ADP
Consulting : Engineering

University of New England Tamworth

Environmental Noise Impact Assessment

Prepared for: Architectus Brisbane Pty Ltd

Project No: SYD2353
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Creating great environments with great people

Project:	University of New England Tamworth
Location:	Prince of Wales Park Tamworth NSW 2340
Prepared by:	ADP Consulting Pty Ltd Level 6, 33 Erskine Street Sydney NSW 2000
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Project Team	
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Architect	Architectus Brisbane Pty Ltd
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1. Introduction

1.1 Document purpose

ADP Consulting Pty Ltd has been retained on behalf of Architectus Brisbane Pty Ltd to undertake an environmental noise impact assessment for the proposed educational facility development to be located at the current Prince of Wales Park site in the corner of Peel and Roderick Streets in Tamworth NSW.

The following will be addressed:

- External noise criteria and recommendations for the proposed development to ensure that a satisfactory level of amenity is achieved for future tenants of the proposed development.
- Noise emission criteria, identification of potential noise generating sources associated with the subject development and recommendations to ensure that the nearby developments are not adversely affected from the operation of the subject development.

The design criteria and acoustic treatment concepts in this report demonstrate the pathways by which these shall be addressed by ADP Consulting and the project team through further analysis, recommendations, and coordination as the design progresses.

It is the responsibility of the relevant contractor to ensure the implementation of the acoustic intent of this document, including compliance with criteria, codes, standards, specification etc.

1.2 Referenced drawings, codes, and standards

The following drawings, conditions guidelines, standards, regulatory requirements, and other project-specific information has been referenced in preparing this report:

- Draft concept architectural drawings, dated 29/05/2023 and provided by Architectus.
- Tamworth Regional Council Development Control Plans 2010.
- AS/NZS 2107:2016 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors (AS/NZS 2107).
- Association of Australasian Acoustical Consultants, Guideline for Educational Facilities, Version 2.0, dated January 2018.
- NSW EPA's Noise Policy for Industry, dated October 2017 (NPfI).
- State Environmental Planning Policy (Transport & Infrastructure), 2021 (SEPP).
- Department of planning's Development near Rail Corridors and Busy Roads – Interim Guideline, dated 2008 (DoP Interim Guideline).

1.3 Project summary

The proposed educational facility development will include four levels of teaching spaces, clinical simulation laboratories, offices, and communal areas. The proposed development will only operate during day and evening-time periods.

1.4 Acoustic Environment

ADP Consulting has not been engaged to conduct acoustic monitoring around the site to measure the current acoustic environment. For the purpose of this assessment, noise emission criteria were developed based on the noise amenity levels of the Noise Policy for Industry document (NPfI).

1.5 Site Analysis

The development site is in the corner of Peel and Roderick Streets. A site investigation has been carried out by this office to identify noise sources that will potentially impact the project development, and nearest noise sensitive receivers, to assess noise emissions from the proposed development.

The subject site is bounded by the following noise sources:

- Directly to the north-west by Roderick Street, which is a road that carries medium volumes of traffic floor.
- Directly to the north-east by Peel Street, which carries medium volumes of traffic flow.
- To the south by New England Highway, which carries medium to high volumes of traffic flow.

The following have been identified as the nearest most affected noise sensitive receivers:

- Receiver 1 (R1) – Commercial receivers to the north-west of the subject site.
- Receiver 2 (R2) – Commercial receivers to the north.
- Receiver 3 (R3) – Commercial receivers to the north-west.
- Receiver 4 (R4) – Commercial receivers to the south, opposite New England Highway.
- Receiver 5 (R5) – Mixed use receivers to the east, opposite Murray Street.
- Receiver 6 (R6) – Low density residential dwellings approximately 250m to the north-east of the subject development.

The figure below provides an aerial photo of the project site and nearest noise sensitive receivers.

Figure 1 Aerial photo of project site and nearest noise sensitive receivers (resourced from SIX Maps)

Subject site
Proposed student facility approximate location
Proposed outdoor carpark approximate location
Nearest commercial noise sensitive receivers
Nearest residential noise sensitive receiver

2. External Noise Emission Criteria

Noise emissions from the operation of the proposed development to all nearest noise sensitive receivers should be assessed to ensure compliance with noise emission criteria presented in this section. Noise emission restrictions apply to future tenant activity and mechanical plant and equipment systems. These must be planned, designed and installed to include suitable sound attenuation, vibration isolation, and other necessary acoustic treatments.

