessary and unreasonable in my opinion. I have been involved in several noise mitigation programs for Waka Kotahi and I consider their general approach to noise mitigation to be appropriate:

73.1 Write to the homeowner describing the mitigation being offered, followed up by reasonable enquiry as necessary.

73.2 Provide a timeframe for response, typically three months.

73.3 The consent holder shall be deemed to comply with the consent condition, where:

(a) The mitigation has been installed;

(b) The property owner did not accept the mitigation; or

(c) The property owner did not respond to the original correspondence.

74 I agree with the proposal within Condition 18 that any ongoing maintenance of the mitigation will be at the cost of the landowner.

75 I question the need for a specific Noise Management Plan (NMP) as required by Conditions 20 to 25, and the particularly onerous way the NMP is to be certified. The site has been established for a long period of time, albeit under different management, and both the compliance monitoring provided in Appendix A and my assessment shows recent quarry operations comply at the nearest dwellings. I am unsure of the data used by Mr Lloyd when he states there has been "poor compliance" (his Paragraph 56).

76 I note the applicant has offered a condition requiring an update of the Quarry Management Plan which includes key noise management issues such as noise monitoring requirements and driver induction. I consider this document is more appropriate in this instance and could be further enhanced to include the list of topics set out in Condition 18.

77 Condition 26 requires noise monitoring within 3 months and then annually for the life of the quarry. For an established quarrying operation that is relatively remote from nearest neighbours and with an established history of compliance, I question the need for this level of noise monitoring. I note none of the submitters raise quarrying noise as an issue. In my view, it is more appropriate to perform one round of monitoring and again on receipt of justifiable complaint.

