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Proposed Residential Development
Land to the north of Barnsley Road, Denby Dale

Noise Impact Assessment

For:
Yorkshire Country Properties

2nd September 2024

Ref: NIA-10187-22-10307-v3 Denby Dale
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Contents

1 Introduction

1.1 Overview

Environmental Noise Solutions Ltd (ENS) has been commissioned by Yorkshire Country Properties to undertake a noise survey and assessment for a proposed residential development (Plots 26-30 & 9) at land to the north of Barnsley Road, Denby Dale (hereafter referred to as 'the site').

Planning permission (ref: 2023/62/92871/E) for the development was granted by Kirklees Council in October 2021, subject to conditions. Condition 19 relates to the control of noise as follows:

19. *Prior to the commencement of superstructure works, a report specifying the measures to be taken to protect the development from noise from the A635 Barnsley Road shall be submitted to and approved in writing by the Local Planning Authority pursuant to condition 19 of permission ref: 2019/91836 or condition 19 of permission ref: 2023/90066. The report shall:*

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

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) and boundary treatments. It has been prepared to aid in the discharge of Condition 19 of Planning Permission ref: 2023/62/92871/E.

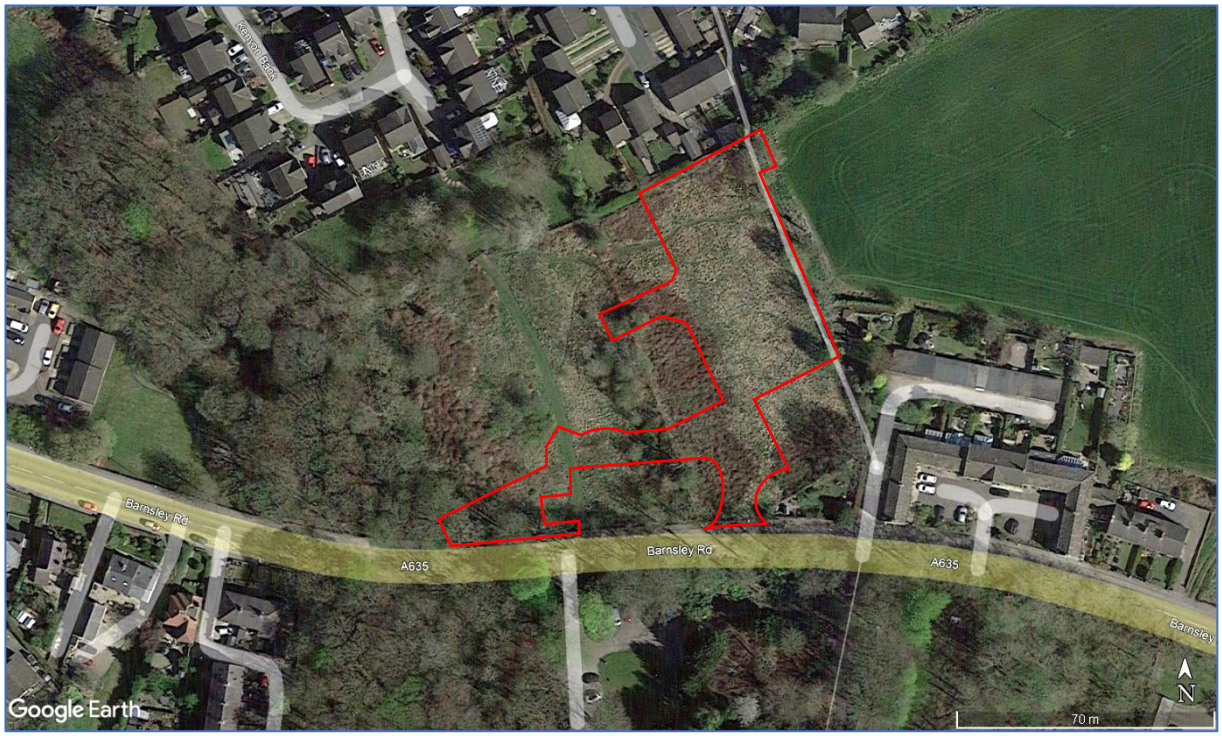
The report has been prepared for Yorkshire Country Properties for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult Yorkshire Country Properties and ENS as to the extent to which the findings may 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 within the village of Denby Dale in West Yorkshire, as shown (highlighted in red) in Figure 1.1.

Figure 1.1: Location of Development



The site is bound by:

- The A635 Barnsley Road to the south
- Residential properties to the north
- Existing residential properties and open farmland to the east
- Open woodland and residential properties to the west

The ambient noise climate at the site is characterised by road traffic on the A635 Barnsley Road.

