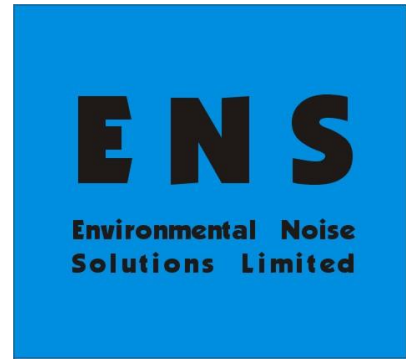




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Proposed Residential Development Wood Lane Barn, Land Off Wood Lane, Mirfield, HD5 0PX

Noise Impact Assessment

**For:
L'Arche Developments**

10th October 2023

Ref: NIA-11099-23-11289-v1 Woodlane Barn, Mirfield
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1 Introduction

1.1 Overview

Environmental Noise Solutions Ltd (ENS) has been commissioned by L'Arche Developments to undertake a noise survey and assessment for a proposed residential conversion at Wood Lane Barn, Land off Wood Lane, Mirfield, HD5 0PX (hereafter referred to as 'the site').

Prior Approval (ref: 2021/CLASS Q/93188/W) for the conversion was granted by Kirklees Council in December 2021, subject to conditions. Condition 9 relates to the control of noise as follows:

9. *Before work to convert the building commences a report specifying the measures to be taken to protect the future occupiers of the development from noise from the nearby railway shall be submitted to and approved in writing by the Local Planning Authority.*

The report shall: -

- a) Determine the existing noise climate*
- b) Predict the noise climate in gardens (daytime), bedrooms (night-time) and other habitable rooms of the development*
- c) Detail the proposed attenuation/design necessary to protect the amenity of the occupants of the new residences (including ventilation if required).*

The development shall not be occupied until all works specified in the approved report have been carried out in full and such works shall be thereafter retained.

The objectives of the noise impact assessment were therefore to:

- Determine external noise levels at the site
- Assess the potential impact of the external noise climate on the proposed residential development with reference to relevant guidelines
- Provide recommendations for a scheme of sound attenuation works, as necessary, to protect future occupants of the proposed residential development from a loss of amenity due to noise

This report details the methodology and results of the assessment and provides recommendations for the building envelope (fenestration and ventilation). It has been prepared to aid in the discharge of Condition 9 of Prior Approval ref: 2021/CLASS Q/93188/W.

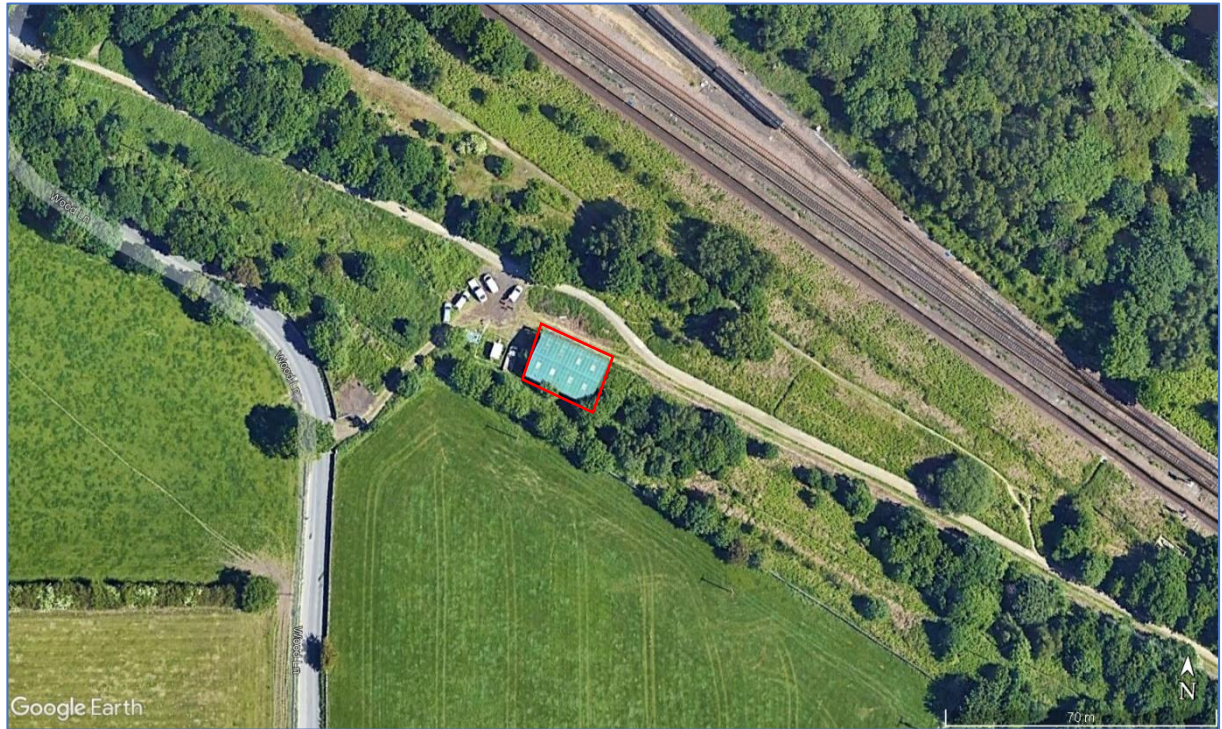
The report has been prepared for L'Arche Developments for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult L'Arche Developments and ENS as to the extent to which the findings may be appropriate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

A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

1.2 Site Description and Development Proposals

The site is located at land off Wood Lane, Mirfield, and comprises a single derelict barn as shown (highlighted in red) in Figure 1.1.

