

IN THE MATTER of the Resource Management Act
1991

AND

IN THE MATTER of a resource consent application to
Whangarei District Council for the
Otaika Quarry overburden disposal
area project.

**STATEMENT OF EVIDENCE OF SIIRI WILKENING ON BEHALF OF GBC
WINSTONE**

1. INTRODUCTION

Qualifications

- 1.1 My full name is Siiri Wilkening. I hold a Master's degree in Environmental Engineering (Land Improvement and Environmental Protection) from the University of Rostock, Germany. I am a Member of the Acoustical Society of New Zealand.

Experience

- 1.2 I am employed by Marshall Day Acoustics as acoustical consultant. I have had more than twenty years' experience in acoustic engineering in Germany and New Zealand, specialising in environmental noise control and computer noise modelling.
- 1.3 Over the last nineteen years, in New Zealand, I have been involved in investigating and reporting on environmental noise effects of numerous projects.
- 1.4 I have given evidence at Council planning hearings, the Environment Court, the Arbitration Court and before five Boards of Inquiry, and have taken part in Environment Court mediation. My work relates to a wide range of environmental noise sources, such as road traffic, rail, ports, quarries, industrial and power generation activities and educational facilities.

- 1.5 I have been involved in a number of quarry projects, such as the quarries at Three Kings, Motumaoho, Whitehall, Hunua, Drury, Clevedon, Brookby and Whangaripo

Background

- 1.6 In respect of GBC Winstone's (**Winstone**) Proposed Otaika Quarry overburden disposal area project (**overburden disposal project**), I have been involved since the initial investigations for the District Plan change, starting in late 2015, which provided the background to this consent application. Specifically, this has involved:

- (a) A site visit to gain an understanding of the lay of the land, sensitive receiver locations and the topographical and acoustic characteristics of the site and neighbouring sites;
- (b) Meeting with Council to discuss the Project in its early stages;
- (c) Computer noise modelling of early overburden layouts and development, in conjunction with the project team, of alternative layouts; and
- (d) Oversight and review of follow on acoustic assessments undertaken by my colleagues at Marshall Day Acoustics, including of the acoustic report submitted as part of the Application for Consent;

- 1.7 My colleague Damian Ellerton assisted with the assessment of effects, and was the author of the assessment report. He also undertook further computer noise modelling of updated project extents since late 2016.

- 1.8 I confirm that I have read the briefs of Mike Harris and Cameron Lines to which I will cross-refer. My evidence will focus on the noise and vibration effects from the establishment and operation of the overburden disposal project.

2. CODE OF CONDUCT

- 2.1 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.

3. EXECUTIVE SUMMARY

- 3.1 My colleague Damian Ellerton, and I have assessed the acoustic effects from the proposed use of the Pegram Block adjacent to the Otaika Quarry for the deposition of overburden from the quarry. The works would be undertaken over a 35 year period, intermittently every 3 to 5 years for about 8 months each.
- 3.2 I concluded that the operations can comply¹ with the relevant noise limits of the Whangarei District Plan during all phases of works; the initial enabling works during the first two earthworks seasons with the relevant construction noise limits, and the subsequent general works within and outside the MEA with the relevant zone noise limits.
- 3.3 Works will be restricted to daytime weekdays and a shorter day on Saturdays, with no work at nights, Saturday afternoons and Sundays. This, in conjunction with the intermittent works over the years, will assist in avoiding significant adverse amenity effects for residents in the vicinity.

4. SCOPE AND STRUCTURE OF EVIDENCE

- 4.1 As part of the Application lodged by Winstone, Marshall Day Acoustics prepared the acoustic assessment report "Otaika Quarry – Proposed Overburden Disposal Area" dated 22 May 2017 (**the report**). That report is found at Appendix 6 of the Application lodged with Whangarei District Council.
- 4.2 I have structured my evidence as follows:
- (a) Description of the site in terms of acoustic characteristics;
 - (b) Methodology of assessment;

¹ Except at two sites from which written approval for the proposal has been obtained, i.e. 5-7 and 11 Grove Lane

- (c) Noise and vibration assessment;
- (d) Issues raised by submitters; and
- (e) Issues raised in the officer's report.