Development proposals are for 6 no. dwellings with associated access roads and landscaping (see Appendix 2 for site layout plan). The site layout plan indicates that Plot 9 is set back circa **5 metres** from the nearside carriage of the A635 Barnsley Road, whilst Plots 26–30 are set back at least **40 metres** from the road.

2 Policy Context and Assessment Guidance

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)[1] 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[2] (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[3] (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)[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 $L_{Aeq\ (0700\text{-}2300)}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq\ (0700\text{-}2300)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\ (0700\text{-}2300)}$	30 dB $L_{Aeq\ (2300\text{-}0700)}$ 45 dB $L_{AFMax\ (2300\text{-}0700)}$

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.'

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:

- ≤ 35 dB $L_{Aeq\ (0700\text{-}2300)}$ in habitable rooms during the daytime
- ≤ 30 dB $L_{Aeq\ (2300\text{-}0700)}$ 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 $L_{Aeq,16hr}$.'

'Whether or not external amenity spaces are an intrinsic part of the overall design, consideration of the need to provide access to a quiet or relatively quiet external amenity space forms part of a good acoustic design process.'

2.5 Approved Document O

Approved Document O, 2021 is written in support of Part O of Schedule 1 to the Building Regulations 2010. The approved document details methods of addressing overheating of residential dwellings and is applicable only across England.

The approved document has the following relevant guidance in Section 3 regarding noise ingress into buildings:

'In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- *40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am)*
- *55dB L_{Amax}, more than 10 times a night (between 11pm and 7am)'*

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 Thursday 3rd February 2022.

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

- MP1 was located along the southern boundary of the site at circa 5 metres from the nearside kerb of the A635 Barnsley Road and at 4 metres above ground level (AGL)
- MP1A was located along the southern boundary of the site at circa 5 metres from the nearside kerb of the A635 Barnsley Road and at 1.5 metres AGL (to assess attenuation due to height)
- MP2 was located along the southern boundary of the site at circa 10 metres from the nearside kerb of the A635 Barnsley Road and at 4 metres AGL
- MP3 was located along the southern boundary of the site at circa 20 metres from the nearside kerb of the A635 Barnsley Road and at 4 metres AGL
- MP4 was located at the north-western corner of the site at 4 metres AGL

Noise measurements were undertaken in free field conditions using a Bruel & Kjaer 2250 Type 1 integrating sound level meter. The 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	04/02/22	1016–1116	64	48	69	81	Dominated by road traffic on A635
		1116–1216	63	46	67	80	
		1216–1316	62	45	67	79	
MP1A	04/02/22	1317–1332	61	44	65	79	
MP2	04/02/22	1336–1351	58	46	63	73	
MP3	04/02/22	1356–1411	55	44	60	67	
MP4	04/02/22	1551–1606	49	45	51	56	

3.3 Analysis

The noise environment at the eastern boundary was controlled by road traffic on the A635 Barnsley Road, with noise levels reducing with increasing distance to the road.

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_{A10} are made over any three consecutive hours between 10:00 and 17:00 hours. Using $L_{A10\,(3\,hour)}$ as the arithmetic mean of the three consecutive values of hourly L_{A10}, the $L_{A10\,(18\,hour)}$ can be calculated from the equation:

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

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 $L_{A10\,(18\,hour)}$ to EU Noise Indices for Noise Mapping' presents a methodology for calculating daytime $L_{Aeq\,(0700\text{-}2300)}$ and night-time $L_{Aeq\,(2300\text{-}0700)}$ ambient noise levels based on the $L_{A10\,(18\,hour)}$ noise levels, as follows:

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

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

Based on the above formulae, the daytime and night-time ambient noise levels at MP1 are calculated at **64 dB $L_{Aeq\,(0700–2300)}$** and **56 dB $L_{Aeq\,(2300–0700)}$** respectively. Maximum noise levels from passing vehicles were measured at up to **81 dB L_{AFMax}** at MP1.

Ambient noise levels reduced with increasing distance and reduced line-of-sight to the A635. Comparative noise levels at MP2 (10 metres to the nearside kerb) and MP3 (20 metres to the nearside kerb) illustrated line-source propagation for ambient noise levels (L_{Aeq}) and point-source propagation for discrete event maxima (L_{AFMax}).

On this basis, noise levels at the façade of Plots 26–30 are calculated at **≤ 52 dB $L_{Aeq\,(0700–2300)}$** and **≤ 44 dB $L_{Aeq\,(2300–0700)}$** respectively, with maximum noise levels of **61 dB L_{AFMax}**.

