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Environmental Noise Impact Assessment Proposed Quarry Expansion

At:-

Lot 5 in DP 255133
Federal Highway
Wollogorang, NSW 2581

Prepared for: -

Denrith Pty Ltd
C/- Laterals Planning Pty Ltd
1st floor, 35 Montague Street
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Attention: Mr Robert Mowle

Reference: 2006003E-R

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12th July 2021



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Laterals Planning Pty Ltd on behalf of Denrith Pty Ltd commissioned Harwood Acoustics to carry out an Environmental Noise Impact Assessment for a proposed expansion of the Wollgorang Quarry located at Lot 5 DP 255133, Federal Highway, Wollgorang, NSW.

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TABLE OF CONTENTS

1.	INTRODUCTION AND SUMMARY.....	4
2.	SITE AND DEVELOPMENT DESCRIPTION.....	5
2.1	Site Description.....	5
2.2	Development Description.....	6
3.	NOISE CRITERIA	7
3.1	Planning Secretary’s Environmental Assessment Requirements.....	7
3.2	NSW EPA’s Noise Policy for Industry 2017	7
3.2.1	<i>Introduction</i>	<i>7</i>
3.2.2	<i>Project Noise Trigger Level</i>	<i>8</i>
3.2.3	<i>Project Intrusiveness Noise Level</i>	<i>8</i>
3.2.4	<i>Amenity Noise Levels and Project Amenity Noise Levels</i>	<i>9</i>
3.2.5	<i>Assessment Locations</i>	<i>10</i>
3.3	Background Noise Levels.....	11
3.4	On-Road Traffic Noise Criteria – Road Noise Policy 2011	12
3.5	Project Specific Noise Goals	12
4.	MODIFYING FACTOR ADJUSTMENTS.....	13
5.	development NOISE EMISSION	13
5.2	Noise Level Predictions.....	14
5.2.1	<i>Noise Modelling Details and Parameters</i>	<i>14</i>
5.2.2	<i>Predicted Noise Levels.....</i>	<i>15</i>
6.	On-road traffic noise.....	15
7.	CONCLUSION	16

1. INTRODUCTION AND SUMMARY

Denrith Pty Ltd proposes to expand the extraction area of its existing friable granite quarry located at Lot 5 in DP 255133, Federal Highway, Wollongorang, NSW (the Site).

The Site is located on the northern side of the Federal Highway, approximately 7.5 kilometres to the northeast of the township of Collector. The Site is located on land RU2 Rural Landscape under Upper Lachlan Shire Council's *Local Environment Plan 2010*.

The surrounding area is predominantly rural farmland and there are rural residential receptors located toward to the south, south east and north east. The nearest of these is approximately 550 metres from the proposed quarry expansion area. A location plan is shown in Figure 1.

The Quarry expansion proposes an extraction rate of 16,000 tonnes per annum being 333 tonnes per week (48 weeks); 9 x 37 tonne truck loads per week, which equates to an average of 2 truck loads per day over 5 days. The Quarry is a friable granite Quarry. A dozer will be used to "rip" and stockpile raw material and a front-end loader will be used to place material on to the screening plant and to load trucks. There will not be any blasting or crushing carried out on Site.

It is a requirement of Upper Lachlan Shire Council that an Environmental Noise Impact Assessment be prepared and The NSW Department of Planning, Industry and Environment has provided Planning Secretary's Environmental Assessment Requirements (SEARs), number 1439 dated May 2020. With respect to assessing noise emission the SEARs require that consideration is given to the relevant NSW noise guidelines and standards.

Project noise trigger levels are therefore derived from the EPA's *Noise Policy for Industry 2017*.

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response, for example, further investigation of mitigation measures.

The trigger level is tailored for each specific circumstance to take into account a range of factors that may affect the level of impact, including:

- the receiver's background noise environment
- the time of day of the activity
- the character of the noise
- the type of receiver and nature of the area.

Background noise levels have been measured at each of the closest residences to the Site and these vary due to their respective distances from the Federal Highway.

Project intrusiveness noise trigger levels are 47 dBA, 53 dBA and 57 dBA $L_{eq, 15 \text{ minute}}$ during the day time period at the furthest and closest receptors to the Highway respectively. There will not be any evening time or night time activity at the Site and consideration is consequently given to day time noise levels only.

Calculations and predictions show that the level of the noise emission from the proposed expansion will be well below the EPA's project intrusiveness trigger levels at all receptors locations during the day time without the need for noise controls.

The level of noise emission from on road traffic will meet the EPA's *Road Noise Policy 2011* recommended noise limits for this development.

2. SITE AND DEVELOPMENT DESCRIPTION

2.1 Site Description

The Site is located on the northern side of the Federal Highway, approximately 7.5 kilometres to the northeast of the township of Collector. The Site is located on land RU2 Rural Landscape under Upper Lachlan Shire Council's *Local Environment Plan 2010*.

The surrounding area is predominantly rural farmland and there are rural residential receptors located toward to the south, south east and north east.

The nearest receptors to the Site are shown in Figure 1 below:-

R1 – 6237 Federal Highway *
(circa 550 metres)

R2 – 6332 Federal Highway
(circa 1055 metres)

R3 – Wollgorang Road (circa 1650 metres)

Distances are based on the closest point of the expansion area to the assessment location at each residential receptor, being 30 metres from the nearest façade facing the Quarry in accordance with the NSW EPA's NPfI.

* The structures at this property comprise rural sheds and there is currently no residential dwelling at the Site. However, this property is the closest to the Site and is considered as a residential receptor in this assessment.

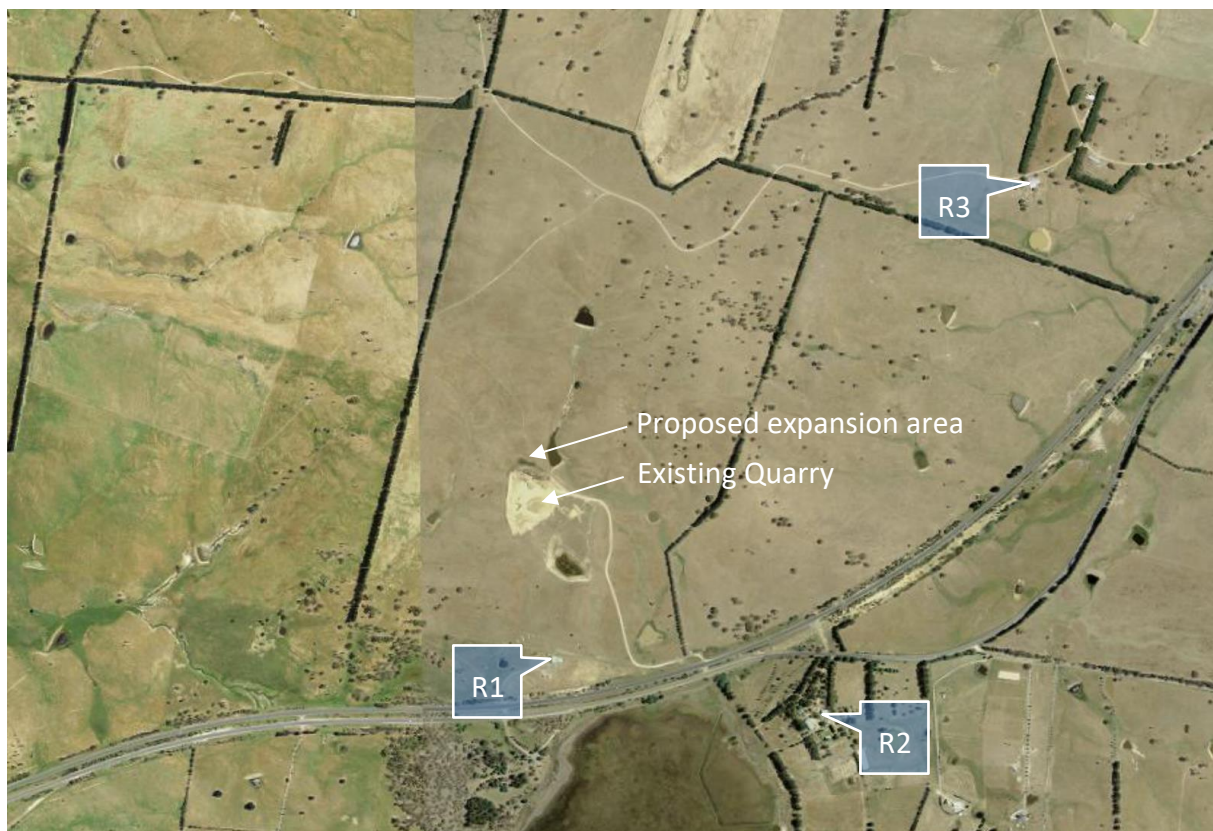


Figure 1. Location Plan – Lot 5 in DP 255133

(source: NSW Government Spatial Information Exchange ©)

2.2 Development Description

The Quarry expansion proposes an extraction rate of 16,000 tonnes per annum being 333 tonnes per week (48 weeks); 9 x 37 tonne truck loads per week, which equates to an average of 2 truck loads per day over 5 days. The Quarry is a friable granite Quarry. A dozer will be used to “rip” and stockpile raw material and a front-end loader will be used to place material on to the screening plant and to load trucks. There will not be any blasting or crushing carried out on Site.