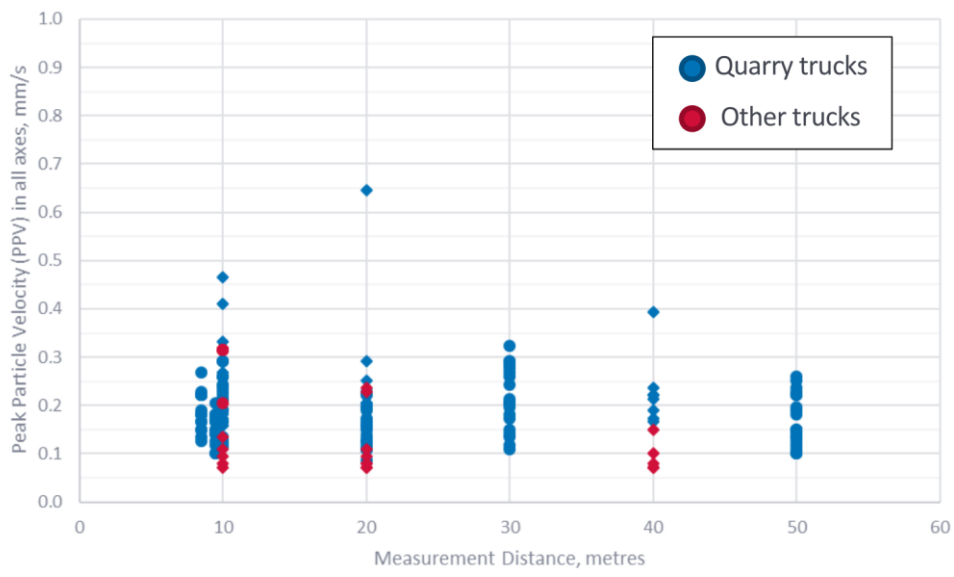
TRUCK VIBRATION

- 78 In response to submitters' concerns regarding vibration, I have prepared a memo dated 29 May 2023 which outlines the commonly adopted vibration criteria and vibration measurements from quarry trucks. In my experience observable vibration is generated by vehicles driving over undulations or holes in the road surface. The amount of vibration is affected by a vehicle's speed – there is less vibration at lower speeds - and is sometimes accompanied by noise in the form of truck body rattle.
- 79 Vibration tends not to occur on well-maintained roads. I understand proposed Condition 5 will require a road condition survey to facilitate repairs and, I expect that when maintained, there will be minimal vibration generation.
- 80 To illustrate this, Figure 1 below shows quarry truck vibration measurements collected at various distances from roads with posted speed limits of 80 and 100 km/h. I would expect vibration levels to be less on roads in good condition with trucks travelling at lower speeds. The current proposal is for a truck speed limit on Kendalls Line of 50 km/h.
- 81 The measurements are all substantially below a value of 5 mm/s (PPV) which is the commonly used threshold for cosmetic damage to buildings taken from DIN 4150⁷. The measurements are also notably below 1mm/s (PPV) which is the threshold from BS 5228⁸ where complaints are typically received. Most measurements are below the threshold of 0.3mm/s (PPV), also from BS 5228, which is usually adopted as the threshold of perceptibility.

⁷ *DIN 4150-3:2016 Vibrations In Buildings - Part 3: Effects On Structures*

⁸ *BS 5228-2:2009 Code of practice for noise and vibration control on construction and open sites –Part 2: Vibration*

Figure 1 – Measured vibration from heavy vehicles on local roads



Jon Farren

6 June 2023

ACOUSTIC ASSESSMENT

GBC WINSTONE LINTON QUARRY
Kendalls Line
Palmerston North

February 2 2020

Prepared for: Cobus Van Vuuren
GBC Winstone

Date: 03 February 2020

Report # 18
Prepared by: Neil Jepsen
Jepsen Acoustics and Electronics Ltd
22 Domain St
Palmerston North



1.0 Introduction

Consent was granted to Infracon Ltd (RC 202277) in May 2007 in an application to extend Linton Quarry at Kendalls Line.

The original consent for the quarry operation was granted by the Palmerston North City Council in 1997. In 2007, due to expansion of the activity, a new consent was sought by the applicant, and was granted on May 1 2007.

Following acoustic advice¹, the consent committee granted a new consent with conditions that are somewhat different from those imposed in 1997. The monitoring positions in 1997 were fixed, and a 50 dB(A) L10 noise limit was imposed at the boundary of the land from which the activity took place. In my view, this resulted in an unrealistic and unnecessary noise limit on the farm land surrounding the activity, as vacant farm land does not need the degree of protection normally afforded rural dwellings and residential land.

The 2007 consent relaxed the noise limit on the boundary of any rural land, from 50 to 60 dB(A) L10, but retained the 50 dB(A) limit at the notional boundary of any dwelling, or residential land.

Additionally, monitoring positions were no longer fixed, and are allowed to change as the boundaries of the activity change. These noise rules better reflect the needs of both the consent holder- and the neighbours, and are in line with the objectives of the current noise rules NZS6801:1991 and NZS26802:1991.

The following is a summary from the 2007 consent noise conditions.

Sound emissions shall not exceed the following limits at any point within the notional boundary of any dwelling as identified in Appendix 1 of this consent, or at any point within any residential zone, during any time period for assessment:

*7.00am to 10.00pm 50dB(A) L10
10.00pm to 7.00am 40 dB(A) L10 and 70 dB(A) Lmax*

(the notional boundary of any dwelling is defined as a line 20 metres from any side of a dwelling or the legal boundary where this is closer to the dwelling (NZS 6801:1999)

Sound emissions from any activity when measured at or within the boundary of any land in the Rural Zone (other than the property from which the noise is emitted or a road) shall not exceed the following:

At all times 60 dBA L10

Note: the property from which the noise is emitted is the property owned by J. and J. Tootell, and is described as Part Sections 109-112, town of Fitzherbert.

The consent holder shall provide to the Palmerston North City Council within six (6) months of the date of this consent, an acoustic design certificate, prepared by a suitably qualified and experienced acoustic engineer. This certificate shall advise of all the potential noise sources as far as they can be ascertained and indicate the means by which the noise performance standards specified in these conditions shall be complied with.

The consent holder shall submit for approval of the Palmerston North City Council within six(6) months of the date of this consent, a programme to regularly monitor noise levels caused by the quarry activities. The programme shall include the proposed times, duration and location of the measurements. The consent holder shall monitor noise levels according to the programme, under the supervision of a suitably qualified and experienced acoustic engineer. The noise measurements

for monitoring are to be taken at the most appropriate locations as specified by the Acoustic Engineer.

