

ACOUSTIC NOISE & VIBRATION SOLUTIONS P/L

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<u>Acoustic Report</u>

Acoustic insulation between floors & walls; & Mechanical Ventilation System

For proposed development at

No. 39-41 Chertsey Ave, Bankstown

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DOCUMENT CONTROL

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1.0 <u>Scope of Work</u>

The aim of this report is to determine the building materials to be used and the construction methods to be adopted such that the Floors & Walls of the proposed development at No. 41 Chertsey Ave, Bankstown comply with section F5 of the BCA and Council Conditions/Requirements.

The site is located on Chertsey Ave in the suburb of Bankstown (Figure 1 – Site Location). The architectural plans by Ghazi Al Ali Architects dated the 26^{th} May, 2015 are for a proposed four (4) storey residential flat building consisting of one (1) level of basement parking and forty (40) units.

2.0 Acoustical Privacy between units (Walls & Floor) Section F5 of the BCA

Sound isolation between units is mainly determined in accordance with section F5 of the BCA (Building Code of Australia). Section F5 of the BCA nominates laboratory acoustic performances of various types of walls and floor construction elements adopted by the building industry.

A Building Solution is proposed to comply with the Deemed to Satisfy Provisions if Performance Requirements FP5.1 to FP 5.6 is satisfied by complying with section F5.1 to F5.7 of the BCA.df

An alternative solution to the Deemed To Satisfy Provisions of F5.1 to F5.7 must be determined in accordance with section A0.10 of the BCA (Relative Performance Requirements).

Section F5 of the BCA acts as a protection from any noise annoyance being transmitted between adjoining sole-occupancy units or from a common spaces to sole occupancy unit.

2.1 Walls between adjacent occupancy units

Airborne sound insulation rating of walls is determined using the weighted sound reduction index R_w or weighted sound reduction index with spectrum adaptation terms $(R_w + C_{tr})$ as determined in accordance with AS/NZS 1276.1 or ISO 171.

Proposed Walls separating one sole occupancy unit from another or one sole occupancy unit from a public corridor, staircase, or a plant room will comply with the Deemed to Satisfy Provision in the section F5 of the BCA provided the following table is satisfied.



Building Component	t Attenuation
between Units- Walls	Required.
Living/Bedroom -	$R_w + C_{tr} \ge 50 \ dB$
Living/Bedroom	
Kitchen/Laundry/Toilet-	$R_w + C_{tr} \geq 50 dB$ -
Living/Bedroom	Discontinuous.
Kitchen/Laundry/Toilet-	
Kitchen/Laundry/Toilet	
Living/Bedroom -	$R_w \ge 50 \text{ dB}$
Corridor/Staircase	
Plant Room/ Lift Shaft	$R_w \geq 50 dB -$
-Living/Bedroom	Discontinuous.

Table 1 - Building Component between Units –Walls

2.2 Floors between occupancy units

The Floors separating sole occupancy units at No. 39-41 Chertsey Ave, Bankstown must have both an Impact Sound insulation rating $L_{n,w}+C_1$ no more than 62 and must have an $R_w + C_{tr}$ not less than 50.

2.3 SOUND INSULATION FOR PIPNG & SERVICES

If a duct, soil, waste or water supply pipe that is embedded or passes through one or more than one sole occupancy unit then it must be separated from the other rooms by construction of $R_w + C_{tr}$ (airborne) not less than:

- 25 if the adjacent room is a kitchen or non-habitable.
- 40 if adjacent room is habitable.

2.4 CAR PARK MECHANICAL VENTILATION

The proposed level of basement parking at No. 39-41 Chertsey Ave, Bankstown is located below ground level and that makes providing natural ventilation not possible and a mechanical extract system should be used. The mechanical ventilation system needs to achieve six air changes per hour for exhaust fume extract and ten air changes per hour for smoke clearance.



The noise from the mechanical ventilation system at the above address is governed under Section 2.1 of the NSW Industrial Noise policy. Noise intrusion from the mechanical ventilation plan is generally considered acceptable if the weighted level of noise from the source measured over a 15 minutes interval does not exceed the background noise level by more than 5dB.

• L_{Aeq,15 minutes <} background levels +5

Section 3.1 of the above policy defines the background level as $L_{A90,15 \text{ minutes}}$ which is the Noise exceeded 90% percent of a time period over which annoyance reactions may occur (taken to be in 15 minute periods).

The maximums outdoor sound power level from a mechanical plant at any point is calculated using the formula $L_w = L_p + 20 \log_{10} r + 8 dB$ where r is the distance in meter to any residential boundary.

It is the requirement that any supplier of any mechanical plant located outdoors meet the sound power reduction requirements.

