

EMAIL TRANSMITTAL

REF: 24152-1-18073
TO: Off2Site Projects
ATTENTION: Ann Tuppen
ADDRESS: Off2site@iinet.net.au
FROM: Tim Reynolds
DATE: 22 March 2019
SUBJECT: **PROPOSED DEVELOPMENT – LOT 2 YANCHEP BEACH ROAD, YANCHEP
PRELIMINARY ACOUSTIC ASSESSMENT OF GYM**

Ann,

As requested, we provide the following information regarding the possible noise emissions from the proposed gym to be located within the above development, with respect to the requirement of the *Environmental Protection (Noise) Regulations 1997*.

From the information provided, we understand that the proposed gym would be a “Plus Fitness”. We understand that normally these gyms use “pinned” weight machines, hence these weights cannot be dropped and the noise of weights dropping is limited to the barbells. To control this noise, appropriate flooring would be included in the fitout of the space. Additionally, they do play background music within the gym and the fitness rooms are noted. However, the noise levels within these spaces is limited and the building structure will contain the noise generated.

Thus, as outlined below, noise associated with the gym would easily achieve compliance with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

CRITERIA

The allowable noise level at the surrounding locales is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 & 8 stipulate maximum allowable external noise levels. For noise sensitive premises this is determined by the calculation of an influencing factor, which is then added to the base levels shown below in Table 3.1. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern. For commercial premises, the assigned noise levels are fixed throughout the day, as listed in Table 1.

TABLE 1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Noise	Receiving	Time of Day	Assigned Level (dB)		
			L _{A10}	L _{A1}	L _{Amax}
Noise sensitive premises: highly sensitive area		0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
		0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day)	40 + IF	50 + IF	65 + IF
		1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
		2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF
Commercial		All hours	60	75	80

Note: L_{A10} is the noise level exceeded for 10% of the time.
 L_{A1} is the noise level exceeded for 1% of the time.
 L_{Amax} is the maximum noise level.
 IF is the influencing factor.

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

“impulsiveness” means a variation in the emission of a noise where the difference between L_{Apeak} and L_{Amax(Slow)} is more than 15 dB when determined for a single representative event;

“modulation” means a variation in the emission of noise that –

- (a) is more than 3 dB L_{Afast} or is more than 3 dB L_{Afast} in any one-third octave band;
- (b) is present for more at least 10% of the representative assessment period; and
- (c) is regular, cyclic and audible;

“tonality” means the presence in the noise emission of tonal characteristics where the difference between –

- (a) the A-weighted sound pressure level in any one-third octave band; and
- (b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as L_{Aeq,T} levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as L_{ASlow} levels.

Where the noise emission is not music, if the above characteristics exist and cannot be practicably removed, then any measured level is adjusted according to Table 2 below.

TABLE 2 - ADJUSTMENTS TO MEASURED LEVELS

Where tonality is present	Where modulation is present	Where impulsiveness is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: These adjustments are cumulative to a maximum of 15 dB.

Where the noise emission is music, if the music is audible, then any measured level is adjusted according to Table 3 below.

TABLE 3 – ADJUSTMENTS TO MEASURED MUSIC NOISE LEVELS

Where impulsiveness is not present	Where impulsiveness is present
+10 dB(A)	+15 dB(A)

For this development, the closest neighbouring residences are located to the south across the Right of Carriageway Easement. For these residences, the influencing factor (IF) has been calculated at +4 dB.

Based on the above influencing factor, the assigned outdoor noise levels for the neighbouring residential locations are listed in Table 4.

TABLE 4 - ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A 10}	L _{A 1}	L _{A max}
Noise sensitive premises	0700 - 1900 hours Monday to Saturday	49	59	69
	0900 - 1900 hours Sunday and Public Holidays	44	54	69
	1900 - 2200 hours all days	44	54	59
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	39	49	59

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.

ASSESSMENT

To provide information on the noise emission from the gym, an analysis of noise that would be received at the neighbouring residence was undertaken for music that would be played within the gym.

From assessments / measurements within similar gyms, music played within the gym is typically background music at around 67 dB(A). Within classes the levels are typically, marginally higher, but are limited to around 73 dB(A), as gym personnel need to provide instructions.

From testing of barbell drops, the maximum noise level from a 15kg dumbbell is around 80 dB(A), with a 15mm matting.

With standard construction, such as concrete walls to the residences (glazing to the north, being the far side of the development from the residences) and a metal deck roof with plasterboard ceiling and insulation in the ceiling space, noise breakout from the gym would be controlled by the roof / ceiling construction. Based on the noise levels stated above and the standard constructions, the noise received at the neighbouring residences has been determined to be as listed in Table 5.

TABLE 5 – NOISE RECEIVED AT THE NEIGHBOURING RESIDENCE FROM MUSIC

Neighbouring Premises	Calculated Noise Level (dB(A))	
	Music	Barbell
Residences to South	11	16

Tables 6 and 7 summarise the applicable Assigned Noise Levels, and assessable noise level emissions for each identified noise. We note that music would be assessed under the L_{A10} criteria, with the barbell drop being under the L_{AMax} criteria.

TABLE 6 – ASSESSMENT OF MUSIC

Location	Assessable Noise Level, dB(A)	Time of Day	Applicable Assigned Noise Level (dB(A))	Exceedance to Assigned Noise Level
Residences to South	11	0700 - 1900 hours Monday to Saturday	49	Complies by 38 dB(A)
		0900 - 1900 hours Sunday and Public Holidays	44	Complies by 33 dB(A)
		1900 - 2200 hours all days	44	Complies by 33 dB(A)
		2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	39	Complies by 28 dB(A)

TABLE 7 – ASSESSMENT OF BARBELL DROP

Location	Assessable Noise Level, dB(A)	Time of Day	Applicable Assigned Noise Level (dB(A))	Exceedance to Assigned Noise Level
Residences to South	16	0700 - 1900 hours Monday to Saturday	59	Complies by 43 dB(A)
		0900 - 1900 hours Sunday and Public Holidays	54	Complies by 38 dB(A)
		1900 - 2200 hours all days	54	Complies by 38 dB(A)
		2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	49	Complies by 33 dB(A)

At the calculated noise levels, the penalties for music would not be applicable. It is noted that noise received at the neighbouring residences from the music would still comply during the night period, even if the level was increased by up to 18 dB(A) (including penalty for music).

We note that noise emissions from free weights hitting the floor are easily controlled by the installation of the correct flooring, such as gym floor matting. Thus, again, noise emissions from this source would be contained within the building and would not be audible at the neighbouring residences.

As the gym noises are contained within the tenancy, the noise generated within the gym is easily controlled. Also, this tenancy does not require the kitchen ventilation systems that would have been required as part of the previously approved proposal, noise emissions from this development proposal would be lower than for the previous approved proposal.

Yours faithfully,
 for **HERRING STORER ACOUSTICS**

Tim Reynolds