Figure 1.1: Location of Proposed Development



The site is bound by:

- A public footpath to the north with the Huddersfield Line railway line further beyond
- Agricultural land to the south and east
- Agricultural land to the west with Wood Lane further beyond

The ambient noise climate at the site is due to local and distant road traffic, intermittent aircraft flyovers and intermittent train passes along the Huddersfield Line.

For reference, the Huddersfield Line is set back circa 60 metres from the existing barn and situated in a deep cutting.

Development proposals are for the conversion of the existing barn to form a residential dwelling.

2 Policy Context and Assessment Guidance

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)¹ was updated in 2023 and sets out the Government's planning policies for England and how these are expected to be applied.

Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 174 where it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of.....noise pollution'.

Paragraph 185 advises that:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should.....mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life'.

The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NPSE) which reinforces and supplements the NPPF.

2.2 Noise Policy Statement for England

The Noise Policy Statement for England² (NPSE) sets out the long-term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This long-term vision is supported by the following aims:

- Avoid significant adverse impacts on health and quality of life
- Mitigate and minimise adverse impacts on health and quality of life
- Where possible, contribute to the improvement of health and quality of life

The NPSE describes the following levels at which noise impacts may be identified:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected
- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur

According to the explanatory notes in the statement, where a noise level falls between the lowest observable adverse effect level (LOAEL) and a level which represents a significant observable adverse effect level (SOAEL):

'....all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur.'

1 National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2023)

2 Government Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. March 2010.

2.3 Planning Practice Guidance on Noise

Planning Practice Guidance³ (PPG) is an online resource which provides additional guidance and elaboration on the NPPF. It advises that the Local Planning Authority should consider the acoustic environment in relation to:

- Whether or not a significant adverse effect is occurring or likely to occur
- Whether or not an adverse effect is occurring or likely to occur
- Whether or not a good standard of amenity can be achieved

In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

‘...the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation’.

The PPG also provides general advice on the typical options available for mitigating noise, suggesting that Local Plans may include noise standards applicable to proposed developments within the Local Authority’s administrative boundary, although it states that:

‘Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed’.

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. The following guidance documents provide some meaningful context.

2.4 ProPG Planning and Noise: New Residential Development

ProPG Planning and Noise: New Residential Development (ProPG)⁴ was published in 2017 by the Association of Noise Consultants, Institute of Acoustics and the Chartered Institute of Environmental Health.

Stage 2: Element 2 of ProPG sets indoor ambient noise levels for residential dwellings based on the guidance contained in British Standard 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’⁵ (BS 8233), see Table 2.1.

Table 2.1: Indoor Ambient Noise Levels in Dwellings

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB L _{Aeq} (0700-2300)	-
Dining	Dining Room/Area	40 dB L _{Aeq} (0700-2300)	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq} (0700-2300)	30 dB L _{Aeq} (2300-0700) 45 dB L _{AFMax} (2300-0700)

³ Planning Practice Guidance on Noise: <http://planningguidance.planningportal.gov.uk/blog/guidance/noise/>

⁴ ‘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)

⁵ British Standards Institution (2014). *British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings*.

Note 4 to the above table states:

'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.'

Note 5 to the above table states:

'Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7'.

This is consistent with the guidance contained within the PPG, which states that:

'... consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations'.

On the basis of the above, the following criteria (with windows closed and an alternative means of ventilation provided) are considered appropriate for the proposed development and considered to represent good resting and sleeping conditions:

- ≤ 35 dB L_{Aeq} (0700-2300) in habitable rooms during the daytime
- ≤ 30 dB L_{Aeq} (2300-0700) in bedrooms during the night-time
- 45 dB L_{AFMax} not regularly exceeded in bedrooms during the night-time

With regard to external amenity, ProPG reflects the advice given in BS 8233 as follows:

'The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50–55 dB $L_{Aeq,16hr}$.'

'These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces.'

3 Noise Survey

3.1 Overview

In order to determine the level of external noise affecting the proposed development, noise monitoring was carried out on Monday 11th September through to Tuesday 12th September 2023.

For the purpose of the assessment, a single noise monitoring position (MP1) was adopted on the northern elevation of the existing barn building (the approximate location of the monitoring position is shown in Appendix 2).

Noise measurements were undertaken at 1 metre from the existing façade of the barn at 1.5 metres above ground level using an NTi XL3 Type 1 integrating sound level meter. The meter was connected to a windshield covered microphone positioned at the location detailed above.

The measurement system calibration 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_{AFmax} together with octave band data.