2.1 Tamworth Regional Council Development Control Plan (DCP) 2010

Tamworth Regional Council DCP does not include any specific requirements for noise emissions from educational development.

2.2 NSW Noise Policy for Industry (NPfI)

Noise Policy for industry requires that trigger levels be calculated from the intrusiveness and amenity criteria. The NPfI also includes the application of modifying factors for undesirable noise characteristics, up to a maximum of 10dB.

2.2.1 Noise intrusiveness

The NPfI states that the intrusiveness of an industrial noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted 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 measured in the absence of the source by more than 5dB.

Noise logging has not been conducted around the site; therefore, this assessment will be based on the noise amenity levels presented in the following section.

2.2.2 Noise amenity

Based on Section 2.4 of the Noise Policy for Industry, in order to limit the increases in noise levels from the introduction of new noise sources in an area, all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable.

Table 2.2 of the NPfI has four categories to distinguish different residential areas, which are rural, suburban or urban. Based on the description of the NPfI (Table 2.3 of the NPfI), nearest noise sensitive receivers are assumed to be suburban.

Table 1 and Table 2 summarise the project amenity noise levels (as described in Table 2.2 of the NPfI). The project specific trigger levels have been derived using the methodology presented in Table E.3.C of the NPfI and are scheduled in the following tables.

2.2.2.1 Residential noise sensitive receivers

Table 1 Noise emission criteria – residential receivers

Period	Recommended amenity levels NPfI, $L_{Aeq, period}$	Project trigger levels, $L_{Aeq, 15min}$
Day (7am to 6pm)	55	**53**
Evening (6pm to 10pm)	45	**43**
Night (10pm to 7am)	40	**38**

2.2.2.2 Commercial noise sensitive receivers

Table 2 Noise emission criteria – commercial receivers

Time of operation	Recommended amenity level by NPfI, $L_{Aeq, Period}$	Project noise trigger levels, $L_{Aeq, 15min}$
When in use	65	**63**

3. Internal Noise Criteria

3.1 Tamworth Regional Council Development Control Plan (DCP) 2010

Tamworth Regional Council DCP does not include any specific requirements for noise intrusions to educational development.

3.2 NSW Department of Planning Development Near Rail Corridors and Busy Roads – Interim Guideline

Section 3.6 of the Interim Guideline provides noise and vibration criteria for residential and non-residential buildings; however, it does not include criteria for commercial development.

3.3 NSW Development Near Rail Corridors and Busy Roads – Interim Guideline

3.3.1 Airborne Noise

Table 3.1 of the NSW Department of Planning's Development Near Rail Corridors and Busy Roads Interim Guideline specifies internal noise criteria for different areas of occupancy. Recommended maximum noise levels for educational institutions are summarised below.

Table 3 Noise criteria Table 3.1 of Interim Guideline

Non-residential Buildings Type of Occupancy	**Recommended Maximum Noise Level, dBA**
Educational Institutions	40

3.4 Australian/ New Zealand Standard AS/NZS 2107:2016

AS/NZS 2107:2016 provides design sound levels for different areas of occupancy. The table below summarises recommended indoor noise levels and design reverberation times for the proposed educational development.

The design sound level limits apply to continuous sources of noise internal to the proposed development such as plant and equipment. Furthermore, the façade should be designed so that the noise levels presented in the table below are complied with.

Table 4 Internal design sound pressure level recommendations by AS/NZS 2107

Type of occupancy/ activity	Design Sound level ($L_{Aeq,t}$) range	Design reverberation time (T) range, s
Educational Buildings		
Office areas	40 to 45	0.4 to 0.7
Laboratories (Teaching)	35 to 45	0.5 to 0.8
Laboratories (Working)	40 to 50	0.4 to 0.6
Corridors and Lobbies	<50	<0.8
Toilets	<55	-

4. Noise Emission Assessment

An assessment of operational noise is presented below. The following noise sources are assessed:

- Mechanical noise from plant equipment such as condenser units, plant rooms and exhaust fans.
- Vehicular noise on site (use of the outdoor carpark).

