AAM BECTIVE POULTRY FARM

NOISE AND VIBRATION IMPACT ASSESSMENT

REPORT NO. 17273
VERSION 1.0

DECEMBER 2024

PREPARED FOR

AAM INVESTMENT GROUP C/- PSA CONSULTING
PO BOX 10824 ADELAIDE STREET
BRISBANE QLD 4000

DOCUMENT CONTROL

Version	Notes	Status	Date	Prepared	Reviewed	Approved
0.1	-	Draft	30/09/2024	NH		NH
1.0	-	Final	17/12/2024	NH		NH

TABLE OF CONTENTS

GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. The most common of these noise descriptors are defined below.

L_{Amax} The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time.

L_{A90} The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This descriptor is a common measure of environmental noise.

ABL The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day.

RBL The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

1 INTRODUCTION

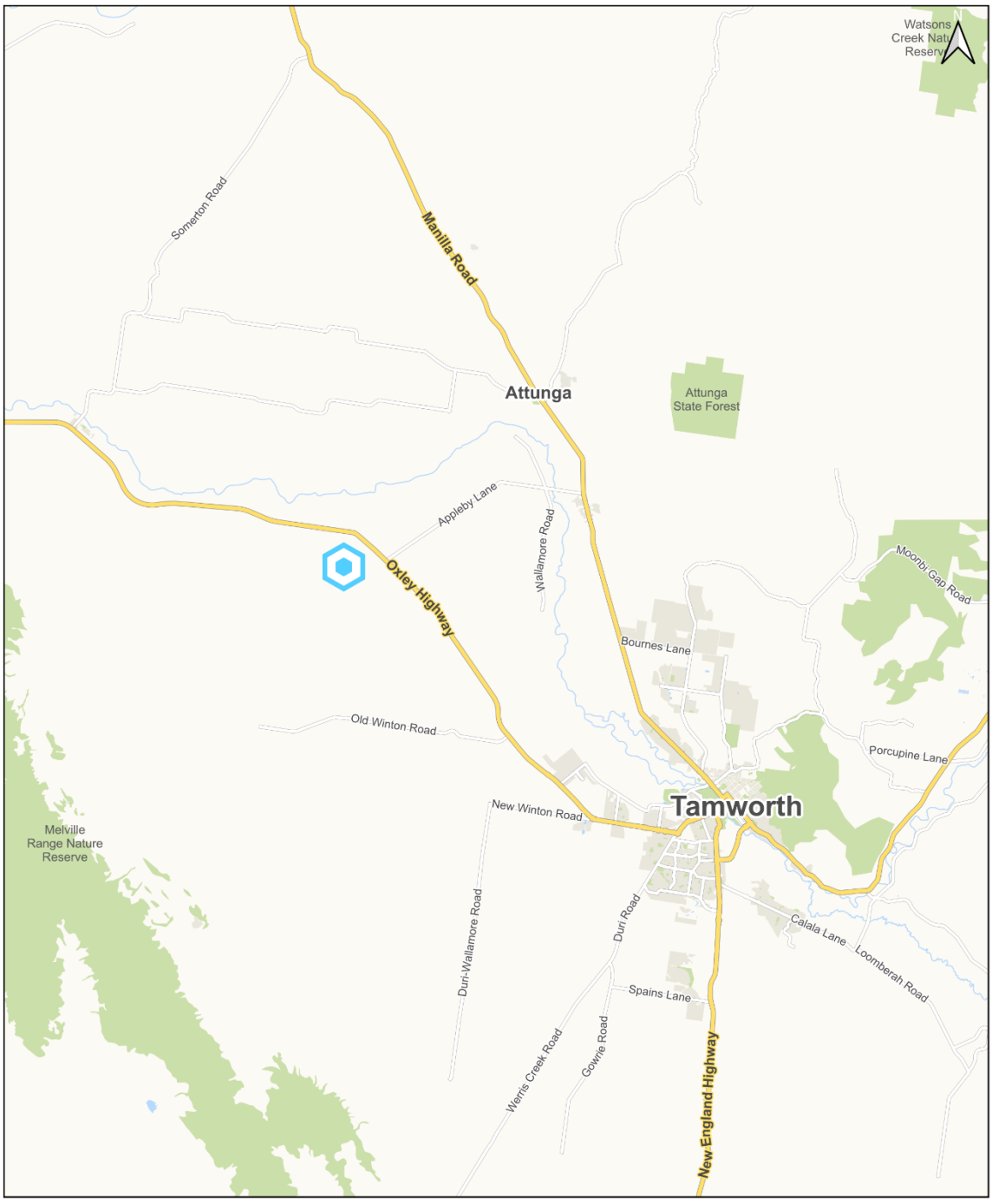
SoundIN Pty Ltd (SoundIN) has been engaged AAM Investment Group (AAM) to undertake a noise and vibration impact assessment for a proposed poultry (broiler) farm (the Proposal) on land at 2432 Oxley Highway, Bective (the Site). The locality of the Proposal is shown in **Figure 1-1**.

This report presents an assessment of potential noise and vibration impacts associated with the construction and operation of the Proposal at nearby sensitive receivers. The assessment has been conducted in general accordance with the following NSW Government guidelines and policies:

- *Interim Construction Noise Guideline* (DECC, 2009)
- *Noise Policy for Industry* (EPA, 2017)
- *NSW Road Noise Policy* (DECCW, 2011)

No significant sources of vibration are likely to be associated with the construction or operation of the proposal. Accordingly, a detailed assessment of vibration impacts has not been conducted.

Figure 1-1 Project Locality



2 THE PROPOSAL

2.1 The Site

The proposed poultry farm is located on land at 2432 Oxley Highway, Bective, NSW 2340. The property has an area of approximately 174 ha and is situated approximately 20 km northwest of Tamworth, NSW. The Site is bounded by Oxley Highway to the north. The development has main vehicular access via Soldiers Settlement Road to the south.

