

**IN THE ENVIRONMENT COURT
WELLINGTON REGISTRY**

**I TE KŌTI TAIAO O AOTEAROA
TE WHANGANUI-A-TARA ROHE**

ENV-2024-WLG-001

UNDER the Resource Management Act 1991

IN THE MATTER the direct referral of applications for resource consents by
under section 87G of the Act for the Mt Munro Wind Farm

BY **MERIDIAN ENERGY LIMITED**
Applicant

STATEMENT OF EVIDENCE OF NIGEL ROBERT LLOYD

ON BEHALF OF TARARUA DISTRICT COUNCIL AND MASTERTON DISTRICT COUNCIL

NOISE

Dated: 23 August 2024



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STATEMENT OF EVIDENCE OF NIGEL LLOYD

A. INTRODUCTION

- [1] My name is Nigel Robert Lloyd. I am an acoustic consultant.
- [2] I prepared a report on the application required by s 87F of the Resource Management Act 1991 (**RMA**) on behalf of Manawatū-Whanganui Regional Council (**Horizons**) and Wellington Regional Council (**WRC**) Tararua District Council (**TDC**), and Masterton District Council (**MDC**) (the **Consent Authorities**) dated 15 March 2024 (**s 87F Report**).
- [3] In my s 87F Report, I reviewed the application from Meridian Energy Limited (the **Applicant** or **Meridian**) for resource consent applications lodged with the District Councils for the Mt Munro Wind Farm (**Mt Munro Project** or **Project**) in relation to noise. The s 87F Report provided recommendations to improve or further clarify aspects of the resource consent applications, including with regard to conditions, should the Court be minded to grant resource consents.
- [4] I confirm I have the qualifications and experience set out at paragraphs 5-9 of my s 87F Report.
- [5] On 7 August 2024, I participated in expert conferencing on noise, resulting in a joint witness statement dated 8 August 2024 (the **Acoustics JWS**). I confirm the contents of the Acoustics JWS.

B. CODE OF CONDUCT

- [6] I repeat the confirmation provided in my s 87F Report that I have read and agree to comply with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. This evidence has been prepared in accordance with that Code. Statements expressed in this evidence are within my areas of expertise, except where I state I am relying on the opinion or evidence of other witnesses.

C. SCOPE OF EVIDENCE

[7] My statement will cover the following:

- (a) The extent to which issues identified in my s 87F Report have been resolved through mediation, Meridian evidence, and expert conferencing;
- (b) A response to section 274 party evidence; and
- (c) Conditions;

[8] In addition to the material that was reviewed for my s 87F Report, I have reviewed the following:

- (a) Statement of Evidence of Miklin Halstead (Acoustics) dated 24 May 2024, on behalf of Meridian;
- (b) The proposed changes to conditions filed with Mr Tom Anderson's evidence (the **Meridian conditions**);
- (c) Evidence of Janet McIlraith (s 274 party) dated 10 July 2024;
- (d) Evidence of Robin Olliver (s 274 party) dated 10 July 2024;
- (e) Evidence of Hastwell/Mt Munro Protection Society Inc. (s 274 party) dated 10 July 2024;
- (f) Evidence (Social Impact Report) of John Maxwell (s 274 party) dated 10 July 2024; and
- (g) The proposed draft conditions attached to the evidence of Damien McGahan on behalf of the Consent Authorities (the **August Proposed Conditions**).

D. OUTSTANDING ISSUES

[9] My s 87F Report identified a number of issues relating to noise associated with construction, operation and maintenance of the Project. In particular, I raised issues relating to construction works noise and construction traffic on

Old Coach Road, the aggregate crusher plant operating hours, and the Construction Laydown and Site Administration area construction hours.¹ These matters have been resolved through design changes with the Project, including with regard to the location of particular activities, and proposed conditions.

[10] Of particular note:

- (a) Proposed condition CN1(b) restricts the hours of operation of the upgrade of Old Coach Road, internal Project roads and the Construction Laydown and Site Administration area to between 7.30am and 6.00pm Monday to Saturday. I also note that both construction of internal roads and the establishment of the Project Construction Laydown and Site Administration area are stated to be constrained to “*weekday daytime operation*”² which would not include Saturdays.
- (b) I recommended that operational wind farm noise conditions should include specific noise limits and to ensure that special audible characteristics are penalised. Proposed conditions WFO2 and WFO3 achieve this. I also consider that conditions WFO4 and WFO5 appropriately provide for pre-installment assessment, including the modelling of the nominated turbines (which have yet to be decided upon).
- (c) Submissions have referred to issues with noise from the existing meteorological mast on the site. This initiated some discussion about methods to mitigate noise from any future masts that would be erected as part of this project. However, it was agreed that it is difficult to anticipate the circumstances that would generate mast sounds and that such phenomena are rarely encountered. The experts have agreed that WFO11 include the requirement for the meteorological mast to comply with the non-turbine related

¹ See the summary of issues, at Section D, s 87F Report – Nigel Lloyd (Acoustics), 15 March 2024.

