



Our ref: 25398-1-16111

19 February 2020

Noahs Rosehill Waters Pty Ltd  
17 Serpentine Drive (Off West Parade)  
South Guildford WA

Attention : Ryan Severn  
Email : [sales@rosehillwaters.com.au](mailto:sales@rosehillwaters.com.au)

Dear Ryan,

**ROSEHILL WATERS RESIDENTIAL DEVELOPMENT  
CONSTRUCTION REQUIREMENTS**

As requested, we have undertaken a review of the construction requirements to achieve acceptable internal noise levels for residential buildings located within the Rosehill Waters development.

Herring Storer Acoustics have previously undertaken noise level measurements within the development of the noise received at the site from planes passing overhead. Additionally, to determine the noise received at various locations, reference has been made to AS2021. This standard not only outlines noise received from various planes taking off and landing, but also lists indoor noise level criteria for different building types.

From AS2102, using the noise emissions from a Boeing 747-400 taking off, noise received within the development site would range between 70 and 87 dB(A).

Note: This noise level range takes into account the future 3<sup>rd</sup> run-way.

This range of noise levels correlates with the measurements recorded by Herring Storer Acoustics. We note that during the 9-day monitoring period the highest noise level recorded was 93 dB(A) at the ANEF 25 contour. However, this extreme noise level only occurred once. Therefore, based on the data available, we recommend a noise level of 87 dB(A) be used to determine construction  $R_w$  ratings of the various building elements.

Based on the above noise levels, the acoustic transmission loss ( $R_w$ ) ratings have been determined for the various building elements with these outlined below.



## CRITERIA

AS2021:2015 “Acoustics – Aircraft Noise Intrusion – Building Siting and Construction” lists the building types compared to the acceptable ANEF contour in Table 2.1 of AS2021:2015. The applicable building types are reproduced in Table 1 below.

**TABLE 1 – ANEF ACCEPTABILITY FOR SITING AND CONSTRUCTION**

Building Type	ANEF zone of Site		
	Acceptable	Conditionally Acceptable	Unacceptable
House, home unit, flat, caravan park	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF

AS2021:2015 also provides guidelines for determining the type of building construction necessary to provide a given noise reduction, given that external windows and doors are closed. Indoor design sound levels for determination of aircraft noise reductions are given as follows:

### Residence

Sleeping areas	-	50 dB(A)
Other habitable spaces	-	55 dB(A)
Bathrooms, toilets, laundries	-	60 dB(A)

Note: Habitable areas include kitchens.

## ASSESSMENT

Calculations were carried out for certain noise levels based on an external noise level of 87 dB(A), being the worst case noise level for aircraft flyovers. Calculations were generally in accordance with guidance from AS2021 to determine the noise that would be received within a 4 bedroom, 2 bathroom typical residence, as obtained by building companies contracted to build the residential housing within the estate.

Based on the above noise level, the required  $R_w$  ratings for the different building elements to achieve acceptable internal noise level to comply with the above criteria are listed in Table 4.1.

For this development, we note that residence outside the ANEF 20 are acceptable and no upgrade of construction is required. However, residence constructed between the ANEF 20 and 25 contours are “conditional”. Hence, upgraded construction is required to ensure acceptable internal noise levels are obtained. Based on the noise level listed above being the worst case noise level, the required  $R_w$  rating for residence located between the 20 and 25 ANEF contours are as listed in Table 2.

Note : Residential are unacceptable for ANEF contours greater than 25.

**TABLE 2 - REQUIRED  $R_w$  RATINGS FOR RESIDENTIAL PREMISES**

Location	Room	Design Noise Level dB(A)	Minimum Required $R_w$ Rating		
			Wall	Roof/Ceiling	Glazing
Between ANEF 20 and 25	Bedrooms	50	52	47	39
	Living Areas	55	52	42	36
	Bathrooms, toilets, laundries	60	52	42	34

## CONSTRUCTION

For information, the following are deemed to satisfy typical constructions for various  $R_w$  ratings.

### Walls

Wall to be a minimum  $R_w$  52.

For this development, it is recommended that all external walls be of double brick constructions, using 110mm thick bricks with a 50mm cavity and 50mm thermal fibrous insulation within the cavity.