The Site location is shown in **Figure 2-1**.

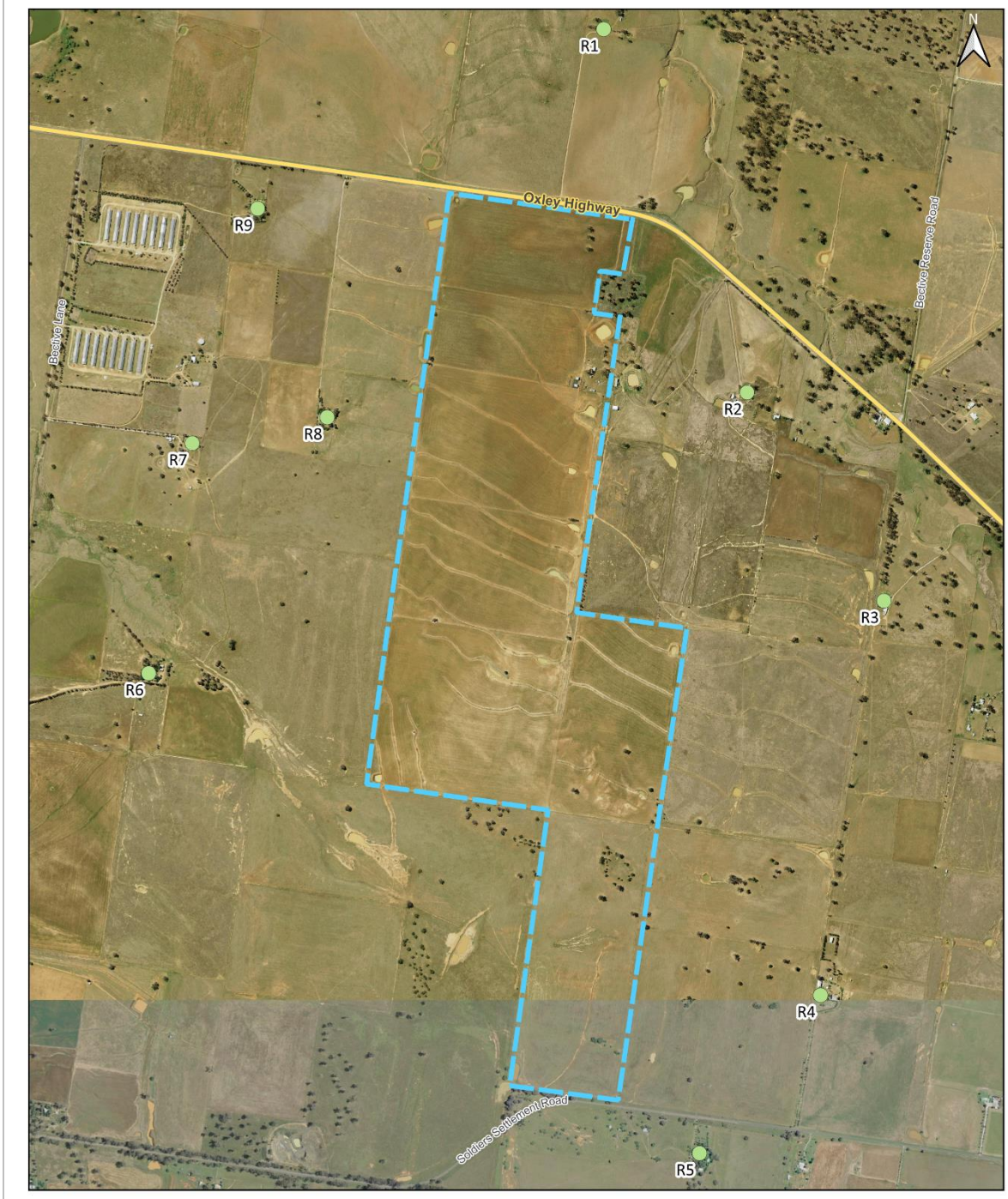
2.2 Surrounding Land Use and Sensitive Receivers

The land use surrounding the Site is rural. The nearest and most potentially affected sensitive receivers are several isolated rural dwellings (i.e. private residences) and caretaker's quarters for nearby poultry farms. Several receivers have been identified for assessment purposes, as identified in **Table 2-1** and shown in **Figure 2-1**.

Table 2-1 Sensitive Receivers

Receiver ID	Lot / DP	Description
R1	Lot 55 / DP755319	Private residence
R2	Lot 12 / DP849425	Private residence
R3	Lot 1 / DP705602	Private residence
R4	Lot 4 / DP705602	Private residence
R5	Lot 100 / DP755319	Private residence
R6	Lot 163 / DP755319	Private residence
R7	Lot 4 / DP592863	Caretaker's quarters
R8	Lot 3 / DP592863	Caretaker's quarters
R9	Lot 2 / DP592863	Caretaker's quarters

Figure 2-1 Proposal Site and Sensitive Receivers



2.3 Proposal Description

2.3.1 Development Overview

AAM Investment Group is seeking development consent under Part 4 of the *Environment Planning and Assessment Act 1979* to develop a poultry broiler farm in the southern part of the Bective property. The farm will be comprised of eighteen (18) poultry sheds where meat chicken birds (broilers) will be grown for human consumption. Each shed will accommodate a maximum of 68,675 birds giving the farm a maximum capacity of 1,236,150 birds. Production of broilers occurs in cycles with each production cycle completed over 8 – 10 weeks. As such, there is an average of 5.2 production cycles each year.