5. DESCRIPTION OF SITE AND PROPOSAL

- 5.1 The Pegram Block is located between Otaika Quarry and SH1. It is bordered by residential land to the north and east, the quarry to the west and open space (Otaika Sports Ground) and the quarry access road to the south. The residential areas to the north (Acacia Drive, Wattle Lane and Grove Lane) and east (Awatea Street, Smeaton Dive and Clark Mcconachy Place) are partially elevated and overlook the Pegram Block. To the north of Otaika Quarry and west of the Pegram Block is the Rurangi Block (Countryside zone), which contains buildings on the west and south of the site.
- 5.2 The proposed works within the Pegram Block is partially located within the Mineral Extraction Area (**MEA**) as shown in the Whangarei District Plan, and partially within the Countryside Living zone.
- 5.3 Current noise levels across the site vary, depending on distance from SH1, the quarry access road and the quarry itself. The proximity of the consented quarry and associated access way has an influence on the site noise levels, particularly on the southern and eastern side of the site, and the proximity to SH1 influences the ambient noise levels to the west. Overall, the current limited rural use of the site means that ambient noise levels are generally controlled by natural sounds, with some influence from the quarry and SH1. Noise levels are generally below 50 dB L_{Aeq} during daytime.
- 5.4 The Project proposes to place overburden from the Otaika Quarry on the Pegram Block over a period of 35 years. Such placement would occur only during the stripping season every 3 to 5 years, with each season extending for 6 to 8 months. Aside from one 6 to 8 months campaign every 3 to 5 years no works are proposed on site. In the 3 to 5 years between earthworks the site's use and noise levels experienced will be similar to those generated by activities that occur at present, i.e. grazing.

- 5.5 In order to undertake the overburden placement, enabling works will be required. Enabling works are preparatory works required to facilitate the OBD. The enabling works include a number of operations, some of which will generate noise. These activities include, amongst others, the initial stripping of topsoil at the construction area, construction of haul roads, works to establish the shear key and toe bund, and filling and placement of matted material, some of which will occur in close proximity to dwellings.² I consider these enabling works to be construction works and I have assessed them accordingly.
- 5.6 Following the enabling works, general works on the site will be undertaken, which include the placement of overburden material and rehabilitation works. I have assessed these operations against the District Plan zone noise limits.

6. METHODOLOGY OF ASSESSMENT

- 6.1 Based on information supplied by GBC Winstone, I obtained noise levels for the equipment likely to be used for the proposed overburden placement operations. The noise levels are based on MDA noise surveys of similar equipment operating under similar load. Equipment sound power levels generally range from 108 to 117 dBA, with the loudest noise sources being the bulldozers and dump trucks.
- 6.2 During enabling works, in addition to the equipment noted in paragraph 6.1 above, some lighter equipment will likely be used at times (ranging in sound power from 108 to 112 dBA) as it is better suited to the detailed work required for the stripping of top soil, construction of the shear key and bund development. This “supplementary” equipment too small to undertake all other enabling works.
- 6.3 The noise level predictions have included both sets of equipment working simultaneously, and located in close proximity to the boundary, to demonstrate in their possible respective locations, to show reasonable worst case noise levels. I have conservatively assumed that all equipment included in each operational scenario is operating continuously and simultaneously, to represent a worst-case noise

² A more detailed description of the enabling works is contained in the Assessment of Environmental Effects, Section 5.3.

situation. In reality, not all equipment will be operating concurrently at all times, and noise levels will for the most time be lower than predicted.