4 Noise Assessment

4.1 Design Noise Levels

Noise levels at MP1 (considered representative of Plot 9) are as follows:

- **≤ 64 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime
- **≤ 56 dB $L_{Aeq\ (2300\text{-}0700)}$** during the night-time
- **≤ 81 dB L_{AFMax}** during night-time

Noise levels at Plots 26–30 have been calculated at:

- **≤ 52 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime
- **≤ 44 dB $L_{Aeq\ (2300\text{-}0700)}$** during the night-time
- **≤ 61 dB L_{AFMax}** during night-time

4.2 Scheme of Sound Attenuation

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).

Plot 9

Due to elevated noise levels from the A635, it is recommended that Plot 9 is provided with a mechanical extract ventilation (MEV) system.

Approved Document F 'Ventilation' (ADF) states that where MEV is used, background ventilators of at least 4000 mm² EA must be provided to each habitable room, with 1 no. ventilator required per bedroom and 2 no. ventilators required in living rooms.

Bedrooms of Plot 9 should be fitted with enhanced laminated glazing rated at least **36 dB R_w+C** (such as 6 mm glass / 6-20 Argon / 6.8 mm Pilkington Optiphon) in conjunction with 1 no. acoustic wall vent rated at least **61 dB $D_{n,e,w}$** per 4000 mm² EA (vent open), such as the DB-61AWV, or equivalent.

Ground floor habitable rooms of Plot 9 should be fitted with enhanced glazing rated at least **32 dB R_w+C** (such as 8 mm glass / 6-20 cavity / 4 mm glass) in conjunction with acoustic wall vents rated at least **61 dB $D_{n,e,w}$** per 4000 mm² EA (vent open).

Plots 26–30

Habitable rooms of Plots 26–30 may be fitted with double glazing rated at least **28 dB R_w+ C_{tr}** in conjunction with standard trickle vents or wall vents rated at least **32 dB $D_{n,e,w}$** per 8000 mm² EA (vent open).

General Points

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 value is achieved (rather than simply the R_w value). Published R_w values tend to be higher than corresponding R_w+C values; therefore, incorrect selection could result in an overestimation of sound reduction performance which in turn could result in higher internal noise levels.
- The opening and free area of the ventilation units should be checked by a mechanical service engineer before designs are finalised. Should the equivalent open area be insufficient to meet the minimum requirements of ADF, it may be necessary to increase the number of units per habitable room. Where this applies, the required sound reduction of the ventilation units may need to be increased accordingly
- Internal noise levels due to mechanical ventilation plant should not exceed 26 dB(A) in bedrooms and 30 dB(A) in living rooms

4.3 External Amenity

Daytime ambient noise levels at MP1A (1.5 metres above ground level) have been measured/calculated at **62 dB $L_{Aeq\ (0700–2300)}$** and it is understood that there is no opportunity to provide additional screening to the garden of Plot 9 due to the impacts on visual amenity.

Whilst such levels are above the target criteria contained in ProPG, the document states that the noise impact may be off-set if residents are provided with access to

'*a relatively quiet, protected, publically accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance).*'

With cognisance to this, the wider development has been provided with a public open space (POS) at the north-western corner of the wider site. Noise measurements undertaken at MP4 illustrate that daytime ambient noise levels within the POS will be **< 50 dB $L_{Aeq\ (0700\text{-}2300)}$**, which is below the desirable noise level for external amenity.

There is no issue with respect to external amenity at Plots 26–30, as noise levels are **≤ 52 dB $L_{Aeq\ (0700–2300)}$** and will reduce further due to screening afforded by the first row of dwellings.

5 Mitigation of Overheating

ADO states that for moderate risk locations (i.e. outside of London) the minimum free area of the open window should be at least 4% of the floor area of the room.

Building in some allowance, this equates to an assumed window opening (S_{open}) area of at least 5% of the floor area. As the open area varies as a function of the floor area, for a typical floor-to-ceiling height of 2.4m, a window open area of 5% of the floor area equates to an external to internal noise reduction of 9 dB.

With reference to the internal targets contained in ADO, it is assumed that open windows can form the overheating mitigation strategy with no additional ventilation or cooling, providing the external noise levels outside bedrooms at night do not exceed **49 dB $L_{Aeq\ (2300\text{-}0700)}$** and **64 dB L_{AFMax}** (more than 10 times).

Based on the measured noise levels at the site, it is assumed that the bedroom windows of Plot 9 would be closed during night-time hours.

This information should be provided to the overheating assessor for the site, in order to determine the extent of additional mitigation required to comply with ADO.

For remaining bedrooms (Plots 26–30), windows may be opened to the minimum open area of 5% of the floor area, meaning that the overheating mitigation strategy is not constrained by acoustics.

6 Summary and Conclusions

A noise impact assessment has been undertaken for the proposed residential development (Plots 26-30 & 9) at land to the north of Barnsley Road, Denby Dale.

The noise environment at the site is predominantly due to road traffic on the A635, 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 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 2 – Noise Measurement Positions