



Report No. DLW/7467

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for
Terence Fidler Partnership Ltd
65 High Street
Kings Langley
Hertfordshire
WD4 9HU

Dated: 13 March 2023

ACOUSTIC DESIGN STATEMENT

35B CHALK HILL

BUSHEY

WD19 4BL

Report Author: Eur Ing D L Watts BEng CEng FIOA

ACOUSTICAL INVESTIGATION & RESEARCH ORGANISATION LTD

Duxons Turn
Maylands Avenue
Hemel Hempstead
Hertfordshire
HP2 4SB

Telephone: +44(0)1442 247146
E-mail: airo@airo.co.uk
Web: <https://www.airo.co.uk/>

ACOUSTIC DESIGN STATEMENT**35B CHALK HILL****BUSHEY****WD19 4BL****1. INTRODUCTION**

The environmental noise effects of proposals to redevelop 35B Chalk Hill, Bushey, WD19 4BL have been assessed.

The proposals are to convert the existing office to provide a single dwelling.

The assessment has been based on a measurement survey at the site and the guidance given in ProPG: Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential Development (ref 1).

2. PROPG: PLANNING & NOISE

The guidance in ProPG describes two sequential stages: Stage 1 – an initial noise risk assessment of the proposed development site and Stage 2 – a systematic consideration of four key elements, leading to an Acoustic Design Statement.

The four elements of the Stage 2 assessment are:

Element 1 – demonstrating a “Good Acoustic Design Process”

Element 2 – observing internal “Noise Level Guidelines”

Element 3 – undertaking an “External Amenity Area Noise Assessment”

Element 4 – consideration of “Other Relevant Issues”

ProPG indicates that the scope is restricted to sites that are exposed predominantly to noise from transportation sources.

ProPG indicates that:

“Where industrial or commercial noise is present on the site and is considered to be “dominant” (i.e. where the impact would be rated as adverse or greater (subject to context) if a BS4142:2014 assessment was to be carried out), then the risk assessment should not be applied to the industrial or commercial noise component and regard should be had to the guidance in BS4142:2014.”

The application site is dominated by sound from road traffic.

3. INITIAL SITE NOISE RISK ASSESSMENT

An environmental sound measurement survey has been conducted at the site over the period 2 to 3 March 2023 and reported in Appendix A.

From this measurement survey, daytime and night-time period noise levels have been calculated for comparison with Figure 1 in ProPG. Table 1 sets out the period noise levels and the noise risk assessment (negligible, low, medium or high) guided by ProPG.

Table 1 – Initial Noise Risk Assessment (ProPG)			
Position	Period	Free-field Noise Level $L_{Aeq,T}$ (dB)	Noise Risk Assessment
	Daytime	69	Medium
	Night-time	61	High

The relevant advice from Figure 1 in ProPG is reproduced below:

“At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised,

and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.”

4. FULL PROPG ASSESSMENT

The four elements of assessment are set out below.

4.1 Element 1 – Good Acoustic Design Process

ProPG sets out a checklist of 7 items for consideration as part of Element 1. Table 2 below sets out the checklist and the responses in relation to the proposed development.

Table 2 – Element 1 Checklist	
The Planning Application Must	Response
(a) Check the feasibility of relocating or reducing noise levels from relevant sources.	The existing sources cannot be relocated.
(b) Consider options for planning the site or building layout.	The scheme is for the conversion of an existing building. The room least exposed to road noise traffic is to be a bedroom.
(c) Consider the orientation of proposed buildings.	See (b) above.
(d) Select construction types and methods for meeting building performance requirements.	See Section 4.2.
(e) Examine the effects of noise control measures on ventilation fire regulations, health and safety, cost, CDM (Construction, design and management) etc.	Only conventional noise control measures needed which are unlikely to significantly affect the areas cited.
(f) Assess viability of alternative solutions.	See (b) above.
(g) Assess external amenity area noise.	There are no external amenity spaces.

