Vipac Engineers and Scientists Limited
215 Portrush Road, Maylands, SA 5069, Australia

t. +61 8 8362 5445 | **f.** +61 8 8362 0793 | **e.** adelaide@vipac.com.au
w. www.vipac.com.au | A.B.N. 33 005 453 627 | A.C.N. 005 453 627

Vipac Engineers & Scientists

Hyde Park Place Pty Ltd

248 Unley Road Hyde Park Acoustic Assessment

248 Unley Road Hyde Park - BRC Acoustic Assessment

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DOCUMENT NO: 50B-17-0128-DRP-8950314-3 **PREPARED FOR:** Hyde Park Place Pty Ltd **CONTACT:** Gemma Broomfield **Tel:** 0414 151 051 **Fax:**	**REPORT CODE:** DRP **PREPARED BY:** Vipac Engineers and Scientists Limited 215 Portrush Road, Maylands, SA 5069, Australia **Tel:** +61 8 8362 5445 **Fax**: +61 8 8362 0793

PREPARED BY:		
Author:	 Saksham Garg Acoustic Engineer	Date: 21 Feb 2019
REVIEWED BY:		
Reviewer:	 Byron Holmes Senior Acoustic Engineer	Date: 21 Feb 2019
AUTHORISED BY:	 Byron Holmes Senior Acoustic Engineer	Date:21 Feb 2019

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1 INTRODUCTION

Vipac was engaged to provide acoustic engineering advice in regards to acoustic compliance of the proposed multi-purpose development at 248 Unley Road, Hyde Park against the National Construction Code (NCC) – Part F5 Sound Transmission and Isolation. This report presents the applicable construction requirements/criteria in accordance with NCC 2016, results of our assessment and acoustic treatment recommendations where required.

2 REFERENCES

[1]. Architectural drawings – Preliminary Issue 4, dated 20 February 2019.

[2]. National Construction Code (NCC) 2016 – Building Code of Australia, Part F5 – Sound Transmission and Insulation.

[3]. INSUL Software – Version 8.0.6, Marshall Day Acoustics.

[4]. '*Understanding the NCC*', National Construction Code – Building Classifications, ABCB, 2017.

[5]. *'Delta Core Floor Manual'*, Delta Corporation Limited.

3 ASSESSMENT CRITERA

3.1 NATIONAL CONSTRUCTION CODE 2016 PART F5 REQUIREMENTS

Part F5 of the National Construction Code 2016, Building Code of Australia [2] provides specific airborne sound insulation and impact sound insulation requirements for walls, floors and doors of Class 2 or 3 and 9c buildings. The airborne sound insulation requirements are provided in terms of Weighted Sound Reduction Index (R_w) or Weighted Sound Reduction Index with Spectrum Adaption Term ($R_w + C_{tr}$) and impact sound insulation requirements are provided in terms of Weighted Normalised Impact Sound Pressure Level ($L_{n,w}$).

Based on the architectural drawings [1] and with reference to the NCC building classification [4], we note that the building (residential section) would classify as Class 2 building. NCC 2016 [2] provides the following minimum deemed-to-satisfy construction requirements for a Class 2 building:

F5.4 *Sound insulation rating between floors*

(a) A floor in Class 2 or 3 building must have $R_w + C_{tr}$ (airborne) not less than 50 and $L_{n,w}$ (impact) not more than 62 if it separates –
- *(i) sole-occupancy units; or*
- *(ii) a sole occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification.*

F5.5 *Sound Insulation rating of walls*

(a) A wall in a Class 2 or 3 building must –
- *(i) have $R_w + C_{tr}$ (airborne) not less than 50, if it separates sole-occupancy units; and*
- *(ii) have R_w (airborne) not less than 50, if it separates sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, pubic lobby or the like, or parts of a different classifications; and*
- *(iii) be of discontinuous construction, if it separates –*
  - *(A) a bathroom, sanitary compartment, laundry or kitchen in one sole-occupancy unit from a habitable (other than kitchen) in an adjoining unit; or*
  - *(B) a sole-occupancy unit from a plant room or lift shaft.*

(b) A door may be incorporated in a wall in a Class 2 or 3 building that separates a sole-occupancy unit from a stairway, public corridor, public lobby or the like, provided the door assembly has an R_w not less than 30.

(e) Where a wall required to have sound insulation has a floor above, the wall must continue to –

(i) The underside of the floor above; or

(ii) The ceiling that provides the sound insulation required for the wall.

