

Greenstead Valley

Noise Impact Assessment

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Attention To	Fresh Hope

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1 INTRODUCTION

This report has been prepared to assess the noise impacts associated with the proposed Greenstead Joadja Development to be located at 1551 Joadja Road, Joadja; Lot 202 in D.P. 861816.

This document addresses the noise impacts associated with noise emissions:

- Noise emissions as a result of vehicle movements within the proposed car park and bus bays, and
- Noise emissions from mechanical plant and equipment servicing the development.

The subject site and locate context are indicated in Figure 1.

This report has been prepared for the sole purpose of a development application assessment should not be used or relied on for any other purpose.

2 REFERENCED DOCUMENTS

2.1 BACKGROUND INFORMATION USED

This assessment has been conducted using the "Greenstead Joadja" architectural drawings provided by Breathe, Revision 01 – WIP dated 03/10/2023.

2.2 PLANNING GUIDELINES

Acoustic Logic have used the following documents and regulations in the assessment of the above noise impact:

- Wingecarribee Shire Council Document 'Wingecarribee Rural Lands Development Control Plan 2010, and
- NSW Environmental Protection Authority (EPA) – 'Noise Policy for Industry' 2017.

3 SITE DESCRIPTION

The project site is located at 1551 Joadja Road, Joadja; Lot 202 in D.P. 861816 and consists of the following:

- An arrival village (including Arrival Building and car parking),
- Community 1 (including Homestead Building and 10 free standing cabins), and
- Community 2 (including Refuge Building and 22 free standing glamping style accommodation).

3.1 NEAREST SENSITIVE RECEIVERS

Table 1 – Sensitive Receivers

Receiver (Refer Figure 1)	Land Use	Comment
R1	Residential	A collection of residential dwellings maintained 600m west of the proposed arrivals village and Community 2.
R2	Residential	A collection of residential dwellings maintained approximately 600m east of the proposed Community 1.

An aerial view of the project site, unattended noise monitoring and nearest sensitive receivers is presented in Figure 1 below.



Figure 1: Project Site Map and Nearest Sensitive Receiver Locations

4 NOISE DESCRIPTORS

Ambient noise constantly varies in level from moment to moment, so it is not possible to accurately determine prevailing noise conditions by measuring a single, instantaneous noise level.

To quantify ambient noise, a 15-minute measurement interval is typically utilised. Noise levels are monitored continuously during this period, and then statistical and integrating techniques are used to characterise the noise being measured.

The principal measurement parameters obtained from the data are:

L_{eq} - represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of noise impact as it closely corresponds with how humans perceive the loudness of time-varying noise sources (such as traffic noise).

L_{90} – This is commonly used as a measure of the background noise level as it represents the noise level heard in the typical, quiet periods during the measurement interval. The L_{90} parameter is used to set noise emission criteria for potentially intrusive noise sources since the disturbance caused by a noise source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

L_{10} is used in some guidelines to measure noise produced by an intrusive noise source since it represents the average of the loudest noise levels produced at the source. Typically, this is used to assess noise from licenced venues.

L_{max} is the highest noise level produced during a noise event and is typically used to assess sleep arousal impacts from short term noise events during the night. It is also used to assess internal noise levels resulting from aircraft and railway ground vibration induced noise.

L_1 is sometimes used in place of L_{max} to represent a typical noise level from a number of high-level, short-term noise events.

5 NOISE EMISSION CRITERIA

The noise emission from the project site shall comply with the requirements of the following documents:

- NSW Environmental Protection Authority (EPA) – ‘Noise Policy for Industry’ 2017.
- Wingecarribee Shire Council Document ‘Wingecarribee Rural Lands Development Control Plan 2010, and

5.1 NSW EPA – NOISE POLICY FOR INDUSTRY 2017

The EPA NPfl has two criteria which both are required to be satisfied, namely Intrusiveness and amenity. The NPI sets out acceptable noise levels for various localities. The policy indicates four categories to assess the appropriate noise level at a site. They are rural, suburban, urban and urban/industrial interface. Under the policy the nearest residential receivers would be assessed against the rural criteria.

Noise levels are to be assessed at the property boundary or nearby dwelling, or at the balcony or façade of an apartment.

5.1.1 Project Intrusiveness Noise Level

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor do not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

In the absence of noise monitoring conducted at the nearest sensitive receiver locations, the minimum assumed Rating Background Levels presented within Table 2.1 of NPfl will be used to establish noise emission criteria for the development. The minimum rating background noise levels applicable to the hours of operation for the development, and the corresponding Project Intrusiveness Noise Levels, are presented within the table below.