4.2 Element 2 – Internal Noise Level Guidelines

ProPG cites BS 8233 (ref 2) as suitable guidance for internal noise levels. ProPG provides additional guidance compared with BS 8233 in respect of maximum noise levels from regular individual noise events at night. Table 3 below summarizes the relevant internal noise level limits for environmental noise from these sources.

Table 3 – Internal Noise Level Design Limits			
Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living Room	35 dB $L_{Aeq,16h}$	--
Dining	Dining Room/area	40 dB $L_{Aeq,16h}$	--
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$ Not normally exceed 45 dB L_{AFmax} more than 10 times a night

From the measured noise levels inside a first floor room fronting Aldenham Road (see Appendix A), the daytime and night-time period noise levels have been determined from the measurements together with the maximum noise level at night. These are shown below in Table 4. Please note that daytime hours that have clearly been affected by internal activity (the office was open during the survey) have been excluded from the calculation of the period value.

Table 4 – Period and Maximum Noise Levels inside 35B Chalk Hill		
Position	Period	Noise Level (dB)
		Inside
Inside first floor room fronting London Road	Daytime ($L_{Aeq,16h}$)	33
	Night-time ($L_{Aeq,8h}$)	27
	Maximum (L_{AFmax})	44

The maximum noise level exceeded by 10 events (i.e. the maximum noise level of the eleventh noisiest event) has been identified from the time history noise level

data at the measurement position. It may be seen that the measured sound levels inside (see Table 4) meet the daytime criteria, marginally exceed the night-time period sound level criterion and exceed by 5 dB the maximum sound level criterion.

The soft furnishings typically found in a bedroom are likely to further reduce the sound level compared with the measurements made in a room serving as an office.

The reduction in sound level due to soft furnishings in a bedroom, should enable the night-time period sound level criterion of 30 dB to be met.

Soft bedroom furnishings should reduce the maximum sound levels of individual noise events at night compared with those measured. However, it remains likely that more than 10 events a night would exceed the guidance limit of 45 dB L_{AFmax} , based on the existing level of sound insulation provided by the building.

The estimated sound level reduction from outside to inside is about 36 dB. This suggests that the existing windows are highly sound insulating, The windows are understood to be triple glazed and were observed to be effectively sealed when shut.

Appendix A of ProPG provides detailed information in relation to noise events and indicates that the ProPG limit represents the onset of effects that might be observable (particularly in relation to lorry pass-bys) but required ***“55 dB L_{Amax} pass-bys to induce EEG awakenings”***.

BS 8233 indicates that the sound level limits reflected in ProPG are “desirable” and ***“Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved”***.

It may be challenging to improve the sound insulation compared with the existing situation. Secondary glazing could be provided but to be effective would normally require a reasonably wide spacing (100 to 150 mm) from the existing units which may involve a protruding framework inside the rooms.

Overall, AIRO would consider that the sound levels inside the completed and furnished dwelling would be satisfactory but maximum sound levels at night may be marginally above the ProPG guidance limit.

Paragraphs 2.33 and 2.34 of ProPG say:

***“2.33 It should be noted that the acoustic performance of the building envelope will be reduced in the event windows are opened for ventilation or cooling purposes, typically reducing the insulation to no more than 10 to 15 dB(A). Most residents value the ability to open windows at will, for a variety of reasons, and LPAs should therefore normally request that designers principally aim through the use of good acoustic design, to achieve the internal noise level guidelines in noise sensitive rooms with windows open. Where internal noise levels are assessed with windows closed the justification for this should be included in the ADS.*”**

2.34 Where the LPA accepts that there is a justification that the internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment. In such circumstances, internal noise levels can be assessed with windows closed but with any façade openings used to provide “whole dwelling ventilation” in accordance with Building Regulations Approved Document F (e.g. trickle ventilators) in the open position (see Supplementary Document 2). Furthermore in this scenario the internal L_{Aeq} target noise levels should not generally be exceeded.”

The minimum reductions necessary at the measurement locations exceed the reduction provided through a partially open window.

4.3 Element 3 – External Amenity Area Noise Assessment

There are no amenity areas forming part of the scheme.

