Doc. No: 232347-10148

Noise Impact Assessment – Proposed Medical Centre
Lot 1, DP 1272981 11 Cessnock Road, Gillieston Heights, NSW

Prepared for:

Doctors & Co
c/- TP Consulting

Author:

Neil Pennington
B.Sc.(Physics), B. Math.(Hons) MAIP, MAAS, MASA
Principal / Director

December 2023

CONTENTS

1.0 INTRODUCTION

This report presents the results, findings and recommendations arising from an acoustic assessment of a proposed Medical Centre at Lot 1 (DP 1272981) 11 Cessnock Road, Gillieston Heights.

The investigation/report supports a Development Application to Maitland City Council (Council) to address their typical requirements for such a development, and address item 11 of Council's Pre-Lodgement Meeting Minutes, dated 26 October 2023, as follows;

"ACOUSTIC IMPACT
11. The proposed medical centre has the potential to cause noise impact upon nearby existing residential land uses. An acoustic assessment report prepared by an appropriately qualified acoustic consultant engineer is to be submitted to assess the potential noise. The assessment is to include recommendations as to whether the proposal will comply with relevant government guidelines and standards and whether acoustic attenuation is required to help ensure the proposal will not result in unreasonable noise impacts upon surrounding land uses."

Under the proposal the development consists of the demolition of an existing residence and erection of a single-storey detached medical centre building containing the following internal rooms:

- Reception and waiting area;
- Five consulting rooms;
- Two treatment/recovery rooms;
- Two ultrasound rooms;
- Two bathrooms and one accessible bathroom;
- One staff room;
- One storage/IT room;
- One IT room;
- One procedure room;
- One X-ray room;
- One write-up room;

The proposal also contains the expansion of an existing vehicle crossing and driveway along Beckett Street, and new car park with a total of 15 car spaces, consisting of:

- 13x standard car spaces
- 1x loading / unloading space (which can also be used as 1 additional standard car space when not in use for loading / unloading)
- 1x accessible/disable space

The centre will operate from 8:30am to 5:00pm on weekdays only, initially with between 5-7 staff members (2-3 doctors, 1 nurse and 2 administration/support staff).

2.0 TERMS AND DEFINITIONS

Table 1 contains the definitions of commonly used acoustical terms and is presented as an aid to understanding this report.

TABLE 1
DEFINITION OF ACOUSTICAL TERMS

Term	Definition
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L10	Average Maximum Noise Level - the level exceeded for 10% of the monitoring period.
L90	Average Minimum Noise Level - the level exceeded for 90% of the monitoring period and recognised as the Background Noise Level. In this instance, the L90 percentile level is representative of the noise level generated by the surrounds of the residential area.

3.0 NOISE CRITERIA & BACKGROUND NOISE LEVELS

3.1 Ambient Noise Logging

Existing traffic noise levels were monitored at a nearby site along Cessnock Road from 12 to 16 October 2015, approximately 440 metres south of the project site. Ambient noise levels were measured at 15 minute statistical intervals using an ARL EL 315 environmental noise logger. Since the dominant noise source in the area is road traffic (as evidenced by the repetitive cyclical nature of the measured noise levels), the four days of valid data is considered representative of the regular traffic noise in the area.

The measurements were conducted in accordance with relevant EPA guidelines and AS 1055-1997 “Acoustics – Description and Measurement of Environmental Noise”. The noise logger used complies with the requirements of AS 1259.2-1990 “Acoustics – Sound Level Meters”, and has current NATA calibration certification.

The logger was programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period. Calibration of the logger was performed during the instrument’s

initialisation procedures, with calibration results being within the allowable ± 0.5 dB(A) range.

The site location is shown in Figure 1. The noise logger was located on the fence line of a vacant lot, approximately 440m to the south of the project site and on the eastern side of Cessnock Road. The location had full line of sight to Cessnock Road. Traffic noise dominated the measurements. Road conditions at the current site are very similar to the logger location and the noise measurements are considered a valid representation of the noise levels at the current site.

The relevant metrics as derived from the logger measurements are shown in Table 1. The data is shown graphically in Appendix A.

