MARSHALL DAY Acoustics

MAHINERANGI WIND FARM
CONSTRUCTION NOISE MANAGEMENT PLAN

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Project: **MAHINERANGI WIND FARM**

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1.0 INTRODUCTION

Marshall Day Acoustics (MDA) has been engaged by Tararua Wind Power Limited (TWP) to prepare a Construction Noise Management Plan (CNMP) for Stage 2 of the Mahinerangi Wind Farm. Stage 2 will consist of 44 additional turbines which will have a maximum tip height of 165m providing an additional 190MW capacity.

This CNMP has been prepared to support resource consent applications for Mahinerangi Wind Farm Stage 2. An existing land use resource consent is held for the wind farm; however, the proposed layout and specification requires a variation to this resource consent under s42(4)(b) of the Fast-track Approvals Act 2024. Additionally, new land use resource consents are required for a transmission line connection between the wind farm and the National Grid, and associated infrastructure.

The existing land use consent contains multiple resource consent conditions that will continue to apply to the Mahinerangi Wind Farm Stage 2 (conditions 31-60 inclusive). In particular, condition 31 sets the requirement to prepare a CNMP prior to construction commencing.

In line with Condition 31, a CNMP was prepared for Stage 1 of the Mahinerangi Wind Farm.

This CNMP outlines the procedures to be followed by TWP and its subcontractors during the construction of Stage 2 of Mahinerangi Wind Farm.

This CNMP is required to satisfy Consent Condition 31. It identifies the performance standards for the Project and sets out best practicable options (BPO) for noise management during the construction period.

This CNMP will be implemented throughout the construction period. It should be considered a 'living document' that will be expanded and updated as the Project progresses. It is the primary tool for managing the Project's construction noise effects.

A glossary of terminology is included in Appendix A.

2.0 PROJECT DESCRIPTION

2.1 Overview

The Project works involve civil construction works to establish site access, internal tracks and turbine platforms; operation of a concrete batching plant, erection of turbines and a substation, and the construction of a transmission line and Battery Energy Storage System (BESS).

A site map is attached in Appendix B.

The works are scheduled for longer than 20 weeks. This means that the long-duration construction noise limits apply (Section 3.0).

In general, physical works on site will be undertaken during daylight hours (being half an hour before sunrise to half an hour after sunset).

However, some activities will need to be undertaken out of daylight hours:

- Pouring of concrete foundations for turbines will start at 4am. Concrete pouring will require early morning and late-night works to control concrete temperature and complete the work in a continuous pour.
- Lifting operations are weather dependent therefore turbine assembly may occur at night when wind speeds are generally lower. Daytime lifting operations may be suspended due to high wind conditions, in cases where delays occur, lifting at night may be required to ensure that the turbine assembly programme is not affected.

- Vehicle movements will be necessary to support any pouring or lifting operations.

2.2 Construction Methodology

At this stage, a contractor has not been appointed. Based on our experience on other wind farm projects, we expect the following works:

- Establishment of a temporary hardstand area for the construction site office and depot/site compound

  The hardstand will be located near the site entrance off Eldorado Track. The site compound will be used for the contractor site offices, parking area, and storage yard.

- Site tracks works

  This work comprises excavation and formation of access roads and tracks using bulldozers/scrapers, excavators, trucks, rollers and compactors.

- Building construction

  Buildings including site compound, batching plant facilities, substation, BESS, and permanent O&M building will be constructed, using excavators, cranes, trucks, compactors, power and hand tools.

- Excavation and foundations

  Turbine platforms will be established, using excavators, trucks, compactors, concrete trucks and pumps, and with the operation of the batching plant. Some work will occur during early morning and at night during concrete pours.

- Erection of turbines

  Turbines will be erected using a large crane, trucks, impact wrenches and other power and hand tools. Some work may occur at night.

- Cable trenching

  Cable trenching will be carried out with excavators, slot trenchers, trucks and compactors.

- Transmission line construction

  Transmission line construction will involve an excavator, a crane, and trucks

- Restoration and landscaping

  Restoration and landscaping will involve excavators, trucks, hydroseeders, and power and hand tools

2.3 Contact Details

Contact details for the relevant personnel are listed in Table 1. The Project Manager is responsible for implementing this CNMP.

