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# **Proposed Residential Development**

**Land to the south of Darton Lane,  
Darton, Barnsley, S75 5AF**

## **Noise Impact Assessment**

**For:  
Duchy Homes**

8<sup>th</sup> February 2024

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# 1 Introduction

## 1.1 Overview

Environmental Noise Solutions Limited (ENS) has been commissioned by Duchy Homes to carry out a noise impact assessment for a proposed residential development at land to the south of Darton Lane, Darton, Barnsley S75 5AF (hereafter referred to as 'the application site').

Outline planning permission (Ref: 2019/1244) for the application site was granted by Barnsley Metropolitan Borough Council in November 2021 subject to conditions. No condition relates to noise.

A reserved matters planning application for the site was submitted in June 2023 (Ref:2023/0566). The following comments were made by Barnsley Council Environmental Health in relation to noise:

*'The 2019/1244 application was before my time but I've read through the NIA that was submitted with the outline application and can see that mitigation would be required for a number of the residential properties. I cannot see any information in the documents for 2023/0566 that shows the mitigation in place or the resulting levels compared to the guidance (unless I've overlooked it?). One of the recommendations in the NIA was that the outdoors amenity areas were located away from Darton Lane, screened by the buildings but this does not seem to be the case on the current plan? There were also recommendations for glazing/ventilation in some properties where noise levels would exceed guidelines.*

*I would like to see an updated NIA, based on the layout submitted with this application, with specific mitigation clearly identified and the resulting noise levels shown to be within guidance.'*

The objectives of the noise impact assessment were therefore to:

- Determine current external noise levels at the site
- Assess the potential impact of the ambient 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 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) and boundary treatments. It has been prepared to accompany a reserved matters app planning application (Ref:2023/0566) to be submitted to the local planning authority.

The report has been prepared for Duchy Homes 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 Duchy Homes and ENS as to the extent to which the findings may be appropriate for their use.

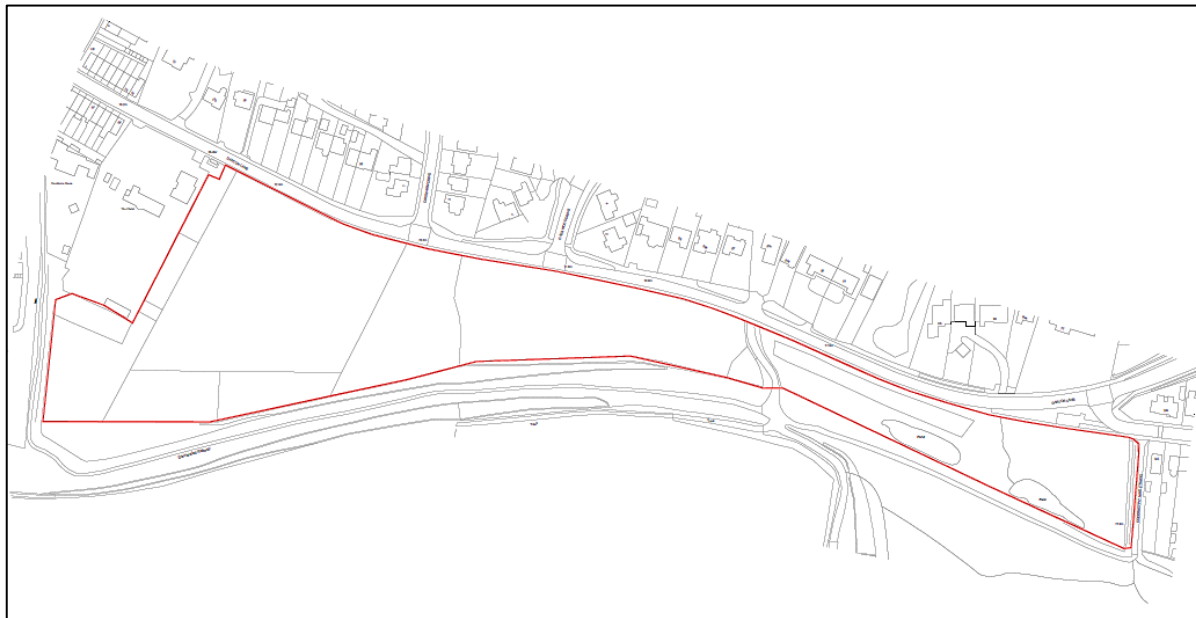
Assess the potential impact of the ambient noise climate on the proposed residential development with reference to relevant guidelines.