The logger was located approximately 10m from the edge of traffic on Cessnock Road.

It is usual for Roads and Maritime Services (RMS) and Councils to require design standards to meet projected traffic levels for the next 10 years after a development is completed. There are no published data on AADT figures for traffic on Cessnock Road. To consider a conservative scenario an increase in traffic volumes of approximately 50% over the 2015 noise levels has been used to determine potential impacts. Such a growth in traffic volumes would result in an increase in traffic noise of slightly less than 2dB(A).

In summary, the additional traffic on Cessnock Road, in 10 years time, could increase the traffic noise by 2 dB(A). To maintain the conservatism, the measured noise levels from the logger have had a 2 dB(A) increase applied and will be used to determine potential impacts. These noise levels are shown in Table 1.

TABLE 1
MEASURED and CALCULATED NOISE LEVELS dB(A)

Percentile	Leq (period)	L90 (period)	Lmax
Day (i.e. 7 am to 10 pm)	65	47	81
Night (i.e. 10 pm to 7 am)	61	30	78

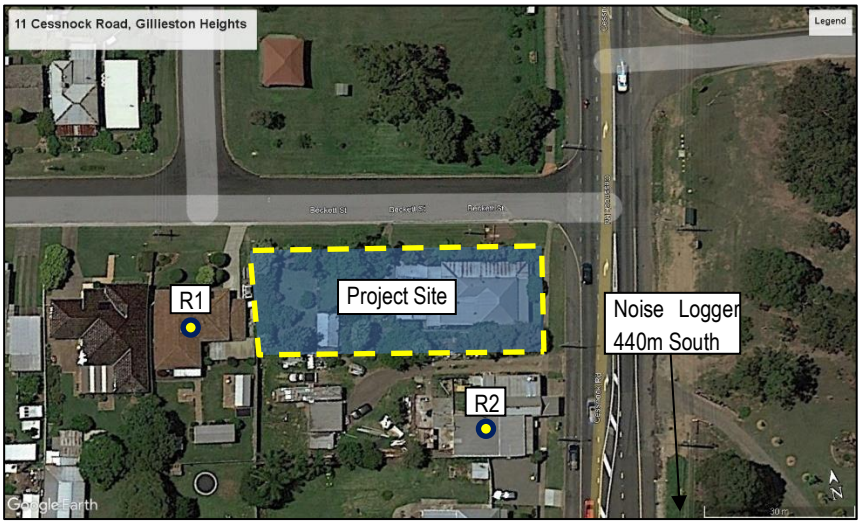


Figure 1. Project site, receivers and noise logger indicative location.

The receiver R1 in Figure 1 is the nearest existing residence to the proposed Medical Centre, and receiver R2 is the nearest commercial receiver to the proposed Medical Centre.

The proponent has indicated that the facility will only operate from Monday to Friday, during the day period. **Table 2** below shows a summary of the measured LA90 (background) and LAeq noise levels for the day, evening and night periods. The data is shown graphically in **Appendix I**.

TABLE 2
MEASURED NOISE LEVELS – 12-16 OCT 2015

		Ambient Noise Levels dB(A)	
Location	Percentile	Day	Night
Cessnock Road	$L_{eq\ (period)}$	63	59
	L_{90}	45	28

3.2 Operational Noise

In relation to determining noise goals for the operation of mechanical plant at the site the NPI sets out two separate sets of criteria designed to ensure developments meet environmental noise objectives. The first criteria account for intrusive noise and the others apply to the protection of amenity of particular land uses. A new development is assessed by applying both criteria to the situation and adopting the more stringent of the two.

Amenity criteria are dependent upon the nature of the receiver area and the existing level of industrial noise. The area is best described as “suburban” and, as current industrial noise is insignificant, the adopted criterion is equal to the recommended amenity limit for an urban area minus 5 dB plus 3 dB, as per Table E1.1 of the NPI.

Table 3 below specifies the applicable base noise objectives for the operation of mechanical plant at the Medical Centre being assessed based on the lowest recorded background noise level for the day time, being 45 dB(A), L90.