Noise sources associated with the operation of the Quarry include:-

- Terex Finley Supertrak 683 screening plant,
- Kawasaki 90ZV front end loader,
- CAT D8T dozer, and
- Heavy vehicle movements.

A Site is showing the proposed expansion area is shown in Figure 2 below.

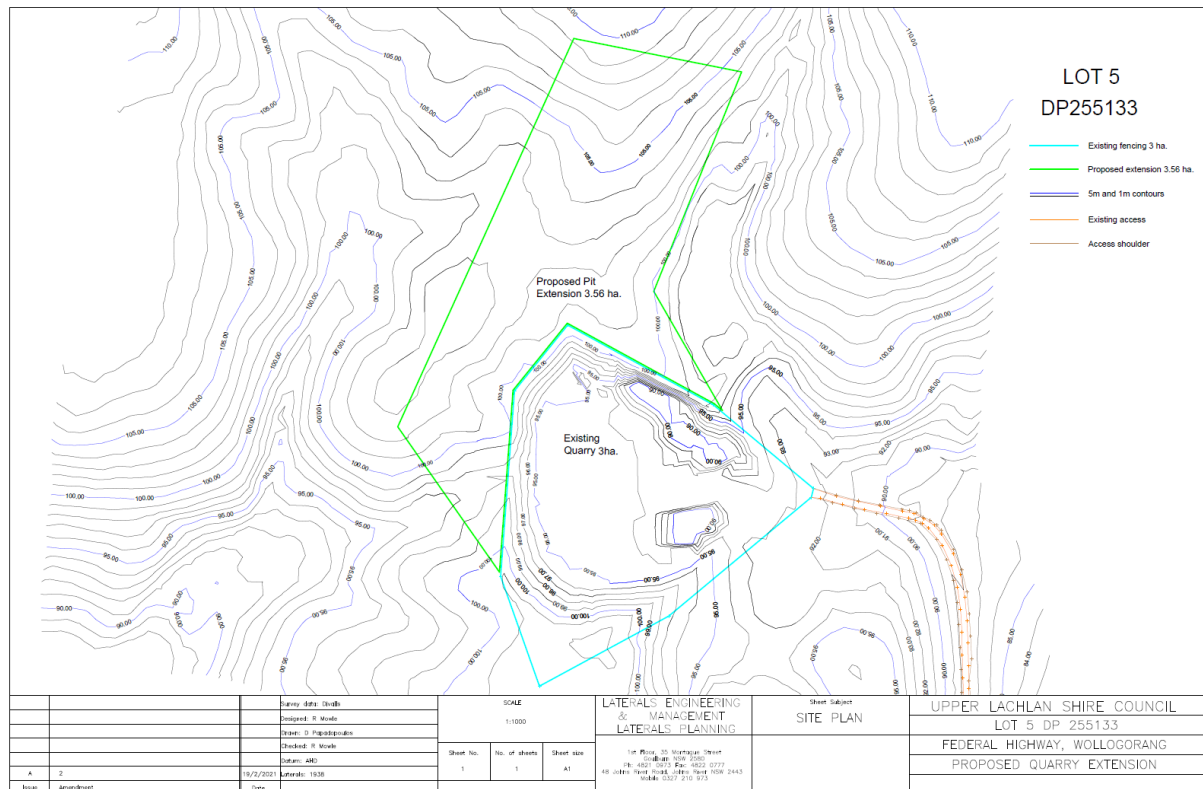


Figure 2. Site Plan

(source: Laterals Planning)

3. NOISE CRITERIA

This section outlines the noise guidelines applicable to this proposal and establishes the project specific noise trigger levels and noise design goals.

3.1 Planning Secretary's Environmental Assessment Requirements

The Planning Secretary's Environment Assessment Requirements (SEARs), number 1439, requires that an Environmental Impact Statement (EIS) is prepared to support the application. A Noise Impact Assessment is then required to form part of the EIS and is to include a quantitative assessment of the construction and operational phases of the development as well as off-site transport noise.

The relevant guidelines pertaining to the assessment are detailed below.

3.2 NSW EPA's Noise Policy for Industry 2017

3.2.1 Introduction

The NSW Environment Protection Authority (EPA) published the *NSW Noise Policy for Industry* in October 2017 (the Policy). This Policy has now replaced the *Industrial Noise Policy* (INP) 2000.

The Policy sets out the NSW Environment Protection Authority's (EPA's) requirements for the assessment and management of noise from industry in NSW. It aims to ensure that noise is kept to acceptable levels in balance with the social and economic value of industry in NSW.

The Policy is designed to assist industry and authorities to ensure that potential noise impacts associated with industrial projects are managed effectively.

The purpose of the policy is to ensure noise impacts associated with particular industrial developments are evaluated and managed in a consistent and transparent manner. It provides noise levels for assessing the potential impact of noise from industry and includes a framework for considering feasible and reasonable noise mitigation measures.

The objectives of the policy are to:

- provide the noise levels that are used to assess both change in noise level and long-term noise levels;
- provide a clear and consistent framework for assessing environmental noise impacts from industrial premises and industrial development proposals;
- promote the use of best-practice noise mitigation measures that are feasible and reasonable where potential impacts have been identified;
- support a process to guide the determination of achievable noise limits for planning approvals and/or licences, taking into account the matters that must be considered under the relevant legislation (such as the economic and social benefits and impacts of industrial development).

The policy is designed for large industrial and agricultural sources and specifies substantial monitoring and assessment procedures that may not always be applicable to the types of sources councils need to address.

However, local government may find the policy helpful in assessing noise from premises it regulates and in the carrying-out of its land-use planning responsibilities.

3.2.2 Project Noise Trigger Level

Section 2 of the *Noise Policy for Industry 2017* sets out the procedure to determine the **project noise trigger levels** relevant to a particular industrial development.

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so ‘trigger’ a management response; for example, further investigation of mitigation measures.

The project noise trigger level, feasible and reasonable mitigation, and consideration of residual noise impacts are used together to assess noise impact and manage the noise from a proposal or site. It is the combination of these elements that is designed to ensure that acceptable noise outcomes are determined by decision makers.

The **project noise trigger level** is defined as the lower (that is, the more stringent) value of the project **intrusiveness noise level** and project **amenity noise level**.

3.2.3 Project Intrusiveness Noise Level

The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the **L_{Aeq} descriptor**), measured over a 15-minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment.

The intrusiveness noise level is determined as follows:

$$L_{Aeq, 15 \text{ minute}} = \text{rating background noise level (RBL)} + 5 \text{ dB}$$

Where:

<i>L_{Aeq, 15 minute}</i>	<i>Represents the equivalent continuous energy average A-weighted sound pressure level of the source over 15 minutes.</i>
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And:

<i>Rating background noise level</i>	<i>Represents the background level to be used for assessment purposes, as determined by the method outlined in Fact Sheets A and B.</i>
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Intrusiveness noise levels are not used directly as regulatory limits. They are used in combination with the amenity noise level to assess the potential impact of noise, assess reasonable and feasible mitigation options and subsequently determine achievable noise requirements.

Minimum assumed Rating Background Levels (RBLs) are applied in the Policy and these result in minimum intrusiveness noise levels. These are shown in Table 2.1 in the Policy and are replicated in Table 1 below.

Table 1 Minimum Assumed RBLs and Project Intrusiveness Noise Levels
(Derived from EPA Table 2.1)

Time of Day	Minimum Assumed Rating Background Level dBA	Minimum Project Intrusive Noise Level (Leq, 15 minute, dBA)
Day (7 am to 6 pm)	35	40
Evening (6 pm to 10 pm)	30	35
Night (10 pm to 7 am)	30	35

3.2.4 Amenity Noise Levels and Project Amenity Noise Levels

To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise levels within an area from **all** industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. (EPA Table 2.2 is replicated in Table 2 below).

The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance.

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

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a **project amenity noise level** applies for each new source of industrial noise as follows:

Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB

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 reasonable and feasible mitigation options, and subsequently determine achievable noise requirements.

Table 2 **Amenity Noise Levels (EPA Table 2.2)**

Receiver	Noise Amenity Area	Time of Day	L _{Aeq} , dBA
(see Table 2.3 to determine which residential receiver category applies)			Recommended amenity noise level
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks *	See column 4	See column 4	5 dB(A) 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 (see notes for table)
Hospital ward internal external	All	Noisiest 1-hour	35
		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
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 dB(A) to recommended noise amenity area

Relevant Notes:

Time of day is defined as follows:

- day – the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays
- evening – the period from 6 pm to 10 pm
- night – the remaining periods,
- In the case where existing schools are affected by existing industrial noise sources, the acceptable L_{Aeq} noise level may be increased to 40 dB (L_{Aeq} (1hr)).

3.2.5 Assessment Locations

For a **residence**, the project noise trigger levels are to be assessed at the reasonably most-affected point on or within the residential property boundary or, if that is more than 30 metres from the residence, at the reasonably most-affected point within 30 metres of the residence, but not closer than 3 metres to a reflective surface and at a height of between 1.2–1.5 metres above ground level. This should not be read to infer that the project noise trigger level (or a limit in a statutory document) applies only at the reasonably most-affected location.