Based on the above, a deemed to satisfy construction would achieve an  $R_w$  of 52.

### Roof / Ceiling

Constructions for the roof/ceiling systems to meet certain  $R_w$  ratings are listed in Table 3 below.

**TABLE 3 – CONSTRUCTION REQUIREMENTS & CORRESPONDING  $R_w$  VALUES – ROOF / CEILING SYSTEMS**

$R_w$ Value	Description of Construction
42 (Living Areas)	Steel roof with Anticon (or equivalent) with 13mm plasterboard ceilings and minimum 100mm thick (minimum 32 kg/m <sup>3</sup> ) insulation laid over the top and no penetrations. A deemed to satisfy construction would be the CSR 6420 (The Red Book) Roof / Ceiling System OR Tiled Roof with Sarking (or Equivalent) with 13mm plasterboard ceilings and minimum 100mm thick (minimum 32 kg/m <sup>3</sup> ) insulation laid over the top and no penetrations. A deemed to satisfy construction would be the CSR 6513 (The Red Book) Roof / Ceiling System
47 (Bedrooms and Ensuites)	Roofs to be colourbond (or equivalent) with 2 layers of 10mm plasterboard ceilings and minimum 100mm thick (minimum 32 kg/m <sup>3</sup> ) insulation laid over the top and no penetrations. A deemed to satisfy construction would be the CSR 6456 (The Red Book) Roof / Ceiling System OR Tiled Roof with Sarking (or Equivalent) with 2 layers of 10mm plasterboard ceilings and minimum 100mm thick (minimum 32 kg/m <sup>3</sup> ) insulation laid over the top and no penetrations. A deemed to satisfy construction would be the CSR 6533 (The Red Book) Roof / Ceiling System

Note: Eaves to be enclosed using 6mm thick compressed cement sheeting or equivalent.

### Glazing

Given that the sound transmission requirements for glazing change greatly, Table 4 details the expected  $R_w$  values for certain construction types. It should also be noted that glass facades must be minimised.

**TABLE 4 – CONSTRUCTION REQUIREMENTS & CORRESPONDING  $R_w$  VALUES - WINDOWS**

$R_w$ Value	Description of Construction
34 (Work Areas)	Openable – 6.38 mm laminated glass in awning type windows with mechanical winders closing on compressible seals. Deemed to satisfy 6.38mm PVB Lam
36 (Living Areas)	Openable – 6.5 mm laminated glass in awning type windows with mechanical winders closing on compressible seals. Deemed to satisfy 6.52mm V-Lam Hush
38 (Bedrooms and Ensuite)	Openable – 10.5mm laminated glass in awning type windows with mechanical winders closing on compressible seals. Deemed to satisfy 10.5mm V-Lam Hush

### Air Conditioning

To ensure the performance of the roof / ceiling system, penetrations are not feasible. Therefore, split systems are likely to be the alternative when considering air conditioning / heating.

### Lighting

Bayonet lighting would be deemed to satisfy. Alternatives are acoustically rated downlights. Alternatively, downlights can be "boxed out" to provide an acoustic barrier.

### Exhaust Fan

Ducted exhaust fan for bathroom / toilet (backdraft shutters) with acoustically attenuated outlet to eaves. Kitchen exhaust re-circulatory where possible. If outlet required, then acoustically attenuated.

#### Notes:

- 1) Hinged or sliding doors are acceptable provided the system complies with required  $R_w$  rating.
- 2) Even though the area outside the ANEF 20 contour is unconditional, we recommend that bedroom windows be casement type using 6.38mm thick laminated glass.
- 3) Alternative constructions to any of the above is possible, provided the acoustic test data is available for review.

As per the development approval conditions, the plans submitted for building licence to the City of Swan must be accompanied by an acoustic assessment, certifying the proposed building will meet the internal criteria contained in AS2021:2015.

Finally, to enable residence to provide additional mitigation to the windows, it is recommended that windows and doors be moved towards the outside face of the cavity. Thus, allowing additional sliding windows to be installed with a minimum air gap of 50mm on the inside awning windows.

Based on the above assessment, noise emissions from the childcare centre would be deemed to comply with Regulatory requirements.

Yours faithfully,  
For **HERRING STORER ACOUSTICS**

Paul Daly