The proposed sheds will be constructed in two rows running east west across the site. Each shed will be approximately 152 m long, 22 m wide with a floor area of 3,350m². The sheds have a ridge height of approximately 4.8m and will be constructed with concrete and/or cement treated sealed floors, insulated panel walls and zincalume roofs. The poultry sheds will be fitted with purpose-built infrastructure associated with poultry production including fans, heaters, water and feed lines and lighting. Other ancillary buildings and supporting infrastructure will include grain storage silos, staff amenities, access roads, power supply, gas storage infrastructure, water pipes and pump, and 2 caretaker residences.

2.3.2 Proposed Operations

Production of broilers occurs in cycles with each production cycle completed over 8 – 10 weeks. As such, there is an average of 5.2 production cycles. The production cycle generally follows the following steps:

- Placement of day-old chicks within the sheds.
- Growing of the birds over a 6 – 8 week period.
- Staggered collection of live birds and transport to the Baiada Poultry abattoir for processing.
- Clean out of sheds and set up for new batch.

The farm will be overseen by 2 on-site managers and 4 full time staff. Contract staff are also used to assist with placement of day-old chicks, clean out and set up the sheds for at the end of each cycle.

2.3.3 Traffic Generation

Heavy vehicle trips will generally be spread over a 24-hour period and will involve deliveries of bedding material, day-old chicks, poultry feed, and gas to and from the site as well as the collection and transfer of live birds to the processing plant at Tamworth.

Heavy vehicles access the site will include a mix of B-Doubles, Semi-trailer and rigid trucks. Based on similar sized farms, it is expected that day to day operations at the site will generate an average of

approximately 18 heavy vehicles per day (9 incoming / 9 outgoing) however some peak periods will occur associated with bird collections, shed clean out and set up at the end of each cycle.

2.3.4 Construction Hours

The works would be limited to standard construction hours, as follows:

- 7:00am – 6:00pm Monday to Friday
- 8:00am – 1:00pm Saturday
- No work on Sundays or Public Holidays.

3 CONSTRUCTION NOISE ASSESSMENT

3.1 Construction Noise Management Levels

The *Interim Construction Noise Guideline* (ICNG) (DECC, 2009) recommends noise management levels (NML) to reduce the likelihood of noise impacts arising from construction activities. The ICNG NML for residential receivers are presented in **Table 3-1**.

Table 3-1 Construction NML – Residential Receivers

Time of day	Management level – $L_{Aeq,15min}$ (dBA)	How to apply
Recommended standard hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or Public Holidays	Noise affected RBL + 10dBA	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq,15min}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that will be provided.
Outside recommended standard hours	Noise affected RBL + 5 dBA	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dBA above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see *ICNG* section 7.2.2.

Noise monitoring has not been undertaken for the purpose of this assessment. Instead, a conservative approach has been taken whereby the minimum daytime RBL value of 35 dBA, as recommended in the *Noise Policy for Industry* (NPfI), has been adopted.

The ICNG does not identify caretaker's quarters as sensitive receivers for construction noise.

Project-specific construction NML for the most potentially affected receivers near the Site are presented in **Table 3-2**.

Table 3-2 Project-specific Construction NML

Receiver	Acceptable $L_{Aeq,15min}$ noise level (standard daytime hours) (dBA)	Highly affected noise level (dBA)
R1 – R6	45	75

3.2 Noise Modelling Methodology and Assumptions

Construction noise emissions from the Proposal have been modelled using SoundPLAN v8.2. The selected noise calculation method is International Standard ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General Method of Calculation* (ISO 9613-2).

Factors accounted for by ISO 9613-2 are:

- Noise source sound power and locations
- Shielding from ground topography and structures
- Noise attenuation due to geometric spreading
- Ground absorption
- Atmospheric absorption.

ISO 9613-2 is a "downwind" model, which conservatively assumes that each receiver is downwind from all noise sources.

3.3 Construction Plant, Activities and Sound Power Levels

Sound levels of typical construction equipment are listed in **Table 3-3**. Equipment sound levels have been determined from Transport for NSW's *Construction Noise Estimator* and the UK Department of Environment, Food and Rural Affairs' (DEFRA) *Noise Database for Prediction of Noise on Construction and Open Sites*.

The table gives both Sound Power Level (SWL) and Sound Pressure Level (SPL) at seven metres from the equipment. SWL is independent of measurement position. Verification of plant noise is often done by measuring the SPL at seven metres.

Based on the information in **Table 3-3**, activity sound power levels for several key construction phases have been calculated and are presented in **Table 3-4**.

Table 3-4 presents typical worst-case construction source noise levels across a 15-minute period, considering the likely usage of plant during that time, termed the "activity sound power level". The activity sound power is considered to represent the typical worst-case level in a given 15-minute period. It is important to note that this sound power level is unlikely to be sustained at such a level for the duration of the activity. As a result, many 15-minute periods will be at lower levels.

Table 3-3 Typical Construction Plant Sound Levels

Equipment	Sound Power Level, L_{Aeq} (dBA)	Sound Pressure Level at 7m, L_{Aeq} (dBA)
Bulldozer (D9)	116	91
Grader	113	88
Dump truck	108	83
Excavator, Large (~30t)	109	84
Concrete truck	107	82
Concrete pump	112	87
Concrete saw	113	88
Forklift	106	81
Mobile Crane	110	85
Hand-held power tools	109	84
Generator	104	79
Welder	105	80
Bulldozer (D9)	116	91

Table 3-4 Construction Phase Activities and Associated Sound Power Levels

Code	Activity	Typical Equipment Used	Activity Sound Power Level (dBA)
EAR	Earthworks (including internal road)	Dozer Grader Dump truck Excavator	119
CON	Concreting	Concrete truck Concrete pump Concrete saw	116
ASS	Assembly and fitout	Hand-held power tools Mobile crane Telehandler Generator Welder Truck	114

3.4 Predicted Construction Noise Levels

The predicted $L_{Aeq,15min}$ noise levels at sensitive receivers during the identified activities are presented in **Table 3-5**.

