

Initial acoustic assessment and proposal to outline potential issues and remediations prior to undertaking a new tenancy



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Table of Contents

1. INTRODUCTION	3
2. LOCATION.....	3
3. GENERAL SOUND ATTENUATION BASICS	5
3.1 AIRBORNE NOISE.....	5
3.2 STRUCTURAL NOISE	5
3.3 FLANKING NOISE	5
4. PRE-TENANCY RECOMMENDATIONS	5
5. DESIGN & CONSTRUCTION CONSIDERATIONS	5
5.1. PRIVACY RATING	5
5.2. DIVIDING PARTITIONS	7
5.3. PARTITIONS AND DOORS TO CIRCULATION SPACES	7
5.4. AMBIENT NOISE LEVEL	7
5.5. OTHER DETAILS	7
5.6. PARTITION CONSTRUCTIONS	8
• PARTITIONS TO – 45 dB RW	8
• PARTITIONS UP TO – 52 dB RW	8
6. CURRENT PROGRESS ON SITE	9
7. PROPOSED TENANCY LAYOUT	9
8. RECOMMENDED ATTENUATION STRATEGIES.....	10
8.1. AIRBORNE NOISE.....	10
8.2. STRUCTURAL NOISE	11
8.3. FLANKING NOISE	11
9. CONCLUSION	11

1. Introduction

Peace & Quiet Group Pty Ltd has been engaged on behalf of Feels Pilates to prepare a noise impact assessment for a proposed new site at Cromer, NSW.

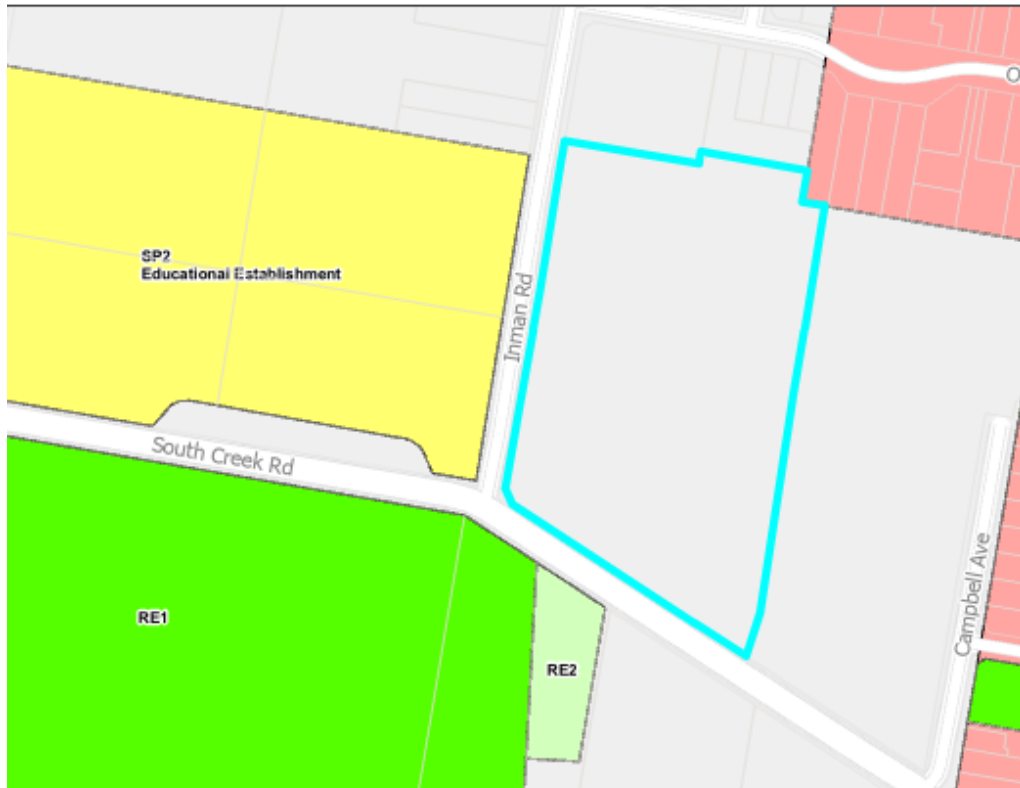
The purpose of this report is to provide an acoustic assessment for a Development Application at 2B 4--10 Inman Road, Cromer, NSW. This report outlines the location, general sound attenuation principles, and provides pre-tenancy recommendations for the Design and Construct phase, with a specific focus on privacy ratings, ambient noise levels, dividing partitions, and insulation treatments in the plenum/ceiling space to achieve acceptable noise levels.