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 is located within a mixed-use setting to the south-east of Darton town centre as shown (highlighted in red) in Figure 1.1.

**Figure 1.1: Location of Proposed Development**



The application site is bound by:

- Darton Lane to the north
- Open fields to the south and west.
- Existing residential dwellings to the east.

The proposed residential development consists of the construction of 46 no. residential dwellings with associated landscaping and access roads (a site layout plan is shown in Appendix 4 for reference).

The noise environment at the application site is characterised by road traffic on Darton Lane and the distant M1 motorway with no other significant noise sources noted.

## 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 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 180 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 191 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 (2021)

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 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’.*

With regard to the mitigation of extant environmental noise at a proposed residential development, the guidance 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’.*

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.

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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)

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 $L_{Aeq}$ (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)

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 residential development and considered to represent good resting and sleeping conditions:

- $\leq 35$  dB  $L_{Aeq}$  (0700-2300) during the daytime
- $\leq 30$  dB  $L_{Aeq}$  (2300-0700) and 45 dB  $L_{AFMax}$  not regularly exceeded during the night-time

With reference to external amenity, BS 8233 states:

*‘For traditional external areas that are used for amenity space, such as gardens and 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.’*

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

## 3 Noise Survey

### 3.1 Overview

In order to establish external noise levels at the application site, a noise survey was undertaken on Wednesday 5<sup>th</sup> October 2022 and the early hours of Thursday 6<sup>th</sup> October 2022.

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

- MP1 was located on the northern boundary of the application site at circa 5 metres from the nearside kerb of Darton Lane at 4 metres above ground level (AGL).
- MP1A was located in the same position as MP1 at 1.5 metres AGL.
- MP2 was located in the north-eastern corner of the application site at circa 30 metres from the near side kerb of Darton Lane and at 4 metres AGL.
- MP3 was located in the south-western corner of the application site at 4metres AGL.
- MP4 was located at circa 10 metres from the nearside kerb of Darton Lane at 4 metres AGL.

Noise measurements were undertaken in free field conditions using a 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 <sub>Aeq</sub> (dB)	L <sub>A90</sub> (dB)	L <sub>A10</sub> (dB)	Comment
MP1	05/10/22	1053-1153	65	51	70	Road traffic on Darton Lane
MP1	05/10/22	1153-1253	66	52	71	
MP1	05/10/22	1253-1353	66	52	71	
MP1	05/10/22	2230-2330	58	47	56	Road traffic on Darton Lane Distant road traffic on M1 motorway
MP1	05/10/22	2330-0030	56	44	51	
MP1	06/10/22	0030-0130	52	43	48	
MP1A	05/10/22	1355-1410	64	54	68	Road traffic on Darton Lane
MP2	05/10/22	1451-1521	54	50	56	Road traffic on Darton Lane
MP3	05/10/22	1531-1602	53	51	54	Distant road traffic on Darton Lane and M1 motorway
MP4	05/10/22	1413-1444	61	53	65	Road traffic on Darton Lane

## 3.3 Analysis

For the prediction of daytime road traffic noise, the Department of Transport's Memorandum on the Calculation of Road Traffic Noise (CRTN) explains that the following shortened measurement procedure may be used. Measurements of L<sub>A10</sub> are made over any three consecutive hours between 10:00 and 17:00 hours. Using L<sub>A10 (3 hour)</sub> as the arithmetic mean of the three consecutive values of hourly L<sub>A10</sub>, the L<sub>A10 (18 hour)</sub> can be calculated from the equation:

$$L_{A10 (18 \text{ hour})} = L_{A10 (3 \text{ hour})} - 1 \text{ dB}$$

A study prepared by TRL Limited on behalf of the Department for Environment, Food and Rural Affairs (DEFRA) entitled 'Converting the UK Traffic Noise Index L<sub>A10 (18 hour)</sub> to EU Noise Indices for Noise Mapping' presents a methodology for calculating daytime L<sub>Aeq (0700-2300)</sub> and night time L<sub>Aeq (2300-0700)</sub> ambient noise levels based on the L<sub>A10 (18 hour)</sub> noise levels, as follows:

$$L_{Aeq (0700-2300)} = \frac{10 * \log \left( \left( \frac{10^{((0.95 * L_{A10 (18 \text{ hour})} + 1.44)/10)^{12}}}{10} \right) + \left[ \frac{10^{((0.97 * L_{A10 (18 \text{ hour})} - 2.87)/10)^{4}}}{10} \right] \right)}{16}$$