Although caretaker's quarters are not considered sensitive receivers for construction noise, predicted noise levels at these locations have been provided for information only.

The results indicate that construction noise levels are predicted to exceed the NML by up to 2 dBA at R5.

Table 3-5 Predicted Construction Noise Levels

Receiver	Predicted Construction $L_{Aeq,15min}$ Noise Levels (dBA)			NML	Exceedance (dBA)
	EAR	CON	ASS		
R1	30 - 31	25 - 27	23 - 25	45	-
R2	39 - 44	37 - 37	35 - 36	45	-
R3	34 - 34	30 - 32	28 - 30	45	-
R4	37 - 40	27 - 28	25 - 27	45	-
R5	39 - 47	25 - 27	23 - 25	45	2
R6	35 - 36	33 - 34	31 - 32	45	-
R7	36 - 38	33 - 34	31 - 33	-	-
R8	44 - 50	40 - 42	39 - 40	-	-
R9	33 - 36	29 - 30	27 - 29	-	-

3.5 Construction Noise Mitigation

Noise levels associated with the proposed works are predicted to exceed the NML at nearby receivers. Therefore, in accordance with the ICNG, all reasonable and feasible measures should be applied to manage construction noise emissions from the site down toward the NML.

A detailed Construction Noise and Vibration Management Plan (CNVMP) should be prepared and should include, but not be limited to, the following:

- Identification of nearby residences and other sensitive land uses
- Description of approved hours of work
- Description and identification of construction activities, including work areas, equipment and duration
- Description of what work practices (generic and specific) will be applied to minimise noise
- Consider the selection of plant and processes with reduced noise emissions
- A complaint handling process
- Noise monitoring procedures
- Induction and training will be provided to relevant staff and sub-contractors outlining their responsibilities with regard to noise.

Examples of typical construction noise mitigation measures are provided in **Table 3-6**, along with the likely reduction in noise levels. Where reasonable and feasible, these measures should be employed during the works to the extent that NML are achieved at sensitive receivers.

Table 3-6 Construction Noise Mitigation Measures and Indicative Noise Reductions

Mitigation measure	Anticipated noise reduction (dBA)
Administrative controls	
Operate during approved hours	N/A
Undertake regular noise monitoring to determine the impact of operating plant on sensitive receivers	N/A
Appropriate training of onsite staff	N/A
Undertake community consultation and respond to complaints in accordance with established project procedures	N/A
Turning off machinery when not in use	0-5
Respite periods for pile drivers and rock breakers	N/A
Undertake noisier activities during standard construction hours	N/A
Engineering controls	
Portable temporary screens	5-10
Screen or enclosure for stationary equipment	10-15
Maximising the offset distance between noisy plant items and sensitive receivers	3-6
Avoiding using noisy plant simultaneously and / or close together, adjacent to sensitive receivers	2-3
Orienting equipment away from sensitive receivers	3-5
Carrying out loading and unloading away from sensitive receivers	3-5
Using dampened tips on rock breakers	3-6
Using noise source controls, such as the use of residential class mufflers, to reduce noise from all plant and equipment including bulldozers, cranes, graders, excavators and trucks	5-10
Selecting site access points and roads as far as reasonably practicable away from sensitive receivers	3-6

Mitigation measure	Anticipated noise reduction (dBA)
Using spotters, closed circuit television monitors, “smart” reversing alarms, or “squawker” type reversing alarms in place of traditional reversing alarms	2-5
Employ non noise-generating structures such as site offices, storage sheds, stockpiles and tanks as noise barriers	5-10

It should be noted that, even with the application of all reasonable and feasible mitigation measures, noise levels at some sensitive receivers may exceed the NML. In accordance with the ICNG, this would be an acceptable outcome so long as all reasonable and feasible mitigation measures are in place.

4 OPERATIONAL NOISE ASSESSMENT

4.1 Operational Noise Trigger Levels

The *Noise Policy for Industry* (NPfI) (EPA, 2017) provides a framework for assessing environmental noise impacts from industrial premises and industrial development proposals in New South Wales.

The NPfI recommends the development of project noise trigger levels, which provide a benchmark for assessing a proposal or site. The project noise trigger levels should not be interpreted as mandatory noise criteria but, rather, as noise levels that, if exceeded, would indicate a potential noise impact on the community.

The project noise trigger level is the lower value of the project intrusiveness noise level and the project amenity noise level. The project intrusiveness noise level assesses the likelihood of noise being intrusive above the ambient noise level and is applied to residential receivers only. The project amenity noise level ensures the total industrial noise from all sources in the area does not rise above a maximum acceptable level.

The NPfI stipulates that project noise trigger levels are determined for the daytime (7am – 6pm), evening (6pm – 10pm) and night time (10pm – 7am) periods, as relevant. The determined trigger levels typically apply at the most affected point on or within the receiver property boundary.

4.1.1 Project Intrusiveness Noise Level

The intrusiveness noise level is the noise level 5 dBA above the rating background noise level (RBL) for each time period (daytime, evening or night time) of interest at a residential receiver. The RBL is derived from the measured L_{A90} noise levels.

The NPfI stipulates that project intrusiveness noise levels should not be set below 40 dBA during the daytime and 35 dBA in the evening and night time. Additionally, the NPfI recommends that the project intrusiveness noise level for evening is set at no greater than that for the daytime, and that the project intrusiveness level for night time is set at no greater than that for the evening and daytime.

A conservative approach has been adopted in this assessment whereby the minimum project intrusive noise levels recommended in the NPfI have been adopted. Intrusiveness noise levels for the project are summarised in **Table 4-1**.