- 6.4 I have used a three-dimensional computer noise model to predict noise levels at the closest noise sensitive receiver locations to the overburden disposal site for the following two operational scenarios:
- (a) Enabling works operations; and
 - (b) General works operation.
- 6.5 The closest receivers are at the notional boundary of dwellings in the Living 3 zone (Acacia Park) and at the boundary of the Living 1 zone (Smeaton Drive, Clark Mcconachy Place and Awatea Street).
- 6.6 The model takes account of shielding from terrain and structures, ground and air absorption, meteorological effects and distance attenuation. Each noise source is placed in the model, and contributions to each receiver location calculated. In addition, I calculated noise level contours over a wider area. These contours show the noise propagation for both the construction and operational components of the proposal and give an indication of noise levels for more distant receivers.
- 6.7 Written approval to the proposal has been given by eight of owner/occupiers of dwellings surrounding the Pegram Block.³ For these dwellings, the effects must not be taken into consideration. Nevertheless, my assessment includes noise level predictions for these dwellings. When the approvals are taken into account the proposal meets permitted noise levels in the plan.

7. NOISE AND VIBRATION ASSESSMENT

Noise from enabling works

- 7.1 Enabling works⁴ will occur for the first two earthworks seasons only, using standard equipment and in addition, at times, lighter equipment. Enabling works will involve any site preparation works, establishing the toe bund, shear key and haul roads and similar works. These works are used to prepare the site and to ensure a stable and solid foundation is created prior to fill being placed. This is further discussed in Mr Lines'

³ 1, 5-7, 6 and 11 Grove Lane, 30 Acacia Drive, 1/19, 21 and 23 Awatea Street

⁴ Refer Assessment of Environmental Effects, Section 5.3

evidence and memorandum filed with the land use consents and Mr Harris' evidence.

- 7.2 I consider the enabling works to be construction works. While the definition of "Mineral Extraction" in the Whangarei District Plan includes the removal of overlying earth and soil, and the placement of overburden, in this instance the establishment of the site to be able to place overburden constitutes construction. This would be similar to a clean fill (or subdivision) where the site preparation, levelling, topsoil removal and construction of roads would without question be labelled construction noise. In relation to an overburden placement area, the same site preparation will be required as it would otherwise not be able to be used for its intended purpose to place overburden.
- 7.3 Enabling works would only occur during daytime, i.e. between Monday and Friday 7am and 6pm and Saturdays between 7.30am and 6pm, and Saturdays 7.30am to 2pm.⁵ .
- 7.4 The relevant noise limits in accordance with NZS6803:1999 "Acoustics – Construction Noise", and as referenced in the Whangarei District Plan, are 70 dB L_{Aeq} and 85 dB L_{Amax} for long duration (more than 20 weeks) daytime construction.
- 7.5 I have predicted noise levels for the enabling works based on a worst case situation where all equipment would operate in close proximity to the boundary and simultaneously. This would not occur for sustained periods, and noise levels would generally be lower than predicted.
- 7.6 For the enabling works, the highest predicted noise level is 67 dB L_{Aeq} at 31 Acacia Drive. This noise level is predicted to occur for only a few weeks during both earthworks seasons when topsoil stripping occurs in close proximity, and when the bund toe is constructed. When equipment operates further away, noise generation will be less. A noise level of 67 dB L_{Aeq} is readily compliant with the long duration daytime construction noise limit of 70 dB L_{Aeq} .
- 7.7 I have predicted that noise levels at other nearby receivers range from 46 to 61 dB L_{Aeq} . When works are closest to the boundary, and also will

⁵ Refer proposed Draft condition 10(a).

get quieter as works progress across the site. All of them are compliant with the relevant noise limit.

- 7.8 Construction noise levels at the higher end of the predictions (e.g. above 60 dB L_{Aeq}) will be clearly audible and may cause annoyance for affected residents. Similar noise levels and duration could be expected if a residential subdivision was established on the Pegram Block, with earthworks required for any site preparation and road construction. Whilst these construction works will be audible, I do not consider them to be unreasonable as they are of limited duration, as discussed below and are well within accepted and acceptable limits for construction activities. I also note that the works will be restricted to weekdays daytime, and are further restricted on Saturdays to reduce amenity effects on residents in the area.
- 7.9 It is proposed to undertake all enabling works (and works closest to dwellings) to which the construction noise standard is applicable in the first two earthworks seasons 3-5 years apart. This work could be undertaken, with smaller equipment, but increased numbers, over multiple successive seasons. However, in the interest of completing these activities in the shortest possible timeframe and reducing the time that residents are exposed to higher noise levels associated with the enabling works, the works in these areas will be completed as a priority.
- 7.10 Noise effects experienced at residences as a result of the works will also reduce as the work area recedes from the boundary. This will reduce effects on neighbouring dwellings, and ensure that higher noise effects associated with the construction noise limit are contained within a clearly defined shorter timeframe.