Table 2 – Minimum RBLs and Project Intrusiveness Noise Levels

Time	Minimum assumed Rating Background Noise Level dB(A)	Minimum Project Intrusiveness Noise Level dB(A)$L_{eq(15min)}$
Day (7am to 6pm)	35	40
Evening (6pm to 10pm)	30	35
Day (10pm to 7am)	30	35

5.1.2 Project Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The EPA’s NPfl sets out acceptable noise levels for various localities. The recommended noise amenity area is based upon the measured background noise levels at the sensitive receiver. Based on the minimum assumed background noise levels detailed in Table 2, the Noise Policy for Industry suggests the adoption of the ‘rural’ categorisation.

The NPI requires project amenity noise levels to be calculated in the following manner.

$$L_{Aeq,15min} = \text{Recommended Amenity Noise Level} - 5 \text{ dB(A)} + 3 \text{ dB(A)}$$

The amenity levels appropriate for the receivers surrounding the site are presented in Table 3.

Table 3 – EPA Amenity Noise Levels

Type of Receiver	Time of day	Recommended Noise Level dB(A) $L_{eq}(\text{period})$	Project Amenity Noise Level dB(A) $L_{eq}(15 \text{ minute})$
Residential – Rural	Day	50	48
	Evening	45	43
	Night	40	38

The NSW EPA Noise Policy for Industry (2017) defines:

- Day as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays.
- Evening as the period from 6pm to 10pm.
- Night as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

5.1.3 Sleep Disturbance Criteria

The Noise Policy for Industry recommends the following noise limits to mitigate sleeping disturbance:

Where the subject development / premises night -time noise levels at a residential location exceed:

- $L_{eq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{Fmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

a detailed maximum noise level even assessment should be undertaken.

Table 4 – Sleep Disturbance Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A) L_{90}	Emergence Level
Residences Surrounding Site Night (10pm – 7am)	30 dB(A) L_{90}	40 dB(A) $L_{eq, 15min}$; 52 dB(A) L_{Fmax}

5.2 WINGECARRIBEE RURAL LANDS DCP 2010

A6.8 Minimisation of External Impacts – Noise

There are two types of noise associated with rural activity that have potential to lead to land use conflicts – 'constant' and 'intermittent'.

Constant noise generally derives from plant and equipment such as compressors, pumps and generators. Such noise need not be occurring all the time for it to be considered 'constant'. Pumps and generators which only operate for certain times of the day or certain days of the week may still be classified as 'constant' by the nature of the noise they emit.

Any increase above the general background noise level, particularly 'constant' noise, may be offensive to neighbours. Such noise will be particularly apparent at night when background noise is less and when sleep patterns can be disrupted.

Constant noise sources must not exceed 5dB(A) above background noise levels at any time when measured at the boundary with any adjoining property or public road.

Intermittent noise generally derives from moving machinery such as tractors and other farm management vehicles, traffic to and from the property due to the nature of the rural activity, or from seasonal activities such as bird scaring devices, or animal weaning.

Neighbours need to appreciate that such intermittent noise is part of the fabric of rural life. However, that said, a tractor which operates from early in the morning until late at night most days would be considered to be more 'constant' than 'intermittent' and noise abatement measures may be required.

In the case of animal noise from weaning and other stock or plant management practices, or occasional additional noise, such as a truck spreading fertiliser, Council encourages 'good neighbour' practices, both on the part of the source property and the adjoining property. Neighbours who are advised when particular farm activities which may impact on them are to occur are generally more tolerant than those who are caught by surprise.

Table 5 – Mechanical Plant and Equipment Noise Criteria (Wingecarribee Rural Lands DCP)

Time	Minimum assumed Rating Background Noise Level dB(A)	Project Noise Criteria dB(A)$L_{eq}(15min)$
Day (7am to 6pm)	35	40
Evening (6pm to 10pm)	30	35
Day (10pm to 7am)	30	35

5.3 SUMMARISED NOISE EMISSION CRITERIA

Table 6 – EPA NPfI Noise Emission Criteria (Residents Surrounding Project Site)

Time Period	Assessment Background Noise Level dB(A) L₉₀	Project Amenity Criteria dB(A) L_{eq}	Intrusiveness Criteria L_{eq}(15min)	NPfI Criteria for Sleep Disturbance
Day	35	48	40	N/A
Evening	30	43	35	N/A
Night	30	38	35	40 dB(A) L_{eq}, 15min; 52 dB(A) L_{Fmax}

The project noise trigger levels are indicated by the bolded values in the table above.

6 NOISE EMISSIONS ASSESSMENT

This section of the document assesses the following noise impacts:

- Noise emissions as a result of vehicle movements within the proposed car park and bus bay, and
- Noise emissions from mechanical plant and equipment servicing the development.