2. Location

The target site is located within a newly developed precinct depicted within the highlighted boundary below. This is for reference to proximity to the road, and surrounding commercial tenancies, with residential properties only on the far North Eastern Corner.



The land is zoned **E4 General Industrial** under the Warringah Local Environmental Plan 2011 (LEP2011) and has some Heritage listing covenants attached to the site.



The current developed site has a new aerial roofline footprint approximately shown below and has been reconfigured with greater space between tenancies



- Roofline & buildings removed or remodeled
- Proposed tenancy

3. General Sound Attenuation Basics

This section provides an overview of the fundamental concepts related to sound attenuation

3.1 Airborne Noise

Airborne noise refers to sound transmitted through the air, such as voices, music, or machinery noise. To mitigate airborne noise, appropriate insulation materials and wall constructions must be employed.

3.2 Structural Noise

Structural noise results from vibrations transmitted through building elements, such as footsteps or mechanical equipment. This type of noise is addressed via inhibiting (hindering or restraining) or isolating (shutting out or segregating). With airborne noise a resolution can be accommodated at the receiving point, whereas structural borne noise requires resolution at the source either via inhibiting the production of noise (in this case weights being dropped) or by isolating the noise with mechanisms installed at the source to stop the production of vibrations onto the slab itself.

3.3 Flanking Noise

Flanking noise occurs when sound travels through indirect pathways, like wall cavities or ceiling plenums. Understanding and addressing potential flanking paths is crucial for noise control.

4. Pre-tenancy recommendations

All tenancies whether residential or commercial spaces, are entitled to the quiet enjoyment of their space. The definition of quiet enjoyment is regulated via council LEP's and is quantified through ambient noise readings and allowable variances from these. It is recommended that all aspects of noise be addressed in the Design & Construct phase to minimize unwanted noise pollution from the tenancy.

5. Design & construction considerations

In this phase, careful planning is essential to achieve optimal acoustic conditions within the tenancy. The following should be considered.

5.1 Privacy Rating

The degree of sound insulation provided by a building element, such as a partition wall, can be defined in basic terms as the difference level, D , in decibels. This is essentially the difference between the sound level measured on either side of the partition/element under test, when one of the rooms contains a noise source. Actual sound attenuation will vary with frequency, however for practical use, a single-figure result can be determined and is normally referred to as D_w .

The specified acoustic performance of partition walls is directly related to the desired level of privacy and/or noise tolerance

from occupants in the receiving room.

Three factors impact speech privacy:

- The sound level of voices in the source room (i.e. normal, raised, or loud voice)
- The sound insulation performance of the dividing partition wall (i.e. dB D_w) and via any flanking paths (e.g. plenum above partitions)
- The ambient noise level (from services etc.) within the receiving room (i.e. dB L_{Aeq}).

A speech Privacy Rating (PR) can be determined using the following relationship:

- $PR = (\text{partition sound insulation performance}) + (\text{ambient noise level} - 5)$
- $PR = D_w + (L_{Aeq} - 5)$.