Noise from general works

- 7.11 Once the enabling works are completed, general works will be undertaken inside and outside the MEA. At that time, the relevant zone noise limits in accordance with the Whangarei District Plan apply. I have assessed activities according to their location and compared predicted noise levels with the noise limit of 55 dB L_{Aeq} (for works inside the MEA) and 50 dB L_{Aeq} (for works outside the MEA).

- 7.12 For works inside the MEA, general works will occur over a large area and equipment will move around the site. Therefore, I have provided a noise level range for each receiver which represents equipment operating close to, and distant from, each receiver.
- 7.13 For works inside the MEA, the most affected receiver from which written approval has not been obtained, is at 3 Grove Lane, with noise levels ranging from 49 to 55 dB L_{Aeq} . These noise levels are compliant with the 55 dB L_{Aeq} noise limit for works inside the MEA. For other receivers from which written approval has not been obtained, noise levels are predicted to range from 44 to 54 dB L_{Aeq} . All of these noise levels are compliant with the relevant noise limit of 55 dB L_{Aeq} . A daytime noise limit of 55 dB L_{Aeq} is commonly applied to residential sites across New Zealand, and is referenced in NZS6802:2008 "Acoustics – Environmental Noise".
- 7.14 For works outside the MEA, works will be undertaken in a smaller area with a limited range of distances to the receivers. For that reason, I only provided one predicted noise level, assuming all works would be at a location closest to the receiver. A number of receivers are predicted to receive a noise level of 50 dB L_{Aeq} , which is compliant with the relevant noise limit, and all other receivers will receive lower noise levels.
- 7.15 At two of the dwellings from which written approval has been obtained, I predict that noise levels will at times exceed the relevant noise limit by a small margin.
- 7.16 As noted above, I have assessed a worst-case scenario where all equipment operates simultaneously in close proximity to the receivers. This would only occur from time to time, and for a limited duration. Therefore, for most times, noise levels would be lower than those predicted.
- 7.17 Overall, I predict that all works can be undertaken in compliance with the relevant noise limits at all receivers from which written approval has not been obtained. While the sound levels will be audible, particularly when in close proximity to the receivers, I consider that the noise levels are reasonable and would cause no more than minor adverse effects on residential activities at the dwellings.

Vibration from works within the project area

- 7.18 Operations closest to receivers will occur during enabling works. No piling or similar high vibration inducing activities are proposed, and the distance from closest works to the receivers is more than 40 metres, which ensures that vibration levels will be well below the criteria.
- 7.19 My predictions show that vibration levels will comply with relevant criterion of the Whangarei District Plan of 1 mm/s.
- 7.20 I predict that vibration would generally be imperceptible in dwellings adjacent to the works, and consider the effects to be negligible.

8. ISSUES RAISED BY SUBMITTERS

- 8.1 I have read the submissions received on the proposal, as they pertain to noise and vibration issues. Of the submissions received, 18 comment on noise and vibration effects. I address these below.

Continual noise from heavy machinery

- 8.2 A number of submitters⁶ are concerned about noise levels from heavy machinery operating on the Pegram Block, in addition to the noise generated by the quarry, and that there will be continual noise. I note that our computer noise model includes both quarry and project area operation, therefore the cumulative effect of both has been taken into consideration⁷ and is within acceptable levels.
- 8.3 The noise levels predicted are within the relevant noise limits of the District Plan, and are commonly used to ensure residential amenity is protected. New Zealand Standard NZS6802:2008 “Acoustics – Environmental Noise” sets guidelines for residential upper noise limits of 55 dB L_{Aeq} daytime and 45 dB L_{Aeq} night-time. These Standard criteria are similar to, and higher than, those applicable to works inside and outside the MEA.