Table 1: Contacts

Role	Name	Organisation	Phone	Email
Project Manager	TBC	TBC	TBC	TBC
Engagement	TBC	TBC	TBC	TBC
Acoustic Specialist	Raditya Putra	Marshall Day Acoustics	021 022 61532	Raditya.putra@marshallday.co.nz

2.4 Conditions of Consent

This CNMP is required to satisfy the following (updated) Conditions of Consent:

Construction noise

31. *A Construction Noise Management Plan shall be prepared and implemented prior to commencement of each stage of construction. This shall be generally in accordance with Section 8 and the relevant annexes of New Zealand Standard NZS6803:1999 Acoustics Construction Noise, which details the types of construction and procedures that will be carried out to ensure compliance with the Standard.*

    For Stage 1, the Construction Noise Management Plan shall be prepared by independent and appropriately qualified and experienced persons, prior to relevant construction stages commencing, and shall be submitted to the Planning and Environment Manager, Clutha District Council, prior to construction commencing.

    For Stage 2, the Consent Holder shall ensure that construction undertaken in accordance with the Construction Noise Management Plan prepared by prepared by Marshall Day Consultants Ltd that forms Part C of the Puke Kapo Hau Mahinerangi Wind Farm Stage 2 – Fast-Track Approvals Act Application dated DD MM 2025.

32. *Noise from all construction and decommissioning work, including (but not limited to) the following, shall be measured, assessed and controlled in accordance with New Zealand Standard NZS6803: 1999 Acoustics - Construction Noise.*

    i) Site works

    ii) Wind turbine generator assembly and placement

    iii) Concrete placement

    iv) Wind turbine removal

    v) Foundation demolition and removal

    vi) Land reinstatement

    The noise limits shall be those set out in Table 2 of NZS6803 for works of 'long term' duration.

33. *The noise associated with concrete manufacture shall be measured in accordance with NZS6801:2008 Acoustics – Measurement of Environmental Sound and assessed in accordance with NZS6802:2008 Acoustics – Environmental Noise. All aspects of concrete manufacture shall not exceed the following noise limits:*

7.00am to 10.00pm	*55dBA L_{eq}*
10.00pm to 7.00am	*45dBA L_{eq}*
10.00pm to 7.00am	*75dBA L_{max}*

    at or within the notional boundary of any dwelling (excluding any dwelling on the wind farm site).

3.0 NOISE

3.1 Noise Performance Standards

Construction noise must be measured and assessed according to New Zealand Standard NZS 6803:1999 "*Acoustics – Construction Noise*". The noise limits apply at 1m outside the façades of buildings, and only while they are occupied.

The construction noise limits from Condition 32 (refer Section 2.4) and NZS6803:1999 are summarised in Table 2 and Table 3.

Table 2: Construction noise levels for occupied dwellings

Time of week	Time period	dB L_{Aeq}	dB L_{AFmax}
Weekdays	0630 – 0730	55	75
	0730 – 1800	70	85
	1800 – 2000	65	80
	2000 – 0630	45	75
Saturdays	0730 – 1800	70	85
	1800 – 0630	45	75
Sundays and public holidays	0730 – 1800	55	85
	1800 – 0630	45	75

Table 3: Construction noise levels for occupied commercial building

Time of week	Time period	dB L_{Aeq}
All days	0730 – 1800	70
	1800 – 0730	75

3.2 Predicted Noise Levels

Table 4 presents the calculated levels of high-noise construction activities at the nearest noise sensitive locations. It will be kept up to date by the Acoustic Specialist when new information becomes available.

Table 4: Calculated noise levels at 1m from a building façade[1]

Equipment	Sound Power Level (dB L_{WA})	Sound Pressure Level (dB L_{Aeq}) At nearest noise sensitive location
Turbine Platform Construction Package	119	43
Concrete Batching Plant	110	27
Internal Road Construction Package	119	43
Construction Traffic (Trucks)	111	39
Worker Vehicles (Light Vehicles)	83	< 15
Transmission Line Construction Package	105	33

4.0 MITIGATION AND MANAGEMENT

As closest receivers are approximately 2km from turbine locations, the activities proposed can readily comply with the limits described in NZS6803:1999 and as stated in the construction noise conditions. As such, it is not anticipated that mitigation, beyond employing good practice as described in this section, will be required.