Table 4-1 Project Intrusiveness Noise Levels

Receiver	Time of day [1]	RBL (dBA)	Project Intrusiveness noise level – $L_{Aeq,15min}$ (dBA)
R1 – R6	Day	35	40
	Evening	30	35
	Night	30	35

1. Day = 7am to 6pm Monday to Saturday, 8am to 6pm Sundays and public holidays; Evening = 6pm – 10pm; Night = the remaining periods.

4.1.2 Project Amenity Noise Levels

Project amenity noise levels aim to set a limit on continuing increases in noise levels from all industrial noise sources affecting a variety of receiver types; that is, the ambient noise level in an area from all industrial noise sources remains below recommended amenity noise levels.

The amenity assessment is based on noise criteria specific to land use and associated activities. The criteria relate only to industrial-type noise and do not include transportation noise (when on public transport corridors), noise from motor sport, construction noise, community noise, blasting, shooting ranges, occupational workplace noise, wind farms, amplified music/patron noise.

The amenity noise level aims to limit continuing increases in noise levels which may occur if the intrusiveness level alone is applied to successive development within an area.

The recommended amenity noise level represents the objective for total industrial noise at a receiver location. The project amenity noise level represents the objective for noise from a single industrial development at a receiver location.

To prevent increases in industrial noise due to the cumulative effect of several developments, the project amenity noise level for each new source of industrial noise is set at 5dBA below the recommended amenity noise level.

The following exceptions apply to determining the project amenity noise level:

- For high-traffic areas the amenity criterion for industrial noise becomes the $L_{Aeq,period(traffic)}$ minus 15dBA.
- In proposed developments in major industrial clusters.
- If the resulting project amenity noise level is at least 10 dB lower than the existing industrial noise level, the project amenity noise level can be set at 10 dB below existing industrial noise levels if it can be demonstrated that existing industrial noise levels are unlikely to reduce over time.
- Where cumulative industrial noise is not a consideration because no other industries are present in, or likely to be introduced into the area, the relevant amenity noise level is assigned as the project amenity noise level for the development.

Amenity noise levels are not used directly as regulatory limits. They are used in combination with the project intrusiveness noise level to assess the potential impact of noise, assess mitigation options and determine achievable noise requirements.

The project amenity noise levels are calculated from the recommended amenity noise levels presented in **Table 4-2**.

Table 4-2 Recommended Amenity Noise Levels

Receiver	Noise amenity area	Time of day [1]	Recommended amenity noise level – $L_{Aeq,period}$ (dBA)
Residential	Rural	Day	50
		Evening	45
		Night	40
	Urban	Day	55
		Evening	45
		Night	40
	Suburban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretaker's quarters, holiday accommodation, permanent resident caravan parks	See column 4	See column 4	5 dBA above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day.
School classroom (internal)	All	Noisiest 1-hour period when in use	35
Hospital ward:			
Internal	All	Noisiest 1-hour	35
External	All	Noisiest 1-hour	50
Place of worship (internal)	All	When in use	40
Area specifically reserved for passive recreation (e.g., national park)	All	When in use	50

Receiver	Noise amenity area	Time of day [1]	Recommended amenity noise level – $L_{Aeq,period}$ (dBA)
Active recreation area (e.g., school playground, golf course)	All	When in use	55
Commercial premises	All	When in use	65
Industrial premises	All	When in use	70
Industrial interface (applicable only to residential noise amenity areas)	All	All	Add 5 dBA to recommended noise amenity area

1. Day – 7am – 6pm; Evening = 6pm – 10pm; Night = 10pm – 7am.

Recommended amenity noise levels presented in **Table 4-2** represent the objective for total industrial noise at a receiver location. In the case of a single new noise source being proposed, the project amenity noise level represents the objective for noise from a single industrial development at the receiver location. This is typically calculated as the recommended amenity noise level minus 5 dBA.

Due to different averaging periods for the $L_{Aeq,15min}$ and $L_{Aeq,period}$ noise descriptors, the values of project intrusiveness and amenity noise levels cannot be compared directly when identifying noise trigger levels i.e. the most stringent values of each category. To make a comparison between descriptors, the NPfI assumes that the $L_{Aeq,15min}$ equivalent of an $L_{Aeq,period}$ noise level is equal to the $L_{Aeq,15min}$ level plus 3dB.

Residential receivers near the Proposal are classified as being in a “rural” noise amenity area.

The project amenity noise levels for the Proposal are presented in **Table 4-3**.

Table 4-3 Project Amenity Noise Levels

Receiver	Time of day [1]	Recommended amenity noise level – $L_{Aeq,period}$ (dBA)	Project amenity noise level – $L_{Aeq,15min}$ (dBA)
R1 – R6	Day	50	48
	Evening	45	43
	Night	40	38
R7 – R9	Day	55	53
	Evening	50	48
	Night	45	43

1. Day = 7am to 6pm Monday to Saturday, 8am to 6pm Sundays and public holidays; Evening = 6pm – 10pm; Night = the remaining periods.

4.1.3 Project Noise Trigger Levels

The project intrusiveness noise levels and project amenity noise levels for sensitive receivers are summarised in **Table 4-4**. The project noise trigger levels (PNTL) – which are the lower values of the project intrusiveness noise levels and the project amenity noise levels – are highlighted in bold.

Table 4-4 Project Noise Trigger Levels

Receiver	Time of day [1]	Project intrusiveness noise level – $L_{Aeq,15min}$ (dBA)	Project amenity noise level – $L_{Aeq,15min}$ (dBA)
R1 – R6	Day	**40**	48
	Evening	**35**	43
	Night	**35**	38
R7 – R9	Day	-	**53**
	Evening	-	**48**
	Night	-	**43**

1. Day = 7am to 6pm Monday to Saturday, 8am to 6pm Sundays and public holidays; Evening = 6pm – 10pm; Night = the remaining periods.