⁶ C Thomas, L Connew and S Lemon-Connew, C Sawyer and B Scott, J and D Dalton, B Povey and S McQuade, R Tonkin, D and J Mosley, C Halliwell, D and I Coates, J Lowe-Arrol and C Arrol, Acacia Park Landowners Association

⁷ Note that noise levels are added logarithmically: adding two noise levels of 50 dB L_{Aeq} results in a combined noise level of 53 dB L_{Aeq} . A noise level change of 3 decibels is generally the smallest change that is noticeable to the human hearing, while a noise level change of 10 decibels sounds about double or half as loud.

- 8.4 Nevertheless, I acknowledge that noise from the site will be audible at some dwellings, both due to its level and character. However, I consider that audibility is not the relevant assessment criterion. Rather, I have compared the noise levels with the relevant noise limits in the District Plan and New Zealand standard and consider the effects to be reasonable. I also note that works will not be “constant” – works are infrequent but recurring, and will occur only for limited and well defined periods, i.e. 6 to 8 months every three to five years during the stripping period, thus further reducing the time of noise exposure. In the interim period, there would be no activities on site. In addition, the proposed conditions restrict the times that works can occur on site in order to ensure that residential amenity during sensitive times (e.g. night-time, Saturday afternoon and Sundays) is protected.
- 8.5 For rural areas (in the context of this Project, all sites zoned Living 3 or Countryside), the assessment position set out in the District Plan (and supported by the Standard) is the notional boundary. The notional boundary is a line 20 metres from a dwelling. The reason for this location is that in rural areas sites can be very large. Normal day to day activities are generally undertaken in the vicinity of the dwelling. This is the sensitive area to be protected. For urban areas (in the context of this Project, all sites zoned Living 1), the assessment position is the site boundary. The reason is that urban areas have a higher density of dwellings and smaller sites.

Suggestion that some locations have not been assessed

- 8.6 In response to some submitters⁸ concern that noise levels have not been predicted to a further distance, e.g. 200 to 250 metres away, I note that the noise level contours extend some 400 metres from the works⁹. Since noise attenuates with distance, if noise levels at the closer receivers (without terrain shielding) can comply with the relevant limits, then the limits will be complied with at more distant receivers also.

52 Acacia Drive

- 8.7 Submitters from 52 Acacia Drive¹⁰ are concerned that the acoustic assessment is inaccurate in relation to their property. As noted in

⁸ C Thomas and Acacia Park Landowners Association

⁹ Refer Appendix B in the Report

¹⁰ A Norman and F Spencer

paragraph 8.5 above, the relevant assessment position is at the notional 20 metres from the existing dwelling. While the submission correctly states that the site shares a common boundary with Otaika Quarry, the dwelling is more than 200 metres from the site boundary.

- 8.8 The assessment position is significantly further from the Pegram Block works than the dwellings specifically named in the Report. Noise level contour predictions in Appendix B of the Report show that the noise levels at the assessment position are in the 50 to 55 dB L_{Aeq} range.
- 8.9 In response to the submission, I have predicted the noise levels at 52 Acacia Drive. Noise levels are:
- (a) During enabling works 52 to 53 dB L_{Aeq}
 - (b) During general works inside the MEA 51 to 53 dB L_{Aeq}
 - (c) During general works outside the MEA 50 dB L_{Aeq}
- 8.10 These noise levels are compliant with the relevant noise limits for all works.

