

Acoustic Associates Sussex Ltd

Planning Condition Indoor Noise Survey

Site: 'Roseland', The Causeway, Arundel

Client: Birchside Management Ltd

Planning Reference: LY/25/17/PL

Report by: George Orton BEng(Hons) MIOA

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Issue 1



Acoustic Associates

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Acoustic Associates Sussex Ltd., 8 Highdown House, Shoreham Airport, Shoreham-by-Sea, West Sussex BN43 5PB

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Report by: George Orton BEng(Hons) MIOA

Checked by: Peter Attwood BSc MSc MCIOB MIOA MIDiagE

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1 Introduction

Acoustic Associates have been appointed to undertake an acoustic assessment of the proposed 'Roseland', The Causeway, Arundel development.

The development has gained planning approval albeit with certain conditions which are discussed in section 4.

The development will demolish the existing buildings and build a new block of residential apartments in its place.

Transportation (road and rail) noise was initially measured, close to where the development will be built, prior to the existing building being demolished.

Noise mitigation measures have been recommended and implemented by the developer.

This report details the noise survey which was carried out inside the partially completed development.

The noise levels for the day and the night time period have been assessed in terms of BS8233 "2014" as discussed in the planning condition

The measurement results and assessment show that planning condition criteria, relating to noise, have been achieved.

2 Context, Noise Criteria & Noise Assessment Methodology

2.1 Context

The proposed development will comprise of one block of flats (2 on ground floor, 2 on first floor and one second floor flat built into the roof)

All of the existing buildings will be demolished to make way for the new development. The development has gained planning approval, albeit with certain conditions.

The final survey of indoor noise levels has been completed as a result of the wording of planning condition 13 which has been copied below:

13: Before first occupation of any dwelling where unacceptably high levels of noise are likely to be experienced, then post validation testing shall be undertaken by a competent person to determine compliance with the acoustic report and BS8233. This must be submitted and agreed in writing with the Local Planning Authority before first occupation.

Note: After discussion with the local authority it was ascertained that "unacceptably high" would be the level of noise where leaving a window open would result in indoor levels in excess of the BS8233 internal noise level criteria.

2.2 Criteria

Based upon the wording of the condition it is recommended that criteria are provided by:

- BS8233 (Sound insulation and noise reduction for buildings) 2014

2.3 BS8233 Noise Criteria

Table 5 of BS8233 provides the following guideline values:

Activity	Location	Time period of day	
		07:00-23:00	23:00-07:00
Resting	Living Rooms	35dB L _{Aeq,16hour}	-
Dining	Dining Room/Area	40dB L _{Aeq,16hour}	-
Sleeping (daytime resting)	Bedroom	35dB L _{Aeq,16hour}	30dB L _{Aeq,8hour}

Table 1: BS8233 Criteria

3 Initial Noise Survey

An unattended noise survey was carried out from the 29/09 to the 04/10 2017 in order to measure Road/Rail noise levels affecting the proposed development. The initial survey was used to specify mitigation measures which were completed by the developer.

3.1 Noise Survey Results

At this position the dominant noise source is the road. The survey data has been used to calculate the 16hr day time and the 8hr night time period noise levels:

Date 2017	Day	Freefield dBA	
		L _{Aeq} 07:00-23:00hrs	L _{Aeq} 23:00-07:00hrs
29/09	Friday	-	52.1
30/09	Saturday	57.3	52.3
01/10	Sunday	57.9	53.8
02/10	Monday	59.7	54.5
03/10	Tuesday	59.4	54.8
Average all		59	54
Average weekdays		60	55

Table 2: Unattended Noise Survey Levels

Additional measurements were also completed of noise created by the nearby railway.