4.1.4 Maximum Noise Trigger Levels

Noise sources at night occurring over a short duration have the potential to cause sleep disturbance despite complying with project noise trigger levels. The Site operates on a 24-hour basis. Therefore, maximum noise level events need to be considered for potential sleep disturbance.

The NPfI recommends that, where the night time L_{Amax} receiver noise levels from a development exceeds 52 dBA or the RBL plus 15 dBA, whichever is the greater, then a more detailed assessment of potential sleep disturbance impacts is warranted. **Table 4-5** presents the maximum noise trigger levels for the receivers identified in this assessment.

Table 4-5 Maximum Noise Trigger Levels

Receiver	RBL (dBA)	RBL + 15 (dBA)	Maximum Noise Trigger Level (dBA)
R1 – R9	30	45	52

In accordance with the NPfI, in instances where night time $L_{Aeq,15min}$ noise levels exceed 40 dBA or the prevailing RBL plus 5 dBA, whichever is the greater, then a detailed assessment of potential sleep disturbance impacts is warranted. Since the night time project noise trigger level is less than 40 dBA for all nearby residential receivers, compliance with these noise trigger levels will ensure that no further assessment of night time $L_{Aeq,15min}$ noise levels, with regard to sleep disturbance, would be required.

4.2 Noise Modelling Methodology and Assumptions

Operational noise emissions from the Proposal have been modelled using SoundPLAN v8.2, using the CONCAWE prediction algorithm. The CONCAWE noise propagation model is used around the world and is widely accepted as an appropriate model for predicting noise over significant distances. Factors addressed in the noise modelling are:

- Equipment noise level emissions and locations
- Shielding from structures
- Noise attenuation due to geometric spreading
- Meteorological conditions
- Ground absorption
- Atmospheric absorption.

4.2.1 Meteorological Effects

At relatively large distances from a source, the resultant noise levels at receivers can be influenced by meteorological conditions, particularly temperature inversions and gradient winds. Where these factors are a feature of an area, their effect on resultant noise levels should be taken into account.

Temperature inversions are considered likely to be a feature of the area during winter nights.

Gradient winds have been identified in general accordance with "Fact Sheet D" of the NPfI based on hourly observations of wind speed and direction at the Bureau of Meteorology's weather station located at the Tamworth Airport over the period 2019 – 2023.

Table 4-6 presents the percentage of time where light winds up to 3.0 m/s are blowing from a particular direction, plus or minus 45 degrees, during the day, evening and night time assessment periods in each season. There the percentage is 30% or more, the winds are considered a feature of the area and should be included in the noise model.

The results in **Table 4-6** indicate that gradient winds are a feature of the area at night during autumn, winter and spring.

Table 4-6 Identification of Gradient Winds, Tamworth Airport (2019-2023)

Direction	Percentage of Time											
	Summer			Autumn			Winter			Spring		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
N	9	7	5	9	12	6	12	17	12	9	12	9
NNE	7	6	5	7	10	6	9	14	10	7	9	8
NE	6	5	5	6	8	5	7	10	8	6	7	8
ENE	6	5	6	7	8	6	7	10	7	6	5	7
E	8	5	9	10	10	12	11	12	13	8	7	12
ESE	8	6	17	14	12	25	15	16	27	9	8	21
SE	9	6	22	16	13	**33**	16	19	**35**	10	9	29
SSE	8	6	24	15	13	**34**	16	18	**38**	9	10	**30**
S	7	6	21	13	12	29	13	16	**33**	7	9	27
SSW	7	6	14	10	9	16	9	11	19	7	9	17
SW	7	5	8	10	9	8	10	11	11	8	9	10
WSW	8	6	6	11	8	4	12	12	7	10	9	7

Direction	Percentage of Time											
	Summer			Autumn			Winter			Spring		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
W	10	6	5	13	8	3	15	14	6	12	11	7
WNW	11	7	5	14	9	4	17	16	8	13	12	7
NW	11	8	5	14	11	5	17	19	11	12	12	8
NNW	10	8	5	12	12	6	15	18	12	11	13	9

In accordance with the NPfI, the following conditions have been modelled to account for potential noise enhancing meteorology:

- Stability category F plus a 2.0 m/s source-to-receiver wind during the night time in autumn, winter and spring.

It is noted that the above noise-enhancing meteorological conditions, which represent temperature inversion conditions, result in equivalent noise enhancement to a 3.0 m/s source-to-receiver gradient wind.

Predicted noise levels associated with both standard meteorological conditions (“standard”) and noise enhancing (“NE”) meteorological conditions are presented in this assessment.

4.3 Operational Noise Sources and Assessment Scenarios

4.3.1 Continuous Noise Sources

Significant continuous noise sources associated with the operation of the Proposal are as follows:

- Ventilation fans
- Trucks
- Forklifts
- Feed silo refill auger.

On the roof of each shed, a bank of 19 fans would be located, at the western end of the shed, to provide adequate ventilation and control temperatures within the sheds. The ventilation fans feature variable speed control and would be operated in such a way that internal temperatures within the shed are tightly controlled to ensure the welfare of the birds.

Noise emissions from the ventilation fans vary significantly with speed, as demonstrated in **Figure 4-1**, which presents the sound power level (SWL) of ventilation fans as a function of speed. The data in **Figure 4-1** is based on measurements conducted by SoundIN at AAM's farm in Rathdowney, Queensland.

AAM advises that the typical maximum fan speed at the Proposal Site would be 78% of the maximum fan speed. The fans would operate at this speed during warm weather. In cooler weather, which includes night time periods during autumn, winter and spring, the maximum fan speed would be 60% of the maximum fan speed.