3.3 Background Noise Levels

In order to establish the project intrusive noise levels, it is necessary to determine the background noise levels in the vicinity of all potentially affected residential receptors.

The background noise level is defined by the EPA as ‘the underlying level of noise present in ambient noise when all unusual extraneous noise is removed’ and is considered to be represented by the $L_{A90, 15 \text{ minute}}$ descriptor. This is a statistical measure of the sound pressure level that is exceeded for 90 % of the time. The Rating Background Level is the single-figure background noise level derived from monitoring $L_{A90, 15 \text{ minutes}}$ over a representative period of time. The Rating Background Level is established for the day, evening and night time periods and is used for assessment purposes.

In this instance a noise loggers were placed as follows:-

- Near to receptors R1 and R2 between Wednesday 3 and Tuesday 9 February 2021, and
- Near to receptor R3 between Saturday 27 February and Friday 5 March 2021.

During the noise surveys the weather conditions were favourable for noise monitoring with the exception of rain on Friday 5 and Sunday 7 February which has been excluded from the measured data.

Background noise levels at all locations are dominated by road traffic on the Federal Highway. The results of the surveys are provided in graphical format in Appendix B and are summarised in Table 3 below. Instrumentation used during the noise survey is shown in Appendix A.

Table 3 Rating Background Noise Levels

Time of Day	Rating Background Level dBA ($L_{eq, 15 \text{ minute}}$, dBA)	Existing Ambient Noise Level ($L_{eq, 15 \text{ minute}}$, dBA)
<i>Receptor R1</i>		
Day (7 am to 6 pm)	47	56
Evening (6 pm to 10 pm)	49	57
Night (10 pm to 7 am)	46	57
<i>Receptor R2</i>		
Day (7 am to 6 pm)	45	57
Evening (6 pm to 10 pm)	48	57
Night (10 pm to 7 am)	44	58
<i>Receptor R3</i>		
Day (7 am to 6 pm)	38	49
Evening (6 pm to 10 pm)	37	46
Night (10 pm to 7 am)	38	47

3.4 On-Road Traffic Noise Criteria – Road Noise Policy 2011

The NSW EPA published the *NSW Road Noise Policy* in March 2011 (RNP) and the RNP replaced the *Environmental Criteria for Road Traffic Noise* in July 2011.

The Policy contains strategies to address the issue of road traffic noise from, among other things, traffic generating developments.

Section 2.3.1 of the Policy '*Noise assessment criteria – residential land uses*' sets out the assessment criteria for residences to be applied to particular types of project, road category and land use.

The relevant parts of the EPA's Table 3 are replicated in Table 4 below.

Table 4 Road Traffic Noise Assessment Criteria (EPA RNP, Table 3)

Road Category	Type of Project / Land Use	Assessment Criteria, dBA	
		Day (7 am – 10 pm)	Night (10 pm – 7 am)
Local Roads	6. Existing residences affected by additional traffic on existing local roads generated by land use developments	L _{Aeq} (1 hour) 55 (external)	L _{Aeq} (1 hour) 50 (external)

3.5 Project Specific Noise Goals

The most relevant noise design goals are as follows: -

Receptor R1

- (47 + 5 =) **52 dBA** L_{eq, 15 minute} during the day time period

Receptor R2

- (45 + 5 =) **50 dBA** L_{eq, 15 minute} during the day time period

Receptor R3

- (38 + 5 =) **43 dBA** L_{eq, 15 minute} during the day time period

On-Road Traffic Noise Goals – Residential receptors

- **55 dBA** L_{eq, 1 hour} from on-road traffic during the day, and
- **50 dBA** L_{eq, 1 hour} from on-road traffic at night.

Discussion

The proposed operating hours of the quarry are between 7 am and 5 pm Monday to Friday and 7 am to 1 pm on Saturdays.

There will not be any activity occurring during evening time or night time hours and consequently no consideration is given to evening time or night time noise goals in this assessment.

With respect to construction noise, there will be no significant activity associated with the "construction" phase of the project that is not addressed and considered as part of the operational phase, for example the operation of the D8 dozer clearing new land areas if required. A such no consideration is given to construction noise criteria in this assessment.

4. MODIFYING FACTOR ADJUSTMENTS

Where a noise source contains certain characteristics, such as tonality, intermittency, irregularity or dominant low-frequency content, there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level. On the other hand, some sources may cause less annoyance where only a single event occurs for a limited duration.

Fact Sheet C of the *Noise Policy for Industry 2017* outlines the correction factors to be applied to the source noise level at the receiver before comparison with the project noise trigger levels, to account for the additional annoyance caused by these modifying factors.

The modifying factor corrections should be applied having regard to:

- the contribution noise level from the premises when assessed/measured at a receiver location, and
- the nature of the noise source and its characteristics (as set out in this fact sheet).

The NPI Table C1 sets out the corrections to be applied. The corrections specified for tonal, intermittent and low-frequency noise are to be added to the measured or predicted noise levels at the receiver before comparison with the project noise trigger levels. The adjustments for duration are to be applied to the criterion. Table C1 of the NPI Fact Sheet C is replicated in the attached Appendix C.

In this instance consideration is given to tonal reversing alarms on trucks and mobile plant.

5. DEVELOPMENT NOISE EMISSION

A schedule of 'A' frequency weighted sound power levels, in decibels re: 1 pW is shown in Table 5 below for each item of plant and equipment.

Table 5 **L_{eq, 15 minute} Sound Power Levels – Mobile Plant & Equipment**

Equipment Description	Individual Sound Power Level L _{eq, 15 minute} (dBA)
D8T CAT Dozer	115
Kawasaki Front End Loader	105
Screening plant	102
Truck manoeuvring	107

5.2 Noise Level Predictions

5.2.1 Noise Modelling Details and Parameters

A noise model has been developed using *SoundPLAN* Essential version 5.1.

Table 4 below provides details on the specific parameters used to develop the noise model.

Table 4 Computer Noise Model Parameters

Parameter	Details
Noise Sources and Modifying Factor Corrections	<ul style="list-style-type: none"> The modelling scenario assumes that all noise sources are operating simultaneously at the full sound power levels shown in Table 5 for a minimum of 15 minutes, in any given 15 minute period, A modifying factor correction of + 5dB is applied to the Dozer, the front-end loader and the truck for tonal reversing alarms, The height of each noise source is between 2.5 and 3 metres above the existing natural ground level, No consideration is given to any shielding from earth mounding as the extraction pit depends, Attenuation is attributed only to distance loss, atmospheric absorption and ground absorption at each receptor location.
Algorithm & Meteorological conditions	<p>Noise sources are modelled in accordance with the International Standard ISO 9613-2 (1996(E)) '<i>Acoustic – Attenuation of sound during propagation outdoors Part 2 General method of calculation</i>'.</p> <p>The method described in the Standard is general in the sense that it may be applied to a wide variety of noise sources, and covers the major mechanism of attenuation.</p> <p>The method allows for downwind propagation conditions namely:-</p> <ul style="list-style-type: none"> wind direction within an angle of $\pm 45^\circ$ of the direction connecting the centre of the dominant sound source and the centre of the specified receiver region with the wind blowing from source to receiver, and wind speed between approximately 1 m/s and 5 m/s measured at a height of 3 m to 11 m above the ground, <p>The equations for calculating downwind sound pressure level, including the equations for attenuation... are the average for meteorological conditions within these limits.</p> <p>These equations also hold, equivalently, for average propagation under well-developed moderate ground-based temperature inversion, such as commonly occurs on clear, calm nights.</p>

5.2.2 Predicted Noise Levels

The predicted noise levels at each of the receptors are shown in Table 7 below.

Table 7 Predicted L_{eq} Noise Levels – Operational Noise at All Receptors

Description	Predicted Noise Level $L_{eq, 15 \text{ minute}}$ (dBA) at Receptor Location		
	R1	R2	R3
Project Noise Trigger Level – Day Time	52	50	43
South western extent of expansion area	52	44	38
Complies	Yes	Yes	Yes
Centre of expansion area	51	44	40
Complies	Yes	Yes	Yes
Northern extent of expansion area	49	43	40
Complies	Yes	Yes	Yes

A diagrammatical representation of the predicted noise levels is shown in Appendix D.

6. ON-ROAD TRAFFIC NOISE

The access to the Site is via the Federal Highway, the level of noise emission from the trucks attendant to the Quarry will be inconsequential in comparison to Highway noise. None the less, in order to predict the level of noise emission from trucks attendant to the development Site whilst on the Federal Highway, we have assumed the following:-

- Two trucks in and out per day which equates to four (4) truck movements,
- As a worst-case scenario it is assumed that this can occur in any given one hour period.
- The nearest dwelling to the Highway in proximity of the Site is at 100 metres from the closest lane.

Formulae are given in the *Calculation of Road Traffic Noise* (CoRTN) from the UK Department of Transport and Welsh Office (1988) for the calculation of on-road vehicle noise. However, the calculation procedure given in CoRTN is untested for small traffic flows (under 200) and typically yields lower levels than occur in practice.