4.4 Element 4 – Assessment of Other Relevant Issues

It is considered that there are no other relevant issues requiring assessment.

5. CONCLUSIONS

This report has set out an Acoustic Design Statement according to the process described in ProPG for the proposed residential redevelopment of 35B Chalk Hill, Bushey, WD19 4BL.

The initial site risk assessment shows the site to be medium to high risk.

The sound levels measured inside show that the sound insulation provided by the existing building enables internal sound level guidance limits to be met during the daytime. The introduction of soft furnishings in a bedroom compared with the existing office furnishings should enable the night-time period criterion to be met.

Maximum sound levels are discussed in some detail in the report. Overall, it is considered that in a suitably furnished bedroom, maximum sound levels are likely to be reasonable but slightly above the ProPG guidance limit.

It is not considered that further works to improve the already high sound insulation provided by the building façade would be warranted, particularly given the practical difficulties of achieving further meaningful increases in sound insulation.

Report Approved by:

Report Author:

A J Jones

D L Watts

A J Jones BSc PhD CPhys MInstP HonFIOA
Managing Director

Eur Ing D L Watts BEng CEng FIOA
Principal Consultant

REFERENCES

1. ProPG: Planning & Noise,
Professional Practice Guidance on Planning and Noise,
New Residential Development
Association of Noise Consultants, Institute of Acoustics and Chartered
Institute of Environmental Health
June 2017

2. British Standard BS 8233:2014
Guidance on sound insulation and noise reduction for buildings
British Standards Institution, 2014