4.1 Mechanical plant noise emission assessment

Noise emissions from condenser units, ventilation fans, and other plant equipment should comply with the noise emission criteria by EPA NSW Noise Policy for Industry (NPfI) as presented in Section 2.2.

A detailed noise emission assessment will be undertaken once mechanical plans and equipment plant selections are available.

- Typical acoustic treatments include:
  - Selection of quieter units with the capability of reduced duty and noise output.
  - Installation of acoustic barriers or acoustic louvres.

4.2 Noise emissions from the carpark

A carpark will be located on the south-eastern side of the project development site, containing 59 carpark spots. A noise assessment has been undertaken to ensure noise emissions from the carpark will not adversely affect the nearest noise sensitive receivers.

Noise emission level predictions have been predicted based on the following assumptions:

- In a peak 15-minute period there will be a total of 30 passenger vehicle movements during day or evening time periods (based on the highly conservative assumption that all 59 carpark spots will be occupied and emptied in a peak 1-hour period).
- It is assumed that the development will not operate during night-time period, therefore, the carpark will not be used during night-time period (10pm – 7am).
- Each car will spend approximately 30 seconds driving to the site and manoeuvring before parking.
- The associated noise level from the passenger vehicles when driving to the site and manoeuvring around the carpark (at 5-10km/h) are:
  - Passenger vehicle 81dB(A)

Based on the above, the following table presents the predicted noise levels at the nearest noise sensitive receivers to the proposed carpark.

Table 5 Predicted vehicle noise emission levels

Noise source	Noise Receiver	Predicted Noise Level – dB(A)$L_{eq(15min)}$	Noise criteria dB(A)$L_{eq(15min)}$	Compliance?
Passenger vehicles entering/exiting and driving around the carpark	Residential Receiver R5 (at the nearest boundary)	< 38	53 (Day) 43 (Evening)	Yes
	Commercial Receiver R3 (at the nearest boundary)	< 50	63	Yes

5. Noise Intrusion Assessment

5.1 Noise intrusion Assessment

ADP Consulting have not been engaged to conduct noise measurements around the site. Traffic noise levels along Peel Street, Roderick Street and New England Highway were assumed based on typically measured traffic noise levels for similar road arrangements.

5.2 Building envelope

The recommended building envelope acoustic treatments to address traffic and other external noise impacts based on achieving the internal noise criteria presented in Table 3 and Table 4, are presented below.

5.2.1 Glazing

Indicative minimum glazing requirements are presented in Table 6 below.

Table 6 Minimum glazing performance requirements

Facade	Element	Recommended minimum glazing thickness	Required STC rating of glazing with seals
All	Windows, glazed doors, skylights	10.38mm laminated	35

We understand that these glazing recommendations will be refined at a later stage and the following considerations will need to be accounted for. These include:

- Selection of glazing supplier (framing systems and ultimately acoustic performance of the glazing system as a whole).
- If required, reassess noise intrusion based on glazing sizes and any changes made.
- Structural and thermal requirements.
- If an analysis of the acoustic environment (noise measurements) is requested.

Window systems should be acoustically tested in a certified laboratory with results indicating compliance with the required rating. In addition to this, all windows and external doors are required to be fitted with polyurethane foam seals (Q-Lon or similar). Mohair seals are not acceptable.

5.2.2 External walls

External walls are proposed to be constructed of light-weight materials. There is no information regarding the proposed construction material at this stage. For the purpose of this assessment, we assumed that the external walls will be constructed of fibre cement sheeting. The following minimum external wall construction is recommended for all areas.

Table 7 Minimum light-weight construction recommendation

External Sheet	Stud/ Cavity	Internal lining
1 x 9mm fibre cement	Minimum 90mm stud with 75mm 11kg/m^3 insulation in the cavity	2 x 13mm plasterboard

If penetrations are required to the external skin of the external walls, this should be sealed with an acoustic grade sealant.

We understand that these external wall recommendations will be refined at a later stage.

5.3 Roof/ ceiling construction

The roof is proposed to be constructed of light-weight materials. There is no information regarding the proposed roof construction material. For the purpose of this assessment, we assumed that the roof will be constructed of metal sheeting. The following minimum roof/ceiling construction is recommended for all areas.