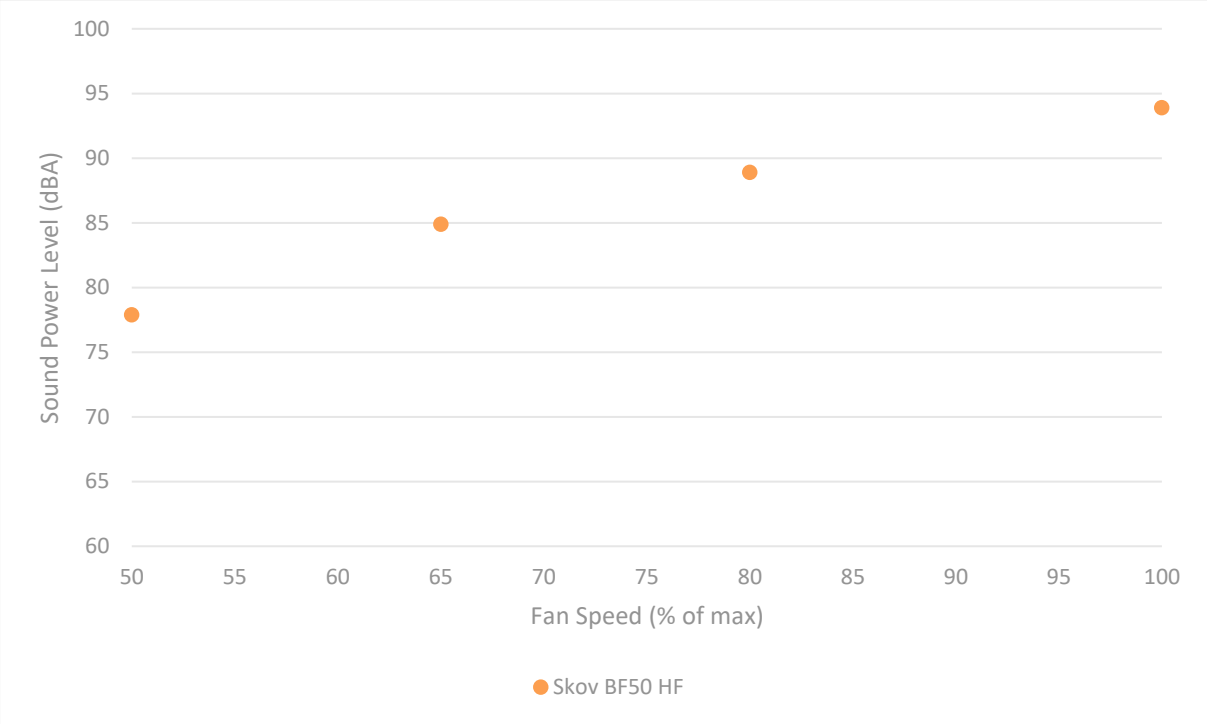
It is noted that the proposed fans for the Proposal site are slightly larger than those used at the Rathdowney site and would have a SWL approximately 5 dBA higher than those at the Rathdowney site.

The roof-mounted ventilation sheds would be mounted such that they discharge vertically. This is contrary to the typical arrangement for poultry farm ventilation fans, which normally discharge horizontally. Due to the "cone" on the outlet of the fans, noise levels at 90 degrees to the axis of the fan outlet are significantly lower than those on or near the outlet axis. Measurements conducted by SoundIN at AAM's Rathdowney farm show that this reduction is approximately 8 dBA. This reduction is included in the noise modelling.

Feed deliveries would occur during the daytime via truck and would also involve the use of an auger to fill the feed silo.

Bird delivery and collection would occur at night, for bird welfare reasons, and would involve trucks and forklifts.

Figure 4-1 Ventilation Fan Noise Level vs Speed



Sound power levels (SWL) for the operational noise sources have been adopted from manufacturer data, information from the client and previous measurements conducted by SoundIN. SWL for significant noise sources associated with the operation of the Proposal a summarised in **Table 4-7**.

Table 4-7 Operational Noise Sources and Sound Power Levels

Item		Continuous SWL (dBA)
Ventilation fan (Skov BF55 or equivalent)	78% of max. speed	93 [1]
	60% of max. speed	87 [1]
Truck		103
Forklift		95
Feed silo refill auger		106

1. When measured on or close to outlet of fan axis. Modelling includes -8dBA correction to account for shielding from fan cone.

Three scenarios have been developed to represent typical worst-case operational noise emissions from the Proposal and are summarised in **Table 4-8**.

Table 4-8 Noise Assessment Scenarios

Period [a]	Source	Comments
Day (all year round)	Ventilation fans	19 fans operating at up to 78% of max speed for each shed
	Trucks	1 truck continuously travelling around internal road
	Feed silo auger	Continuous operation
Evening (all year round)	Ventilation fans	19 fans operating at up to 78% of max speed for each shed
	Trucks	1 truck continuously travelling around internal road
	Forklifts	4 forklifts operating continuously between the sheds
Night (summer)	Ventilation fans	19 fans operating at up to 78% of max speed for each shed
	Trucks	1 truck continuously travelling around internal road
	Forklifts	4 forklifts operating continuously between the sheds
Night (other seasons)	Ventilation fans	19 fans operating at up to 60% of max speed for each shed
	Trucks	1 truck continuously travelling around internal road
	Forklifts	4 forklifts operating continuously between the sheds

4.3.2 Maximum Noise Level Sources

Pneumatic brakes on trucks are the most likely source of maximum (L_{Amax}) noise levels at sensitive receivers. The L_{Amax} sound power level of a semi-trailer parking brake can be up to 120 dBA.

4.4 Predicted Noise Levels

4.4.1 Predicted $L_{Aeq,15min}$ Noise Levels

The predicted $L_{Aeq,15min}$ noise levels at nearby residential receivers associated with the scenarios described in Section 4.3.1 are presented in **Table 4-9**.