Therefore, a calculation based on the sound exposure level for various vehicles has been carried out. The sound exposure level (L_{Ae}) is a summation of the sound energy produced during a single event (i.e. a motor vehicle pass-by, train pass-by, etc).

The author has measured the level of noise emission from the vacuum trucks onsite as well as a variety of semi-trailers, truck and trailer and truck and dog combinations previously.

The average maximum measured sound exposure levels of a range vehicles, normalised to a distance of 10 metres is as follows:-

- Tipper truck or truck and trailer – 86 dBA.

Once established, a sound exposure level (L_{Ae}) can be used to calculate an energy average, sound pressure level ($L_{eq, time}$) using the following formula:-

$$L_{eq, 1 \text{ hour}} = L_{Ae} - 10 \log_{10}(T) + 10 \log_{10}(N)$$

Where T is time in seconds and N is the number of vehicle trips. The calculated level can then be adjusted to various distances from the 10 metre assessment location.

The predicted noise level from on road vehicle movements during peak flows is shown in Table 8 below.

Table 8 Predicted $L_{eq, 1 \text{ hour}}$ Noise Levels – Passing Heavy Vehicles

Description	Predicted Noise Level $L_{1, 1 \text{ hour}}$ (dBA) at Nearest Receptor Locations
Day Time Road Traffic Noise Limit	55
4 trips in one hour (two trucks)	45
Complies	Yes

7. CONCLUSION

An assessment of the potential noise emission arising from the proposed expansion of the Wollongorang Quarry located at Lot 5 in DP establishment of a resource recovery centre at Lot 5 in DP 255133, Federal Highway, Wollongorang, NSW has been undertaken.

Noise modelling, calculations and predictions show that the level of noise emission from the operation of the facility will meet the EPA's *Noise Policy for Industry* 2017 project noise trigger levels during the day time at all receptor locations without the need for noise controls.

The NSW EPA's Road Noise Policy 2011 will also be met for this proposal from trucks accessing the site during day time or night time hours.



Matthew Harwood, MAAS

Principal Acoustical Consultant

Attachments: -

Important note

Appendix A – Noise Survey Instrumentation

Appendix B – Background Noise Survey Results

Appendix C – NSW EPA's Modifying Factors

Appendix D – *SoundPLAN* Noise Model Map

Important Note

All products and materials suggested by Harwood Acoustics are selected for their acoustical properties only.

*Recommendations made in this report are intended to resolve acoustical problems only, therefore all other properties such as aesthetics, air flows, chemical, corrosion, combustion, construction details, decomposition, expansion, fire rating, fumes, grout or tile cracking, loading, shrinkage, smoke, ventilation etc. are outside Harwood Acoustic's fields of expertise and **must** be checked with the supplier or suitably qualified specialist before purchase.*

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Noise Survey Instrumentation	Appendix A
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The instrumentation used during the noise survey consisted of the following:-

Description	Model No.	Serial No.
SvanTek Sound Level Meter	SVAN 971	74362
Acoustical Calibrator	SV34A	58762
Infobyte Noise Logger	Im4 104	104

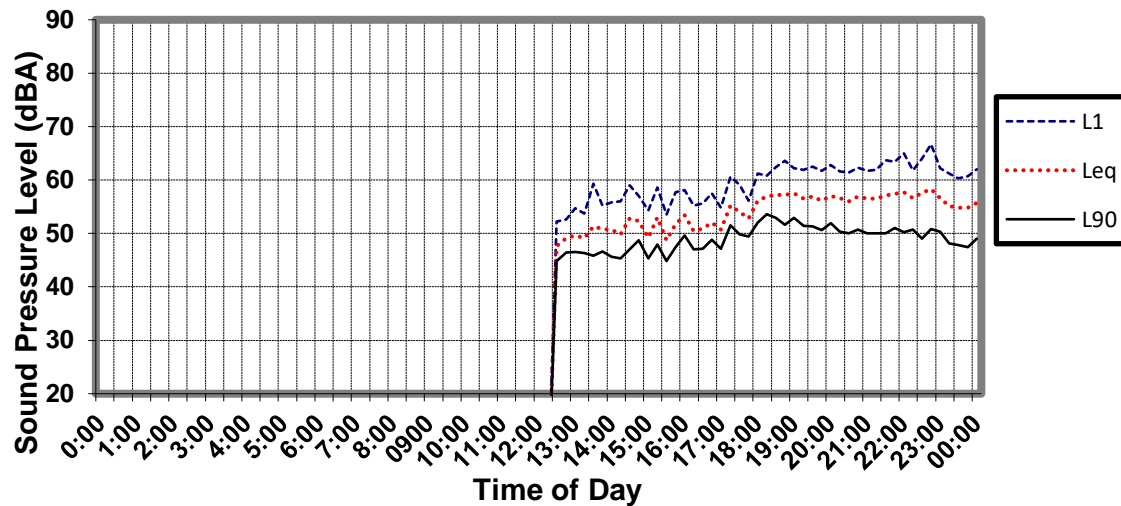
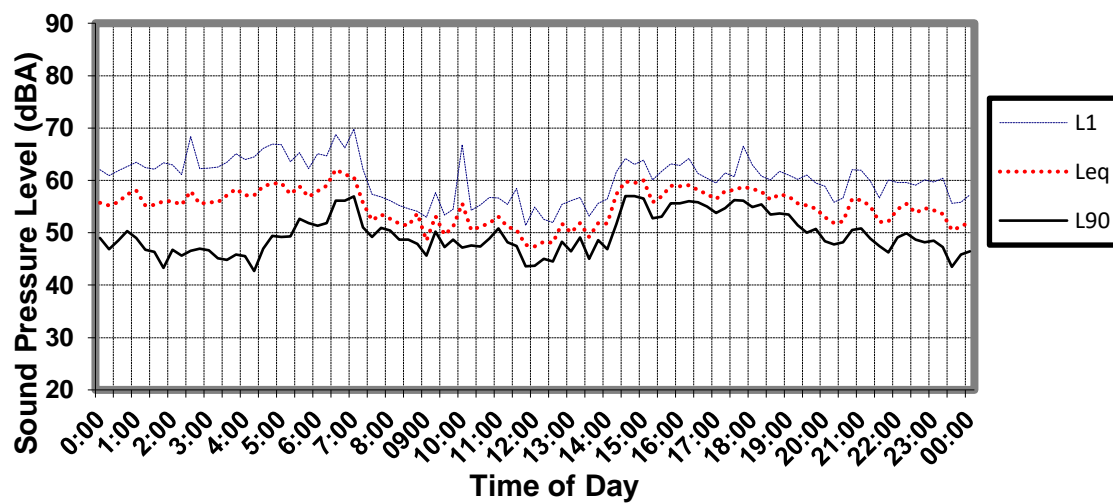
The sound level meter conforms to Australian Standards AS IEC 61672.1-2004 : 'Electroacoustics - Sound level meters – Specifications' as a Class 1 precision sound level meter and the noise logger conforms to AS 1259 as a Type 2 precision sound level meter.

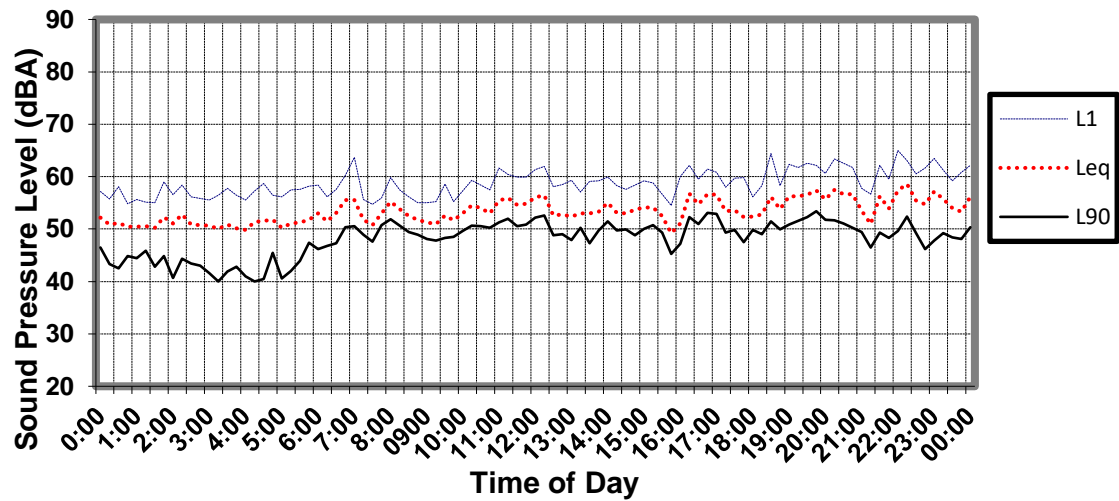
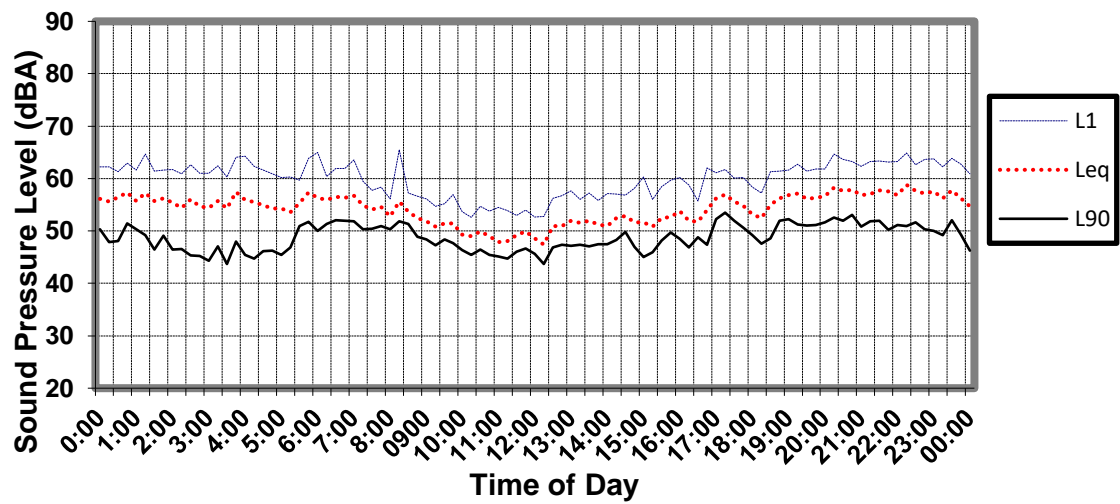
The calibration of the meter and noise logger was checked before and after the measurement period. No significant system drift occurred over the measurement period. The sound level meter and calibrator have been checked, adjusted and aligned to conform to the factory specifications and issued with conformance certificates as required by the regulations.

