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# **Proposed (Outline) Residential Development Land to South of Pit Lane, Wombwell, Barnsley**

## **Noise Impact Assessment**

**For:**  
**Crest Nicholson Yorkshire**

12<sup>th</sup> September 2025

Ref: NIA-11128-23-11436-v2 Pit Lane, Wombwell

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# 1 Introduction

## 1.1 Overview

Environmental Noise Solutions Ltd (ENS) has been commissioned by Crest Nicholson Yorkshire to undertake a noise survey and assessment for a proposed (outline) residential development on land south of Pit Lane, Wombwell, Barnsley (hereafter referred to as 'the site').

The objectives of the noise impact assessment were 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 outline recommendations for noise mitigation measures (be it layout, enhanced building envelope and/or boundary treatments) to avoid any unacceptable 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) and boundary treatments. It has been prepared to accompany Planning Application ref: 2025/0514, submitted to Barnsley Metropolitan District Council.

The report has been prepared for Crest Nicholson Yorkshire 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 Crest Nicholson Yorkshire 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 in a predominantly residential setting on the western fringe of Wombwell, as shown (highlighted in red) in Figure 1.1.

**Figure 1.1: Location of Development**



The noise environment at the site is characterised by road traffic on Pit Lane to the north, distant road traffic on the surrounding road network, and train passes on the Penistone railway line to the west.

Development proposals are for 280 residential dwellings with associated landscaping and access roads.

Outline planning permission is sought for the proposed development and, as a consequence, the layout plan is preliminary. Notwithstanding this, the objective of the noise impact assessment is to assess whether the ambient noise climate represents a constraint to the proposed development.

## 2 Policy Context and Assessment Guidance

### 2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)<sup>1</sup> was updated in December 2024 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 187 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 198 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 England<sup>2</sup> (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 Guidance<sup>3</sup> (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.

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)<sup>4</sup> 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'<sup>5</sup> (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 <sub>Aeq</sub> (0700-2300)	-
Dining	Dining Room/Area	40 dB L <sub>Aeq</sub> (0700-2300)	-
Sleeping (daytime resting)	Bedroom	35 dB L <sub>Aeq</sub> (0700-2300)	30 dB L <sub>Aeq</sub> (2300-0700) 45 dB L <sub>AFMax</sub> (2300-0700)

Note 4 to the above table states:

*'A guideline value may be set in terms of SEL or L<sub>Amax,F</sub>, 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<sub>Amax,F</sub> more than 10 times a night.'*

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 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:

- $\leq 35$  dB  $L_{Aeq}$  (0700-2300) in habitable rooms during the daytime
- $\leq 30$  dB  $L_{Aeq}$  (2300-0700) in bedrooms during the night-time
- 45 dB  $L_{AFMax}$  not regularly exceeded 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 Tuesday 3<sup>rd</sup> October through to Wednesday 4<sup>th</sup> October 2023.

The adopted noise monitoring positions (shown in Appendix 2) were as follows:

- MP1 was located at the southern tip of the site
- MP2 was located at the western tip of the site
- MP3 was located at 5 metres distance from Pit Lane at the northern boundary
- MP4 was located at the south-eastern corner of the site

Noise measurements were undertaken in free field conditions at 4 metres above ground level using Bruel & Kjaer 2250 Type 1 integrating sound level meters. Each meter was connected to a windshield covered microphone positioned at the locations 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 linear octave band data.

The noted weather conditions during the survey were dry with wind speeds < 5 m/s. Weather conditions were therefore considered appropriate for noise monitoring.

### 3.2 Summary

Table 3.1 presents a summary of the noise data for each measurement session, at each measurement position, rounded to the nearest decibel.