3.2 Required Sound Insulation of Building Envelope

The survey data was used to create a noise model for the proposed development. The revised model (actual as built window positions)

The noise model predictions were then used to demonstrate minimum building envelope sound reduction (SRI) required so that the BS8233 criteria can be achieved. *For simplicity worst RPs have been used.*

Model Position	External Noise Level	ReqSRI
4 Bedroom Night	49	19
4 Bedroom Day	54	19
4 Living Day	60	25
5 (roof) Lounge	59	24
5 (roof) Bedroom	54	24

Table 3: Required SRI

4 Final Indoor Noise Survey Baseline Conditions and Results

4.1 Methodology

Measurements have been completed inside the part completed development to demonstrate that the BS8233 noise criteria have been achieved. The measurements were completed in unfurnished rooms whilst construction work (mainly external) was still being completed during the day and occasional evenings.

4.2 Equipment

The following equipment was used to complete the measurements:

- 2x Castle "Mirus" Type 1 sound level meter

4.3 Site Conditions

All measurements were conducted inside the partially completed building. At the time of the survey the development was still being constructed and there was a large amount of activity which would have affected the daytime noise survey results.

The unattended measurements were completed in unfurnished rooms the two lounge rooms had a hard floor finish the bedroom had been carpeted.

4.4 Results Flat 4 Lounge

The model showed that Flat 4 (lounge) is exposed to the highest levels of external noise. The results of the survey can be found below:

Date	Date	Plot 4 Lounge	
		L _{Aeq} , 23:00-07:00	L _{Aeq} , 07:00-23:00
10-Aug	Friday	27	
11-Aug	Saturday	25	33
12-Aug	Sunday	28	30
13-Aug	Monday	28	37
14-Aug	Tuesday	28	37
15-Aug	Wednesday	27	35
16-Aug	Thursday	28	43
17-Aug	Friday	27	64

Table 4: Survey Results 4 Lounge

4.5 Results Flat 4 Bedroom

A sound level meter was also installed in Flat 4's bedroom.

Unfortunately the night time noise levels were often below the 21dBA lowest range for the sound level meter.

Therefore every night time $L_{Aeq,8hr}$ noise level, when calculated from the 15minute consecutive measurements, was 22dBA (with one exception when building alarm went off during the night). The survey graph can be seen in the appendix and the day time results can be seen below:

Date	Date	Plot 4 Bedroom
		$L_{Aeq, 07:00-23:00}$
11-Aug	Saturday	25
12-Aug	Sunday	27
13-Aug	Monday	30
14-Aug	Tuesday	27
15-Aug	Wednesday	48
16-Aug	Thursday	31
17-Aug	Friday	37

Table 5: Survey Results 4 Bedroom

4.6 Results Flat 5 Lounge

Additional measurements were also completed after construction works finished on Monday the 20th August:

- $L_{Aeq,18:00-21:41Hrs} = 30dBA$

Date	Time	Plot 5 Lounge
		$L_{Aeq, 1Hr}$
11-Aug	18:00	31
12-Aug	19:00	31
13-Aug	20:00	29
14-Aug	21:00	29

Table 6: Plot 5 Measurements

5 Conclusion

Noise levels have been measured in several locations within the development.

The measurements were completed in empty rooms which may mean that the recorded levels are higher than they will be when the rooms are furnished. As the criteria have been achieved at this stage no reverberation time corrections have been applied to predict the "finished furnished" noise levels.

The survey also had to be completed as early as possible in order so that the condition could be signed off before the building is occupied. This meant that the survey was conducted whilst the building site was still operational during the day. This is the reason why some of the day time results are higher than others.

A summary of noise levels can be found below:

- Plot 4 Lounge – no more than 33dBA during the daytime
On weekend days when only the painter was working during the mornings (Also see note below)
- Plot 4 Lounge – average of 27dBA during the night time
This was for all nights which should not have been affected by site operations. For the original survey the daytime noise level was 5dB higher than the night time. This means that the noise level during the day should be approximately 32dBA if measured with no site operations.
- Plot 4 Bedroom – less than 30dBA during the daytime on days when site activities were quieter.
- Plot 4 Bedroom – less than 22dBA during the night time
- Plot 5 Lounge – 30dBA during an evening measurement period.
This is approximately equal to the equivalent time period as measured in Flat 4 Lounge. Therefore the overall level in Flat 5 should be approximately 27dBA during the night time and 32dBA during the day.

