

## **MOTION TO APPROVE BY-LAW FOR FLOOR COVERINGS AND CHANGES TO FLOOR COVERINGS**

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The owners corporation SPECIALLY RESOLVES pursuant to sections 110 and 141 of the *Strata Schemes Management Act 2015* THAT an additional by-law be made, Special By-Law – Changes to Floor Coverings – on the terms set out below or which are attached to the notice of this meeting, and that notification of the by-law be lodged for registration with NSW Land Registry Services.

*Explanatory Note: This is a motion to make a new by-law that will regulate the installation of hard floor coverings in lots and require any new hard floor coverings to achieve at least a 3-star acoustic rating. It also includes a mechanism to address noise complaints involving existing lots with hard floors.*

## **MOTION FOR OWNERS CORPORATION TO DETERMINE NOT TO REPAIR CHANGES TO FLOOR COVERINGS**

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The owners corporation SPECIALLY RESOLVES pursuant to section 106(3) of the *Strata Schemes Management Act 2015* THAT:

- (a) it is inappropriate for the owners corporation to maintain, renew, replace or repair any new floor coverings installed in accordance with Special By-Law – Floor Coverings and Changes to Floor Coverings; and
- (b) in the light of the obligations imposed on owners in that by-law to maintain, renew, replace or repair any new floor coverings installed by them, its decision will not affect the safety of any building, structure or common area in the strata scheme or detract from the appearance of any property in the strata scheme.

*Explanatory Note: This is a motion for the owners corporation to determine not to maintain, renew, replace or repair any new floor covering installed by owners pursuant to the new by-law for floor coverings approved at this meeting.*

## **SPECIAL BY-LAW – FLOOR COVERINGS AND CHANGES TO FLOOR COVERINGS**

### **1. Introduction**

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This by-law sets out the standard for floor coverings and sets out the rules you must follow if you intend to change the floor coverings in your apartment. You must not change the floor coverings in your apartment without first obtaining the approval of the owners corporation.

### **2. Definitions & Interpretation**

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2.1 In this by-law, unless the context or subject matter otherwise indicates or requires:

- (a) **“3 star rating”** means a 3 star rating in accordance with the AAAC Guide including a weighted, standardised impact sound pressure level rating of not more than an  $L_{nT,w}$  of 55 between separate lots,
- (b) **“AAAC Guide”** means the Association of Australian Acoustical Consultants Guideline for Apartment and Townhouse Acoustic Rating dated June 2017,
- (c) **“Act”** means the *Strata Schemes Management Act 2015*,
- (d) **“apartment”** means a lot in the strata scheme,
- (e) **“building”** means the building in the strata scheme in which your apartment is located,
- (f) **“common area”** means the common property in the strata scheme,
- (g) **“flooring works”** means any work involved in:
  - (i) removing carpet or other soft floor coverings in an apartment to expose underlying wooden or other hard floors, or
  - (ii) installing or replacing wood or other hard floors in an apartment,
- (h) **“new floor coverings”** means any new floor coverings that are installed during flooring works,
- (i) **“strata scheme”** means the strata scheme to which this by-law applies, and
- (j) **“you”** means an owner of an apartment and includes your successors in title.

2.2 In this by-law, unless the context or subject matter otherwise indicates or requires:

- (a) headings have been inserted for guidance only and do not affect the interpretation of this by-law,
- (b) references to any legislation include any legislation amending, consolidating or replacing the same, and all by-laws, ordinances, proclamations, regulations, rules and other authorities made under them,
- (c) words importing the singular number include the plural and vice versa,
- (d) where any word or phrase is given a definite meaning any part of speech or other grammatical form in respect of that word or phrase has a corresponding meaning,
- (e) any expression used in this by-law and which is defined in the Act will have the same meaning as that expression has in that Act unless a contrary intention is expressed in this by-law, and
- (f) if there is any inconsistency between this by-law and any other by-law applicable to the strata scheme, then the provisions of this by-law will prevail to the extent of that inconsistency.

### **3. Floor coverings**

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- 3.1 An owner of an apartment must ensure that all floor space within the apartment is covered or otherwise treated to an extent sufficient to achieve at least a 3 star rating.
- 3.2 If, after the owners corporation receives not less than 3 complaints of noise from one or more owners or occupiers of adjoining or nearby apartments, where the complaint made is that the noise emanating from that apartment is such that the noise is likely to interfere with the peaceful enjoyment of the owner or occupier of their apartment, then the owners corporation may issue a notice to the owner requiring that the owner of that apartment address the complaints within 30 days of receipt of such notice.
- 3.3 On receipt of such notice, the owner must address the complaint either by:
- (a) confirming that all floor space within the apartment satisfies acoustic standard set out in clause 3.1 of this by-law, by providing the owners corporation a report addressed to the owners corporation from an acoustic consultant, being a member of the Association of Australian Acoustical Consultants, or being a member of such other similar association as may be agreed by the owners corporation, certifying that the in situ acoustic rating of the floor space is at least a 3 star rating; or
  - (b) carry out such work required to bring all floor space up to the acoustic standard set out in clause 3.1 of this by-law within a further period of not less than 90 days after the date of the notice issued by the owners corporation under clause 3.2 of this by-law, or such other reasonable period as may be agreed with the owners corporation.
- 3.4 Work required to be carried out under clause 3.3(b) of this by-law by the owner, will also constitute “**flooring work**” and “**new floor coverings**” as if included in the definitions to those terms, and the provisions of clause 4 to 12 (inclusive) of this by-law shall apply to all such flooring work and new floor coverings required to be carried out under clause 3.3(b) of this by-law by the owner.