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$$L_{Aeq (2300-0700)} = 0.90 * L_{A10, 18 \text{ hour}} - 3.77$$

Based on the above formulae, the daytime and night-time ambient noise levels at MP1 have been measured / calculated at **67 dB L<sub>Aeq (0700-2300)</sub>** and **59 dB L<sub>Aeq (2300-0700)</sub>**. Typical maximum noise levels were measured at **80 dB L<sub>AFMax</sub>** during the night-time period at MP1.

Noise levels throughout the remainder of the application site decreased with increased distance from Darton Lane and the northern boundary.

## 4 Noise Assessment

### 4.1 Design Noise Levels

The design noise levels for plots set back circa 5 metres from Darton Lane have been measured / calculated as follows:

- ≤ **67 dB**  $L_{Aeq}$  (0700-2300) during the daytime
- ≤ **59 dB**  $L_{Aeq}$  (2300-0700) during the night-time
- ≤ **80 dB**  $L_{AFMax}$  during the night-time

Comparisons made between MP1 at 5 metres from Darton Lane and MP4 at 10 metres from Darton lane demonstrate a reduction in noise level of circa 5 dB. Therefore, the design noise levels for plots set back 10 metres from Darton Lane have been calculated as follows:

- ≤ **62 dB**  $L_{Aeq}$  (0700-2300) during the daytime
- ≤ **54 dB**  $L_{Aeq}$  (2300-0700) during the night-time
- ≤ **75 dB**  $L_{AFMax}$  during the night-time

Comparisons made between MP1 at 5 metres from Darton Lane and MP2 at 30 metres from Darton lane demonstrate a reduction in noise level of circa 12 dB. Therefore, the design noise levels for plots set back 30 metres from Darton Lane and beyond have been calculated as follows:

- ≤ **55 dB**  $L_{Aeq}$  (0700-2300) during the daytime
- ≤ **47 dB**  $L_{Aeq}$  (2300-0700) during the night-time
- ≤ **68 dB**  $L_{AFMax}$  during the night-time

### 4.2 Ventilation

It is recommended that plots on the northern boundary within 10 metres of Darton Lane are provided with a mechanical ventilation strategy. Appropriate ventilation solutions include:

- A System 3 mechanical extract ventilation (MEV) system
- A whole house positive input ventilation (PIV) system (e.g. Nuair Drimaster 365)

In dwellings where the designed air permeability is tighter than (<)  $5 \text{ m}^3/(\text{h.m}^2)$ ,  $4000 \text{ mm}^2$  EA background ventilators may be required where MEV or PIV systems are proposed (1 no. vents per habitable room – to be confirmed with the developer). In order to maintain the sound insulation properties of the façade, any trickle / wall vents in habitable rooms should meet the requirements as specified in Table 4.1 (vent open).

### 4.3 Scheme of Sound Attenuation

The sound insulation requirements of habitable rooms at the development have been calculated using the methodology advocated in BS 8233, based on the external noise levels, worst-case room/glazing dimensions and reverberation time, together with parameters for the various elements of the building envelope.

The scheme of sound insulation for the development is summarised in Table 4.1.