**Table 3.1: Summary of Noise Measurement Data**

Position	Date	Time	$L_{Aeq}$ (dB)	$L_{A90}$ (dB)	$L_{A10}$ (dB)	$L_{AFMax}$ (dB)	Comment
MP1	03/10/2023	1252–1352	48	44	50	66	Distant road traffic and occasional train passes (up to 66 dB $L_{AFMax}$ ), birdsong
		1530–1630	48	43	49	66	
		1630–1700	47	42	48	65	
	04/10/2023	0630–0730	46	44	48	54	
MP2	03/10/2023	1405–1505	47	42	48	62	Distant road traffic and occasional distant train passes
MP3	03/10/2023	1720–1820	58	43	56	80	Occasional vehicle passes on Pit Lane dominant (maximum noise levels typically 80 dB $L_{AFMax}$ ), distant road traffic
	04/10/2023	0515–0610	50	40	44	82	
MP4	03/10/2023	1405–1505	47	44	49	60	Distant road traffic

### 3.3 Analysis

Noise levels at the northern site boundary (MP3) were predominantly due to passing traffic along Pit Lane. Noise levels at MP3 were circa 58 dB  $L_{Aeq,T}$  during the daytime and 50 dB  $L_{Aeq,T}$  during the night-time period, with maximum noise levels of typically 80 dB  $L_{AFmax}$  due to passing vehicles.

Noise levels across the remainder of the site were lower, with daytime and night-time ambient noise levels of  $\leq 48$  dB  $L_{Aeq,T}$  and  $\leq 46$  dB  $L_{Aeq,T}$  respectively. Maximum noise levels associated with train passes were measured at up to 66 dB  $L_{AFmax}$  at MP1, and up to 62 dB  $L_{AFmax}$  at MP2.

## 4 Noise Assessment

### 4.1 Design Noise Levels

Noise levels at the northern development footprint are as follows:

- $\leq 58 \text{ dB } L_{Aeq, T}$  during the daytime
- $\leq 50 \text{ dB } L_{Aeq, T}$  during the night-time
- $\leq 80 \text{ dB } L_{AFMax}$  during night-time

Noise levels at the southern development footprint are as follows:

- $\leq 48 \text{ dB } L_{Aeq, T}$  during the daytime
- $\leq 46 \text{ dB } L_{Aeq, T}$  during the night-time
- $\leq 66 \text{ dB } L_{AFMax}$  due to train passes

Noise levels throughout the remainder of the site reduce with increasing distance from the road and railway line and will reduce further once the development is built out due to screening afforded by the dwellings themselves.

### 4.2 Internal Amenity

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).

It is assumed that the residential development footprint will follow the preliminary site layout, with dwellings set back circa 5 metres from Pit Lane.

On this basis, road-fronting bedrooms of plots adjacent to Pit Lane should be fitted with enhanced laminated glazing rated at least **38 dB  $R_w+C_{tr}$**  (such as 10 mm glass / 16 Argon / 8.8 Pilkington Optiphon) in conjunction with acoustic wall vents rated at least **41 dB  $D_{n,e,w}+C_{tr}$**  per 8000 mm<sup>2</sup> EA (vent open), such as the Ryton AAC125HP or equivalent.

As evidenced in the calculation sheet overleaf, this configuration will provide circa 35 dB(A) sound insulation from external to internal at the site.

Note: It is the control of discrete event maxima from passing vehicles during the night-time which governs the glazing/ventilation requirements in road-fronting bedrooms.

