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229 OLD SHOREHAM ROAD, SOUTHWICK

INTERNAL NOISE LEVEL REPORT

Report **17379-INL-01**

Prepared on 11 July 2022

Institute of Acoustics sponsoring organisation
committed to CSCS Platinum award
CQMS Safety Scheme
ISO 17025 Quality Assurance
CHAS Contractors Health & Safety Assessment Scheme Accredited Contractor
Constructionline
UKAS Testing 7688

*Company registered in England & Wales no. 07958744 - UKAS accreditation is only applicable to sound insulation testing services
UKAS accreditated services undertaken by Clement Acoustics Ltd* and not linked to the endorsements, certifications and accreditations shown above

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Document Revision	Date of Revision	Reasons for Revision	Revision By
0	11/07/2022	First Issue	Matt Markwick MIOA

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Falcon Energy Ltd to undertake acoustic commissioning of internal noise levels at the development at 229 Old Shoreham Road, Southwick, West Sussex BN42 4LR.

This report presents the results of internal noise surveys and the summary results compared to the criteria.

2.0 SITE DESCRIPTION

The development comprises of a change of use property consisting of 2 self-contained residential units within an existing dwelling house.

The site is in a predominantly residential area, bound by Old Shoreham Road (A270) to the south. The main source of noise from the area is road traffic noise from this and surrounding roads.

3.0 INTERNAL NOISE CRITERIA

3.1 BS 8233: 2014

BS 8233: 2014 '*Guidance on sound insulation and noise reduction for buildings*' describes recommended acceptable internal noise levels for residential spaces during daytime and night-time hours. These levels are shown in Table 3.1.

Activity	Location	Design range $L_{eq,T}$ dB	
		Daytime (07:00-23:00)	Night-time (23:00-07:00)
Resting	Living Room	35 dB(A)	-
Dining	Dining Room/Area	40 dB(A)	-
Sleeping	Bedroom	35 dB(A)	30 dB(A)

Table 3.1: BS8233 recommended internal background noise levels

3.2 World Health Organisation Guidelines

The World Health Organisation (WHO) document on *'Guidelines for Community Noise'* 1999 states the internal noise level guidelines as summarised in Table 3.2.

Specific Environment	Critical Health Effects	$L_{eq,T}$	$L_{max,\ F}$
Dwelling, Indoors	Speech Intelligibility and moderate annoyance, daytime and evening	35 dB(A)	-
Inside Bedrooms	Sleep disturbance, night-time	30 dB(A)	45 dB(A)

Table 3.2: WHO Internal noise level guidelines

The document also states, *'For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dBA LAmax more than 10-15 times per night, (Vallet & Varnet 1991).'*

As shown in Table 3.2, bedrooms present the most onerous internal levels, however, in order to provide a robust assessment, the internal levels were measured within two bedrooms and also two living room / kitchens.

4.0 INTERNAL NOISE SURVEYS

4.1 Procedure

Internal noise surveys were undertaken within selected rooms on the first floor. The rooms were chosen based on the proximity and view of the nearby road / rear garden. It is understood that proposals are to retain the existing PVC double glazing.

The location of each survey was as follows:

- Front Bedroom: First Floor
- Rear Bedroom: First Floor

All noise survey monitors were installed in outward facing rooms, towards identified sources of noise.

All microphones were fixed on a tripod, above 1.5 m and approximately 2 m away from the window.

Continuous automated monitoring was undertaken for the duration of the survey between 11:20 on 7 June 2022 and 12:15 on 9 June 2022. Measurements were taken of the L_{Aeq} and L_{AFMax} parameters

in 5 minutes integration. Due to onsite construction activities during the daytime period, there are sections of data that have been omitted so that noise from these activities were not included in the calculations.

4.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used was as follows.

- 1 No. Svantek Type 957 Class 1 Sound Level Meter,
- 1 No. Svantek Type 977 Class 1 Sound Level Meter,
- Rion NC-74 Class 1 Calibrator.

5.0 RESULTS

5.1 Internal Noise Survey

The L_{Aeq}, and $L_{Amax:}$ acoustic parameters were measured throughout the duration of the survey, in the integration periods stated in in Section 4.1.

It should be noted that at the time of the surveys all rooms were furnished with floor finishes installed. Reverberation times in the rooms are therefore considered to be representative and no correction has therefore been applied relating to this.

Measured levels are shown as time histories 17379-INL-01-TH1 & TH2.