Based upon a low ambient noise level of 30 dB L_{Aeq} , the table over the page details the achieved Privacy Rating and subjective privacy likely to be achieved, depending upon the sound insulation rating of the separating partition

Partition sound reduction dB D_w	Privacy Rating	Privacy description	Subjective impression
< 40	PR < 70	Poor privacy	Normal voice level speech can be clearly understood in the adjacent space.
40 – 45	PR 70 – 75	Normal voice = Normal privacy	Normal voice level speech can be heard, and some may be understood. Raised voice level speech can be clearly understood.
45 – 50	PR 75 – 80	Normal voice = Confidential privacy	Normal voice level speech is audible as muffled sound but is unlikely to be understood. Raised voice level speech can be heard, and some may be understood
Partition sound reduction dB D_w	Privacy Rating	Privacy description	Subjective impression
50 – 55	PR 80 – 85	Raised voice = Confidential privacy	Normal voice levels cannot be heard. Raised voice level speech is audible as muffled sound but is unlikely to be understood.
> 55	PR > 85	Loud voice = Confidential privacy	Loud voice level speech is audible as muffled sound but is unlikely to be understood.

5.2. Dividing partitions

When testing a particular partition system to determine its effectiveness, manufacturers typically construct their partition system in a laboratory, where conditions are routinely controlled. The resultant sound insulation effectiveness of a partition system tested in a laboratory is typically quoted in terms of an R_w value.

Thus, when specifying a partition's acoustic performance, it is important to understand that there will be a reduction from the quoted R_w (laboratory) value to the actual D_w attenuation that is measured on site.

This is because site test conditions will include other elements such as connections to other walls, soffits and floors, which will transmit sound between two rooms (known as flanking sound).

It is considered good practice to allow for a 5 dB reduction from the R_w performance, compared to the D_w value that would be required on site.

5.3. Partitions and doors to circulation spaces

Sound insulation performance will be reduced when partitions contain a door or windows. Manufacturers once again test systems to develop a range of R_w rating to accommodate different privacy ratings.

All acoustic doorsets should be of proprietary type, by a specialist manufacturer. The acoustic rating of the doorset should include the door, frame, seals, hinges, any furniture, and any required glazing or vision panels.

Alternatively, standard solid-core doorsets could be utilised, provided appropriate perimeter and drop-down seals are used to achieve the required R_w privacy ratings.

Care should be taken to ensure that the force required to open doors is not excessive and meets applicable DA requirements. To minimise opening forces, doors should be fitted correctly, and good quality hinges and latches used. Door closers should be selected with care. Acoustic and/or fire seals on doors should be regularly inspected and replaced when worn.

Where practicable, adjacent doorsets should be located as far apart as possible to minimise noise flanking around the partition dividing spaces.

5.4. Ambient noise level

Internal ambient noise levels will be driven by mechanical services noise (primarily from ventilation systems). It is common to specify limits for services plant noise within rooms in terms of Noise Rating (NR) curves. The family of curves specify maximum sound pressure levels across a range of frequencies. Generally, the ambient noise level measured in L_{Aeq} (see Privacy Rating, above) will be approximately 5 dB higher than the associated NR value. Australian Standard AS2107 provides guidance on acceptable design sound levels.

5.5. Other details

Wherever possible, services should not pass through/over partitions dividing adjacent noise-sensitive spaces but be routed via

an adjoining corridor.

Where there is no other option but to pass services through/over sound-resisting partitions, care must be taken to see that the acoustic integrity of the partition is not compromised. Attenuators will be required to any common ductwork between noise-sensitive rooms. (Pipework and ducting above noise sensitive areas may require pipe lagging to prevent noise breakout)

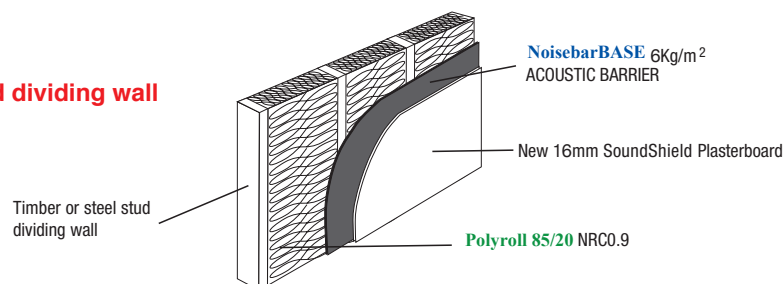
5.6. Partition constructions

Partition walls with low privacy ratings can generally be constructed within normal office fitout construction framework, however as greater privacy ratings are required there is a greater need to upweight the system configurations. The following partitions could be used to provide increased acoustic performance for internal partition walls.