4.1 Training

All staff will participate in an induction training session before starting work on the construction, with attention given to the following matters:

- Activities with the potential to generate high levels of noise
- Mitigation and management measures
- Sensitive receivers and any agreements made through engagement
- Monitoring requirements

As the construction progresses, any updates of noise matters will be addressed during regular site meetings and/or 'toolbox' training sessions.

4.2 Equipment Selection

When selecting construction equipment:

- Use quieter construction methodologies where practicable
- Use electric motors rather than diesel engines where practicable
- Use rubber tracked equipment rather than steel tracked equipment where practicable
- Use equipment that is suitably sized for the task
- Maintain equipment well to minimise rattles, squeaks etc
- Fit engines with exhaust silencers and engine covers, where practicable

[1] In accordance with the requirements of NZS 6803: 1999 (Section 3.0), inclusive of 3 decibels façade reflection. Based on predictions using the 3D model of the site and receivers.

- Avoid tonal reversing or warning alarms (beepers). Alternatives include broadband alarms (squawkers/quackers), flashing lights, proximity sensors, reversing cameras and spotters

4.3 General Measures

Complaints can arise even if the noise levels comply with the Project limits. To minimise complaints, the following common mitigation measures are recommended:

- Avoid unnecessary noise. This means managing the site to ensure:
  - No shouting
  - No unnecessary use of horns
  - No loud site radios
  - No rough handling of material and equipment
  - No banging or shaking excavator buckets
  - No unnecessary steel on steel contact (e.g. during the loading of scaffolding on trucks)
  - No high engine revs. This includes choosing the right sized equipment and turning engines off when idle.
- Mitigate track squeal from tracked equipment, such as excavators. This may include tensioning and watering or lubricating the tracks regularly

5.0 ENGAGEMENT

5.1 Communication

5.1.1 Before construction

Written communication (e.g. newsletter) will be provided to members of the local community (e.g. those close to the access routes) within two weeks of the commencement of site works. It will include:

- Details of the overall works, its timing and duration
- Contact details and names of personnel whose job is to receive complaints and enquiries (should also match a person identified in Section 2.3)

5.1.2 During construction

Once construction has begun, ongoing communication is important. Regular communication during the works will include:

- Public site signage that includes contact details

5.2 Complaints Response

Complaints will be managed in accordance with Condition 58 and acknowledged and responded to promptly. If a more detailed response is needed, it will be provided within a timeframe agreed with the complainant.

All construction noise complaints will be recorded in a log book that is available to Council on request. For each complaint, an investigation will be undertaken as soon as practicable using the following steps:

- Acknowledge receipt of the concern or complaint and record:

  - The name, address and contact details of the complainant (unless they elect not to provide)
  - Time and date the complaint was received and who received it
  - Time and date of the activity that caused the complaint (estimated where not known)
  - The complainant's description of the activity and its resulting effects
  - Any relief sought by the complainant (e.g. scheduling of the activity)
- Identify the relevant activity and review the activity log to verify the complaint (or otherwise)
- Review data from monitoring (if available) to identify the time in question and, if possible, verify exceedance
- Review the predicted noise levels to determine if the activity was identified. Consider attended monitoring to verify the underlying reference level assumptions
- Review the mitigation and management measures in place to ensure the BPO has been applied (Section 4.0). Review the relief sought by the complainant. Adopt further mitigation and management measures as appropriate.
- Review the potential residual effects if predicted to continue to exceed the relevant performance standards
- Report the findings and recommendations to the Project Manager, implement changes and update this CNMP as appropriate
- Report the outcomes of the investigation to the complainant, identifying where the relief sought by the complainant has been adopted or the reason(s) otherwise.

APPENDIX A GLOSSARY OF TERMINOLOGY

Noise	A sound that is unwanted by, or distracting to, the receiver.
dB	Decibel (dB) is the unit of sound level. Expressed as a logarithmic ratio of sound pressure (P) relative to a reference pressure (Pr), where dB = 20 x log(P/Pr).
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) to more closely approximate the frequency bias of the human ear. A-weighting is used in airborne acoustics.
$L_{Aeq\ (t)}$	The equivalent continuous (time-averaged) A-weighted sound level commonly referred to as the average level. The suffix (t) represents the period, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{AFmax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
NZS 6803:1999	New Zealand Standard NZS 6803: 1999 "Acoustics - Construction Noise"

APPENDIX B SITE

Figure 1: Indicative Stage 2 layout showing 54 potential turbine locations and the 110 kV transmission line connecting to National Grid