### **4. Flooring Works Approval Process**

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#### **4.1 Flooring Works Require Approval**

You may carry out, or permit another person to carry out on your behalf, flooring works with the prior approval of the owners corporation.

#### **4.2 The Approval Process**

- 4.2.1 If you wish to carry out flooring works you must make an application to the owners corporation in order to seek its approval of the flooring works.
- 4.2.2 The application must be in writing and sent to the strata managing agent of the owners corporation or, if there is no strata managing agent, to the secretary of the owners corporation.
- 4.2.3 Your application must contain:
- (a) your name, address and telephone number, your apartment and lot number,
  - (b) details of the flooring works including details of any new floor coverings, underlay, and drawings, plans and specifications for the flooring works,
  - (c) a brochure or product specifications identifying the acoustic properties of any new floor coverings and underlay,
  - (d) an acoustic test report addressed to the owners corporation, completed by an acoustic consultant being a member of the Association of Australian Acoustical Consultants, or being a member of such other similar association as may be agreed by the owners corporation, that assesses the likely impact of and the acoustic rating of the new floor coverings and any underlay and compares the acoustic rating of the new floor coverings and underlay to the existing floor coverings in your apartment, by undertaking an on site noise test.

- (e) an estimate of the duration and times of the flooring works,
  - (f) details of the persons carrying out the flooring works including the name, licence number, qualifications and telephone number of those persons,
  - (g) details of arrangements to manage any resulting rubbish or debris arising from the flooring works.
- 4.2.4 The owners corporation may request further information to supplement the information contained in your application, but it must not act unreasonably when doing so.
- 4.2.5 The owners corporation may engage a consultant to assist it review your application.
- 4.2.6 The owners corporation may:
- (a) approve your application either with or without conditions, or
  - (b) withhold approval of your application (but it must not act unreasonably when doing so).
- 4.2.7 Without limiting the generality of clause 4.2.6, it will be reasonable for the owners corporation to withhold approval of your application if the new floor coverings installed during your flooring works or the floor coverings that will be exposed as a result of the flooring works will not achieve or be likely to achieve at least a 3 star rating.
- 4.2.8 You must comply with any conditions which the owners corporation issues as part of its approval and the conditions contained in this by-law.

## **5. Conditions for Flooring Works**

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### **5.1 Before the Flooring works**

- 5.1.1 Before commencing the flooring works, you must:

(a) **Prior Notice**

give the owners corporation at least 21 days' written notice. Your written notice must include the estimated start date of the flooring works and the estimated end date of the flooring works,

(b) **Contractor's Licence and Insurance Details**

give the owners corporation a copy of a certificate or other document demonstrating that the contractor who will carry out the flooring works holds a current:

- (i) licence,
- (ii) all risk insurance policy which must include public liability cover in the sum of \$10,000,000.00,
- (iii) workers compensation insurance policy (if required by law), and
- (iv) home building compensation fund insurance policy under the *Home Building Act 1989* for the flooring works (if required by law),

(c) **Bond**

if requested to by the owners corporation, pay a bond to the owners corporation in the sum of \$2,500 or such other amount determined from time to time by the owners corporation,

(d) **Costs**

pay the reasonable costs of the owners corporation incurred in connection with considering or approving your application for flooring works including any consultant's costs.

- 5.1.2 If you have not complied with any of the conditions set out in clause 5.1.1 you must not begin the flooring works and if you have already begun the flooring works you must immediately stop them.

## **5.2 During the Flooring works**

During the flooring works you must:

(a) **Standard of Workmanship**

ensure the flooring works are carried out in a competent and proper manner by appropriately qualified and licensed contractors utilising only first quality materials which are good and suitable for the purpose for which they are used,

(b) **Quality of Flooring Works**

make certain the flooring works are completed in accordance with any specifications for them and comply with the Building Code of Australia and any applicable Australian Standard (in the event of a conflict, the Building Code of Australia shall prevail),

(c) **Time for Completion of Flooring Works**

make sure the flooring works are carried out with due diligence and are completed as soon as practicable from the date of commencement,

(d) **Times for Flooring Works**

ensure that the flooring works are only carried out between the hours of 8.00am – 5.00pm on Monday – Friday and 9.00am – 3.00pm on Saturdays (not including public holidays) and are not carried out any other times,

(e) **Times for Operation of Noisy Equipment**

make sure that percussion tools and noisy equipment such as jack hammers and tile cutters are only used between 10.00am – 3.00pm and that at least 72 hours' notice is given to the occupiers of the other apartments in the building by a sign prominently displayed on the noticeboard before the use of any such tools and equipment,

(f) **Appearance of Flooring Works**

ensure the flooring works are carried out and completed in a manner which is in keeping with the rest of the building,

(g) **Noise During Flooring Works**

ensure the flooring works and your contractors do not create any excessive noise in your apartment or in a common area that is likely to interfere with the peaceful enjoyment of the occupier of another apartment or of any person lawfully using a common area,

(h) **Transportation of Construction Equipment**

ensure that all construction materials and equipment are transported in accordance with any manner reasonably directed by the owners corporation and in a manner that does not cause damage to the building,