Table 8 Minimum light-weight roof/ceiling construction recommendation

External Sheet	Stud/ Cavity	Internal lining
1 x 5mm metal sheet + 1 x 6mm fibre cement sheeting	Large airgap with 75mm 11kg/m^3 glasswool insulation in the cavity	2 x 10mm plasterboard

We understand that the roof/ceiling recommendations will be refined at a later stage.

6. Conclusion

ADP Consulting has completed an acoustic assessment for the proposed commercial redevelopment at the current Prince of Wales Park site in the corner of Peel and Roderick Streets in Tamworth NSW.

Noise impacts from traffic noise onto the future occupants of the proposed development have been assessed in accordance with the criteria presented in Section 3. A noise intrusion assessment and minimum treatment recommendations was presented in Section 5.

Noise emission criteria for the proposed development have been determined based on the requirements of NSW EPA Noise Policy for Industry. Noise predictions at nearest residential and commercial receivers from the use of the proposed carpark were found to be compliant with noise emission criteria. A detailed mechanical noise assessment will be conducted at later stage, once mechanical drawings and plant selections are available.

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Appendix A
Glossary of Acoustic Terms

Air-borne sound

The sound emitted directly from a source into the surrounding air, such as speech, television or music.

Ambient sound

Of an environment: the all-encompassing sound associated with that environment, being a composite of sounds from many sources, near and far. This is normally taken to be the L_{Aeq} value.

Background noise level

The average of the lowest levels of the noise levels measured in an affected area in the absence of noise from occupants and from unwanted external ambient noise sources. Usually the L_{A90} value represents the background noise level.

dB(A)

Unit of acoustic measurement weighted to approximate the sensitivity of human hearing to sound frequency.

Decibel scale

The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. Therefore, a 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. It is generally accepted that a 10 dB increase in the sound pressure level corresponds to a perceived doubling in loudness.

Examples of decibel levels of common sounds are as follows:

- 0 dB(A) Threshold of human hearing
- 30 dB(A) A quiet country park
- 40 dB(A) Whisper in a library
- 50 dB(A) Open office space
- 70 dB(A) Inside a car on a freeway
- 80 dB(A) Outboard motor
- 90 dB(A) Heavy truck pass-by
- 100 dB(A) Jackhammer / Subway train
- 110 dB(A) Rock Concert
- 115 dB(A) Limit of sound permitted in industry
- 120 dB(A) 747 take off at 250 metres

Frequency

The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high-pitched sound and a low frequency to a low-pitched sound.

L_{90}, L_{10}, etc

A statistical measurement giving the sound pressure level which is exceeded for the given percentile of a measurement period (i.e. L_{90} is the level which is exceeded for 90 percent of a measurement period). L_{90} is commonly referred to as a basis for measuring the background sound level.

$L_{Aeq,T}$

The equivalent continuous A-weighted sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound.

L_{Amax}

The maximum sound pressure level measured over the measurement period.

L_{Amin}

The minimum sound pressure level measured over the measurement period.

Day

Referred to as the period between 7am and 6pm for Monday to Saturday and 8am to 6pm for Sundays and Public Holidays.

Evening

Referred to as the period between 6pm and 10pm for Monday to Sunday and Public Holidays.

Night

Referred to as the period between 10pm and 7am for Monday to Saturday and 10pm to 8am for Sundays and Public Holidays.

Assessment background level (ABL)

The overall background noise level on each day, evening and night periods for each day of the noise monitoring.

Rating background level (RBL)

The overall background level on each day, evening and night periods for the entire length of noise monitoring.

Reverberation

The persistence, after emission by the source has stopped, of a sound field in an enclosure.

Sound isolation

A reference to the degree of acoustical separation between two spaces. Sound isolation may refer to sound transmission loss of a partition or to noise reduction from any unwanted noise source. The term 'sound isolation' does not specify any grade or performance quality and requires the units to be specified for any contractual condition.

Sound pressure level, L_p, dB of a sound

A measurement obtained directly obtained using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the R.M.S. sound pressure to the reference sound pressure of 20 micro Pascals.

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