6.1 OPERATIONAL ASSUMPTIONS

The operational vehicle movements of the proposal are as follows:

- 30 x passenger automobile vehicles, and
- 3 x Bus vehicles.

Noise emissions associated with the development have been assessed for passenger automobile and bus movements. Predicted noise levels at residential facades have been calculated and the assumptions are detailed below.

Operational noise impacts have been assessed individually for each activity and combined for worst case accumulative noise scenario.

Noise emissions associated with vehicles movements within the development have been assessed against the requirement of the NPfI. The assessment is based on the following assumptions.

The sound power levels of vehicles operating on site are as follows:

Table 7 – Assumed Vehicle Operational Noise Levels

Noise Source	Sound Power Level dB(A)	Speed	Area Assessed	Operation Time Duration
Passenger Automobile	84 dB(A) _{Leq}	10km/h	Proposed Car Park	Any time of the day and night
Bus	102 dB(A) _{Leq}	10km/h	Proposed Bus Bay	Any time of the day and night
Bus Air brake	110 dB(A) _{L_{max}}	-	Proposed Bus Bay	Night time

6.2 ON-SITE OPERATIONAL NOISE EMISSIONS

Noise generated by vehicles driving on the site is presented below. The prediction is based on the assumption that there are, at worst case, the following vehicle movements in any 15-minute period:

Day and evening, and night-time periods:

- 30 passenger automobile vehicles (inbound and outbound), and
- 3 Bus movements (inbound and outbound)

The predicted noise levels associated with vehicle movements within the site based on the operational assumptions above are presented in the table below.

Table 8 – Vehicle Movements predicted Noise Levels

Receiver	Time of Day	Predicted Noise Level	Noise Emission Criteria dB(A) L_{eq} 15min	Compliance
R1	Day	< 30 dB(A) $L_{eq}(15min)$	40 dB(A) $L_{eq}(15min)$	Yes
	Evening		35 dB(A) $L_{eq}(15min)$	Yes
	Night		35 dB(A) $L_{eq}(15min)$	Yes
R2	Day	< 30 dB(A) $L_{eq}(15min)$	40 dB(A) $L_{eq}(15min)$	Yes
	Evening		35 dB(A) $L_{eq}(15min)$	Yes
	Night		35 dB(A) $L_{eq}(15min)$	Yes

6.2.1 Sleep Disturbance

The potential for sleep disturbance has been assessed for buses exiting the bus bays maintained east of the Arrivals Village during the night time period. Sleep disturbance has been based on the following noise levels:

- A Sound Power Level of 110dB(A) SWL for a bus air brake has been assessed as a point source at the boundary of the development. This noise source is the loudest typical noise source to be generated externally on site.

The predicted noise levels for the aforementioned conditions are detailed in the Table below.

Table 9 – Sleep Disturbance L_{MAX} Noise Levels

Noise Source	Receiver Location	Predicted External Noise Level dB(A) L_{max}	Criteria dB(A) L_{max}	Compliance
Bus exiting Bus Bays	R1	46	52	Yes
	R2	47		Yes

6.3 MECHANICAL PLANT NOISE

Detailed plant selection and location has not been undertaken at this stage. Satisfactory levels will be achievable through appropriate plant selection, location and if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures.

Noise emissions from all mechanical services to the closest residential receivers should comply with the requirements of Section 5.3.

Detailed acoustic review should be undertaken at CC stage to determine acoustic treatments to control noise emissions to satisfactory levels.

7 COMPLYING CONTROLS

To ensure ongoing compliance with the requirements presented within Section 5, we recommend the following:

- Buses are to limit the use of airbrakes as much as feasible.

Day, Evening and Night time Period

- In any 15-minute period during the day and evening, the maximum allowable vehicle movements are as indicated below:
 - 30 passenger automobile vehicles (inbound and outbound), and
 - 3 Bus movements (inbound and outbound).
- Prominent notice should be placed on site to remind staff to minimise noise at all times.

8 CONCLUSION

This report presents an assessment of potential noise impacts associated with the proposed Greenstead Joadja Development to be located at 1551 Joadja Road, Joadja; Lot 202 in D.P. 861816.

Provided that the complying controls presented in Section 7 are adopted, operational noise emissions will satisfy the requirements of the following documents:

- Wingecarribee Shire Council Document 'Wingecarribee Rural Lands Development Control Plan 2010, and
- NSW Environmental Protection Authority (EPA) – 'Noise Policy for Industry' 2017.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'A Pham', with a stylized, cursive script.

Acoustic Logic Pty Ltd
Andrew Pham