(i) **Debris**

ensure that any debris and rubbish associated with or generated by the flooring works is removed from the building strictly in accordance with the reasonable directions of the owners corporation,

(j) **Storage of Building Materials on Common Areas**

make sure that no building materials are stored in a common area,

(k) **Protection of Building**

protect all areas of the building outside your apartment which are affected by the flooring works from damage, the entry of water or rain and from dirt, dust and debris relating to the flooring works and ensure that all common areas, especially the walls and floors leading to your apartment, are protected by covers and mats when transporting furniture, construction materials, equipment and debris through the building,

(l) **Daily Cleaning**

clean any part of the common areas affected by the flooring works on a daily basis and keep all of those common areas clean, neat and tidy during the flooring works,

(m) **Access**

give the owners corporation's nominee (which may be its consultant) access to your apartment to inspect (and, if applicable, supervise) the flooring works on reasonable notice,

(n) **Variation to Flooring Works**

not vary the flooring works without obtaining the written approval of the owners corporation or executive committee,

(o) **Costs of Flooring Works**

pay all costs associated with the flooring works including any costs incurred by the owners corporation engaging a consultant to inspect or supervise the flooring works.

### **5.3 After the Flooring Works**

After the flooring works have been completed, you must:

(a) **Notify the Owners Corporation**

promptly notify the owners corporation that the flooring works have been completed,

(b) **Access**

give the owners corporation's nominee (which may be its consultant) access to your apartment to inspect the flooring works on reasonable notice,

(c) **Restore the Common Areas**

restore all common areas damaged by the flooring works as nearly as possible to the state which they were in immediately prior to commencement of the flooring works,

(d) **Acoustic Consultant's Report**

give the owners corporation a report from an acoustic consultant, addressed to the owners corporation, certifying that the in situ acoustic rating of the new floor coverings is at least a 3 star rating.

### **5.4 Enduring Obligations**

You must:

(a) **Maintenance of Flooring Works**

properly maintain and keep in a reasonable state of good and serviceable repair the flooring works (including any new floor coverings) and, where necessary, renew or replace any part of those flooring works (including any new floor coverings),

(b) **Repair Damage**

repair any damage caused to another apartment or the common areas by the carrying out of the flooring works in a competent and proper manner,

**(c) Acoustic Rating of Floor Coverings**

ensure that any new floor coverings installed or any floor coverings exposed in an apartment during or as a result of the flooring works achieve at least a 3 star rating,

**(d) Indemnity**

indemnify and keep indemnified the owners corporation against all actions, proceedings, claims, demands, costs, damages and expenses which may be incurred by or brought or made against the owners corporation arising out of the flooring works or the altered state or use of any of the common areas or your apartment arising from the flooring works or your breach of this by-law,

**(e) Comply with the Law**

comply with all statutes, by-laws, regulations, rules and other laws for the time being in force and which are applicable to the flooring works and the requirements of the local council concerning the flooring works.

**6. Bond**

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The owners corporation shall be entitled to apply the bond paid by you under the conditions of this by-law, or any part of it, towards the costs of the owners corporation incurred:

- (a) repairing any damage caused to a common area or any other apartment during or as a result of the flooring works, or
- (b) cleaning any part of the common area as a result of the flooring works,

and the owners corporation must refund the bond, or the remaining balance of it, when you notify the owners corporation that the flooring works have been completed and the owners corporation is reasonably satisfied that you have complied with the conditions of this by-law.

**7. Breach of this By-Law**

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7.1 If you breach any condition of this by-law and fail to rectify that breach within 14 days of service of a written notice from the owners corporation requiring rectification of that breach (or such other period as is specified in the notice), then the owners corporation may:

- (a) rectify the breach,
- (b) enter on any part of the building including your apartment, by its agents, employees or contractors, in accordance with the Act for the purpose of rectifying the breach, and
- (c) recover as a debt due from you the costs of the rectification and the expenses of the owners corporation incurred in recovering those costs including legal costs on an indemnity basis.

7.2 Nothing in this clause restricts the rights of or the remedies available to the owners corporation as a consequence of a breach of this by-law.

**8. Flooring Works are a Minor Renovation**

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To avoid doubt, flooring works are a minor renovation for the purposes of section 110 of the Act.

**9. Strata Committee Approvals**

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The strata committee may approve flooring works under this by-law. To avoid doubt, the owners corporation delegates its functions under section 110 of the Act in connection with flooring works to the strata committee.

**10. Decision of Owners Corporation not to Maintain Flooring Works**

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To avoid doubt, the owners corporation determines that:

- (a) it is inappropriate for the owners corporation to maintain, renew, replace or repair any new floor coverings installed during flooring works done by you pursuant to an approval granted under this by-law; and
- (b) in the light of the obligations imposed on you in this by-law to maintain, renew, replace or repair any such new floor coverings, its decision will not affect the safety of any building, structure or common area in the strata scheme or detract from the appearance of any property in the strata scheme.

#### **11. Inconsistency**

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If this by-law is inconsistent with any other by-law, this by-law prevails to the extent of the inconsistency. For the avoidance of doubt, this by-law prevails to the extent of any inconsistency with by-law 6.2 Renovations, with respect to flooring works or other works to flooring areas the subject of this by-law.

#### **12. Wet Areas**

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The provisions of this by-law which require floor coverings, new floor coverings installed, or any floor coverings exposed, in an apartment during or as a result of flooring works to achieve at least a 3 star rating do not apply to any areas in an apartment comprising a laundry, lavatory, bathroom or kitchen.





