

# PALING YARDS WIND FARM NOISE

## PURPOSE

UFWA engaged SLR Consulting Australia Pty Ltd (SLR) to assess the potential noise impacts of the project.

SLR's report analyses:

- the acoustic criteria;
- the background noise measurements;
- the predicted noise level at all potentially impacted receivers from the operation of the project; and
- the acoustic impact of the project during the construction phase, including blasting and traffic noise.

The methodology and criteria used in the noise impact assessment was based on the South Australian Environmental Protection Authority Environment Noise Guidelines for Wind Farms (February 2003) (SA EPA Guidelines), the World Health Organization (WHO) limits, construction noise guidelines (DECC Interim Construction Noise Guideline 2009) and blasting impact guidelines.

**SLR FOUND THAT PREDICTED NOISE LEVELS AT ALL NON-PROJECT INVOLVED RECEPTORS (INCLUDING ALL LOCATIONS OF BUILDINGS NOT IDENTIFIED AS AN OFFICIAL DWELLING) WERE FOUND TO BE BELOW THE RELEVANT NOISE CRITERIA.**

## Other Noise

SLR assessed potential noise from construction, blasting, traffic, substations and transmission lines. In all cases, noise levels were found to be acceptable and within relevant standards.

Most notably, SLR Consulting found that the 'worst case' maximum construction traffic generated scenario would increase existing traffic noise levels along local roads by up to 4-7 dBA. However, due to the typically large setback of dwellings from the road network, SLR concluded that the predicted traffic noise impacts would be acceptable.

## Daytime & Night-time Background Noise

The background noise data was reprocessed to define background noise curves for the daytime period (7.00am to 10.00pm) and night-time period (10.00pm to 7.00am), in accordance with the Draft NSW Wind Farm Planning Guidelines (December 2011). The new background noise curves were used to update the noise limit curves for all receptors and all predicted results were assessed against these criteria.

The assessment found that there were no exceedances of the daytime-only or night-time-only criteria for non-project involved receptors.\*\*

TABLE 14 Noise Criteria Exceedances

Location	Exceedance of WHO Noise Criteria at Hub Height Wind Speed										Max
	4.3	5.7	7.2	8.6	10.0	11.5	12.9	14.3	15.8	17.2	
7A				2.4	3.4	3.3	3.1	3.0	2.0	0.6	3.4
9A					0.8	0.6	0.4	0.4	0.4	0.1	0.8
9B					0.7	0.5	0.4	0.3	0.3	0.1	0.6
8					0.3						0.3
8A					0.2						0.2
9					0.1						0.1
7					0.1						0.1

The maximum exceedance for project-involved receptors was determined by the WHO criteria, rather than the SA EPA criteria. Table 2 shows the exceedances for project involved locations for the night-time criteria.

TABLE 17 NSW Draft Wind Farm Guidelines Exceedance - Night-time Criteria

Location	Exceedance at Hub Height Wind Speed										Max
	4.3	5.7	7.2	8.6	10.0	11.5	12.9	14.3	15.8	17.2	
7A				2.4	3.4	3.3	3.1	3.0	3.0	1.4	3.4
9A					0.8	0.6	0.4	0.4	0.4	0.4	0.8
9B					0.7	0.5	0.4	0.3	0.3	0.3	0.6
8					0.3						0.3
8A					0.2						0.2
9					0.1						0.1
7					0.1						0.1

## KEY FINDINGS & IMPACTS

Once the existing background noise levels and noise limits were assessed and determined in accordance with the relevant guidelines, an assessment of the predicted project noise levels was undertaken for all receivers located within a distance of 6km of a wind turbine.

Turbine noise was predicted using the indicative turbine layout and the turbine models currently being considered and assessed against relevant criteria prescribed by the SA EPA Guideline and WHO based noise criteria where appropriate.

Accordingly, the adopted noise limits will be met for all non-project involved receptors. Figure 42 demonstrates noise contours around the proposed development.

Table 14 shows the predicted noise exceedances (in decibels) at the project-involved residences (at locations 7A, 9A, 9B, 8, 8A, 9 and 7). Wind speeds are in m/s.

The locations of these seven residences is portrayed on Figure 12.

For locations 7, 8 and 9, the exceedance occurs only at one wind speed and is less than 0.5 dB in magnitude. The noise impact assessment found that this is a minor exceedance and unlikely to cause any additional effect on the amenity of the area or health of the residents.

Locations 7A, 8A, 9A and 9B are project-involved secondary dwellings and the proposed noise agreements will make specific provision for these dwellings to ensure that no adverse noise impacts to any person.

SLR found that predicted noise levels at all non-project involved receptors (including all locations of buildings not identified as an official dwelling) were found to be below the relevant noise criteria.

## Special Audible Characteristics

SLR assessed the predicted levels of levels of swish, modulation, discrete tones and low frequency noise, otherwise known as 'Special Audible Characteristics', for the project.\*

The noise impact assessment found that:

- The results from the SoundPlan model [low frequency noise] predict that wind turbine noise would only exceed 60 dBC for one receiver location, Location 7A, the predicted exceedance was 0.8 dBC. This is a relatively small exceedance of the criteria, however, post-construction monitoring is already planned for this location which would confirm LFN.
- The tonality tests showed no presence of tonality in the predicted results.
- There currently is no means to predict the eventuality, severity or frequency of occurrence of excessive amplitude modulation excessive amplitude modulation has only been confirmed at a small number of wind farm sites and when it occurs it is relatively infrequent.
- Nevertheless, should excessive amplitude modulation be found to be a problem with the wind farm, it would be possible to limit the impact on the residents through adaptive management techniques.