3.2 Summary

Table 3.1 contains a summary of the measurement data for each measurement session, rounded to the nearest decibel. As noise measurements were made at 1 metre from an existing building façade, a –3 decibel façade enhancement correction has been applied to the measured levels in order to establish the free field level.

Table 3.1: Summary of Noise Measurement Data

Position	Date	Time	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	$L_{A90,T}$ (dB)	$L_{A10,T}$ (dB)	Comment
MP1	11/09/23	0935–2000	42	67	37	45	Distant traffic, intermittent train passes and intermittent vehicles along Wood Lane
		2000–2300	37	57	33	40	
	11-12/09/23	2300–0700	45	60*	36	49	Rain showers dominant, distant traffic, intermittent train passes and intermittent vehicles along Wood Lane
* 11 th highest maximum noise level event during the night-time							

During the daytime, ambient noise levels were due to local and distant traffic, intermittent train passes on the Huddersfield Line and intermittent aircraft. Ambient noise levels during the day were measured at circa 42 dB L_{Aeq} (0700–2300), which is very low.

Whilst noise measurements during the night-time were impacted by rain noise, the measured ambient noise levels were still relatively low.

Maximum noise level events during the night-time were measured at typically 60 dB L_{AFmax} , but in the absence of rain noise this level is likely to be much lower. For reference, the absolute highest maximum noise level event during the evening (prior to the onset of rain) was typically 57 dB L_{AFmax} .

For reference, the Huddersfield Line is 60 metres from the existing barn and situated in a deep cutting. As a consequence, noise levels due to train passes are not significant, with no individual train pass exceeding 57 dB L_{AFmax} at the building footprint.

4 Noise Assessment

4.1 Internal Amenity

Whilst night-time measurements at MP1 were affected by rain noise, the noise levels remained relatively low, at **45 dB L_{Aeq} (2300-0700)** and typically **60 dB L_{AFMax}** .

In order to calculate the sound insulation requirements of the building envelope for habitable rooms throughout the development, the Building Research Establishment (BRE) building envelope insulation calculation spreadsheet was used. This spreadsheet is based on the calculation methodology advocated in BS 8233. The spreadsheet allows input of external noise levels, typical room dimensions and reverberation time together with parameters for the various elements of the building envelope and calculates the internal noise level in terms of the external noise level metric (L_{Aeq} and L_{AFMax} in this case).

As evidenced in the calculation sheet below, a typical standard double-glazed window (rated at least 29 dB R_w) with standard trickle vents will provide circa 25 dB(A) sound insulation from external to internal at the site.

Figure 4.1: Example BRE Calculation Spreadsheet

BRE Building Envelope Insulation

Switch to Reverberation Time Calculation

2) Select elements of facade structure, and enter corresponding internal surface area in m² OR enter number of vents.

1) Enter room dimensions or volume

Use dimensions

x [] m

y [] m

z [] m

Volume [] m³

OR

Use volume

[30] m³

3) Enter reverberation time of the room.

[0.5] seconds

4) Select exterior sound level type

Option (A) ☒ User defined spectrum

45 dB L_{Aeq} (Night)

View/Edit Data

Option (B) ☐ Spectrum shape

Select spectrum shape and enter free field exterior sound level, L_{Aeq} (considering only the octave bands between 125Hz and 2kHz)

L_{Aeq} [45] dB

ISO 717 - 1 (C)

View Data

Internal sound level

L_{Aeq} [19.7] dB

For reference, 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 dB.”

The resultant internal noise levels are set out in the table below.

Table 4.1 – External Noise Levels and Resultant Internal Noise Levels

External Noise Level	Reduction	Resultant Internal Level	Comment
≤ 45 dB L_{Aeq} (2300-0700) ≤ 60 dB L_{AFMax}	–25 dB (closed windows)	≤ 20 dB L_{Aeq} (2300-0700) ≤ 35 dB L_{AFMax}	Very good internal noise levels with closed windows
	–15 dB (open windows)	≤ 30 dB L_{Aeq} (2300-0700) ≤ 45 dB L_{AFMax}	Good internal noise levels with open windows

On the basis of the above, standard double glazing (i.e. 4 mm glass / 12 mm cavity / 4 mm glass) and standard trickle vents are appropriate throughout the development.

4.2 External Amenity

Daytime ambient noise levels at MP1 were measured at circa **42 dB L_{Aeq} (0700-2300)**. Such levels are comfortably below the desirable value described in ProPG/BS 8233 for gardens.

On this basis, there is no issue with respect to external amenity.

5 Summary and Conclusions

A noise impact assessment has been undertaken for the proposed residential conversion at Wood Lane Barn, Land off Wood Lane, Mirfield, HD5 0PX.

The ambient noise climate at the site is due to local and distant road traffic, intermittent aircraft flyovers and intermittent train passes along the Huddersfield Line.

Ambient noise levels at the site are relatively low. As a consequence, standard double glazing and standard trickle vents are appropriate throughout the development and there are no issues with respect to external amenity.

Appendix 1 – 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:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = 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 2 – Noise Measurement Position