# Blackett Acoustics

Noise & Vibration Consultants

16 February 2024

Project Number: BA231126

Email: [simon\\_chalmers@hotmail.com](mailto:simon_chalmers@hotmail.com)

Mr Simon Chalmers  
40-44 Victoria Street  
Potts Point, NSW 2011

Dear Simon

**Re: 40-44 Victoria Street, Potts Point – Acoustic Testing Results**

## 1. Introduction

Blackett Acoustics has been engaged by the Owners Corporation of Strata Plan 11452 to conduct acoustic testing in 2 units within 40-44 Victoria Street, Potts Point. The existing floor coverings of Unit [REDACTED] were tested. All existing floor coverings were installed on timber substrate.

The purpose of the engagement is to establish if the sound insulation rating of the existing floor coverings will achieve compliance with the proposed By-Law requirement of achieving the Association of Australian Acoustical Consultants (AAAC) 6 Star ratings and Part F5 (Sound Insulation) of the Building Code of Australia (BCA).

In addition, the acoustic test results are compared to expected values outlined in the proposed By-Law pertaining to floor coverings and the AAAC Star Rating Guideline.

A series of floor impact noise test were conducted on Monday, 12 February 2024 to investigate floor performance of the existing floor coverings in the following area:

- **Floor 1** – Carpet flooring installed in Unit [REDACTED] Testing was conducted in the living area of Unit [REDACTED] and living area of Unit [REDACTED] located directly below.
- **Floor 2** – 14mm engineered timber with 5mm Regupol Sonus Core 5 acoustic underlay glued down in Unit [REDACTED] Testing was conducted in the living area of Unit [REDACTED] and living area of Unit [REDACTED] located directly below.

### Blackett Acoustics

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## 2. Proposed By-Law and BCA Requirements

The proposed By-Law requirements by the Owner Corporation of Strata Plan 11452 are outlined in a letter prepared by JS Mueller & Co Lawyers (Reference DT:43468 dated 1 November 2023). For ease of reference, the relevant information contained in the Mueller & Co Lawyers letter are presented below:

### 1. My Brief

- 1.1. I am asked to draft a by-law that will require owners to ensure their existing floor coverings will be at or brought up to a particular acoustic standard.
- 1.2. I am also asked to draft a by-law that will regulate the installation of new hard floor coverings by owners in the lots throughout your strata scheme to the particular acoustic standard.
- 1.3. I have been asked to include provision in the by-law for the highest possible standard, which is at least a 6-star rating in accordance with the Association of Australian Acoustical Consultants Guideline for Apartment and Townhouse Acoustic Rating dated June 2017 (**6 star rating**). A copy of that guideline is **attached** for your strata scheme's reference.

Based on the above-outlined requirements of Clause 1.3, Blackett Acoustics interprets that the building's proposed By-Law requirement is to achieve a  $L'_{nT,w}$  rating of equal to or lesser than 40 (AAAC 6-star rating). This interpretation is consistent with the AAAC position statement concerning the transmission of impact sounds through flooring of apartment buildings dated 23 June 2017. For floor impact insulation,  $L'_{nT,w}$ , lower numbers correspond to better acoustic amenity.

## 3. Testing Methodology

The recognised method for testing and rating the floor impact performance of floors is described in:

- ISO 140-7:2006: Acoustics – Measurement of sound insulation in buildings and building elements – Part 7: Field measurements of impact sound insulation of floors, and
- ISO 717-2:2013: Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation.

One-Third octave (100Hz to 3.15kHz) noise measurements were obtained by using an NTi XL2 sound level meter, set to fast response. The sound level meter was calibrated before and after the measurements with no significant drift recorded.

A Phon-X Ntek Slim tapping machine was placed randomly at four different positions on the source room directly above to the receiver room. A standard tapping machine is a device containing five metal cylinders, each weighing 500grams and with a slightly curved head. The cylinders are alternately lifted and dropped through a height of 40mm. Each cylinder is dropped twice per second, so that the device imparts 10 taps per second onto the floor being tested.

The noise levels generated by the tapping machine were measured in the receiver room in one-third octave bands (100Hz to 3.15kHz). The amount of reverberation (or “echo”) of the

room was also measured using a series of balloon bursts as an impulse trigger, along with the room volume, so that the measured impact noise level can be standardised. The standardised noise levels in each frequency band are then compared to a reference curve ( $L_{nT,w}$ ) and the rating of the impact noise determined.

#### 4. Measurement Results and Conclusion

In order to quantify the performance of the tested floor systems in Unit [REDACTED] and Unit [REDACTED] reference will be made to the AAAC star rating system for floor coverings. The AAAC star rating system referenced is based on a published booklet entitled “*Acoustical Star Ratings for Apartments and Townhouses*”.

Table 4-1 below presents the Star Rating values at different levels of floor impact performance.