(Note: Typically noise monitoring is undertaken at the same location. However as the operations of the quarry change (bunds are built or activities occur in different parts of the site) these locations may not provide an appropriate measurement of the noise generated by the quarry. Condition 6 provides flexibility to the acoustic engineer such that measurements can be taken from relevant locations so that noise is appropriately controlled)

In 2007, a noise monitoring program was submitted and approved by the Palmerston North City Council, requiring that noise be monitored at three monitoring positions, twice per year at intervals of not less than 4 months.

Sound power

Crushing and screening takes place at the crusher site behind the bunds west of the plant and between the crusher site and Kendalls Line. Noise from the 120tonne/hr plant and gen set was measured at a distance of 10m from the crusher in 2019 to establish an approximate sound power and the sound spectra.

Results of the 2019 measurements were as follows;

A-weighted 1/1 spectra: 51,82,74,70,77,76,75,69,63,55

LAeq at 22m = 84.5 @ 10m

Lwa = 113.4 dB



Figure 1 below shows the approximate locations of the measurement sites in relation to the quarry.

2.0 Measurements

In accordance with the Noise Monitoring Plan (NMP), measurements were made at three sites:- viz the three previously identified sites

- **MP1:** 10m to the South of the junction of the extension of Kendalls Line and the paper road leading to the quarry, and at the boundary of the neighbouring farmland. (Consent limit 60dBA L10)
- **MP2:** 20m North of the nearest dwelling, at the East end of Kendalls Line, at the road end (Consent limit 50dBA L10)
- ~~**MP3:** Approximately 500M West of the quarry on farmland, at the West boundary of the Tootell property, adjacent to a row of pine trees running North-South. (Consent limit 60dBA L10)~~ Not measured in February 2020
- **MP4:** At or within the notional boundary of the property at 286 Hewitts Road. Linton. (Consent limit 50dBA L10)

3.0 Weather Conditions.

February 3 2020

Weather Conditions at the time of measurement were 50% cloud cover, with a 10kt westerly breeze. The temperature was 18C.

Measurements were carried out by Neil Jepsen .

Sources of noise from the quarry included the following:

- 1 digger and 1 front end loader operating near the crusher, the crusher plant and a gen set. No noise from the excavation of product was audible as this is carried out below ground level in the hole. Noise from several trucks and truck and trailer units was included in the measurements.

4.0 Summary of Results

The measurements made are summarized in the table below.

Measurement site	Date of Measurements: February 3 2020
MP1	Two 15 measurements made: L10 = 65.4 (Consent limit = 60.0 L10) L10 = 61.4(Consent limit = 60.0 L10)
MP2	Quarry not audible. (Consent limit = 50)
MP3	Not measured, due to inaudibility of quarry at this point.
MP4	Quarry inaudible and less than ambient, except for very occasional impact noise. Ambient noise from distant traffic noise from the main road. LA 45.6 (Consent limit = 50)

5.0 Conclusion

The measurements made on this day are consistent with those made previously with no increase in noise level from the quarry at any residential site. The measured level at the Road End site (MP1) marginally exceeded the consent limit due to wind noise at the microphone, and adjacent structures. No measurement exceeded consented noise limits at the other measurement sites.

Signed

A handwritten signature in black ink, consisting of a series of connected, somewhat jagged loops followed by a long, horizontal tail stroke.

N.M. Jepsen.
Acoustic Consultant.