TABLE 3 BASE NOISE LEVEL OBJECTIVES		
Period	Intrusiveness trigger level* L_{eq} (15 min) dB(A)	Amenity trigger level L_{eq} (15 min) dB(A)
Residential (Day)	50	53**
Commercial Premises (When in use)	N/A	63***

* Rating Background Level (RBL) + 5dB. RBL is the median value of each ABL (Assessment Background Level) over the entire monitoring period. The ABL is a single figure representing the "L_{90} of the $L_{90's}$" for each separate day of the monitoring period.
** Suburban zone Table 2.2 of NPI.
*** Commercial Premises Table 2.2 of NPI.

The project specific noise trigger level is therefore,

Day **50 dB(A) Leq (15 min)**

The project specific noise trigger level for commercial receivers is therefore,

When in use **63 dB(A) Leq (15 min)**

3.3 Traffic Noise

Noise impacts from road traffic are assessed separately to site noise using the EPA Road Noise Policy (RNP).

The RNP, as adopted by Roads and Maritime Services (RMS) NSW, defers to the Infrastructure SEPP (2007), which now is part of the consolidated Transport & Infrastructure SEPP (2021), regarding traffic noise impacts on new developments. Provisions relevant to medical centres are included in Appendix C10 of the SEPP as follows:

> For new sensitive land use developments around existing busy roads in NSW, such as educational institutions, child care facilities, places of worship and hospitals, both suggested internal acoustic performance requirements and design principles are provided in **Section 3.6.1** of the interim guideline.
>
> The acoustic design advice in the guideline may be considered when designing such a development near any type of road.
>
> In certain circumstances, the Infrastructure SEPP imposes a requirement on councils to consider these guidelines before determining development applications for noise sensitive developments.

The DP&E "Development near rail corridors and busy roads – Interim guideline" supports the SEPP (2021) and provides internal noise criteria applicable to sensitive developments.

Table 3.1 of the Interim guideline is reproduced below.

Table 3.1: Noise criteria

Residential Buildings		
Type of occupancy	Noise Level dBA	Applicable time period
Sleeping areas (bedroom)	35	Night 10 pm to 7 am
Other habitable rooms (excl. garages, kitchens, bathrooms & hallways)	40	At any time
Non-Residential Buildings		
Type of occupancy		Recommended Max Level dBA
Educational Institutions including child care centres		40
Places of Worship		40
Hospitals	- Wards	35
	- Other noise sensitive areas	45

Note: airborne noise is calculated as L_{eq} (9h) (night) and L_{eq} (15h)(day). Groundborne noise is calculated as L_{max} (slow) for 95% of rail pass-by events.

Due to the nature of the proposal being a medical centre containing various rooms for medical consults, procedures, and recovery/treatment for patients, the internal noise criteria for 'other noise sensitive areas' for Hospitals, from Table 3.1 above, will be adopted for this assessment. Use of these rooms is not inclusive of long-term stays where sleep and residence-like comfort is required, such as for patients staying for prolonged periods in a hospital ward. The applicable internal noise criterion is therefore **45 dB(A)**.

4.0 NOISE ASSESSMENT

4.1 Mechanical Plant

Air conditioning will typically be provided by split system units. The requirement for any additional external condenser units is yet to be determined although, if required, would logically be contained within or immediately adjacent to the building footprint.

Condenser units for similar applications, typically, have sound power levels in the range 65 to 70 dB(A) when they are operating at full capacity. Air conditioner selection and location should be reviewed by the acoustical consultant at the design documentation stage to ensure compliance with the criteria established in this report.

4.2 Car Park

The proposed car park area is shown below in **Figure 2** with entry off Beckett Street. The nearest receivers to the carpark are the existing residence R1 and commercial receiver R2, approximately 15m and 30m, respectively, from the centre point of the car park (CP(average)).