	Ambient Noise Level $L_{eq,T}$	Typical Maximum Noise Level* $L_{Fmax,\ 5min}$
Position 1 – Front Bedroom – First Floor		
Daytime [07:00 - 23:00]	43 dB(A)	-
Night-time [23:00 - 07:00]	36 dB(A)	54 dB(A)
Position 2 –Rear Bedroom – First Floor		
Daytime [07:00 - 23:00]	24 dB(A)	-
Night-time [23:00 - 07:00]	21 dB(A)	37 dB(A)

Table 5.1: Measured internal noise levels for daytime and night-time

***This is the maximum noise level that is not exceeded more than 10-15 times per night.**

It is understood that rooms to the front of the building are to be bedrooms. As shown in Table 5.1, noise levels in the front facing room exceeds the required criteria during night-time by a margin of 9 dB. It is recommended that the glazing / ventilation system of the front facade be upgraded to mitigate traffic noise from Old Shoreham Road to achieve the required criteria for daytime and night-time hours (additional assessment may be required).

Noise levels in the rear facade are compliant with the recommended criteria at all times.

Where possible, in order to meet the requirements of BS 8233: 2014, we would recommend that good acoustic design is followed, with flat layouts arranged with living rooms to the front façade and all bedrooms facing the rear. Where this is not possible, mitigation must be applied.

6.0 CONCLUSION

Internal noise surveys have been undertaken at 229 Old Shoreham Road, Southwick in order to measure the internal ambient noise levels within change of use residential spaces.

Measured noise levels have demonstrated noise levels in the front facing living room exceed the required criteria and it is recommended that the glazing / ventilation system be upgraded in order to reduce noise received in these rooms.

Noise levels in the rear bedroom are compliant with the recommended criteria.

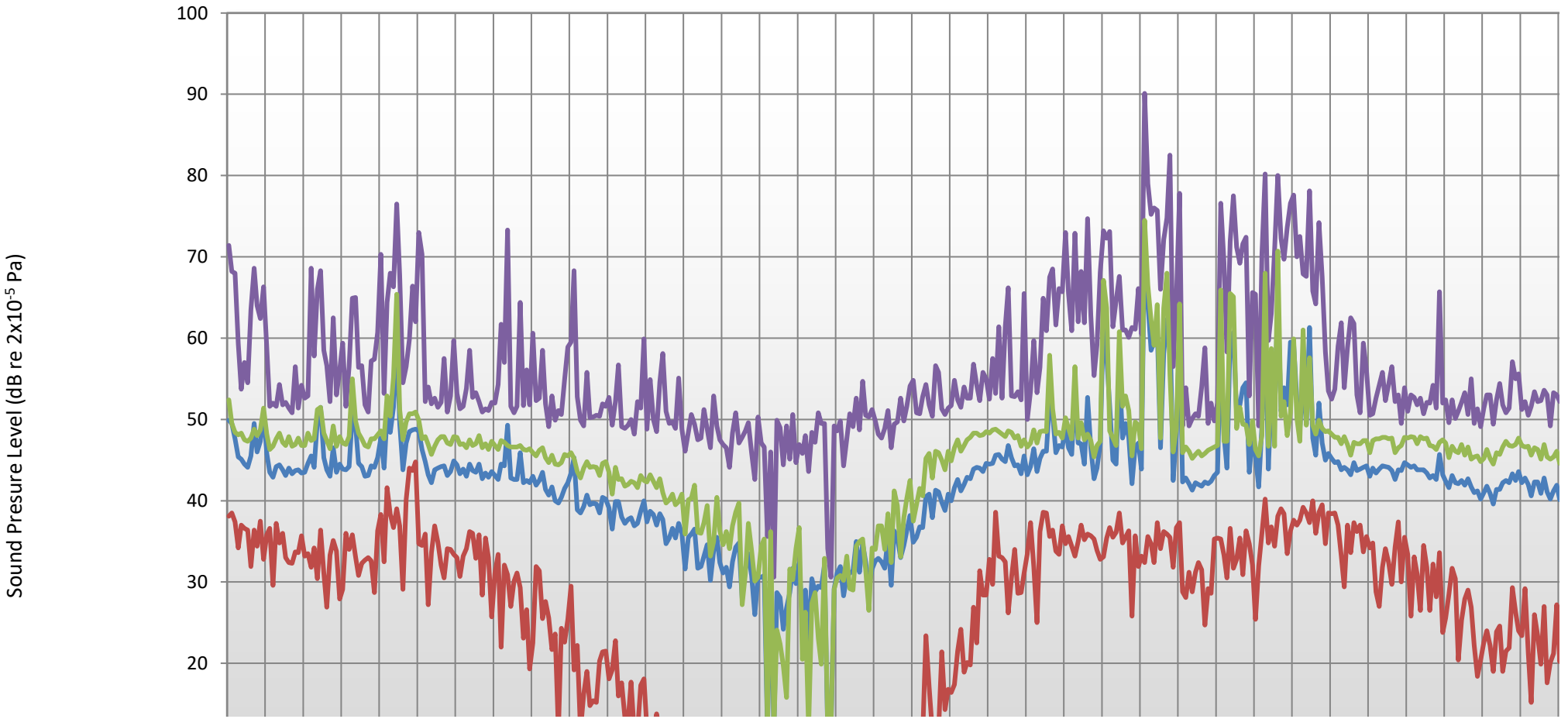
An additional assessment may be required in order to specify a suitable glazing system for the front.