Table A1 - Noise levels dBA L10 - Consent Limit = 50 dBA L10

	Site 1 Road End	Site 2 Nearest Dwelling	Site 3 Western Boundary	Site 4 Hewitts Road
October 1999	43.5 Pass	46.2 Pass	<50 Pass	
March 2000	47.3 Pass	43.7 Pass	<50 Pass	
September 2000	48.5 Pass	40.0 Pass	<50 Pass	
March 2001	48.2 Pass	43.7 Pass	<50 Pass	
April 2001	50.7 Fail			
Oct. 2003	56.9, 63.1 Fail	46.6 Pass	45.2 50.2 Pass	
December 2004	56.2 56.4 55.9 Fail	48.1 43.0 Pass	47.2 54.8 Fail	
May 2005	48.1 Pass	Quarry activity Inaudible at this site. Pass	47.0 Pass	
August 18 2005	61.2, 52.4, 61.4 Fail	46.7 Pass	50.7, 52.0 Fail	
January 07 2006	62.2 Fail	49.7 Pass	<50 Pass	
September 9 2006	48.2 Pass	Pass	Pass	Pass
February 22 2008	Pass	Pass	Pass	Pass
February 18 2009	54.0 Pass	Pass	Pass	Pass
February 24 2010	70.5 Fail	Pass	Pass	Pass
March 18 2013	75.9 Fail	pass	Pass	Pass
December 2016	65.4 Fail	pass	pass	pass
September 1 2017	1 x Pass result x marginally over	Pass	na	na
	Road end	Nearest Dwelling	Western Boundary	Hewitts Rd.
Sept 10 2018	Pass	Pass	Pass	pass
April 26 2019	Pass	Inaudible	NA	Inaudible most of the time. Pass
February 3 2020	Fail	Inaudible	Inaudible	Inaudible

6.2.6 RULES: NOISE

R6.2.6.1 Measurement of Noise

1. Except where specific reference is made to other standards, all sound emissions shall be assessed, predicted and measured in accordance with NZS6801:2008 Acoustics – Measurement of Environmental Sound and NZS6802:2008 Acoustics – Environmental Noise.

R6.2.6.2 Exclusions from Noise Control Rules

1. Noise from the following activities shall not be controlled using rules in this Plan, but shall be controlled separately by reference to the application of relevant New Zealand Noise Standards, where these are applicable, and to Sections 16 and 17 of the Resource Management Act 1991:
 - a. Aircraft during flight, except where specifically provided for.
 - b. Airport noise shall be managed by reference to NZS 6805:1992 Airport Noise Management and Land Use Planning.
 - c. Noise from helicopters using separate helicopter landing areas that are not otherwise part of an airport, shall be assessed, predicted, measured and controlled by reference to NZS6807: 1994 Noise Management and Land Use Planning for Helicopter Landing Areas as that Standard applies.
 - d. Vehicles being driven on a road (within the meaning of Section 2(1) of the Transport Act 1962), or within a site as part of and compatible with a normal residential activity.
 - e. Trains on rail lines (public or private), including railway yards, railway sidings or stations. This exclusion does not apply to the testing (when stationary), maintenance, loading or unloading of trains.
 - f. Rural activities listed in R9.5.1 and R9.5.2 in the Rural Zone, and grazing and cropping activities, including horticulture, in the Flood Protection Zone.
 - g. Sounds generated by construction, maintenance and demolition activities, and, additionally, sounds generated by soil conservation and river control works carried out or supervised by the Manawatū-Wanganui Regional Council in the Flood Protection Zone, shall be assessed, predicted, measured, managed and controlled by reference to NZS6803:1999 Acoustics – Construction Noise.

- h. Crowd noise at a park, reserve or any land zoned as Recreation, Racecourse, Conservation and Amenity or Arena.

R9.5.1 PERMITTED ACTIVITIES

The following activities are Permitted Activities provided they comply with the specified Performance Standards:"

- i. Farming, excluding intensive farming;
- ii. Horticulture;
- iii. Soil conservation and rivers control works carried out or supervised by the Manawatu-Wanganui Regional Council or the Palmerston North City Council;
- iv. The farm-based teaching and research activities of Massey University, and other individuals and/or organisations associated with the University;
- v. Roads;
- vi. Demolition or removal of a building, except Scheduled Buildings.

Performance Standards

(a) Separation Distances

Buildings housing poultry or pigs; also silage pits and piles must be located at a minimum of:

- 50 metres from any residentially zoned property.
- 50 metres from any residentially used building on any adjoining property.
- 20 metres from any public road, river or property boundary other than a boundary with any residentially zoned property.

(b) Access and Loading

Compliance with the following performance standards of R20.4.2:

20.4.2(a) Vehicle Access;

20.4.2(e) and (f) Loading Space Provision and Design.