(f) Where a wall required to have sound insulation has a roof above, the wall must continue to –

(i) The underside of the roof above; or

(ii) The ceiling that provides the sound insulation required for the wall.

***F5.6** Sound Insulation rating of internal services*

(a) If a duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one sole-occupancy unit, the duct or pipe must be separated from the rooms of any sole-occupancy unit by construction with an $R_w + C_{tr}$ (airborne) not less than –

(i) 40 if the adjacent room is a habitable room (other than a kitchen); or

(ii) 25 if the adjacent room is a kitchen or non-habitable room.

(b) If a storm water pipe passes through a sole-occupancy unit it must be separated in accordance with F5.6 (a) (i) and (ii).

4 ASSESSMENT & RECOMMENDATIONS

4.1 ARCHITECTURAL SPECIFICATIONS & ASSUMPTIONS

With reference to the architectural drawings and specifications, we note the following internal wall and floor/ceiling constructions.

4.1.1 WALLS

- WT1 – 150mm precast concrete panel.
- WT2 – 200mm precast concrete panel.
- WT4 – 75mm Hebel PowerPanel on 50mm top hats to one side of 92mm steel studs and 2 layers of 16mm Fyrcheck plasterboard to the other side, with cavity infill of 90mm R2.5 glasswool.
- WT5 – 10mm plasterboard to the internal side (SOU[1] side) on 64mm steel studs, separated by 25mm air gap from the external wall (WT1 or WT2), with cavity infill of 90mm R2.5 glasswool.
- WT7 – 92mm steel studs with cavity infill of R2.0 glasswool, between bathroom and laundry pods.
- WT8 – CSR1385 wall of 1 layer of 16mm Fyrcheck plasterboard to both sides of two rows of 64mm steel studs separated by 20mm airgap and cavity infill of 75mm R1.7 Acoustigard to both sides.
- WT8a – CSR1385 wall of 1 layer of 16mm Fyrcheck plasterboard to both sides of two rows of 64mm steel studs separated by 20mm airgap and cavity infill of 75mm R1.7 Acoustigard to both sides.
- WT9 – CSR1385 wall of 1 layer of 16mm Fyrcheck plasterboard with 1 layer of 6mm fibre cement on 35mm top hats to one side and 1 layer of 16mm Fyrcheck plasterboard to the other side of two rows of 64mm steel studs separated by 20mm airgap and cavity infill of 75mm R1.7 Acoustigard to both sides.

[1] *SOU – Sole Occupancy Unit*

4.1.2 FLOOR/CEILING

Based on the architectural drawings and sections [1], we have considered the following floor/ceiling constructions:

- Floor/ceiling between two sole occupancy units (Construction F1) – Floor finish of carpet floor tiles and timber over Delta Core DC200 (non-core filled) with 80mm topping and ceiling of 10mm plasterboard with overlay in approximately 230mm ceiling cavity. We have considered ceiling overlay of minimum 50mm thick, 10kg/m^3 fibreglass.
- Floor/ceiling between balcony of one sole occupancy unit and habitable spaces of sole occupancy unit below (Construction F2) – Tiles over Delta Core DC200 (non-core filled) with 80mm topping (1:100 fall to drain) and ceiling of 10mm plasterboard with overlay in approximately 230mm ceiling cavity. We have considered ceiling overlay of minimum 50mm thick, 10kg/m^3 fibreglass.

4.2 ASSESSMENT RESULTS

Based on the wall constructions provided above, we predicted the sound insulation rating (impact and airborne) for each internal partition wall and floor/ceiling construction provided above, and assessed it against the NCC 2016 requirements. The results of our assessment are presented in Table 1 and Table 2 below.