**Table 4-1 AAAC Star Rating System for Typical Performance of Floor Systems**

Floor Covering	Descriptor	Level
6 Star Rating Floor	$L'_{nT,w}$	40
5 Star Rating Floor	$L'_{nT,w}$	45
4 Star Rating Floor	$L'_{nT,w}$	50
3 Star Rating Floor	$L'_{nT,w}$	55
2 Star Rating Floor	$L'_{nT,w}$	65

The lower the  $L'_{nT,w}$  descriptor, the better the floor will perform to insulate against floor impact noise. In general, the perceptions of each of the star rating floor standards are as below:

- **2 Star Rating Floor** – Deemed to be below acceptable standard for impact sound insulation for floor covering between apartment units.
- **3 Star Rating Floor** – Deemed to be a minimum acceptable standard for impact sound insulation for floor covering between apartment units.
- **4 Star Rating Floor** – Deemed to be a good standard for impact sound insulation for floor covering between apartment units.
- **5 Star Rating Floor** – Deemed to be a very good standard for impact sound insulation for floor covering between apartment units.
- **6 Star Rating Floor** – Deemed to be an excellent standard for impact sound insulation for floor covering between apartment units.

Based on Blakett Acoustics experience with floor impact noise issues within residential apartments, our interpretation of the general By-Law requirement of “to prevent the

*transmission from the floor space of noise likely to disturb the peaceful enjoyment of the owner or occupier of another lot*", is to achieve at least a 3 Star rating floor system. However, an Owner's Corporation has the discretion to set its own By-Law in this regard.

It is noted that even a 3-Star performance for floor impact noise is relatively modest. Different Owner's Corporations in different buildings have decided for themselves what constitutes "disturb the peaceful enjoyment" based on that building's circumstances. Very expensive (luxury) buildings have opted for 5-Star or 6-Star levels of impact sound insulation for owners wishing to change carpet and underlay floor covering.

The current Building Code of Australia (BCA) structure borne noise requirement, which is of a minimum amenity (maximum impact sound level) of  $L'_{n,TW} \leq 62\text{dB}$ . This is approximately equivalent to a 2 Star rating floor system.

Table 4-2 presents the measured impact performance of proposed floor systems based on the floor/ceiling construction between the source and receiver room.

**Table 4-2 Measured Performance of Tested Floor Systems**

Description	Measured $L'_{nT,w}$ floor performance	Equivalent AAAC Star Rating	Comply with $L'_{nT,w} \leq 40$	Comply with BCA $L'_{nT,w} \leq 62$
<b>Floor 1</b> – Carpet flooring installed in Unit ■ Testing was conducted in the living area of Unit ■ and living area of Unit ■ located directly below.	29	6-star	Yes	Yes
<b>Floor 2</b> – 14mm engineered timber with 5mm Regupol Sonus Core 5 acoustic underlay glued down in Unit ■ Testing was conducted in the living area of Unit ■ and living area of Unit ■ located directly below.	64	Less than 2-star	No	No

Based on the results presented in Table 4-2, the following can be established –

- The current level of impact insulation in Unit ■ with 14mm engineered timber floor is  $L'_{nT,w}$  64. This should be  $L'_{nT,w}$  55 or lower to comply with the minimum recommended requirement to satisfy the general By-Law requirement of *“to prevent the transmission from the floor space of noise likely to disturb the peaceful enjoyment of the owner or occupier of another lot”*. The engineered timber floor also fails to meet the current BCA requirement of a minimum amenity (maximum impact sound level) of  $L'_{nT,w} \leq 62$ dB.
- The test results from Unit ■ with carpet floor covering, it has demonstrated that carpet and underlay can achieved 6-star rating within the building and is well within the current BCA requirement of a minimum amenity (maximum impact sound level) of  $L'_{nT,w} \leq 62$ dB.

In order to minimise the probability of breaching the requirements of not unreasonably disturbing another Owner or Occupier, it is recommended that the occupants with installed hard flooring systems take the following additional precautions into consideration:

- No shoes in the apartment i.e. leave shoes at the front door.
- Felt or other soft pads under the feet of all the furniture such as chairs, tables and lounges etc.
- Children (if any) are to have play mats to play on so that they do not bang their toys on the floor etc.
- Scatter rugs.
- Carpet runners in hall ways and other high traffic areas.

I trust this information is sufficient. Please contact us if you have any further queries.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Jimi Ang', with a stylized flourish at the end.