The above levels achieve the criteria detailed in BS8233 and the planning condition which have been copied below:

- 07:00-23:00hrs noise level to be less than or equal to 35dBA
- 23:00-07:00hrs noise level to be less than or equal to 35dBA

As mentioned previously some of the day time readings may have been affected by building site noise. Measurements were also conducted in empty unfurnished rooms. Therefore the levels inside will likely be marginally lower when the development is finished and occupied.

Untested rooms on the front façade had the same glazing and ventilation arrangements as Flat 4 Lounge. Therefore noise levels in these rooms would be subject to lower internal noise levels as they are marginally less affected by noise and have smaller windows.

Untested rooms on the rear façade will have internal noise levels similar to as measured in the bedroom of Flat 4.

The above demonstrates that planning condition has been satisfied.

6 Appendix

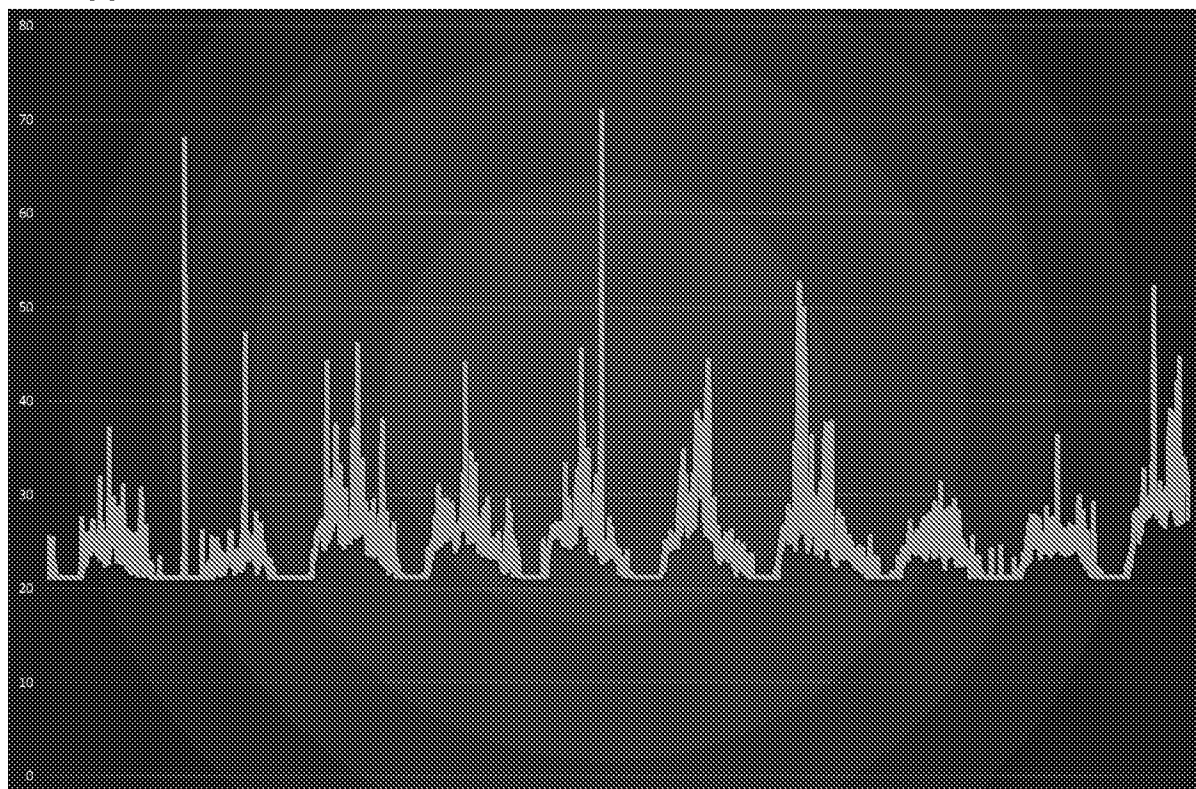


Figure 1: Plot 4 Bedroom Survey Graph