² S92 Response dated 31 January 2024 Appendix 3 (Marshall Day Acoustics letter of 30 January 2024) paragraph 5.

operational noise limits in WFO1.³ This would then allow any issues with future mast noise to be appropriately dealt with.

[11] Following mediation, expert conferencing and review of the Meridian evidence, and Acoustics JWS I have identified the following matters that remain at issue following preparation of my s 87F Report:

- (a) I remain of the view that concrete batching plant noise and mobile aggregate crushing activities are reasonably controlled by reference to the Operational Noise – Non-Turbine Related noise limits in WFO1 rather than the construction noise limits.
- (b) *“Production blasting”* has been differentiated from *“controlled blasting”* and was excluded from hours of operation restrictions in condition CN2(b). During expert conferencing, Mr Halstead and I were unable to decide what impacts these activities might have, and I have concerns about providing for production blasting on an unrestricted time basis.

[12] I address these issues in turn below. I also provide comment on the conditions specifically, at section F below.

Concrete Batching Plant Noise

[13] In my s 87F Report, I explained why I consider concrete batching plant noise should be controlled by reference to the operational noise non-turbine related noise limits rather than the construction noise Standard limits.⁴

[14] I therefore recommend that condition CN1 is amended to read:

Noise generated from all activities associated with the construction of the Project must be measured and assessed in accordance with the long-term duration noise limits in Table 2 of ‘NZS6803:1999 Acoustics – Construction Noise’. The exceptions to this requirement are the Concrete Batching Plant and the Mobile

³ Acoustics JWS, page 7, item 16.

⁴ Section 87F Report – Nigel Lloyd (Acoustics), 15 March 2024 at [46]-[55].

Aggregate Plant which are subject to the noise limits specified in Condition WFO1.

- [15] This makes it clear that the Concrete Batching Plant (and Mobile Aggregate Plant) noise is to be controlled by the Operational Noise – Non-Turbine Related limits.
- [16] As part of expert conferencing, I became aware that concrete batching activities would operate at night-time on a restricted basis i.e. where concrete pours for turbine foundations cannot be completed during daytime hours, and there would need to be provision for the concrete batching plant to exceed the night-time noise limits on those occasions.
- [17] The night-time noise limits are the same numerical value in the construction noise Standard as they are in condition WFO1 (but they apply at different times). I recommend that night operation of the concrete batching plant be provided for in the conditions, on a strictly limited basis. I suggest the following addition to condition CN1:

Night operation of the Concrete Batching Plant must only occur for the pouring of large foundations which cannot be completed during daytime hours. This night operation shall be managed to ensure noise levels are kept as low as reasonably practicable and that residents who may experience noise that exceeds the night-time noise limits are informed 7 days in advance.

- [18] I agree with Mr Halstead that 250 metres is a suitable setback for the Concrete Batching Plant from any dwelling because this will result in appropriate protection for daytime residential amenity at dwellings.⁵ However, there will still be some noise impacts on a small number of dwellings resulting from the night-time operation of the concrete batching plant. I expect this to occur on approximately 20 occasions given that is the number of wind turbines involved.
- [19] In light of the envelope approach taken (where the actual location of the concrete batching plant is yet to be determined by the Applicant) I remain of

⁵ Acoustics JWS at pg 4, item 5.

the view that the noise limits in condition WFO1 are appropriate in the circumstances. Noting that:

- (a) The daytime limit can be met and provides more certainty that daytime residential amenity will be protected;
- (b) The night-time limits are numerically the same in the two scenarios (and may be exceeded anyway); and
- (c) For the reasons summarised in my s 87F Report⁶ and particularly in paragraph 53.

[20] I note that the set-back distances for the Concrete Batching Plant (CB1) and the Mobile Aggregate Crushing Facility (MACF1) are both “250 m of the Project Site access from Old Coach Road.” The Acoustics JWS agrees that this distance should be from dwellings.⁷ I recommend that the set-back distance of 250 metres should apply to dwellings in these two conditions.

Mobile Aggregate Crushing Plant

[21] To my knowledge there is no intention for the mobile aggregate crushing plant to operate at night but for the same reasons I consider the noise from that facility should be controlled by the condition WFO1 noise limits.

Blasting Noise

[22] Blasting noise is a particular concern of section 274 parties. Mr Halstead recommended that the hours of blasting are limited to daytime hours – specifically 0730-1800 Monday – Saturday for “production blasting” and 0900-1700 Monday to Friday for blasting activities with more exposed charges.⁸ I assume this to be “controlled blasting” required for specific construction works (roading or turbine foundation works). Mr Halstead states that “production blasting” noise will have “*very low levels of noise emission*”.⁹

⁶ Section 87F Report – Nigel Lloyd (Acoustics), 15 March 2024 at [51-55].