Rurangi Block

- 8.11 The Rurangi Block west of the Pegram Block contains a number of buildings at significant distance from the Pegram Block (more than 550m), but in closer proximity to Otaika Quarry (approximately 70 metres). I understand that while the buildings are not currently in use (apart from one being used as quarry worker accommodation), they may be used in the future. Therefore, *if* these buildings *were* to be assessed as sensitive receivers, I have predicted noise levels for completeness.
- 8.12 For all operational scenarios (i.e. enabling works and general works on the Pegram Block), noise from activities on the Pegram Block will have no effect on the noise level at the buildings on the Rurangi Block. During all operational scenarios, noise levels from the Pegram Block range from 39 to 43 dB L_{Aeq} . This is well within the relevant noise limits of 50 dB L_{Aeq} (for works inside the MEA), 50 dB L_{Aeq} (for works outside the MEA) and 70 dB L_{Aeq} (for enabling works).
- 8.13 I predict noise levels up to 62 dB L_{Aeq} at the closest building, which is controlled by quarry works only and not affected by noise from either enabling or main works from the Pegram Block. Such noise levels would

only occur when quarry works are undertaken in close proximity to the boundary, at the north western most corner of the quarry site.

Terrain effects on noise propagation

- 8.14 Some submitters¹¹ are concerned that the computer noise model does not accurately reflect the topographical layout of the site and surrounding land, and therefore does not reflect the lack of terrain shielding or high location of the properties above the site.
- 8.15 The computer noise model is based on detailed 3D topographical information. This means that when the sources and receivers are placed in their respective height above ground, any shielding (or lack of) is accurately reflected. Where the receiver includes a double storey dwelling, this has also been taken into consideration with the receiver being placed higher above the ground.
- 8.16 The calculation method (ISO9613-2) takes into consideration shielding from terrain where this is present, as well as meteorological conditions such as downwind conditions.
- 8.17 I therefore consider that the model accurately reflects the site and surrounding sites.

Change of equipment over time

- 8.18 Some submitters¹² are concerned that the predictions are based on a certain set of equipment, which may change over time, thus not accurately reflecting noise levels in future years. Similarly, truck sizes may change over time.
- 8.19 While it is correct that equipment may change, new equipment is generally less noisy than old. Technology continues to develop, and the design of trucks and bulldozers means that newer types generate less noise.
- 8.20 I also note that Section 16 of the RMA requires that the best practicable option be implemented to ensure that emissions of noise do not exceed a reasonable level. Therefore, any replacement equipment would be

¹¹ A Norman, F Spencer and R Taylor

¹² R Taylor, C Johnson

very unlikely to be noisier than is currently the case and still fulfil the BPO.

Adverse health effects from noise exposure

- 8.21 Some submitters¹³ are concerned that the noise levels predicted for enabling works may lead to hearing loss.
- 8.22 The noise levels predicted for enabling works are at most 67 dB L_{Aeq} and for all other receivers 61 dB L_{Aeq} or less. As discussed in paragraph 7.5 above, these levels represent a worst case scenario where all equipment operates simultaneously and in close proximity to the boundary. These levels would be experienced for only limited periods, and noise levels would generally be lower.
- 8.23 At the highest predicted levels in the 60 to 70 dB L_{Aeq} range (which would occur for only limited periods of the enabling works), hearing loss is highly unlikely to occur. For reference, the New Zealand Health and Safety criterion for the avoidance of hearing loss is 80 dB L_{Aeq} for an 8 hour exposure.
- 8.24 I also note that the construction noise standard permits a level of 70 dB L_{Aeq} for construction works, without the danger of hearing loss.

Noise from the quarry, including blasting and traffic on the access road

- 8.25 Some submitters¹⁴ are concerned about noise from the quarry, including blasting noise and vibration. As noted in paragraph 8.2, the quarry noise has been taken into consideration when noise levels were predicted for the overburden disposal project, including stripping of overburden in the quarry area.
- 8.26 There will be no blasting on the Pegram Block. Quarry operations are unrelated to this application, and while they have been considered in the predictions, because they form part of the existing environment, the current proposal is for operations on the Pegram Block only.
- 8.27 Traffic noise associated with the truck movements on the access road is controlled by conditions relating to the quarry operations and TMP for the

¹³ G Barton and M Barton-Boots

¹⁴ M Elmes, Southern Whangarei Action Group

quarry. The use of the Pegram Block for overburden disposal will have no effect on the use of the access road to the quarry, and no trucks transporting overburden to the Pegram Block will use the quarry access road.