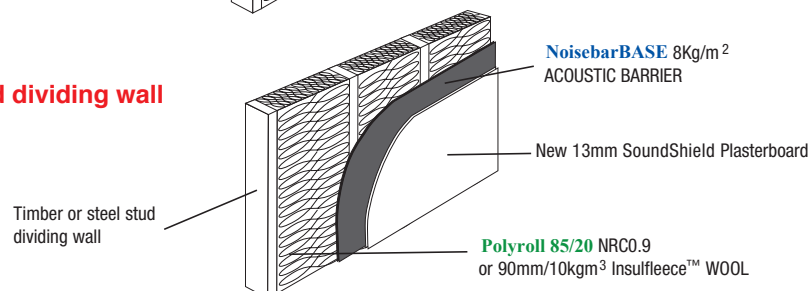
- Partitions to – 45 dB R_w

Understanding that the acoustic performance of partitions that contain doors will be limited by the door. The following constructions, or equivalent, could be used to provide up to 45 dB R_w partitions

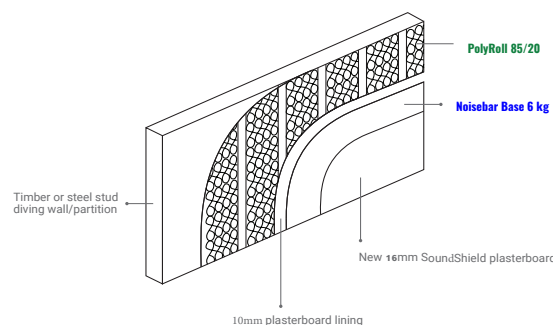
To insulate a stud dividing wall to exceed R_w45



To insulate a stud dividing wall to exceed R_w45



- Partitions up to – 52 dB R_w



8. Recommended attenuation strategies

8.1. Airborne Noise

The key potential noise generated by a Pilates studio will be airborne noise due to music being played, and the sound of instructor's voices being elevated, in order for clients to hear instructions being made.

Mitigation

1. Landlord to supply an inter-tenancy ACOUSTIC wall between the subject tenancy and the only adjacent tenancy.
2. Recommendations for wall partition construction outlined above are at the tenant's discretion to determine their internal requirement for privacy rating within their own space. None of the other internal walls to be constructed affect external tenants and hence the tenant can utilize standard partitioning systems if required. The only recommendation being, that whilst not absolutely necessary to comply, acoustic insulation should be utilized in the partition walls for their own acoustic comfort.
3. Tenant to construct a suspended acoustic ceiling in the studio area (the noise generating area) with sound absorbing insulation with an acoustic rating NRC 1.0.

This will have a double benefit, in that it will help absorb noise generated and lessen the need for it to escape, plus it will create greater speech intelligibility with the room lessening the requirement to turn up volumes of both music & voices, to be heard sufficiently.

This has been utilized to great effect in another of their studios to overcome council regulations for a building directly adjacent to a residential unit block



4. Given the Southern border of the studio is mostly glass, and part of a heritage listing, there are no real attenuation measures that the tenant can undertake to stop noise escaping through the windows. However, this façade faces straight onto a concrete wall and thus there is limited impact for any noise that does escape.

8.2. Structural Noise

The tenancy will not generate any structural borne noise other than via the building elements/services themselves which the tenant has no control over. The insulated ceiling however help to will mitigate a fair amount of the noise generating by the air-conditioning ducts and other services within the plenum

8.3. Flanking Noise

Any potential flanking noise to the adjacent tenancy will be addressed via the acoustic ceiling the tenant is installing, plus the acoustic wall the landlord is installing. It is however imperative that the acoustic wall is constructed all the way to the roof and all extremities as once again the said tenant cannot be held liable for any failure in this wall construction.

9. Conclusion

This report serves as a document that addresses the acoustic aspects of the development application and offers recommendations to mitigate noise-related issues effectively. Please feel free to reach out if you require any further information or clarification.

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