Table 4-9 Predicted $L_{Aeq,15min}$ Noise Levels

Rec.	Predicted $L_{Aeq,15min}$ noise level (dBA)					Project noise trigger level (dBA)			Complies?
	Day	Evening	Night			Day	Evening	Night	
			Summer	Other Seasons					
				Calm	NE				
R1	24	23	23	18	23	40	35	35	Y
R2	33	31	31	26	31	40	35	35	Y
R3	31	29	29	24	29	40	35	35	Y
R4	28	27	27	25	30	40	35	35	Y
R5	28	28	28	27	32	40	35	35	Y
R6	31	29	30	24	29	40	35	35	Y
R7	32	30	30	25	30	53	48	43	Y
R8	37	35	35	29	34	53	48	43	Y
R9	27	26	26	20	25	53	48	43	Y

The results in **Table 4-9** indicate that predicted noise levels at all nearby receivers comply with the noise trigger levels at all times.

4.4.2 Predicted L_{Amax} Noise Levels / Sleep Disturbance Assessment

The predicted night time L_{Amax} noise levels at nearby residential receivers due to the operation of the Proposal are presented in **Table 4-10**.

Table 4-10 Predicted L_{Amax} Noise Levels

Receiver ID	Predicted L_{Amax} Noise Level (dBA)		Maximum Noise Trigger Level (dBA)	Complies?
	Calm	NE		
R1	32	37	52	Y
R2	41	46	52	Y
R3	38	43	52	Y
R4	33	38	52	Y
R5	32	37	52	Y
R6	40	46	52	Y
R7	41	46	52	Y
R8	47	52	52	Y
R9	38	43	52	Y

The results in **Table 4-10** indicate that predicted L_{Amax} noise levels at all nearby receivers comply with the maximum noise trigger levels.

5 ROAD NOISE ASSESSMENT

The following Section assesses potential road noise impacts on sensitive receivers due to traffic generated by the Proposal.

Sensitive receivers most potentially affected by noise from traffic generated by the Proposal are residences along Soldiers Settlement Road, east of the Site access road.

5.1 Road Noise Criteria

The *NSW Road Noise Policy* (RNP) (DECCW, 2011) sets out criteria for assessment of noise from traffic on public roads. The RNP sets out noise assessment criteria for "freeways", "arterial", "sub-arterial" and "local roads".

In accordance with the RNP, Soldiers Settlement Road is considered a local road. The RNP impact assessment criteria for residential land uses affected by additional traffic on local roads are presented in **Table 5-1**.

Table 5-1 RNP Impact Assessment Criteria

Road	Category	Assessment criteria (dBA)	
		Day	Night
Soldiers Settlement Road	Local	$L_{Aeq,1\ hour}$ 55 (external)	$L_{Aeq,1\ hour}$ 50 (external)

Note: Day = 7am – 10pm; Night = 10pm – 7am

5.2 Road Noise Modelling

Road noise levels at the most potentially affected receivers along have been predicted using the Calculation of Road Traffic Noise (CoRTN) algorithm, and are based upon the following assumptions:

- Vehicle speeds are 100 km/h along Soldiers Settlement Road.
- The facades of the nearest receivers to Soldiers Settlement Road are set back approximately 40 metres from the road.

5.3 Existing and Future Traffic Flows

Existing traffic flows along Soldiers Settlement Road have been provided by PSA consulting.

According to the traffic impact assessment (TIA) prepared for the Proposal, prepared by PSA Consulting (V2, dated 11 September 2024), the Proposal would generate up to 3 light vehicle and 2 heavy vehicle

movements in peak hours during the daytime. Additionally, during night-time bird collections, the Proposal would generate up to six heavy vehicle movements in the busiest hour.

Table 5-2 summarises the future ("build") traffic volumes and percent heavy vehicles ("mix") along Soldiers Settlement Road near the Site

Table 5-2 Hourly Traffic Volumes – No-Build and Build

Road	Time [a]	Existing (no-build)		Future (build)	
		Volume	% Heavy	Volume	% Heavy
Soldiers Settlement Road	Day	22	9%	27	15%
	Night	7	0%	13	46%

a. Day = 7am – 10pm; Night = 10pm – 7am.

5.4 Predicted Road Noise Levels

Using the traffic data in **Table 5-2**, road noise levels at the most potentially affected sensitive receivers along Soldiers Settlement Road have been predicted for the no-build and build scenarios and are shown in **Table 5-3**.

Table 5-3 Predicted $L_{Aeq,period}$ Road Noise Levels

Road	No-build		Build		RNP Criteria		Complies?	
	Day [a]	Night [a]	Day [a]	Night [a]	Day [a]	Night [a]	Day [a]	Night [a]
Soldiers Settlement Road	49	43	51	50	55	50	Yes	Yes

a. Day = 7am – 10pm; Night = 10pm – 7am.

Review of **Table 5-3** indicates that the predicted road noise levels at the facades of the most potentially affected receivers along Soldiers Settlement Road comply with the RNP assessment criteria.

6 CONCLUSION

SoundIN has been engaged by AAM to undertake a noise and vibration impact assessment for a proposed poultry farm on land at 2432 Oxley Highway, Bective.

Noise impacts associated with the construction of the Proposal have been assessed in general accordance with the *Interim Construction Noise Guideline*.

Construction NML have been established for nearby residential receivers and recreation areas.

A computer noise model has been developed to predict noise levels associated with construction activities at nearby sensitive receivers.

The modelling results indicate that construction noise levels are predicted to exceed the NML by up to 2 dBA at nearby receivers.

Noise impacts associated with the operation of the Proposal have been assessed in general accordance with the NPfI. A computer noise model has been developed to predict operational noise levels at sensitive receivers. Noise modelling indicates that operational noise levels comply with the established noise trigger levels at all receivers.

Road noise impacts associated with the Proposal have been assessed in accordance with the RNP. Predicted road noise levels associated with traffic generated by the Proposal comply with the RNP impact assessment criteria.