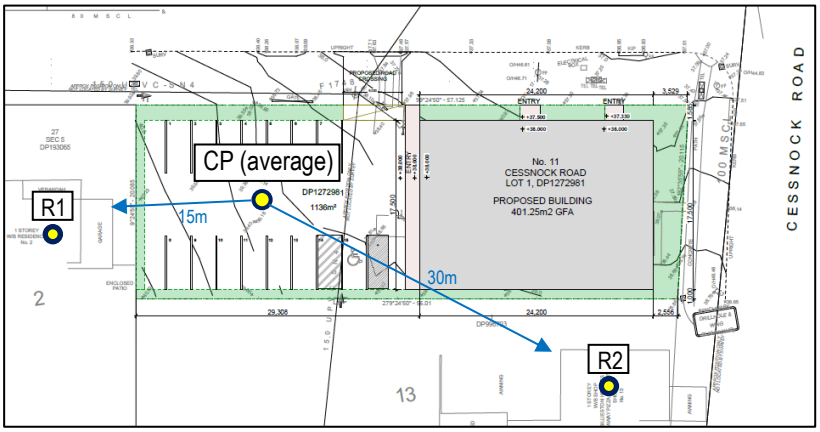


Figure 2. Proposed car park layout, noise source, and receivers.

Noise compliance measurements taken by Spectrum Acoustics at a child care centre at Wamberal with a car park of similar size recorded a level of 40 dB(A),Leq(15min) at a distance of 15m from the nearest point of the carpark during afternoon pick-up time.

Considering the equivalent distance from the noise source location from the proposed car park to receiver R1 shown in Figure 2, the predicted noise level of 40 dB(A),Leq(15min) at R1 is well below the applicable noise criterion of **50 dB(A),Leq(15min)**.

Considering the noise source (CP(average)) propagated out to 30m gives a predicted noise level of 34 dB(A),Leq(15min) at R2, which is well below the applicable noise criterion of **63 dB(A),Leq(15min)**.

4.3 Road Traffic Impacts on the Proposal

Figure 3 is a reproduction of Figure B2 from the Interim Guideline (2008) showing a typical situation of a dwelling adjacent to a busy road and calculated internal noise levels relative to external noise levels using the UK Calculation of Road Traffic Noise (CoRTN) methodology. Figure 3 shows a traffic noise level of 68 dB(A) at windows W1 and W2 directly facing the road. Windows W3 and W4 are on facades perpendicular to the road, thereby being shielded from 50% of the traffic noise by the building structure, and noise levels are 2-3 dB below the traffic noise level at W1 and W2. Window W5 is approximately twice the distance from the road as W4 and experiences an external traffic noise level 4 dB below the level at W4.

Figure 3 also gives the traffic noise loss for three constriction scenarios labelled A, B and C. The following specifications for these construction scenarios are reproduced from the Guideline. The specification for walls includes insulation in the wall cavity, however brick veneer achieves Rw >45 without insulation, which will not reduce the overall noise insulation of the room as a whole, since windows are the acoustically weakest elements. Any recommendations regarding the following construction specifications assume no insulation in facade walls.

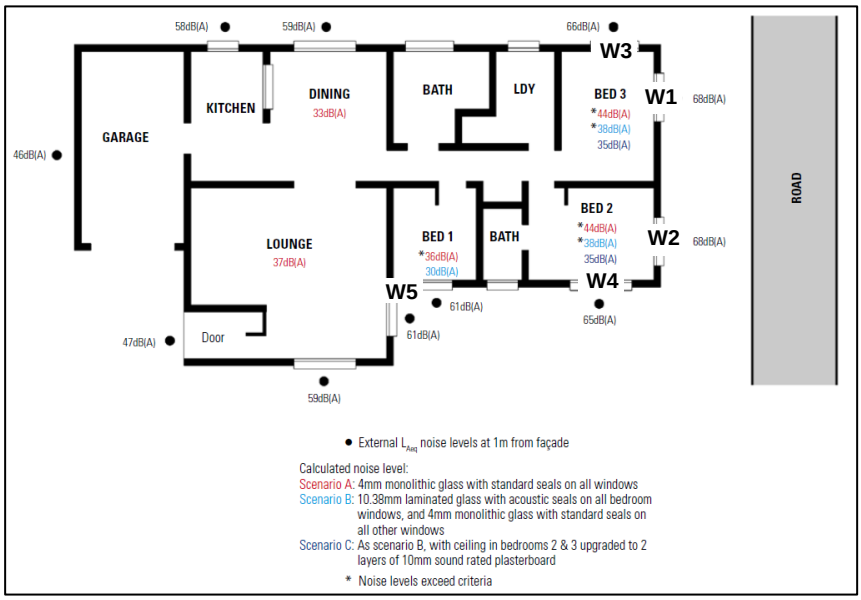


Figure 3. Traffic noise reduction for various construction types.