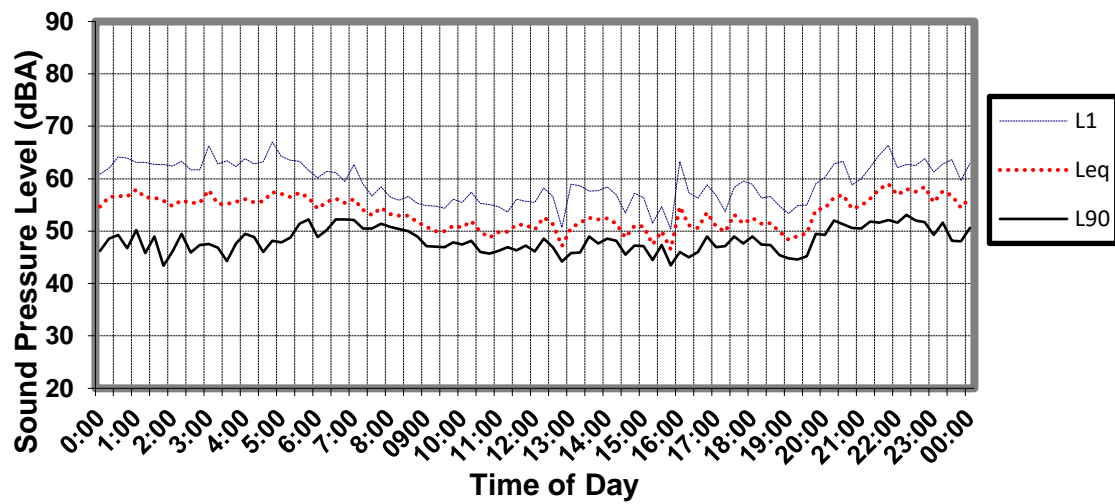
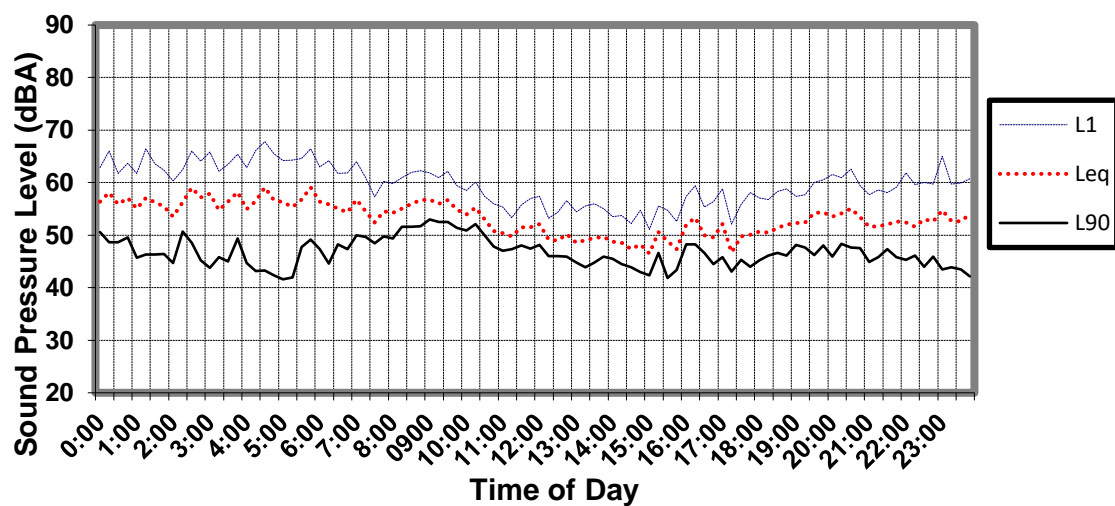
Background Noise Survey Results

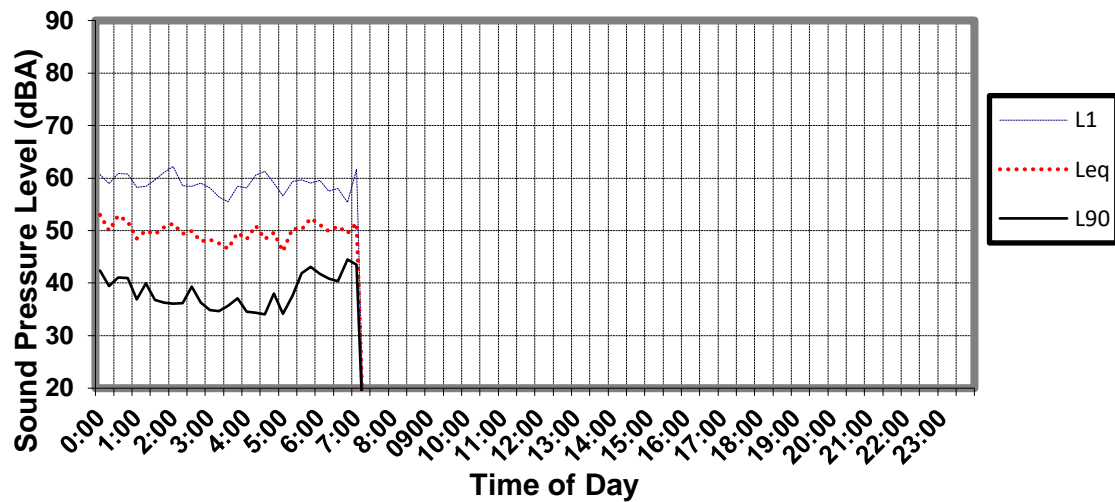
Appendix B

Location R1

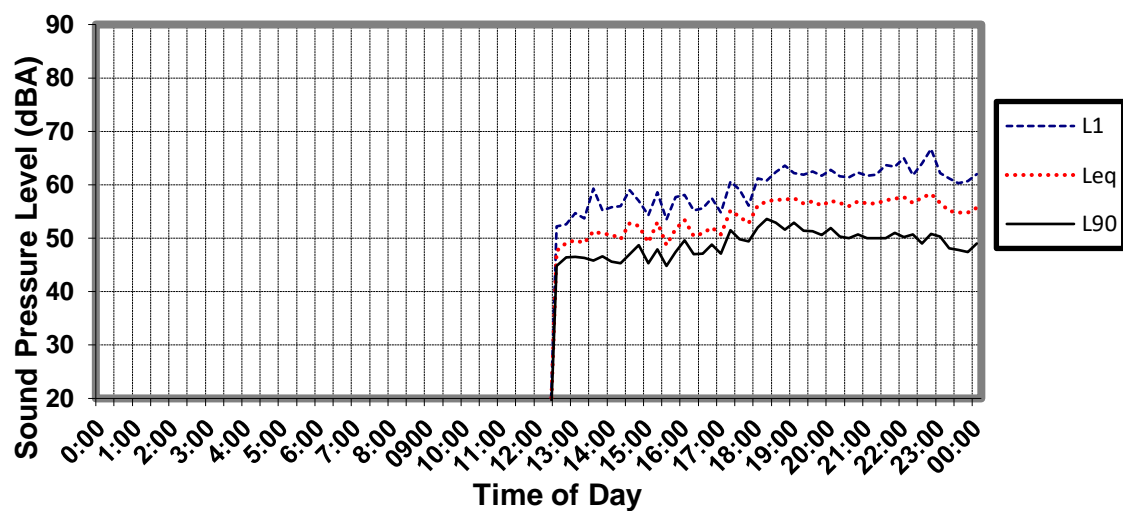
Wednesday February 3rd 2021Thursday February 4th 2021

