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Birk Avenue, Kendray, Barnsley, S70 3AL

Noise Impact Assessment

For:
White Agus Ltd

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Contents

1 Introduction

1.1 Overview

Environmental Noise Solutions Ltd (ENS) has been commissioned by White Agus Ltd (hereafter referred to as 'the client') to undertake a noise impact assessment for the redevelopment of the former Tote Bookmaters at Birking Avenue, Kendray, Barnsley, S70 3AL (hereafter referred to as 'the site').

This report details:

- The methodology and results of a noise survey conducted at the site
- The assessment of potential impact of surrounding noise sources that may affect the proposed residential units
- Recommendations for the building envelope (fenestration and ventilation)

This report details the methodology and results of the assessment and has been prepared to support a planning application for the development.

The report has been prepared on behalf of the client for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult the client and ENS as to the extent to which the findings may be appropriate for their use.

A glossary of acoustic terms used in the main body of the text is contained in Appendix A.

1.2 Site Description and Development Proposals

The site location is a disused two-storey property adjacent to the northern façade of Central Garage MOT Test Centre, in an area of predominantly residential uses. Barnsley Central Working Men's Club lies approximately 24m south of the site boundary, with access to the car park adjacent to the western site boundary.

Figure 1.1 below indicates the approximate site location in red.

Figure 1.1: Location of Proposed Development

2 Noise Criteria

2.1 Assessment Guidance

British Standard 8233:2014 - Guidance on Sound Insulation and Noise Reduction for Buildings

British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS8233)[1] provides recommendations for the control of noise both in and around buildings and suggests criteria and limits appropriate to their function. For residential dwellings, the main considerations are:

- Bedrooms - the effect of noise upon sleep
- Other habitable rooms - the effect of noise upon resting, listening and communicating

It is desirable that the internal ambient noise level does not exceed the guideline values as replicated in Table 2.1.

Table 2.1: Indoor Ambient Noise Levels for Dwellings - BS8233:2014

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

BS8233 states:

'If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.'

Whilst BS 8233 is primarily concerned with noise within dwellings, the following guidance is also provided for external amenity areas:

"For traditional external areas that are used for amenity space, such as gardens or patios it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited".

[1] British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings. BSI

ProPG Planning and Noise: New Residential Development

ProPG Planning and Noise: New Residential Development (ProPG)[2] recommends compliance with indoor noise level targets in residential dwellings based on the guidance contained in BS8233 (see Table 2.1). Additionally, with regard to individual noise events, ProPG states:

'Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline, then the judgement of acceptability will depend not only on the maximum noise levels but also factors such as the source, number, distribution, predictability and regularity of the noise events."

ProPG acknowledges that the internal target noise levels may only be practically achieved with windows closed in certain areas (e.g. in urban areas or sites adjacent to transportation noise sources) and states that:

'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).

It should also be noted that the internal noise level guidelines are generally not applicable under 'purge ventilation' conditions as defined by Building Regulations Approved Document F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).'

[2] 'ProPG Planning and Noise: New Residential Development (ProPG)', 2017. Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH)

3 Noise Survey and Results

3.1 Overview

Noise monitoring was undertaken at the site between Friday 20th and Saturday 21st September 2024 and on Wednesday 30th October 2024

The adopted noise monitoring positions (illustrated in Appendix B) were as follows:

- 1 – at the eastern façade at first floor level;
- 2 – at the north-western façade at first floor level; and
- 3 – approximately 4m east of the site boundary.
- 4 – internally within the existing building

All noise measurements were undertaken using a Bruel & Kjaer 2250 Type 1 integrating sound level meter. The meter was connected to a windshield covered microphone at all times.

The calibration of each measurement system was verified immediately before and after the survey period using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration levels greater than 0.5 dB was noted.

Measurements consisted of A–weighted broadband parameters including L_{Aeq}, L_{A10}, L_{A90} and $L_{Amax,F}$ together with linear octave band data.

3.2 Summary of Results

Table 3.1 presents a summary of the noise data for each measurement session, at each measurement position, rounded to the nearest decibel. All measurements at position 1 and 2 were made within 3m of a façade, therefore the presented noise levels include a 3 dB correction to approximate free-field levels.

Table 3.1: Summary of Noise Measurement Data

Position	Date	Time (hh:mm)	$L_{Aeq,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
1	20/09/24	10:19-10:49	66	68	50
		12:08-12:38	64	68	50
		20:08-20:40	61	65	45
	21/09/24	21:47-22:18	63	64	42
2	20/09/24	10:51-11:22	64	68	51
		12:40-13:10	64	68	49
		20:42-21:13	60	65	43
	21/09/24	22:19-22:50	58	60	39
3	20/09/24	11:32-12:05	63	67	52
		13:12-13:44	65	68	53
	21/09/24	21:15-21:45	70	63	43
		22:52-23:23	57	60	43
Internal	30/10/24	15:40-16:40	40	43	27

In terms of individual events, noise levels at the northern façade were typically ≤ 74 dB $L_{Amax,F}$.