Figure 4 shows the internal layout of the proposed medical centre building and applied calculated noise levels from Table 1 of the report at the building façades, considering the reduction in noise levels for differently oriented windows/glazed panels as per the above.

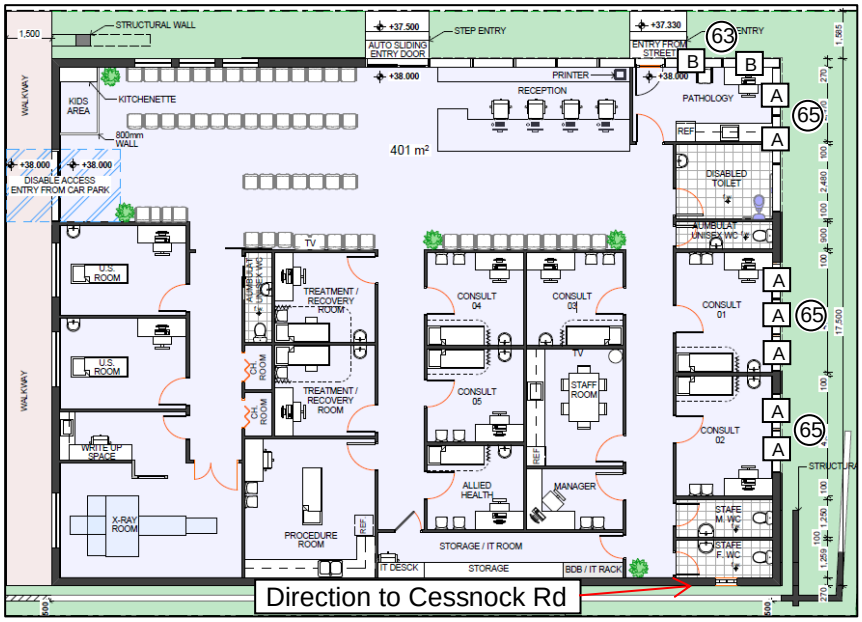


Figure 4. Proposed internal layout and applied traffic noise levels.

Table 4 summarises the traffic noise levels at facades exposed to the traffic, the noise criteria, traffic noise reduction and recommended minimum required Rw ratings for windows/glazing.

TABLE 4 Required traffic noise reduction and recommended construction scenarios				
Window/Panel	**External traffic noise dB(A)**	**Required internal dB(A)**	**Required reduction dB**	**Required Rw rating**
A – Pathology x 2	65	45	20	26
A – Consult 01 x3	65	45	20	26
A – Consult 02 x 2	65	45	20	26
B – Pathology x 2	63	45	18	24

The results in Table 3 indicate that glazing upgrades from standard 4mm glass will be required for the nominated windows/glazed panels. Rw ratings must be confirmed by the glazing supplier.

4.4 Road Traffic Impacts from the Proposal

Any traffic generated by the proposal would be low volume and originating from local homes with minimal influence on current traffic volumes in the area, therefore a full quantitative assessment of traffic noise impacts for this development is not considered necessary.

5.0 CONCLUSION

A Noise Impact Assessment has been carried out for a proposed Medical Centre at 11 Cessnock Road, Gillieston Heights.