Therefore, it is found that the predicted special audible characteristics for the project are acceptable and manageable.

\*These were based on Draft NSW Planning Guidelines Wind Farm 2011

\*\*Project involved residence were found to exceed as follows:

## RESPONSE TO FINDINGS

If undue turbine noise impacts are identified during operations due to temperature inversion, atmospheric stability or other reasons, then adaptive management measures may be implemented to mitigate or remove the impact. This process may include:

- Receiving and documenting noise impact complaint through 'hotline' or other means.
- Investigating the nature of the reported impact.
- Identifying exactly what conditions or times lead to undue impacts.
- Operating turbines in a reduced 'noise optimised' mode during identified times and conditions (sector management).
- Providing acoustic upgrades (glazing, façade, masking noise etc) to affected dwellings.
- Turning off turbines that are identified as causing the undue impact during identified times and conditions.

Upon finalising the layout and turbine models a revised noise prediction and assessment will be completed in which the noise impact mitigation techniques will be investigated thoroughly in order to ensure a fully noise compliant turbine layout.

The noise impact assessment notes that UFWA proposes to enter into noise agreements with the owners of the project-involved properties prior to construction. These agreements would specify that:

- UFWA would ensure that the properties met the World Health Organisation noise guidelines; and,
- UFWA would implement an adaptive management approach which could include the use of building treatments and turbine operation/management strategies if operational noise causes significant impact to the amenity of involved residents.

In addition, it is proposed that the noise agreements will make specific provision for the project involved secondary dwellings so as to ensure that no adverse health impacts result to any person as a result of turbine noise impacts.



PHOTO Abercrombie Road (south) (Proposed View)

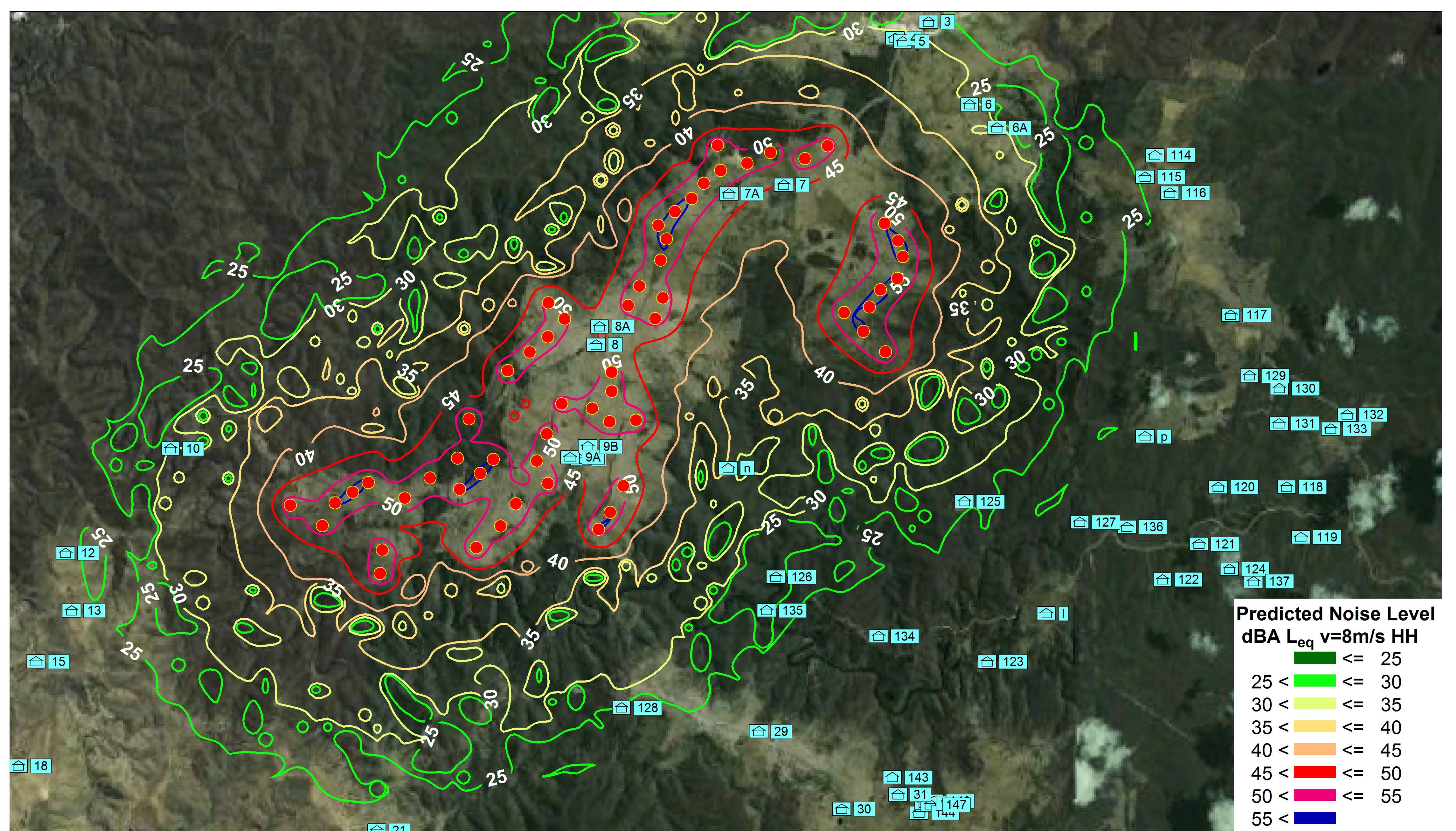


FIGURE 42 Predicted Noise Levels Contour Map