(c) Cultural and Natural Heritage

Compliance with the provisions of Section 17 - Cultural and Natural Heritage.

(d) Hazardous Substances

Compliance with the provisions of Section 14 - Hazardous Substances.

(e) Signs

Compliance with R6.1.5.

(f) Height

Any buildings or structures shall comply, in terms of height, with R13.4.7.1

R9.8.3 QUARRYING, INCLUDING THE REMOVAL OF SAND, SHINGLE, SOIL OR OTHER MATERIAL, AND OIL AND GAS EXPLORATION ACTIVITIES

Quarrying, including the removal of sand, shingle, soil or other material is a Discretionary Activity.

Determination Clause

In determining whether to grant consent and what conditions to impose, if any, Council will, in addition to the City View objectives in Section 2 and the Rural Zone objectives and policies, assess any application in terms of the following assessment criteria:

Assessment Criteria

- a. The extent to which any adverse effects on the safe and efficient operation of the roading network from the traffic movements generated by activities are avoided, remedied or mitigated.
- b. To ensure the provision of adequate on-site parking, loading, manoeuvring and access space to avoid this taking place on roads.
- c. The extent to which the effects of noise, dust and other environmental disturbances on the amenity values of the area, particularly on adjacent residential uses can be avoided, remedied or mitigated.
- c. To avoid, remedy or mitigate the risk of contamination posed by hazardous substances.
- d. The extent to which the adverse effects on the safe and efficient operation of the roading network from the traffic movements generated by activities are avoided remedied or mitigated.
- e. To ensure the provision of adequate on-site parking, loading, manoeuvring and access space to avoid this taking place on roads.
- f. The extent to which there is a functional need for the industrial activity to locate in a rural area.

- g. The extent to which the proposal retains the productive capability of rural land, especially the productive use of versatile Class 1 and Class 2 soils.

R9.11.1 NOISE

Sound emissions from any activity in the Rural Zone when measured at or within the boundary of any land zoned for residential purposes or at or within the boundary of any land in the Rural Zone (other than land from which the noise is emitted or a road) shall not exceed the following:

7.00 am – 7.00 pm 50 dB LAeq (15mins)

7.00 pm to 10.00pm 45dB LAeq (15 mins)

10.00 pm – 7.00 am 40dB LAeq (15 mins)

Night-time L_{max} 10.00pm – 7.00 am 70dBA L_{max}

R9.11.2 NOISE INSULATION: ROAD TRAFFIC NOISE

Any new habitable room (including any addition of a new habitable room to an existing building) in a building used by a noise sensitive activity, and any habitable room in a relocated building used by a noise sensitive activity on any site within the Rural Zone must be protected from road traffic noise by complying with the following performance standards:

- (i) Habitable rooms must be at least 20 metres from the designations for State Highways 3, 54 and 57.
- (ii) For any habitable rooms between 20 and 80 metres of the designation for State Highway 3 or State Highway 54, or between 20 and 50 metres of the designation for State Highway 57 between Tennent Drive and Summerhill Drive (known as Old West Road), or between 20 and 50 metres of the designation for State Highway 57 between Staces Road and Napier Road (known as Fitzherbert East Road), or 20 – 80 metre of the designation for any other part of State Highway 57 either:
 - a. A design report prepared by an acoustics specialist shall be submitted to the Council prior to construction of the habitable spaces, demonstrating that road-traffic sound levels will not exceed 40 dB LAeq(24hr) inside all habitable spaces based on the predicted Annual Average Daily Traffic vehicle count 10 years after construction of the habitable room: or
 - b. A design report prepared by an acoustics specialist shall be submitted to the Council prior to construction of the habitable spaces, demonstrating that road-traffic sound levels will not exceed 57 dB LAeq(24hr) outside the most affected

part of the building exterior based on predicted Annual Average Daily Traffic vehicle count 10 years after construction of the habitable room.

- (iii) Where new habitable room(s) with openable windows are proposed, a positive supplementary source of fresh air ducted from outside is required at the time of fit-out. The supplementary source of air is to achieve a minimum of 7.5 litres per second per person.

Appendix C – Figure 3 from noise report – with updated noise levels at 11 Kendalls Line