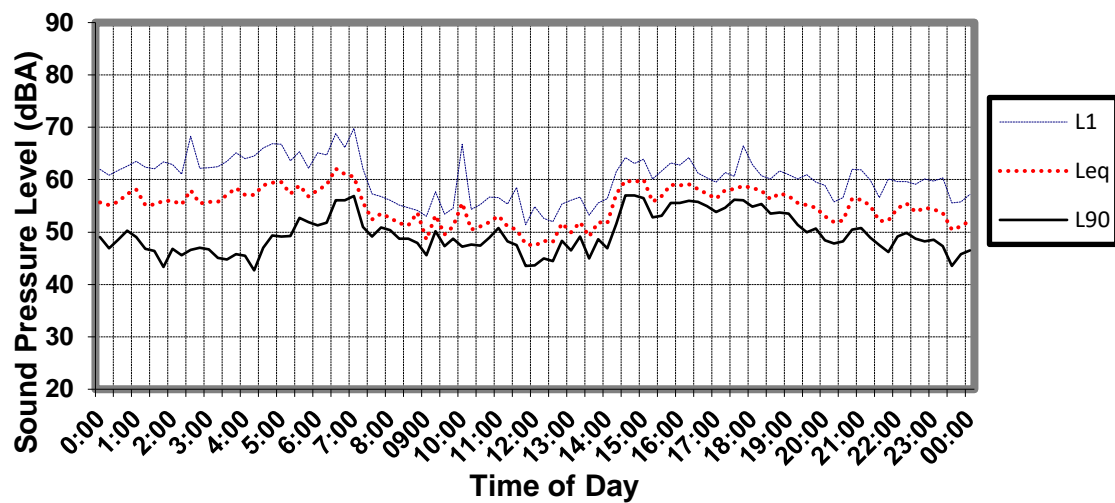
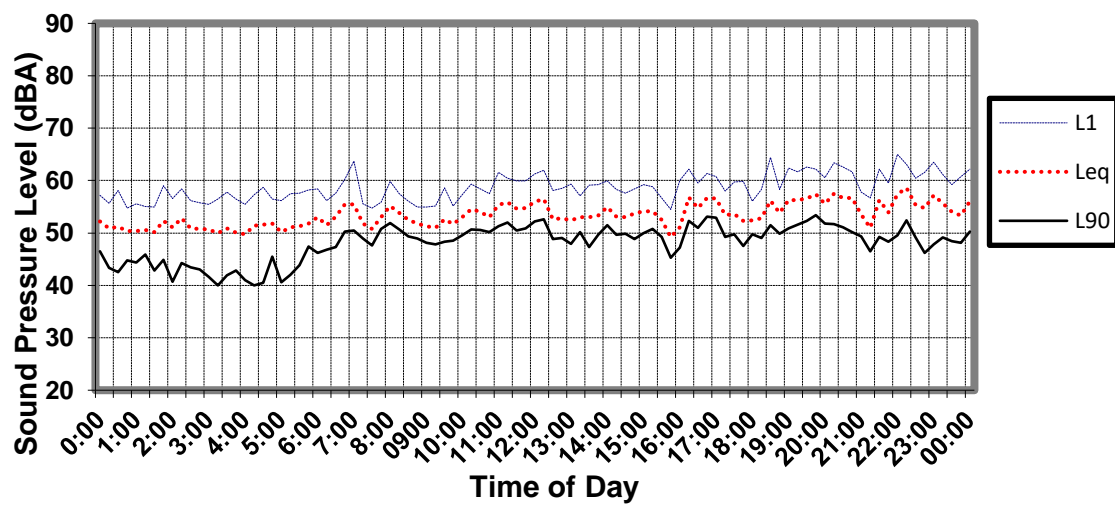
Friday February 5th 2021**Saturday February 6th 2021**

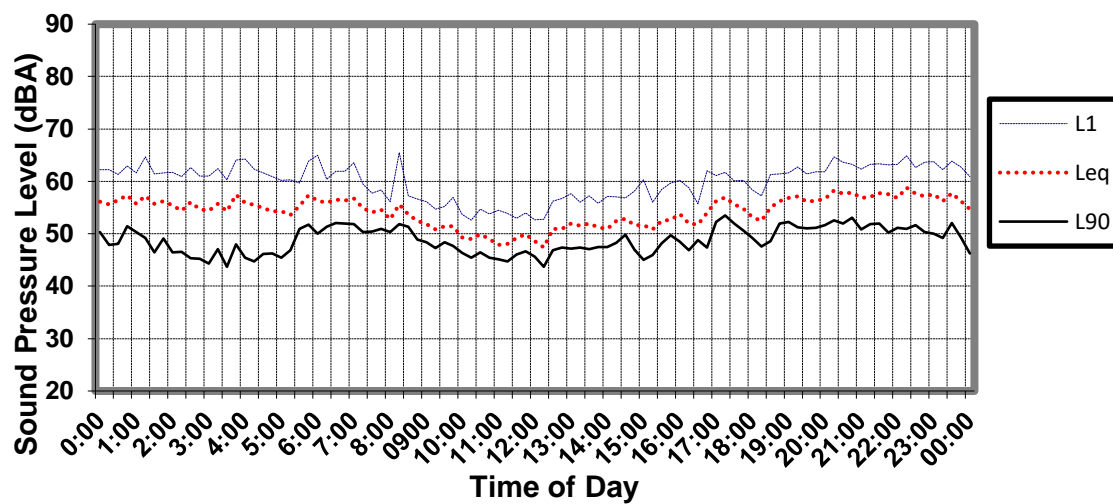
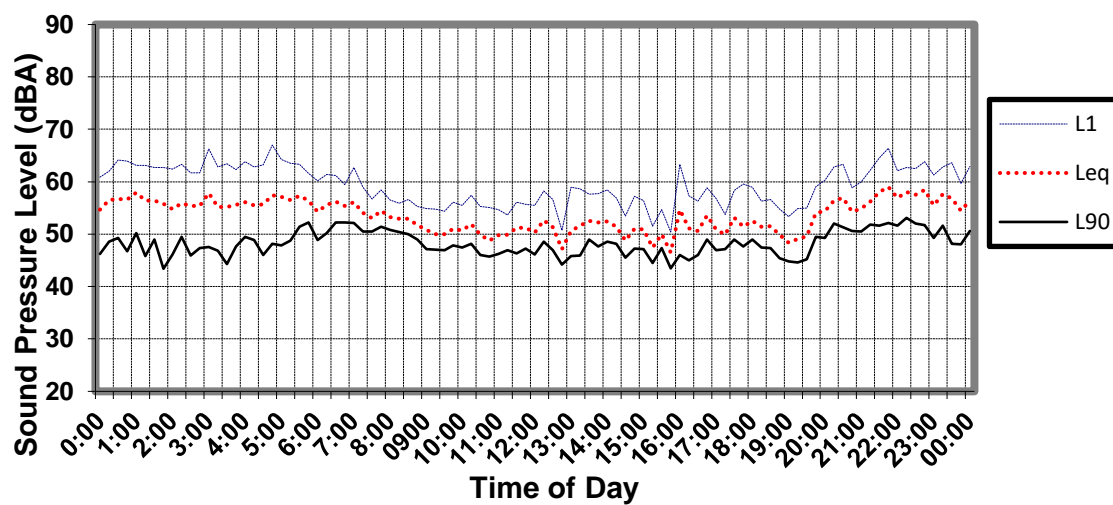
Sunday February 7th 2021**Monday February 8th 2021**