**Jimi Ang**

Principal | B.Eng (Aeronautical) | M.A.A.S

# **Association of Australasian Acoustical Consultants Guideline for Apartment and Townhouse Acoustic Rating**

**Version 1.0**



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## 1.0 INTRODUCTION

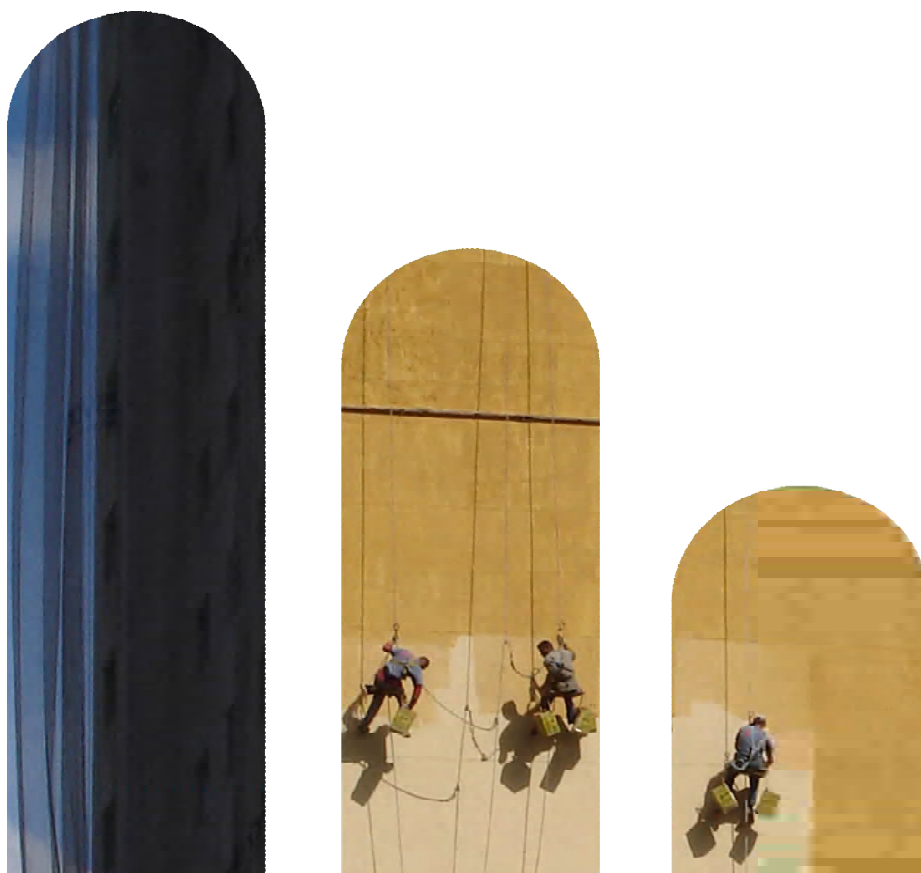
Members of the AAAC have been concerned for some time that there are no building regulations or standards that encompass all aspects of the acoustical qualities of apartments, townhouses and other multi-tenancy dwellings.

The Building Code of Australia (BCA) regulates minimum acceptable construction standards for buildings and sets minimum standards for privacy. Many in the housing industry have interpreted these as absolute requirements, applicable to all types of dwelling. For instance, Part F of the BCA sets minimum requirements for party walls and floors between apartments and for ducts or bulkheads enclosing hydraulic waste pipes, however, it does not deal with other acoustical issues such as noise intrusion from outside or noise generated by building services.

The Association of Australasian Acoustical Consultants (AAAC) Acoustical Star Rating provides you with a logical tool to determine an accepted or expected acoustical result related to multi-dwellings.

The Star Rating has been produced by members of the AAAC and fulfils a need identified by the community and is based on the current experience and technical expertise of AAAC members. The ratings are periodically reviewed and updated.

The result has been that owners of luxury apartments built to BCA standards have become dissatisfied with acoustic performances, which in their view are not commensurate with the price they have paid.



## 2.0 THE STAR RATING SYSTEM

The AAAC rating system ranks the acoustical quality of apartments and will promote better standards of acoustical quality in dwellings. While this guide has been prepared principally by and for AAAC members, it is anticipated that it will also be of use to others involved in the design, development and purchase of apartments or townhouses. Only a AAAC member firm may issue a AAAC Star Rating Certificate.

The objectives of the AAAC Star Rating system are:

- To provide guidance in the design process so that all important acoustical attributes are properly addressed;
- To encourage consistency between the apparent quality of the design of apartments and the underlying acoustical quality of the structure;
- To allow a vendor or purchaser to apply an acoustical rating to a property for sale.

The intent of the rating system is to quantify and communicate the opinions of AAAC members on the design of residential buildings. It deals with the major issues, including the intrusion of external noise, noise generated by building services and appliances and noise transfer between apartments.

The rating system will not compete with established statutory or advisory codes such as the Building Code of Australia, AS/NZS Standards or local authority building ordinances. It is intended to be complementary to all of these.

As the rating system is subject to change, it is recommended that an intending user check with an AAAC member to confirm that the most recent release of this guide is being used.

A current list of AAAC members may be found on the AAAC website [www.aaac.org.au](http://www.aaac.org.au)

An AAAC Rating Certificate can only be issued by an AAAC member firm.

The rating system considers the following aspects that influence the acoustic environment of an apartment or townhouse.



### 3.0 EXTERNAL NOISE INTRUSION

This is most commonly caused by transportation systems, such as road, rail and air traffic. In some instances, plant noise intrusion from adjoining industry, commerce or even from an adjoining residential building can also be a problem.

Intrusive noise can generally be classified as either continuous or intermittent. Continuous noise, even though it might vary from time to time, is measured using a procedure to determine its equivalence over a representative time period. In this document, the continuous measurement is expressed as ( $L_{Aeq}$ ) whereas intermittent noise is measured as the average of the maximum sound level readings expressed as ( $_{ave} L_{Amax}$ ).

### 4.0 INTERNAL BUILDING SERVICES

Internal building services include a range of plant and equipment; all of which have the potential to generate noise within an apartment. These include air-conditioning and ventilation systems, lifts, hydraulic waste and water supply systems, garbage chutes, car park roller doors etc.

These noises can be continuous as in the case of air-conditioning plant or intermittent such as flushing toilets or lift pass-by. They can intrude into an apartment by a combination of airborne and structure-borne transmission paths. It is therefore necessary to insulate these services against airborne noise and isolate them at mounting points against structure-borne noise.

There is a concern that if the background noise level is made very low then other sounds normally masked might become audible. The rating system takes this into account.

### 5.0 RESIDENTIAL ACTIVITIES

A wide range of different noises is generated by residential activities, again broadly classified into airborne and structure-borne noise.