**Figure 4.1: BRE Calculation Spreadsheet (road-fronting bedrooms)**

<p><b>BRE</b></p> <p>1) Enter room dimensions or volume</p> <p><input type="radio"/> Use dimensions</p> <p>x <input type="text"/> m</p> <p>y <input type="text"/> m</p> <p>z <input type="text"/> m</p> <p>Volume <input type="text"/> m<sup>3</sup></p> <p>OR</p> <p><input checked="" type="radio"/> Use volume</p> <p><input type="text" value="25"/> m<sup>3</sup></p>	<p><b>Building Envelope Insulation</b></p> <p>2) Select elements of facade structure, and enter corresponding internal surface area in m<sup>2</sup> OR enter number of vents.</p> <p style="text-align: right;">Surface area OR number of vents</p> <table border="1"> <tr> <td>Wall 1</td> <td>Brick/block cavity</td> <td>5</td> <td>m<sup>2</sup></td> </tr> <tr> <td>Wall 2</td> <td>None</td> <td></td> <td>m<sup>2</sup></td> </tr> <tr> <td>Window 1</td> <td>10/16/8.8 Phon</td> <td>1.5</td> <td>m<sup>2</sup></td> </tr> <tr> <td>Window 2</td> <td>None</td> <td></td> <td>m<sup>2</sup></td> </tr> <tr> <td>Door</td> <td>None</td> <td></td> <td>m<sup>2</sup></td> </tr> <tr> <td>Roof/Ceiling</td> <td>None</td> <td></td> <td>m<sup>2</sup></td> </tr> <tr> <td>Vent 1</td> <td>Ryton AAC125HP</td> <td>1</td> <td></td> </tr> <tr> <td>Vent 2</td> <td>None</td> <td></td> <td></td> </tr> </table> <p style="text-align: right;">View/Edit Data</p>	Wall 1	Brick/block cavity	5	m <sup>2</sup>	Wall 2	None		m <sup>2</sup>	Window 1	10/16/8.8 Phon	1.5	m <sup>2</sup>	Window 2	None		m <sup>2</sup>	Door	None		m <sup>2</sup>	Roof/Ceiling	None		m <sup>2</sup>	Vent 1	Ryton AAC125HP	1		Vent 2	None			<p style="text-align: center;">Switch to Reverberation Time Calculation</p> <p style="text-align: center;">HELP</p>	<p>4) Select exterior sound level type</p> <p>Option (A) <input checked="" type="radio"/> User defined spectrum</p> <p><input type="text" value="80 dB LAFMax"/></p> <p style="text-align: right;">View/Edit Data</p> <p>Option (B) <input type="radio"/> Spectrum shape</p> <p>Select spectrum shape and enter free field exterior sound level, <math>L_{Aeq}</math> (considering only the octave bands between 125Hz and 2kHz)</p> <p><math>L_{Aeq}</math> <input type="text" value="80"/> dB</p> <p><input type="text" value="ISO 717 - 1 (Ctr)"/></p> <p style="text-align: right;">View Data</p>
	Wall 1	Brick/block cavity	5	m <sup>2</sup>																															
Wall 2	None		m <sup>2</sup>																																
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Roof/Ceiling	None		m <sup>2</sup>																																
Vent 1	Ryton AAC125HP	1																																	
Vent 2	None																																		
<p>3) Enter reverberation time of the room.</p> <p><input type="text" value="0.5"/> seconds</p>		<p><b>Internal sound level</b></p> <p><math>L_{AFMax}</math> <input type="text" value="44.8"/> dB</p>																																	

Road-fronting living rooms of plots adjacent to Pit Lane should be fitted with enhanced glazing rated at least **29 dB  $R_w+C_{tr}$**  (such as 8 mm glass / 6–20 mm cavity / 4 mm glass) in conjunction with acoustic wall vents rated at least **41 dB  $D_{n,e,w}+C_{tr}$**  (vent open).

As evidenced in the calculation sheet below, this configuration will provide circa 30 dB(A) sound insulation from external to internal at the site.