The noise climate at monitoring positions 1 and 3 was controlled by local road traffic along Birk Avenue during the daytime. Noise levels at monitoring position 3 were controlled by road traffic noise and noise from Central Garage during the daytime.

During the evening period on Saturday 21st, music noise from Barnsley Central WMC was audible at all monitoring positions, most prominently at position 3. Noise from traffic movements to and from the car park and human activities around the WMC was also observed during the late evening.

Internal noise levels were measured between 15:40 and 16:40, to assess noise transfer from the adjacent commercial premises and other external noise sources such as road traffic. The results indicate that road traffic noise is the primary noise source internally, with no noise transfer from commercial sources audible internally.

4 Assessment

4.1 Feasibility of Open Windows

With regard to internal noise levels when windows are open, the World Health Organisation (WHO) Guidelines for Community Noise (1999) states:

'the noise reduction from outside to inside with the window partly open is 15 decibels'.

Based on the results summarised in Section 3, external noise levels are such that ventilation via partially open windows or non-acoustic trickle ventilators would not be suitable.

On this basis, it is not recommended that permanently open windows or standard (non-acoustic) trickle vents are relied upon as the primary means of ventilation for proposed habitable rooms in these areas.

A scheme of sound insulation will be required with acoustically attenuated ventilation such that the minimum ventilation rates specified in Approved Document Part F can be achieved with windows closed. A scheme of sound insulation is set out below which is designed to provide suitable internal ambient noise levels for normal ventilation rates (according to Approved Document Part F).

4.2 Sound Insulation

A scheme of sound insulation has been formulated to satisfy the internal ambient noise level criteria set out in Section 2, including limiting individual events to a level not exceeding 45 dB $L_{Amax,F}$ more than 10 times per night.

The sound insulation requirements of the building envelope have been calculated based on the methodology set out in Annex G of BS 8233.

All dwellings should be provided with a fully mechanical ventilation system providing supply and extract ventilation without façade openings or trickle vents. The proposed ventilation systems should be capable of achieving the minimum ventilation rates set out in Approved Document Part F without partially open windows or other simple façade openings.

Table 4.1 below presents suitable glazing sound insulation performance requirements for dwellings within the development.

Table 4.1: Required Sound Reduction of Façade Elements

Element	Required Sound Reduction (dB)						Indicative Specification
	125 Hz	250 Hz	500 Hz	1kHz	2kHz	Weighted R_w ($R_w + C_{tr}$) / $D_{n,e,w}$ ($D_{n,e,w} + C_{tr}$)	
Studio Two							
Glazing	24	30	39	47	45	**45 (36)**	6/15/6.6 Acoustic double glazing
Studio One and Three							
Glazing	20	21	33	40	36	**33 (29)**	8/6-20/6 Acoustic double glazing

Alternative solutions to the indicative specifications shown in Table 4.1 may be considered if sound reduction performances are equivalent to (or greater than) those stipulated.

The glazing recommendations apply to the window within a sealed unit. It is the responsibility of the window supplier to ensure that the window frame does not compromise the performance of the glazing.

The proposed ventilation solutions should be checked by mechanical services engineer against the requirements of Approved Document Part F (ADF) before designs are finalised.

5 Summary and Conclusions

A noise impact assessment has been performed for a new residential development at the former Tote Bookmakers, Birk Avenue, Barnsley.

A noise survey was undertaken at the site, to assess noise levels from existing noise sources. The noise climate was found to be controlled primarily by noise from local and distant road traffic with contributions from nearby commercial uses.

Section 4 of this report sets out proposals for a scheme of sound insulation which is considered to achieve suitable residential amenity for the proposed new dwellings.

Appendix A – Abbreviations and Definitions

Sound Pressure Level (L_p)
The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_o)$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_o = reference sound pressure (20 μPa).

A-weighting
A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,\,T}$
The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, *T*, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq,\,16h}$ (07:00 to 23:00 hours) and $L_{Aeq,\,8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10,\,T}$
The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10,\,18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90,\,T}$
The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF\,max}$
The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Single Event Level / Sound Exposure Level (SEL or L_{AE})
The energy produced by a discrete noise event averaged over one second, regardless of the event duration. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_W)
Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix B – Noise Monitoring Positions