⁷ Acoustics JWS, pages 4 and 20, items 6 and 20.

⁸ Statement of Evidence – Miklin Halstead (Acoustics), 24 May 2024 at [64].

⁹ At [64].

- [23] I note the draft conditions circulated for the purposes of expert conferencing excluded production blasting from the hours of operation for controlled blasting (condition CN2(b)) without being restricted separately by the times Mr Halstead recommends. The concept of *production blasting* is therefore a newly introduced concept and the experts sought further information through the Acoustics JWS to inform an understanding of the scale and intensity of production blasting and what constraints on hours of operation are appropriate.¹⁰ At this time, I remain of the opinion that all blasting should be restricted in condition CN2(b) to 0900 – 1700 Monday to Friday.
- [24] Proposed condition CN2(a) requires blasting activities to meet ground vibration and airblast limits recommended by AS 2187-2:2006 “Explosives – Storage and use Part 2: Use of Explosives” to be written into conditions (CN2). The relevant parts of AS 2187-2:2006 are copied to Annexure B-3 and B-1 of the Acoustics JWS. This condition would apply to all aspects of blasting including *production* and *controlled*.
- [25] My concerns about night-time blasting arise because of matters such as secondary noise. AS 2187-2:2006 (Appendix J1) states that people may easily confuse the sources of their discomfort and misconstrue the actual source. Their discomfort is often attributed to ground vibration but it is secondary noise, such as windows and crockery rattling, which may have been caused either by the ground vibration or airblast. For example, air blast noise may be inaudible outside a building but may cause awakening inside a building because of the secondary noise issues.
- [26] Notably, there is nothing in AS 2187-2:2006 (Appendix 11) that provides criteria for protection against sleep disturbance. I therefore take this to be an indication that the Standard assumes blasting should only take place during the daytime.

¹⁰ Acoustics JWS, at page 6, items 13-14.

E. RESPONSE TO SECTION 274 PARTY EVIDENCE

- [27] I have reviewed the section 274 party evidence of Janet McIlraith, John Maxwell and Robin Olliver who raise noise concerns.

Janet McIlraith

- [28] Ms McIlraith raises the noise of the current survey mast as being intrusive and is concerned that windfarm noise will often be audible, which, along with other intrusions, will impact their daily life on the land.¹¹

- [29] The issue of the meteorological mast is addressed in the Acoustics JWS.¹² In my experience acoustic phenomena from meteorological masts are rare occurrences although clearly residents experience annoyance from wind noise generated by the existing mast at Mt Munro.

- [30] The Acoustics JWS recommends that a requirement to monitor the new mast noise is added to proposed condition WFO12 to ensure it complies with the non-turbine related operational noise limits in condition WFO1.¹³ Should the mast generate noise with special audible characteristics, it will need to be measured and assessed in the same way as any other (non-turbine) noise generator on the Project. In the event of non-compliance with the limits in WFO1 (which includes assessment of tonality by way of NZS 6802:2008) then noise mitigation will be necessary until compliance is achieved.

John Maxwell

- [31] Mr Maxwell discusses noise as issue 4 of his evidence which I summarise as follows:

- (a) The physics of sound waves and that noise will be funnelled toward the Hastwell group of residences;¹⁴

¹¹ Statement of Evidence – Janet McIlraith, 10 July 2024, at [31]-[32].

¹² Acoustics JWS, at pages 6-7, items 15-16.

¹³ Acoustics JWS, at page 7, item 16.

¹⁴ Statement of Evidence – John Maxwell, 10 July 2024 at [22].

- (b) That reliance cannot be placed on NZS 6808:2010 because it is an *“industry standard”*,¹⁵
- (c) Concerns about special audible characteristics (hum) from the wind farm;¹⁶
- (d) Infrasound;¹⁷ and
- (e) The whistling of the meteorological mast.¹⁸

[32] I consider that NZS 6808 is the appropriate standard to apply. This standard (or the previous version) has been applied to each windfarm application in New Zealand to date. The application of the noise limits in NZS 6808:2010 provide for a reasonable noise environment and includes assessment of special audible characteristics in the unlikely event that they should arise.

[33] NZS 6808:2010 would be used for assessment of any of the concerns raised in Mr Maxwell’s evidence should it be necessary after construction.

Robin Olliver

[34] This evidence identifies construction noise and blasting as a major concern.¹⁹

[35] These issues are dealt with by way of conditions. As stated above, I consider concrete batching and rock crushing should not be controlled by reference to the construction noise standard but controlled by reference to non-turbine related operational noise limits in condition WFO1. These limits are akin to those in District Plans which control noise from concrete batching plants or aggregate crushing machines in the rural zones of the districts.