3.0 <u>RECOMMENDATIONS FOR MATERIAL SPECIFICATIONS</u>

The proposed development is a four (4) storey residential development consisting of forty (40) units. The common walls between the rooms vary between a living/bedroom to a living/bedroom, living/bedroom to a bathroom/ensuite, and living/bedroom to a common corridor /staircase.

3.1 INTERNAL WALLS SEPARATING ADJACENT OCCUPANCIES

Internal walls between occupancies are to be constructed as per the following wall system or any other form of construction that achieves $Rw + Ctr \ge 50$ or $Rw \ge 50$ dB.

CSR 218 Wall System

- 16mm Gyprock Fyrecheck Plasterboard
- 2 rows of Steel Studs at 600mm maximum centres with 20mm minimum gap
- 16mm Gyprock Fyrecheck Plasterboard
- Cavity width is 200mm with cavity filled with 2x 75mm Bradford Glasswool Partition Batts 11kg/m³
- Any water supply pipe that is required to pass through an acoustically rated wall must only be installed in the cavity of discontinuous construction



3.2 FLOORS SEPARATING OCCUPANCIES

The sound insulation required for the floor system is $R_w + C_{tr} \ge 50 \text{ dB} \& L_{n,w} + C_{tr} \ge 62$ satisfying Section F5 of the BCA and is attainable with the following floor treatments:

For carpet areas:

- a 200mm thick Concrete Slab covered with
- a Layer of Carpet underlay followed by
- Carpet.
- Or 170mm thick Concrete Slab with acoustic underlay

For tiled areas:

- A minimum 150mm Concrete Slab covered with
- Adhesive followed by
- 5mm thick Acoustic Mat 702 (Ph: 9756 2146) covered with
- Adhesive followed by
- Minimum 5mm Tiles

Please see Figure 2 (Slab Detail – Direct Stick On)

OR

- A minimum 150mm Concrete Slab covered with
- Adhesive followed by
- 5mm thick Acoustic Mat 702 (Ph: 9756 2146) followed by
- Screed Bed
- Adhesive, followed by
- Minimum 10mm Tiles

Please see Figure 3 (Slab Detail – Screed Bed)

3.3 SOUND INSULATION FOR PIPNG & SERVICES

To achieve an Rw + Ctr not less than 25 (i.e. if the adjacent room is a kitchen or non-habitable) for any riser in the kitchen or any non-habitable room:

- Minimum of
- Two layers of 13 mm plasterboard are required to partition the services/ waste pipes from any kitchen or non-habitable room or
- One layer of 10mm plaster board plus a cupboard or
- Two layers of 10mm plasterboards plus tiles.

In all situations riser should be filled with insulation bats.

To achieve an Rw + Ctr not less than 40 (i.e. if adjacent room is habitable):



- Minimum of two layers of 13 mm plasterboard are required as a partition for the services/waste pipes from a habitable room, and in addition the pipes are to be lagged with an acoustic lagging material such as Pyrotech's Soundlag 4525C (Ph:9534 5366) or equivalent is always considered provided certification of performance.
- For pipes and risers constructed in the wardrobes and additional clarifications refer to Figures 4 & 5

Services running horizontally can be insulated using Bradford insulation batts and Acoustic lagging as per Figures 6 & 7

Access doors and panels must be firmly fixed so as to overlap the frame or rebate the frame by not less than 10 mm, and be fitted with a proper sealing gasket along all edges and constructed of:

- wood, particle board or block board not less than 38 mm thick; or
- compressed fibre reinforced cement sheeting not less than 9 mm thick; or
- other suitable material with a mass per unit area not less than 24 kg/m2

3.4 CAR PARK MECHANICAL VENTILATION

Select a quiet fan and enclose the fan shaft or lining the fan box with 50mm thick insulation blankets (e.g. 50mm rigid grade fibre glass). A qualified acoustical consultant may be required to progressively inspect the installation of various suppression components and certify to council that it meets installation.



4.0 Discussion and Conclusion

The construction of the proposed development at No. 39-41 Chertsey Ave, Bankstown if carried out as recommended in plans and specifications and including the acoustic recommendations in this report then it will meet the required measures for noise isolation between units regarding floors, walls, pipes & services as per Section F5 of the BCA.

Should you require further explanations, please do not hesitate to contact us.

Yours Sincerely,

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Figure 1 - Site Location







Prepared By: Acoustic Noise & Vibration Solutions Pty. Ltd.







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Figure 4 - Pipes in Habitable Rooms (Option 1)

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Figure 5 - Pipes in Habitable Rooms (Option 2)





Figure 6 – Non Habitable Rooms