APPENDIX A

Noise Survey Details

Figure A1 – Extract Drawing Indicating Measurement Locations

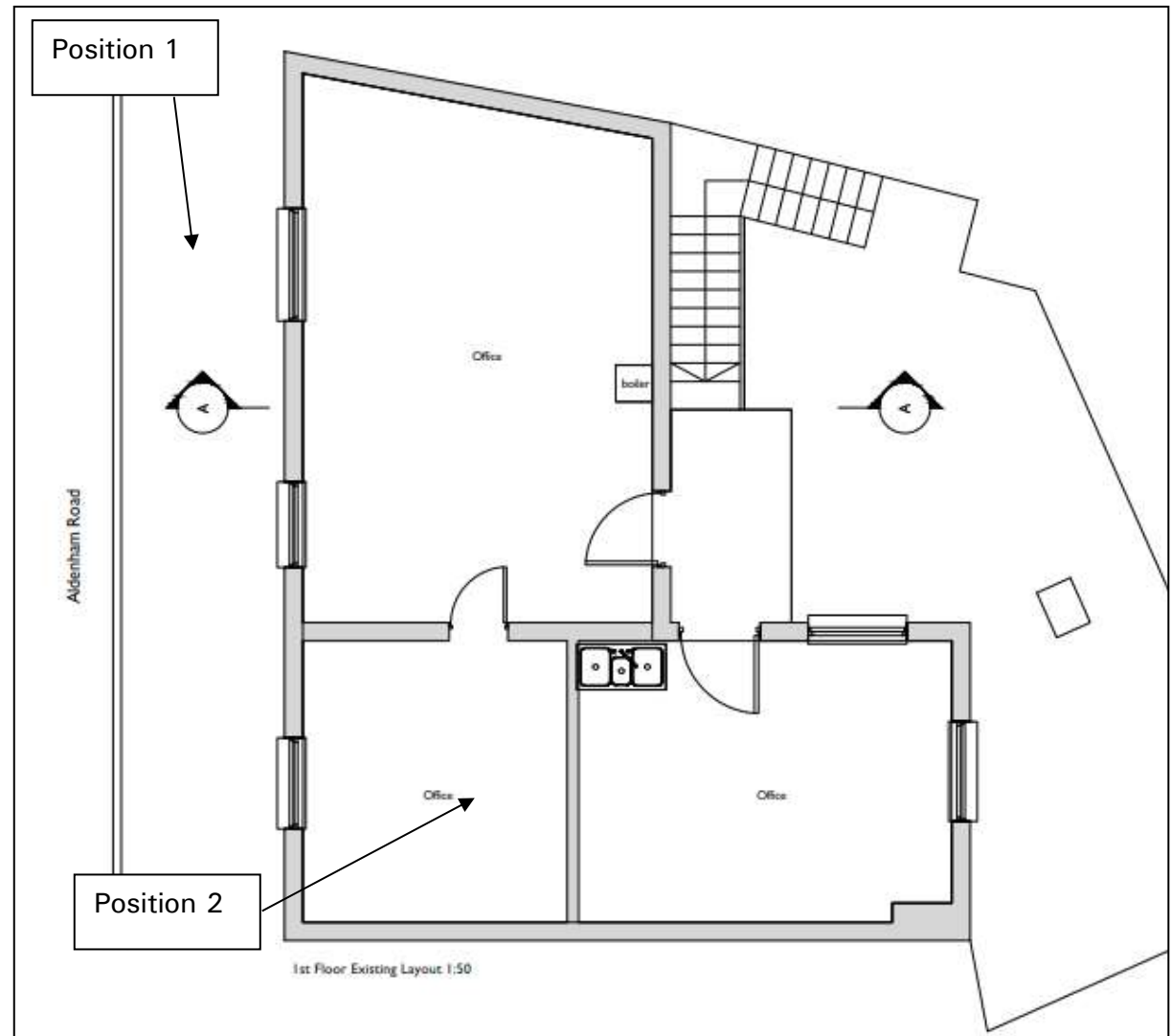


Table A1 – Sound Levels, 35B Chalk Hill, Bushey 2 to 3 March 2023

Hour Commencing	Sound Level in dB			
	Outside Façade		Inside	
	L_{Aeq}	L_{AFmax}	L_{Aeq}	L_{AFmax}
Thursday 2 March 2023				
12:00	71.6	--	34.7	--
13:00	72.2	--	48.9	--
14:00	72.0	--	35.4	--
15:00	71.8	--	38.5	--
16:00	72.0	--	36.8	--
17:00	73.9	--	40.2	--
18:00	71.4	--	34.7	--
19:00	71.2	--	35.0	--
20:00	70.3	--	34.0	--
21:00	69.9	--	34.0	--
22:00	68.7	--	33.1	--
23:00	66.5	93.5	32.2	61.4
Friday 3 March 2023				
00:00	61.9	84.5	29.7	49.3
01:00	60.3	87.1	29.6	56.7
02:00	57.8	84.6	28.5	45.6
03:00	56.8	80.3	28.9	43.5
04:00	59.9	82.7	29.4	50.1
05:00	65.6	98.4	31.7	62.1
06:00	69.0	88.9	33.5	57.2
07:00	71.4	--	35.6	--
08:00	71.3	--	35.5	--
09:00	71.9	--	37.2	--
10:00	71.6	--	37.3	--
11:00	71.5	--	35.1	--

Table A2 - Schedule of Noise Instrumentation		
Use	Type	Serial No.
Measuring System	SVAN958A	45502
Microphone	MK 255	17730
Pre-amplifier	SV12L	47652
Calibrator	CR:511E	41882
Measuring System	Norsonic Nor140	1406786
Microphone	Norsonic 1255	264702
Pre-amplifier	Norsonic 26AK	26575
Calibrator	Norsonic Nor1251	29213

CALIBRATION

AIRO is accredited by the United Kingdom Accreditation Service as a UKAS testing laboratory No. 0483 and although the measurements carried out for this survey are not listed on our schedule of accreditation, all of AIRO's noise and vibration measurement equipment is routinely calibrated as part of the calibration regime in our Quality Manual and these calibrations are traceable to National Standards.

In addition, the calibration level of the measuring equipment was checked at the start and the end of each survey period using the appropriate calibrator for the relevant meter.

Table A3 - Weather Conditions		
	2 March 2023	3 March 2023
Temperature °C	6	4
Relative Humidity %	71	80
Wind Speed m/s	1	1
Wind Direction	E	NE