**Figure 4.2: BRE Calculation Spreadsheet (road-fronting living rooms)**

<p><b>BRE</b></p> <p>1) Enter room dimensions or volume</p> <p><input type="radio"/> Use dimensions</p> <p>x <input type="text"/> m</p> <p>y <input type="text"/> m</p> <p>z <input type="text"/> m</p> <p>Volume <input type="text"/> m<sup>3</sup></p> <p>OR</p> <p><input checked="" type="radio"/> Use volume</p> <p><input type="text" value="40"/> m<sup>3</sup></p>	<p><b>Building Envelope Insulation</b></p> <p>2) Select elements of facade structure, and enter corresponding internal surface area in m<sup>2</sup> OR enter number of vents.</p> <p style="text-align: right;">Surface area OR number of vents</p> <table border="1"> <tr> <td>Wall 1</td> <td>Brick/block cavity</td> <td>15</td> <td>m<sup>2</sup></td> </tr> <tr> <td>Wall 2</td> <td>None</td> <td></td> <td>m<sup>2</sup></td> </tr> <tr> <td>Window 1</td> <td>8 / (6-20) / 4 double glazing</td> <td>3</td> <td>m<sup>2</sup></td> </tr> <tr> <td>Window 2</td> <td>None</td> <td></td> <td>m<sup>2</sup></td> </tr> <tr> <td>Door</td> <td>None</td> <td></td> <td>m<sup>2</sup></td> </tr> <tr> <td>Roof/Ceiling</td> <td>None</td> <td></td> <td>m<sup>2</sup></td> </tr> <tr> <td>Vent 1</td> <td>Ryton AAC125HP</td> <td>3</td> <td></td> </tr> <tr> <td>Vent 2</td> <td>None</td> <td></td> <td></td> </tr> </table> <p style="text-align: right;">View/Edit Data</p>	Wall 1	Brick/block cavity	15	m <sup>2</sup>	Wall 2	None		m <sup>2</sup>	Window 1	8 / (6-20) / 4 double glazing	3	m <sup>2</sup>	Window 2	None		m <sup>2</sup>	Door	None		m <sup>2</sup>	Roof/Ceiling	None		m <sup>2</sup>	Vent 1	Ryton AAC125HP	3		Vent 2	None			<p style="text-align: center;">Switch to Reverberation Time Calculation</p> <p style="text-align: center;">HELP</p>	<p>4) Select exterior sound level type</p> <p>Option (A) <input checked="" type="radio"/> User defined spectrum</p> <p><input type="text" value="58 dB LAeq (Day)"/></p> <p style="text-align: right;">View/Edit Data</p> <p>Option (B) <input type="radio"/> Spectrum shape</p> <p>Select spectrum shape and enter free field exterior sound level, <math>L_{Aeq}</math> (considering only the octave bands between 125Hz and 2kHz)</p> <p><math>L_{Aeq}</math> <input type="text" value="58"/> dB</p> <p><input type="text" value="ISO 717 - 1 (Ctr)"/></p> <p style="text-align: right;">View Data</p>
	Wall 1	Brick/block cavity	15	m <sup>2</sup>																															
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Vent 2	None																																		
<p>3) Enter reverberation time of the room.</p> <p><input type="text" value="0.5"/> seconds</p>		<p><b>Internal sound level</b></p> <p><math>L_{Aeq}</math> <input type="text" value="28.1"/> dB</p>																																	

Habitable rooms fronting towards the railway line may be fitted with double glazing rated at least **28 dB  $R_w+C_{tr}$**  (such as 6 mm glass / 6-20 cavity / 4 mm glass) in conjunction with standard wall vents or trickle vents rated at least **32 dB  $D_{n,e,w}$**  per 4000 mm<sup>2</sup> EA (vent open).

As evidenced in the calculation sheet below, this configuration will provide circa 26 dB(A) sound insulation from external to internal at the site.

**Figure 4.3: BRE Calculation Spreadsheet (rail-fronting habitable rooms)**

**BRE Building Envelope Insulation**

Switch to Reverberation Time Calculation

2) Select elements of facade structure, and enter corresponding internal surface area in m<sup>2</sup> OR enter number of vents.

1) Enter room dimensions or volume

Use dimensions (x, y, z) or Use volume (25 m<sup>3</sup>)

Element	Material/Type	Surface area OR number of vents	Unit
Wall 1	Brick/block cavity	15	m <sup>2</sup>
Wall 2	None		m <sup>2</sup>
Window 1	6 / (6-20) / 4 double glazing	1.5	m <sup>2</sup>
Window 2	None		m <sup>2</sup>
Door	None		m <sup>2</sup>
Roof/Ceiling	None		m <sup>2</sup>
Vent 1	Greenwood 5000EA	2	
Vent 2	None		

3) Enter reverberation time of the room. 0.5 seconds

4) Select exterior sound level type

Option (A)  User defined spectrum

66 dB LAFMax

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)

$L_{Aeq}$  66 dB

ISO 717 - 1 (Ctr)