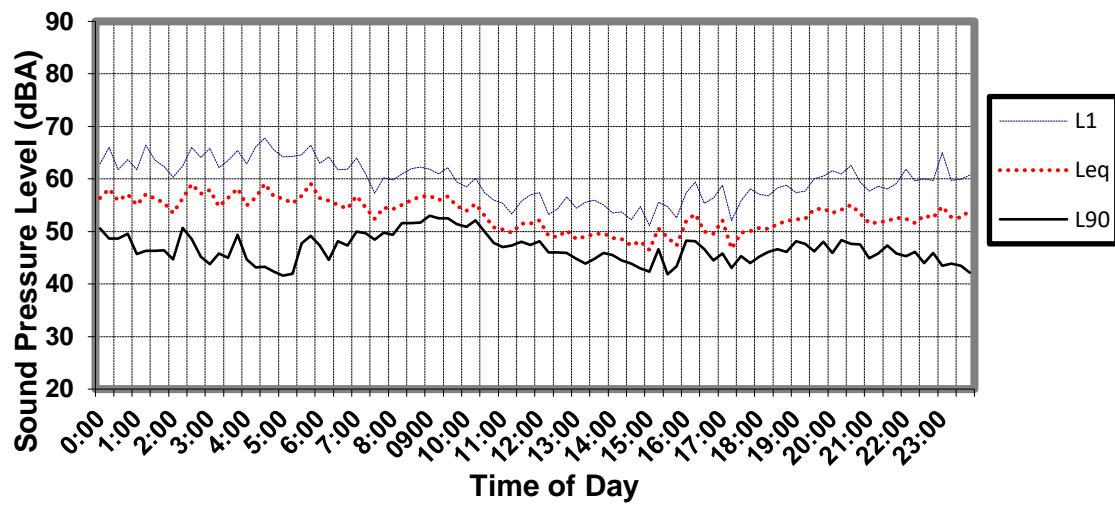
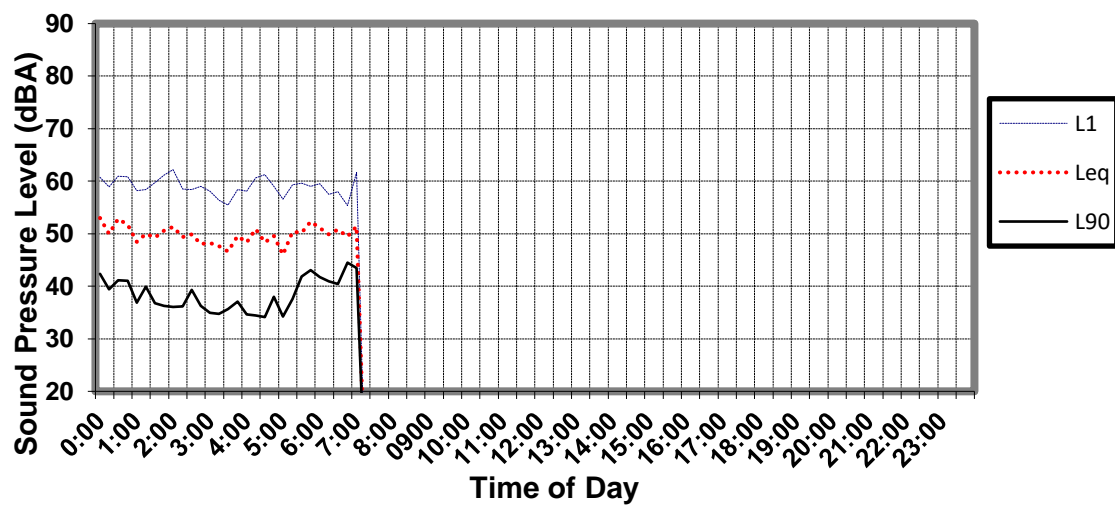
Tuesday February 9th 2021

Location R2

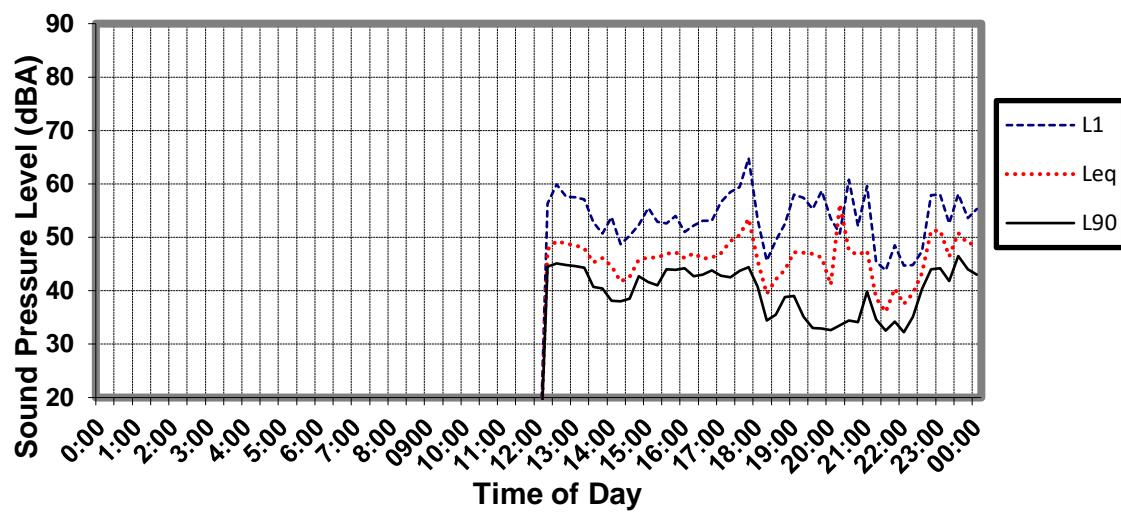
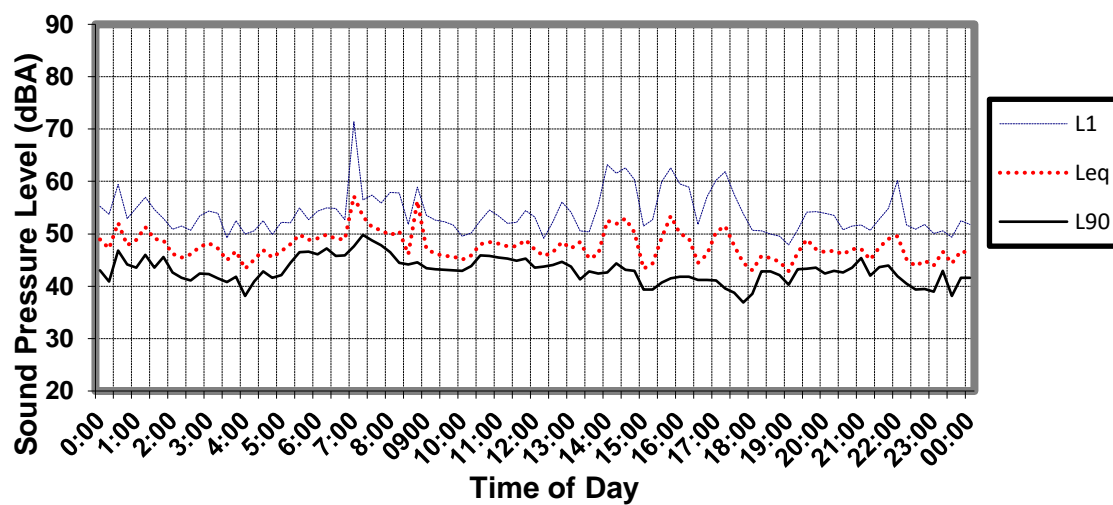
Wednesday February 3rd 2021

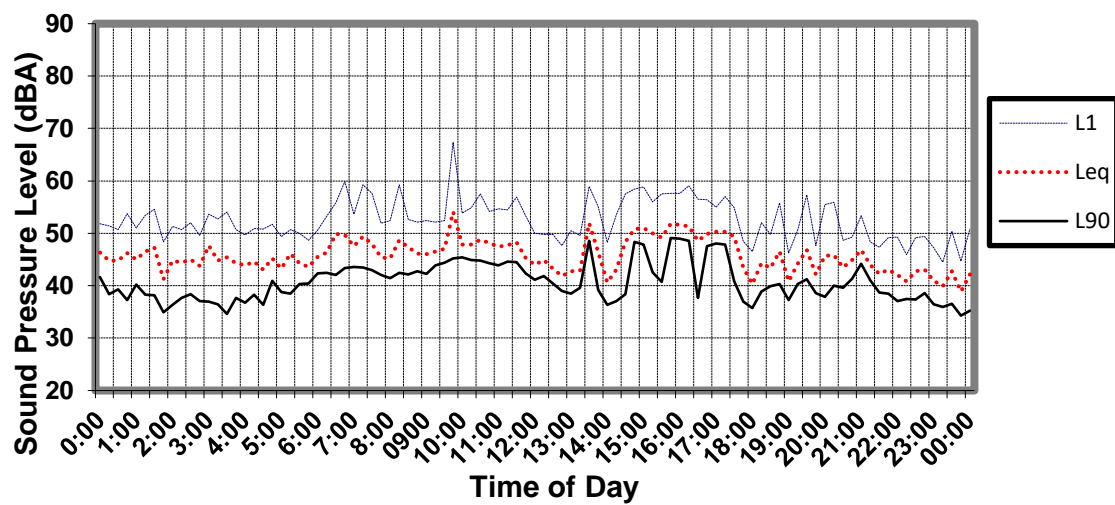
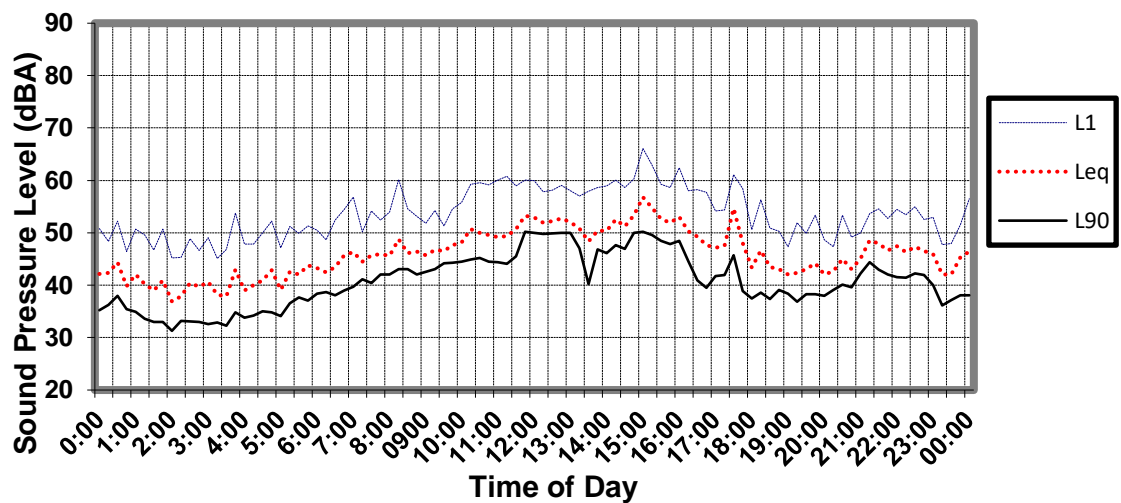
Thursday February 4th 2021**Friday February 5th 2021**