4.2.1 AIRBORNE SOUND INSULATION

Wall or Floor/Ceiling Construction	Description	Predicted R_w/ R_w+C_{tr}	NCC Requirements	Comments
WT1 + WT5	Wall between plantroom and SOU	R_w >50	Discontinuous construction with R_w ≥50	Refer Note 1
	Wall between gymnasium and SOU	R_w >50	R_w ≥50	Refer Note 1
	Wall between SOU and corridor	R_w >50		Refer Note 1
WT8 (CSR1385)	Wall between SOU's	R_w+C_{tr} 50	R_w+C_{tr} ≥50	Refer Note 1
WT8a (CSR1385)	Wall between SOU's	R_w+C_{tr} 50	R_w+C_{tr} ≥50	Refer Note 1
WT5+WT1+WT5	Wall between SOU's	R_w+C_{tr} >50	R_w+C_{tr} ≥50	Refer Note 1
WT1 + WT7	Wall separating bathroom, laundry pods from corridor	R_w ≥50	R_w ≥50	Refer Note 1
WT9	Wall between SOU and corridor	R_w 59	R_w ≥50	Refer Note 1
WT5+WT1+WT7	Wall separating bathroom, laundry pods of one SOU from habitable spaces of adjoining SOU	R_w+C_{tr} >50	Discontinuous construction with R_w+C_{tr} ≥50	Refer Note 1
F1[2]	Between SOU's	R_w+C_{tr} >52	R_w+C_{tr} ≥50	Refer Note 1
F2[2]	Between SOU's	R_w+C_{tr} >52	R_w+C_{tr} ≥50	Refer Note 1

Table 1: Assessment results – Airborne noise insulation

Comments

1. NCC 2016 Part F5 compliance for airborne noise insulation achieved.

[2] *Please note that assessment of airborne noise insulation for the floor construction is based on the technical specifications (data for airborne noise insulation) for Delta Core floor systems [5].*

Glazing

The architectural drawings [1] do not provide the construction of the glazing between SOU's and the communal areas (public corridors, communal plaza and central atrium). To ensure that the entire partition (including the glazing) separating the SOU's from the communal areas achieve the specified NCC 2016 requirement for airborne sound insulation of R_w 50, we recommend glazing construction rated to achieve minimum Weighted Sound Reduction Index of R_w 45 be used in these areas. For example, a double glazing construction of 10.38mm laminated glass and 6mm toughened glass separated by 50mm air gap would generally achieve R_w 45.

Apartment Entry Doors

The architectural drawings [1] do not provide the construction for the apartment entry doors. We recommend minimum 45mm thick solid core doors be used with medium duty acoustic seals.

4.2.2 IMPACT SOUND INSULATION

Floor/Ceiling Construction	Description	Predicted $L_{n,w}$	NCC Requirements	Comments
F1	Between SOU's with carpet tiles	$L_{n,w}$ <62	$L_{n,w}$ ≤62	Refer Note 1
	Between SOU's with timber floor	$L_{n,w}$ >62		Refer Note 2
F2	Between balcony of one SOU and SOU underneath	$L_{n,w}$ >62	$L_{n,w}$ ≤62	Refer Note 3

Table 2: Assessment results – Impact noise insulation

Comments

1. NCC 2016 Part F5 compliance for impact noise insulation achieved.
2. For the purpose of acoustic assessment, we had considered timber flooring with no underlay. Considering this, we note that the predicted Weighted Normalised Impact Sound Pressure Level ($L_{n,w}$) marginally exceeds the NCC 2016 requirements for impact noise insulation. To mitigate this issue, we recommend acoustic underlay such as 3-5mm Damtec® Standard, 4.5mm Regupol® 4515 or equivalent product, be used underneath the timber flooring.
3. Assessment results show that the predicted Weighted Normalised Impact Sound Pressure Level ($L_{n,w}$) exceeds the NCC 2016 requirements for impact noise insulation. To ensure that the NCC 2016 requirements are achieved, we recommend 6-8mm Damtec® Estra or equivalent acoustic underlay underneath the screed and tiles to all the balconies over SOU's. Please note that this treatment is not required for balconies which are stacked.

Gymnasium Floor

Please note that the floor separating the gymnasium from the spaces below would achieve the NCC 2016 requirements. However, based on our experience on similar projects, we note that vibrations due to weight falls and heavy lifting machinery within the gymnasium may result in transfer of structure borne noise to the adjoining SOU's through walls and floor/ceiling. Therefore, additional treatment (such as floating floor construction or proprietary gym/sports floor systems) to the gymnasium floor may be required to isolate the gymnasium floor from the adjoining structure.

5 SUMMARY

An acoustic engineering assessment in regards to compliance of the proposed multi-purpose development at 248 Unley Road, Hyde Park against the National Construction Code (NCC) – Part F5 Sound Transmission and Isolation was undertaken. The applicable construction requirements/criteria in accordance with NCC 2016 were determined, and on the basis of our assessment acoustic treatment recommendations were provided where required.