**Internal sound level**

$L_{AFMax}$  39.7 dB

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

**Table 4.1: External Noise Levels and Resultant Internal Noise Levels**

Location	External Noise Level	Reduction	Resultant Internal Level
Bedrooms adjacent to/fronting towards Pit Lane	≤ 58 dB $L_{Aeq}$ (0700-2300) ≤ 50 dB $L_{Aeq}$ (2300-0700) ≤ 80 dB $L_{AFMax}$	-35 dB	≤ 23 dB $L_{Aeq}$ (0700-2300) ≤ 15 dB $L_{Aeq}$ (2300-0700) ≤ 45 dB $L_{AFMax}$
Living rooms adjacent to/fronting towards Pit Lane	≤ 58 dB $L_{Aeq}$ (0700-2300)	-30 dB	≤ 28 dB $L_{Aeq}$ (0700-2300)
Habitable rooms fronting towards railway line	≤ 48 dB $L_{Aeq}$ (0700-2300) ≤ 46 dB $L_{Aeq}$ (2300-0700) ≤ 66 dB $L_{AFMax}$	-26 dB	≤ 22 dB $L_{Aeq}$ (0700-2300) ≤ 20 dB $L_{Aeq}$ (2300-0700) ≤ 40 dB $L_{AFMax}$

Due to increasing distance from the road and rail, and screening afforded by the first row of dwellings, the provision of standard double glazing with standard trickle vents is likely to be appropriate for remaining habitable rooms across the site.

A detailed building envelope specification can be provided when the detailed layout is determined (as part of a Reserved Matters application). The ambient noise climate at the site is, however, suitable for residential development.

### 4.3 External Amenity

In accordance with the good acoustic design principle, the preliminary site layout shows that the majority of dwellings at the northern boundary will front onto Pit Lane, such that gardens are screened by the dwellings themselves.

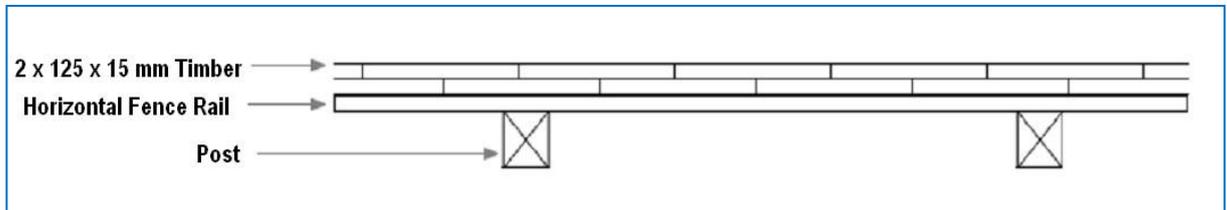
In order to reduce garden levels as far as practicable, it is recommended that any exposed gardens along the northern boundary are provided with circa 2-metre-high solid timber fences or brick walls.

A brick wall of any construction is appropriate, providing there are no gaps in the construction.

If a solid timber fence is installed, then it should be ensured that it has a mass per unit area of  $\geq 10$  kg/m<sup>2</sup>. The fence should have no gaps or holes and should be fully sealed at the ground (i.e. include a gravel board).

An indicative acoustic fence detail is illustrated in Figure 4.1 below. The double-thickness solid timber construction is considered robust and appropriate.

**Figure 4.1: Indicative Acoustic Fence Detail**



A detailed boundary treatment specification can be provided when the detailed layout is determined. The noise climate at the site is, however, suitable for residential development.

## 5 Summary and Conclusions

A noise impact assessment has been undertaken for the proposed (outline) residential development on land south of Pit Lane, Wombwell, Barnsley.

The noise environment at the site is predominantly due to road traffic on Pit Lane to the north, distant road traffic on the surrounding road network, and train passes on the Penistone railway line to the west.

An outline scheme of sound attenuation works (glazing, ventilation and boundary treatments) has been developed to protect the proposed development from the ambient noise climate in accordance with pertinent guidelines. On this basis, the ambient noise climate does not pose a constraint to the proposed residential development.

## 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  $\mu$ Pa 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  $\mu$ Pa).

### 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 Positions