Airborne noise sources include voices, TV sets, hi-fi equipment and home theatre systems. Because of the nature of entertainment noise sources, it is important that the sound insulation between two spaces also includes good sound insulation of the lower frequencies.

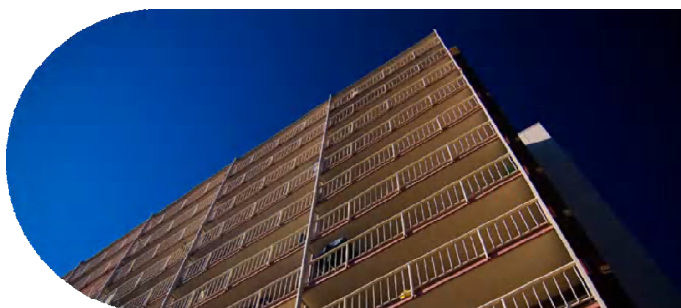
The star rating system measures the actual installed performance of the wall or floor system. The expression for effective sound insulation between two adjacent spaces is  $D_{nT,w}$ . This is the sound level difference, which is adjusted to simulate a typical furnished room. To this value is added a correction factor  $C_{tr}$  that helps to quantify the low frequency performance of the wall or floor. The  $C_{tr}$  factor is a negative value.

$D_{nT,w}$  is an international measure and is described as the weighted standardised level difference. It has been adopted by Australia and New Zealand and is used in this rating system. A high value of  $D_{nT,w} + C_{tr}$  indicates increased acoustic performance.

The 5 star rated wall or floor is close to the maximum achievable in normal building construction.

The following table gives an indication of the sound insulation performance of the various Star Ratings in respect to controlling typical noise sources within the domestic environment.

	Sound Insulation expressed as $D_{nT,w} + C_{tr}$				
	35	40	45	50	55
Type of Noise Source	2 Star	3 Star	4 Star	5 Star	6 Star
Normal Speech	Audible	Just Audible	Not Audible	Not Audible	Not Audible
Raised Speech	Clearly Audible	Audible	Just Audible	Not Audible	Not Audible
Dinner Party/Laughter	Clearly Audible	Audible	Just Audible	Not Audible	Not Audible
Shouting	Clearly Audible	Clearly Audible	Audible	Just Audible	Not Audible
Small Television/ Small Entertainment System	Clearly Audible	Clearly Audible	Audible	Just Audible	Not Audible
Large Television/ Large Hi-fi Music System	Clearly Audible	Clearly Audible	Clearly Audible	Audible	Just Audible
DVD With Surround Sound	Clearly Audible	Clearly Audible	Clearly Audible	Audible	Audible
Digital Television with Surround Sound	Clearly Audible	Clearly Audible	Clearly Audible	Audible	Audible



## 6.0 STRUCTURE-BORNE NOISE

Structure-borne noise includes footsteps on hard floors, scraping chairs and dropping objects. For this type of noise, Australia and New Zealand have adopted the measurement called the weighted standardised impact sound pressure level  $L_{nT,w}$ . A reduction in this parameter corresponds to an improvement in impact isolation. This replaces Impact Insulation Class (IIC), which is in common use in Australia. The AAAC rating system uses  $L_{nT,w}$ . There is an approximate relationship between  $L_{nT,w}$  and IIC. Either value can be subtracted from 110 to approximately indicate the other.

Other sources of structure-borne noise are wall mounted clothes driers, or operating a kitchen appliance on a bench connected to a common wall. While there exists a standardised impact test for floors, there is currently no accepted method for testing impact performance of walls. This guide recognises the need for impact isolation of walls, but refrains from nominating quantitative criteria for walls until test methods are available. Separated wall construction is the current best solution for these situations.

Household equipment installed after the rating measurements are not covered by the rating certificate. Owners/Corporations may need to be mindful of how owners and tenants can adversely affect the Star Rating of their and other apartments/townhouses if they add or modify appliances without appropriate attention to isolation details.

## 7.0 SCORING

The tables in this guide assign quantitative values for each acoustical attribute, corresponding to each star rating. The values relate to the actual performance achieved in a completed apartment. Using these tables, it is possible to score a rating for each design attribute.

With acoustical design, it is important to achieve a balance of performance across all of the design attributes. Each attribute is separately rated. For some owner/occupiers an otherwise well-designed apartment can be devalued in their perception, even if it is deficient in only one attribute. For this reason, we recommend that any potential owner/occupier ask for a copy of the rating certificate so that they can assess the apartment/townhouse in terms of their expectations.

Interpolations and half-stars are not used. Rather than describing an attribute as 3½ stars, the preferred description is "3 star with some 4 star attributes".

Designers may also choose performance beyond the limits prescribed for 6 star, however, it must be pointed out that in some aspects 6 star in itself is very hard to achieve. In this case, the preferred description for such dwellings would be "better than 6 star".

## 8.0 SCORING SYSTEM

Each acoustical attribute is separately rated (noise intrusion, services noise or sound and impact isolation). The overall rating is determined by the lowest score awarded to each attribute within that classification. The Certificate will show the rating for each attribute within the classification and the overall rating for each classification. An overall rating is assigned that is the average of all the three classifications. This can be used to indicate the overall acoustic performance of the apartment.