- 8.28 All truck movements on the haul road associated with the Pegram Block works have been included in the computer noise model, and are unrelated to the access road. Trucks on the haul road are controlled by proposed condition 13 in relation to reduced speed to reduce noise effects.
- 8.29 One submitter¹⁵ is concerned about the cumulative noise effects from the quarry, trucks on the access road and the Pegram Block. While quarry operations were included in the noise level predictions, together with the Pegram Block works, I note that trucks on the access road (Quarry Road) were not in the computer noise model. Including these trucks in the calculation results in a negligible change in the predicted noise level of less than 1 decibel. The predicted levels in tables 2, 3 and 4 of the Noise report for all residential sites remain valid.

ISSUES RAISED IN OFFICER'S REPORT

- 8.30 I have reviewed the Council Officer's report and the supporting acoustic review of Peter Runcie of SLR. The Officer's report also contains recommended conditions of consent. I discuss any issues relating to noise and vibration below.
- 8.31 Overall, the Officer's report agrees with the findings of the report, that noise and vibration effects can be appropriately managed through conditions of consent.
- 8.32 The Officer's report¹⁶ notes that "the scale and nature of the works [...] will introduce noise [...] on the site that is not readily accounted for by any permitted baseline". I do not agree with this assessment. If a subdivision was developed on the Pegram Block, or if the site was levelled for other use, then a similar amount of construction and associated earth works would need to occur, over a similar duration of several months. For such works, the construction noise standard NZS 6803:1999 would apply in accordance with the relevant District Plan

¹⁵ Chrissie Johnston

¹⁶ Paragraph 8.17

provisions, with noise limits of 70 dB L_{Aeq} and 85 dB L_{AFmax} daytime would apply. Such noise levels are anticipated, and permitted by the District Plan.

- 8.33 Similarly, during operation of the site, the permitted noise limits are predicted to be complied with. Therefore, the scale of effects would be within the range anticipated by the District Plan.
- 8.34 The Officer's report¹⁷ correctly identifies that noise would only occur intermittently.
- 8.35 The Officer's report, quoting Mr Runcie's peer review, considers that using the Construction Noise Standard for the entirety of the enabling works would "not be considered reasonable in the context of Section 16 of the RMA". I disagree with this statement. Section 16 requires that any occupier of land adopts the BPO to ensure that noise emissions do not exceed a reasonable level. In my opinion, the proposed activities on the site fulfil this requirement.
- 8.36 The District Plan permits elevated noise levels for construction on sites. It is therefore incorrect, to label the predicted noise levels of up to 67 dB L_{Aeq} for some periods during the enabling works as "unreasonable".
- 8.37 The enabling works proposed clearly constitute construction works, involving construction of drainage, the establishment of haul roads, and the construction of the bund toe, which will enable the use of the site following the enabling works. Large construction projects, such as this require a relatively long period of time to complete. Comparatively, construction of roads or large office buildings takes upward of 2-3 years, and for some projects up to 6 years.
- 8.38 When planning the site operations, several aspects were reviewed, including the duration of works, and the equipment required to undertake the works. The chosen option put forward in the application and our assessment involved the intermittent use (once every 3 to 5 years) of few items of large equipment for limited times (up to two earthworks seasons). Another option, not chosen, involved the continuous use of several items of smaller equipment over a longer time (at least double).