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Reviewed & Approved	**John Smethurst** Director BSc (Hons) MIOA		11 July 2022

229 Shoreham Road, Southwick

Position 1

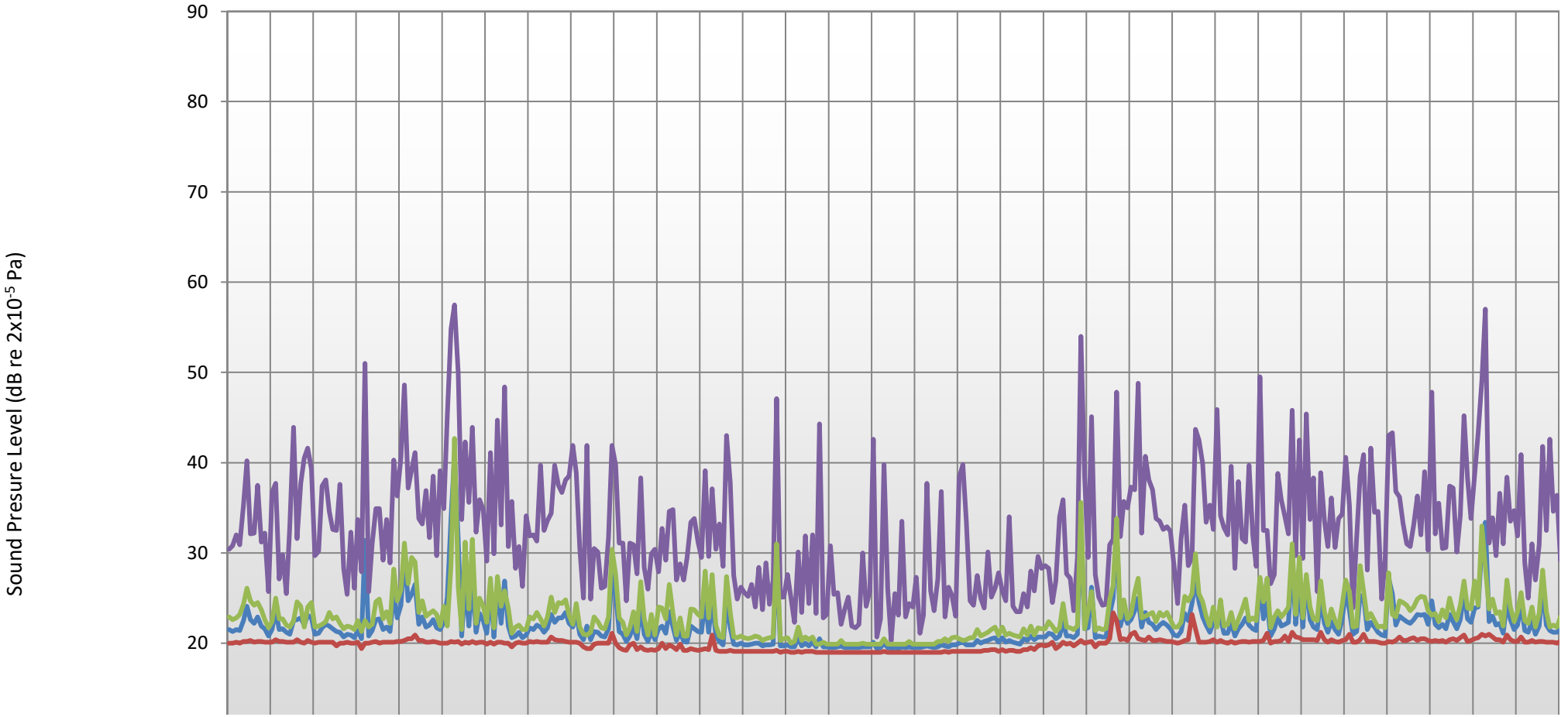
Environmental Noise Time History
07 June 2022 to 09 June 2022



229 Shoreham Road, Southwick

Position 2

Environmental Noise Time History
07 June 2022 to 09 June 2022



APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for not more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise

L_{90}

This is the level exceeded for not more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 10 such octave bands whose centre frequencies are defined in accordance with international standards.

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than one alone and 10 sources produce a 10 dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3 dB for each doubling of distance.

Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.