## 9.0 STAR RATINGS FOR VARIOUS ATTRIBUTES OF ACOUSTIC PERFORMANCE

External Noise Intrusion	2 Star	3 Star	4 Star	5 Star	6 Star
<b>(a) Bedrooms</b>					
Continuous Noises $L_{Aeq} \leq$	36 dB(A)	35 dB(A)	32 dB(A)	30 dB(A)	27 dB(A)
Intermittent Noises $_{ave} L_{Amax} \leq$	50 dB(A)	50 dB(A)	45 dB(A)	40 dB(A)	35 dB(A)
<b>(b) Other Habitable Rooms including Open Kitchens</b>					
Continuous Noises $L_{Aeq} \leq$	41 dB(A)	40 dB(A)	37 dB(A)	35 dB(A)	32 dB(A)
Intermittent Noises $_{ave} L_{Amax} \leq$	55 dB(A)	55 dB(A)	50 dB(A)	45 dB(A)	40 dB(A)

**External Noise Intrusion** is most commonly caused by transportation systems, such as road, rail and air traffic. This category also includes plant noise from adjoining industry, commerce or even from an adjoining residential building.

Measurements are made in bedrooms and any nominated habitable rooms. Bedrooms are measured over a period between 22:00hrs and 07:00hrs. Noise measurements in other habitable rooms are undertaken between 06:00hrs to 00:00hrs. In any event the measurement period must be representative of the noise being measured. Measurements must include  $L_{Aeq}$  and  $L_{Amax}$ .

Internal Building Service and Appliances	2 Star	3 Star	4 Star	5 Star	6 Star
<b>(a) Bedrooms</b>					
Continuous Noises $L_{Aeq \text{ adj}} \leq$	36 dB(A)	35 dB(A)	32 dB(A)	30 dB(A)	27 dB(A)
Intermittent Noises $_{ave} L_{Amax} \leq$	45 dB(A)	40 dB(A)	35 dB(A)	30 dB(A)	27 dB(A)
<b>(b) Other Habitable Rooms including Open Kitchens</b>					
Continuous Noises $L_{Aeq \text{ adj}} \leq$	41 dB(A)	40 dB(A)	35 dB(A)	30 dB(A)	27 dB(A)
Intermittent Noises $_{ave} L_{Amax} \leq$	55 dB(A)	45 dB(A)	40 dB(A)	35 dB(A)	32 dB(A)
<b>(c) Wet Areas including Bathrooms, Ensuites and Laundries</b>					
Continuous Noises $L_{Aeq \text{ adj}} \leq$	55 dB(A)	50 dB(A)	45 dB(A)	42 dB(A)	40 dB(A)
Intermittent Noises $_{ave} L_{Amax} \leq$	60 dB(A)	55 dB(A)	48 dB(A)	42 dB(A)	40 dB(A)

**Internal Building Services** include a range of plant and equipment; all of which have the potential to generate noise within an apartment. These include air-conditioning and ventilation systems, lifts, hydraulics wastes and water supply systems, garbage chutes, spa baths and appliances of adjacent apartments. Appliances such as spa baths and dishwashers in the same tenancy are excluded.

Measurements shall be carried out in accordance with Section 6.1 Measurement of Ambient Sound Level given in AS/NZS 2107:2000. Noise measurements are made at relevant positions but no closer than 1.5 metres from the noise source.

Many noises contain pronounced tonal or impulsive characteristics, which increase their annoyance. Such noises need to have a penalty adjustment (adj) to account for the annoying characteristics. If these characteristics are clearly audible a 5 dB(A) penalty shall be applied. If the characteristics are just audible, then a 2 dB(A) penalty shall be applied.

Intertenancy Activities	2 Star	3 Star	4 Star	5 Star	6 Star
<b>(a) Airborne Sound Insulation for Walls and Floors</b>					
Between Separate Tenancies $D_{nT,w} + C_{tr} \geq$	35	40	45	50	55
Between A Lobby/Corridor & Bedroom $D_{nT,w} + C_{tr} \geq$	30	40	40	45	50
Between A Lobby/Corridor & Living Area $D_{nT,w} + C_{tr} \geq$	25	40	40	40	45
<b>(b) Corridor, Foyer To Living Space Via Door(s) <math>D_{nT,w} \geq</math></b>	20	25	30	35	40
<b>(c) Impact Isolation of Floors</b>					
Between Tenancies $L_{nT,w} \leq$	65	55	50	45	40
Between All Other Spaces & Tenancies $L_{nT,w} \leq$	65	55	50	45	40
<b>(d) Impact Isolation of Walls</b>					
Between Tenancies	No	Yes	Yes	Yes	Yes
Between Common Areas & Tenancies	No	No	No	Yes	Yes

**Intertenancy Activities** generate a wide range of different noises, which can be broadly classified into airborne and structure-borne noise.

Airborne sound insulation is measured in accordance with Australian Standard AS 2253 and rated in accordance with AS 1276 (ISO 140-4 and ISO 717.1).

The nominated  $D_{nT,w} + C_{tr}$  values are considered as minimums and there is no site tolerance applicable.

Floor impact transmission is measured in accordance with ISO 140-7 and rated in accordance with ISO 717.2.



**For more information and other published AAAC Guidelines, go to [www.aaac.org.au](http://www.aaac.org.au)**

### Member Firms:

To contact a AAAC member, select a region from the link below:

<http://www.aaac.org.au/act>

<http://www.aaac.org.au/nsw>

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