¹⁷ Paragraph 8.20

- 8.39 I have predicted noise levels for the continuous use of the smaller equipment, and have found that, while noise levels could be reduced by 2 to 4 decibels, compliance with the 55 dB L_{Aeq} noise limit would not be achievable due to the close proximity to some houses. However, the effects in terms of duration and exposure would be ongoing and therefore significantly more adverse. For these reasons, I consider that the proposed 8 months construction period twice every 3 to 5 years would result in less noise effects.
- 8.40 As noted earlier in my evidence, the noise levels predicted are the highest levels that would occur, when equipment operates closest to the respective houses. This noise level would only occur intermittently, and for only a small part of the overall enabling works period (a few days or weeks as opposed to eight months).
- 8.41 I disagree with Mr Runcie's comment that the noise levels from the enabling works should comply with the operational noise limits. The works are enabling works as discussed above, and fall into the construction noise category. They do not, generally, fall within the definition of mineral extraction as set out in the District Plan, particularly the aspects of drainage and haul road construction and the construction of the bund toe. That some top soil removal is required for all of these activities, is a given and would apply similarly to all construction activities, including subdivisions or roads. It is therefore unreasonable to apply the operational noise limits to activities that are not part of the normal operation of an overburden disposal area.
- 8.42 Mr Runcie comments that with the installation of noise bunds or barriers, and the choice of lower noise equipment, compliance with the operational noise limits could be achieved. I disagree with this comment.
- 8.43 The terrain formation between the dwellings in Acacia Drive and the Pegram Block is such that dwellings (some multi storey), are elevated above the site. This is also commented on by the submitters. We assessed the option to construct a noise bund between the subdivision and the site. In my opinion, there is no practicable way of providing an effective bund. In order to achieve any meaningful noise level reduction, a bund would need to be in excess of 5 metres high and span most of the norther side of the Pegram Block. The construction of such a bund would take several earthworks seasons of large equipment, resulting in

significantly higher noise levels for significantly longer periods for the residents at Acacia Drive. I would not consider this BPO in terms of noise effects.

- 8.44 The use of smaller and quieter equipment is already discussed in paragraph 8.39 above. I understand that there is no feasible lower noise equipment that could be used for the works while still achieving compliance with the operational noise limits.
- 8.45 Overall, as discussed in the paragraphs above, I remain of the opinion that enabling works constitute construction and should be assessed and managed accordingly. All following works should be assessed and managed in accordance with the relevant operational noise performance standards. I do, however, agree that noise can be managed through conditions of consent.
- 8.46 The Officer's report provides recommended conditions of consent. I discuss these below.
- 8.47 Conditions 7 to 10 relate to Enabling works, and conditions 11 to 17 to General works.
- 8.48 I note that wording of Condition 12, and the following Note, should be included in the suite of conditions relating to the Enabling works. The requirement to provide start and finish dates of works to the Council prior to commencement, ensures that Enabling works in accordance with the construction noise limits are clearly defined, and Council and residents are aware of the high noise periods on site. This notification of timeframes provides certainty to all involved about the relevant performance standards that need to be achieved, and ensures that any high noise periods are limited to pre-defined months.
- 8.49 I disagree with the noise limits in condition 8(c) for the reasons set out above, and recommend deleting this subpoint. The previous subpoint 8(b) should apply to all enabling works, and hence read:
- “(b) Noise generated by enabling works shall not exceed the limits in NZS 6803:1999 Acoustics – Construction Noise”*
- 8.50 I consider that the monitoring conditions in relation to the noise generation from enabling and general works will provide an additional

level of certainty for Council and the residents that works will be undertaken within the relevant criteria.

9. SUMMARY AND CONCLUSIONS

- 9.1 I, and my colleagues of MDA, have undertaken an assessment of noise and vibration effects from the establishment and operation of overburden placement at the Pegram Block, adjacent to Otaika Quarry.
- 9.2 The works would be undertaken intermittently every 3 to 5 years, over an earthworks season of approximately 8 months. Enabling works include the establishment of the site, construction of drainage and haul roads and the bund toe. For these works, the construction noise limits should apply. Following the preparation of the site, the fill operation would occur over a total period of approximately 35 years. These works would comply with the current District Plan zone noise limits.
- 9.3 With appropriate management and conditions, I consider that the noise effects of the works can be managed and be reasonable, particularly taking into consideration the intermittent nature of the works.

Siiri Wilkening
March 2018