[36] Residents will inevitably experience some adverse noise impacts during the construction period, but this is not necessarily unreasonable in the circumstances. The application of noise and vibration construction management plans will be implemented in accordance with section 16 of the

¹⁵ At [23].

¹⁶ At [25].

¹⁷ At [26].

¹⁸ At [27].

¹⁹ Statement of Evidence – Robin Olliver, 10 July 2024 at pages 7-8.

Resource Management Act 1991 to adopt the best practicable option to ensure construction activities do not exceed a reasonable level.

- [37] The impacts of construction noise will be greatest on residents of Old Coach Road and proposed condition CN3(c) specifically identifies the mitigation measures for residents along Old Coach Road (and Opaki-Kaiparoro Road between SH2 and Mt Munro Road) that could be considered. I consider those measures to be appropriate and necessary as circumstances dictate.
- [38] Rock blasting noise is considered in the Acoustics JWS although further information is required if production rock blasting is needed outside of daytime working hours.²⁰ Annexure B to the Acoustics JWS recommends that additional information is included in draft conditions to make it clear what airblast and ground vibration limits apply.

F. CONDITIONS

- [39] I have reviewed the August Proposed Conditions. I provide comments and summarise my recommended changes below:

(a) CBN1 Construction Noise General be amended as follows:

- a) Noise generated from all activities associated with the construction of the Project and must be measured and assessed in accordance with the long-term duration noise limits in Table 2 of 'NZS6803:1999 Acoustics – Construction Noise' (Annexure B-2). The exceptions to this requirement are the Concrete Batching Plant and the Mobile Aggregate Plant which are subject to the noise limits specified in Condition W01.

- (b) To include the following provisions for the essential night-time operation of the Concrete Batching Plant:

Night operation of the Concrete Batching Plant must only occur for the pouring of large foundations which cannot

²⁰ Acoustics JWS, at page 6, item 13.

be completed during daytime hours. This night operation shall be managed to ensure noise levels are kept as low as reasonably practicable and that residents who may experience noise that exceeds the night-time noise limits are informed 7 days in advance.

- (c) CN1(b) - The upgrade of Old Coach Road, internal Project roads and the Construction Laydown and Site Administration Area must only occur between the hours of 7.30am and 6.00pm, Monday to ~~Saturday~~ Friday.²¹
- (d) CN2(b) – I support the deletion of “*production blasting*” as an exclusion. All blasting shall be restricted to between the hours of **0900am to 1700pm, Monday to Friday**.
- (e) WFO11 should include the requirement for the meteorological mast to comply with the non-turbine related operational noise limits in WF01 (as currently set out).
- (f) CN2(a) should apply to all blasting, including production blasting (as currently set out).
- (g) CN3 – I support the inclusion of Condition CN3 which provides for the preparation of a Construction Noise and Vibration Management Plan and the submission of the plan for certification. This represents best practice for ensuring noise impacts are recognised and dealt with by the Consent Holder.
- (h) CN1 - I support the inclusion of the long-term construction noise limits from Table 2 NZS 6803:1999.
- (i) CN2(a)(i) – I support the inclusion of the 5mm/s ground vibration limit for controlled blasting. This limit is for *human comfort* rather than control of damage to structures.

²¹ Marshall Day Acoustics Recommendation S92 Response dated 31 January 2024 Appendix 3 (Marshall Day Acoustics letter of 30 January 2024) paragraph 5.

- (j) CN3(b)(II) – I support the inclusion of the ground vibration effects controls in Table 1 of DIN 4150-3:2016-12.

[40] Otherwise, I agree that the conditions address the matters arising out of my s 87F reporting, and evidence to date. This includes the opinions I expressed in the Acoustics JWS. It is important that oversight is maintained through management plans, and use of best practice, which are considered critical factors in managing noise effects.

G. CONCLUSION

[41] I consider the assessment of noise effects and additional information provided on request or through evidence allows the adverse noise impacts of the wind farm to be understood. It also enables noise conditions to be drafted in a manner that will provide appropriate controls on construction noise and vibration, wind turbine noise and other non-turbine related noise.

[42] The exception to this is production blasting. While this blasting can be controlled by noise and vibration limits in the same manner as controlled blasting, I consider it also needs to be restricted to core daytime hours.

[43] I consider the appropriate method to control concrete batching plant and aggregate crushing facility noise is using the non-turbine related operational noise limits in condition WFO1.

[44] If the concrete batching plant needs to operate at night in exceedance of night-time noise limits, then this would only be for essential reasons on a strictly limited basis. I have recommended a condition which provides for these circumstances. The Concrete Batching Plant Management Plan should otherwise set out the process for where such exceedances can occur, having regard to who will be impacted by the noise and what measures are to be put in place to mitigate the noise.

23 August 2024

Nigel Lloyd