**Table 4.1: Scheme of Sound Insulation Works**

Location	Noise Level	Internal Criteria	Glazing and Ventilation
Plots up to 10 metres from Darton Lane			
All habitable rooms	$\leq 67$ dB $L_{Aeq}$ (0700-2300) $\leq 59$ dB $L_{Aeq}$ (2300-0700) $\leq 80$ dB $L_{AFMax}$ (2300-0700)	$\leq 35$ dB $L_{Aeq}$ (0700-2300) $\leq 30$ dB $L_{Aeq}$ (2300-0700) $\leq 45$ dB $L_{AFMax}$ (2300-0700)	Enhanced double glazing rated at 33 dB $R_w+C_{tr}$ e.g. 6 / (6-20) / 6.8 Optiphon and MEV or PIV with acoustic wall vent*
Plots between 10 and 30 metres from Darton Lane			
All habitable rooms fronting towards Darton Lane (including side elevations)	$\leq 62$ dB $L_{Aeq}$ (0700-2300) $\leq 54$ dB $L_{Aeq}$ (2300-0700) $\leq 75$ dB $L_{AFMax}$ (2300-0700)	$\leq 35$ dB $L_{Aeq}$ (0700-2300) $\leq 30$ dB $L_{Aeq}$ (2300-0700) $\leq 45$ dB $L_{AFMax}$ (2300-0700)	Enhanced double glazing rated at 29 dB $R_w+C_{tr}$ e.g. 8 / (6-20) / 6 and with acoustic wall vent*
Rear facades	Standard double glazing rated at 25 dB $R_w+C_{tr}$ e.g. 4 / (6-20) / 4 and standard trickle vents**		
Plots 30 metres and beyond from Darton Lane			
All habitable rooms	$\leq 55$ dB $L_{Aeq}$ (0700-2300) $\leq 47$ dB $L_{Aeq}$ (2300-0700) $\leq 68$ dB $L_{AFMax}$ (2300-0700)	$\leq 35$ dB $L_{Aeq}$ (0700-2300) $\leq 30$ dB $L_{Aeq}$ (2300-0700) $\leq 45$ dB $L_{AFMax}$ (2300-0700)	Standard double glazing rated at 25 dB $R_w+C_{tr}$ e.g. 4 / (6-20) / 4 and standard trickle vents**

\* 1x Acoustic wall vent rated at least 43 dB  $D_{n,e,w}$  in open position, such as the Ryton AAC125HP or equivalent – ventilation requirements to be confirmed by developer.

\*\* 2x Standard trickle vents rated at least 33 dB  $D_{n,e,w}$  per 5000 mm<sup>2</sup> EA in open position (note: 2 no. required per habitable room) – ventilation requirements to be confirmed by developer

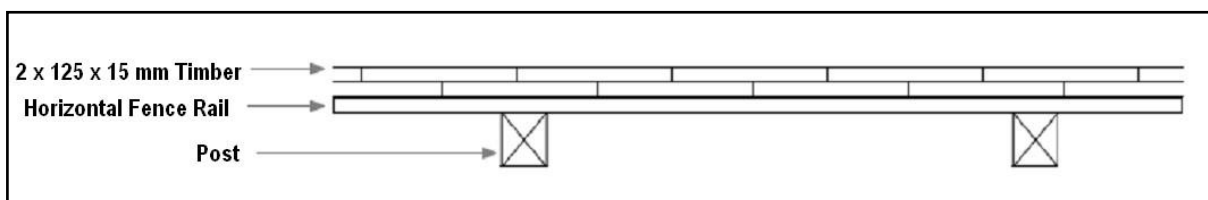
The following points should be noted.

- 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.
- When selecting a glazing system to satisfy the requirements outlined above, it is important to ensure that the  $R_w + C_{tr}$  value is achieved (rather than simply the  $R_w$  value). Published  $R_w$  values tend to be higher than corresponding  $R_w + C_{tr}$  values; therefore, incorrect selection could result in an overestimation of sound reduction performance which in turn could result in higher internal noise levels.
- Internal noise levels due to mechanical ventilation plant should not exceed 26 dB(A) in bedrooms and 30 dB(A) in living rooms
- Trickle ventilation sound reduction requirements apply to the vent in the open position and calculations assume 2 no. vent required per habitable room

## 4.4 External Amenity (Gardens)

It is recommended that 1.8-metre-high solid timber fences (or solid masonry walls) be installed along the northern boundary where gardens are not located to the rear of property and therefore exposed to Darton Lane (plots 4-5, 21-30, 33, 37, 42-46).

The acoustic fence should be built in double-thickness (2 x 15 mm) solid timber construction as illustrated below. The fence should have no gaps or holes and should be fully sealed at the ground (i.e. include a gravel board).



A boundary treatment markup is provided within appendix 3.

## 5 Summary and Conclusions

A noise impact assessment has been undertaken for the proposed residential development at land to the south of Darton Lane, Barnsley, S75 5AF.

The noise environment at the application site is characterised by road traffic on Darton Lane and the distant M1 motorway with no other significant noise sources noted.

A scheme of sound insulation works has been developed to protect the proposed residential development from the ambient noise climate.

## 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**





## Appendix 3 – Boundary Treatments and Glazing Mark-Up, Eastern Area