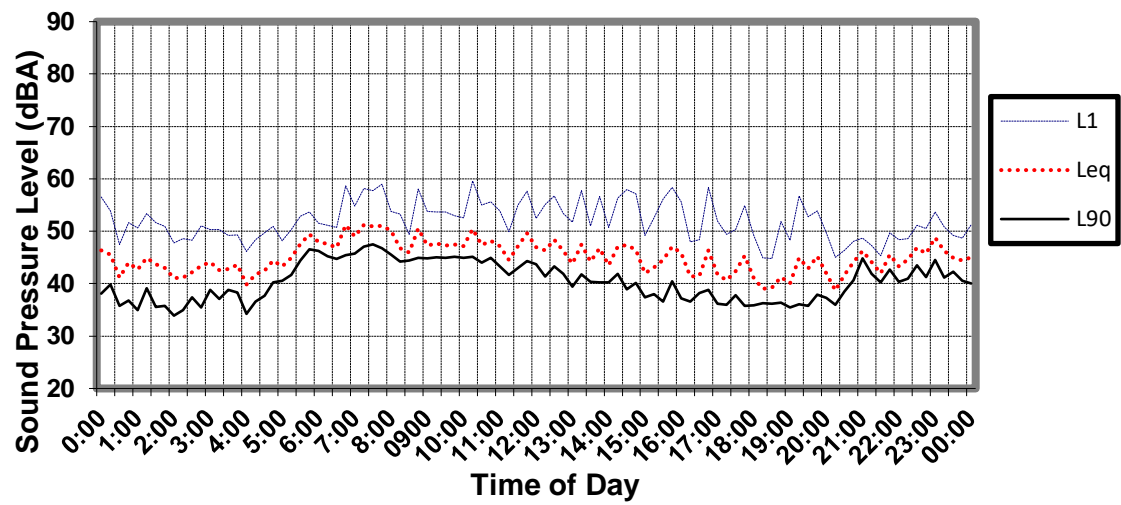
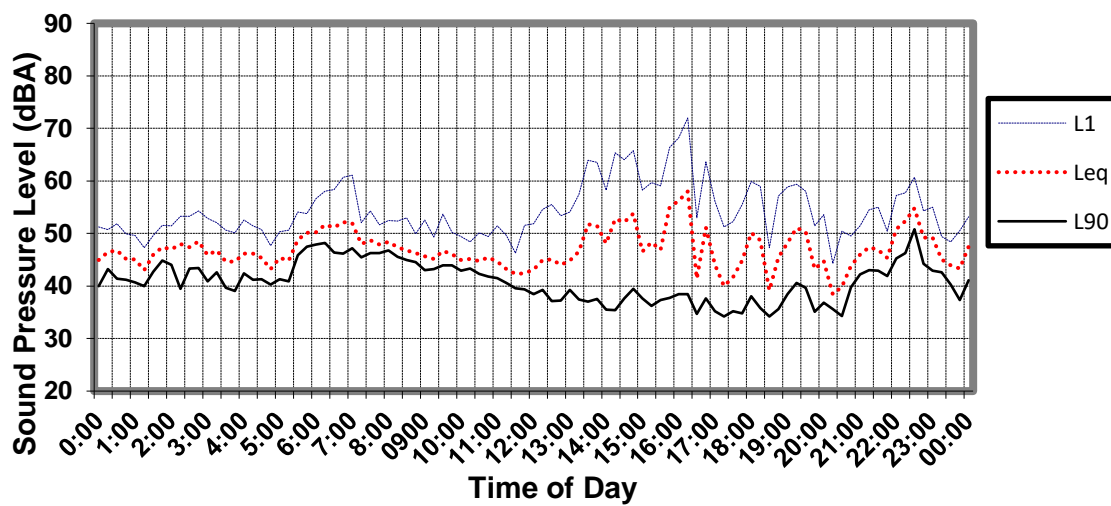
Saturday February 6th 2021**Sunday February 7th 2021**

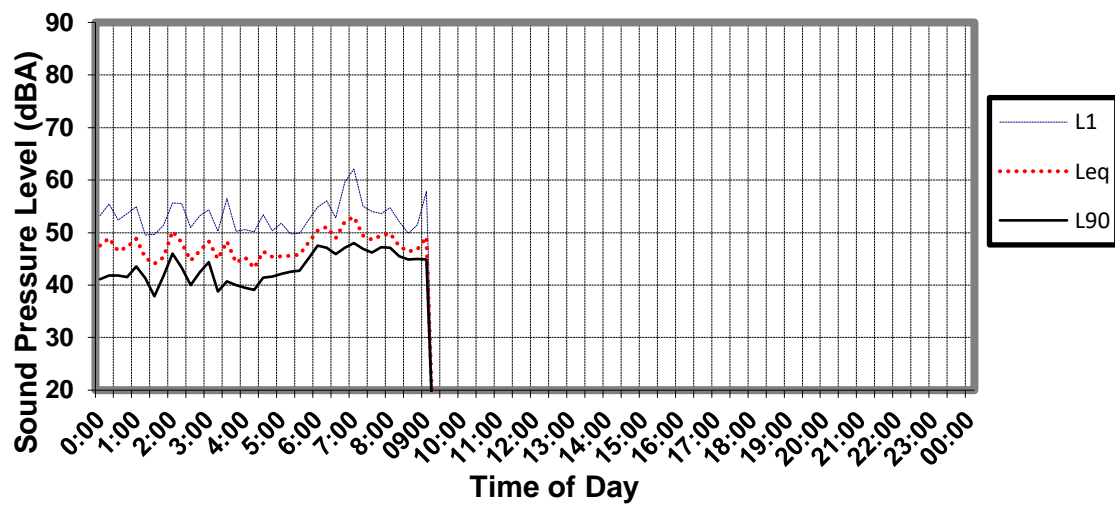
Monday February 8th 2021**Tuesday February 9th 2021**

Location R3

Saturday February 27th 2021Sunday February 28th 2021

Monday March 1st 2021**Tuesday March 2nd 2021**

Wednesday March 3rd 2021**Thursday March 4th 2021**

Friday March 5th 2021

Modifying Factor Corrections (EPA 2017)	Appendix C
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Table C1 Modifying Factor Corrections (from Table C.1 of the NSW Noise Policy for Industry 2017)

Factor	Assessment/ Measurement	When to Apply	Correction	Comments
Tonal Noise	One-third octave band analysis using the objective method for assessing the audibility of tones in noise – simplified method (<i>ISO1996-2:2007 – Annex D</i>).	Level of one-third octave band exceeds the level of the adjacent bands on both sides by: <ul style="list-style-type: none"> • 5 dB or more if the centre frequency of the band containing the tone is in the range 500–10,000 Hz • 8 dB or more if the centre frequency of the band containing the tone is in the range 160–400 Hz • 15 dB or more if the centre frequency of the band containing the tone is in the range 25–125 Hz. 	5 dB	Third octave measurements should be undertaken using unweighted or Z-weighted measurements. Note: Narrow-band analysis using the reference method in <i>ISO1996-2:2007, Annex C</i> may be required by the consent/regulatory authority where it appears that a tone is not being adequately identified, e.g. where it appears that the tonal energy is at or close to the third octave band limits of contiguous bands.
Low Frequency Noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements in the range 10–160 Hz	Measure/assess source contribution C- and A-weighted Leq,T levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and: <ul style="list-style-type: none"> • where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period • where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2-dB(A) positive adjustment applies for the daytime period. 	2 or 5 dB	A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for DEFRA fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.

Table C1 Modifying Factor Corrections (from Table C.1 of the NSW Noise Policy for Industry 2017) *Cont...*

Factor	Assessment/ Measurement	When to Apply	Correction	Comments
Intermittent Noise	Subjectively Assessed but should be assisted with measurement to gauge the extent of change in noise level.	The source noise heard at the receiver varies by more than 5 dB(A) and the intermittent nature of the noise is clearly audible.	5 dB	Adjustment to be applied for night-time only .
Duration	Single-event noise duration may range from 1.5 m to 2.5 h	One event in any 24-hour period	0 to -20dBA	The acceptable noise trigger level may be increased by an adjustment depending on duration of noise (see Table C.3)
Maximum adjustment	Refer to individual modifying factors	Where two or more modifying factors are indicated	Maximum correction of 10 dBA ² (excluding duration correction)	

Notes:

1. Corrections to be added to the measured or predicted levels, except in the case of duration where the adjustment is to be made to the criterion.
2. Where a source emits tonal and low-frequency noise, only one 5-dB correction should be applied if the tone is in the low-frequency range, that is, at or below 160 Hz.
3. Where narrow-band analysis using the reference method is required, as outlined in column 5, the correction will be determined by the ISO1996-2:2007 standard.