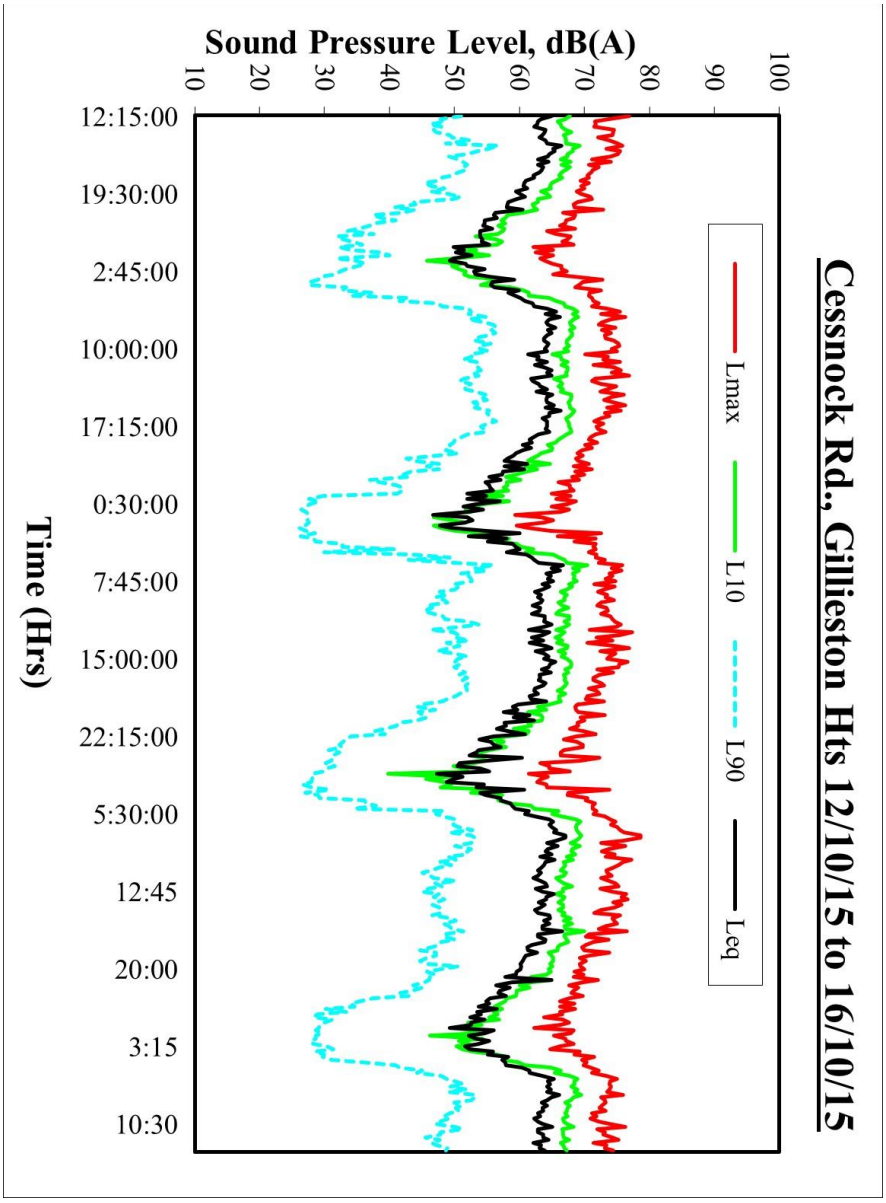
The noise impacts at the nearest sensitive receivers have been assessed, due to the operation of the medical centre and car park noise.

Any external mechanical plant (air conditioning) must be reviewed by the acoustical consult during the design stage to confirm compliance with the noise criteria established in this report.

The noise impacts on the noise sensitive rooms within the proposed building due to traffic on Cessnock Road has been assessed, with the recommended Rw ratings specified for glazing to satisfy the internal noise criteria. These Rw ratings must be confirmed by the glazing supplier.

Based on these findings, we see no acoustic reason why the proposed Medical Centre should not be approved.

APPENDIX I
NOISE LOGGER DATA CHART


Sound Pressure Level, dB(A)
10
20
30
40
50
60
70
80
90
100
Time (Hrs)
12:15:00
19:30:00
2:45:00
10:00:00
17:15:00
0:30:00
7:45:00
15:00:00
22:15:00
5:30:00
12:45
20:00
3:15
10:30
Lmax
L10
L90
Leq
Cessnock Rd., Gilliestion Hts 12/10/15 to 16/10/15