



**East Hill Phase 1, Chatham**

# **Residential Noise Assessment**





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Entran Limited  
2<sup>nd</sup> & 3<sup>rd</sup> Floors  
Northgate House  
Upper Borough Walls  
Bath  
BA1 1RG

T: 0117 937 4077  
[www.entranltd.co.uk](http://www.entranltd.co.uk)

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## **1 INTRODUCTION**

- 1.1 Entran Ltd has been commissioned to undertake a noise assessment for Phase 1 of the proposed residential development at East Hill, Chatham.
- 1.2 The assessment has been undertaken to consider the noise levels at the proposed residential development. The assessment considers the existing ambient noise and the suitability of the site for residential use.
- 1.3 The potential noise impacts are assessed in accordance with the most relevant national and local standards and guidelines.
- 1.4 The noise levels are assessed using criteria provided within BS 8233:2014 and the WHO Guidelines. This report is necessarily technical in nature and contains terminology relating to acoustics and noise. Therefore, a glossary together with a brief introduction to the subject of noise has been provided in Appendix A.

## 2 SITE DESCRIPTION

- 2.1 The site is situated to the east of North Dane Way and West of Shawstead Road. The surrounding area comprises largely open grassland and residential dwellings. The existing noise climate within the vicinity of the Proposed Development is dominated by local road traffic on North Dane Way and distant road and traffic on the surrounding network.
- 2.2 The Proposed Development location and boundary are indicated in Figure 1.

**Figure 1 – Site Location**



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### 3 ASSESSMENT METHODOLOGY

#### National Policy

##### ***National Planning Policy Framework (NPPF) (July 2021)***

3.1 The National Planning Policy Framework (NPPF) sets out the Government's economic, environmental and social planning policies for England. It attempts to summarise in a single document all previous national planning policy advice. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

3.2 Under Section 15; Conserving and enhancing the natural environment, the following is stated in paragraph 174:

*"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 soil, air, water or noise pollution or land instability..."*

3.3 The NPPF goes on to state in paragraph 185 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 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;*

*identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason"*

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## **Noise Policy Statement for England NPSE (March 2010)**

3.4 The Government is committed to sustainable development and the Department for Environment Food and Rural Affairs (Defra) plays an important role in this by working to secure a healthy environment in which current and future generations can prosper. One aspect of meeting these objectives is the need to manage noise for which Defra has the overall responsibility in England.

3.5 In March 2010, the Noise Policy Statement for England (NPSE) set out the long-term vision of Government noise policy as to:

*‘Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.’*

3.6 The long-term vision is supported by the following aims:

*‘Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

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

3.7 The explanatory note to the policy statement emphasises that sustainable development is a core principle underpinning all government policy. In this respect, there is a need to integrate consideration of the economic and social benefit of the activity under examination with proper consideration of the adverse environmental effects.

3.8 To achieve these objectives the NPSE sets out three noise conditions to be determined by the assessor:

*NOEL - No Observed Effect Level*

3.9 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*

3.10 This is the level above which adverse effects on health and quality of life can be detected.

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### SOAEL - Significant Observed Adverse Effect Level

- 3.11 This is the level above which significant adverse effects on health and quality of life occur.
- 3.12 The NPSE considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable.
- 3.13 Where the assessed noise levels fall between the LOAEL and the SOAEL noise levels, the NPSE requires that:

*‘All reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development.... This does not mean that such adverse effects cannot occur.’*

- 3.14 No objective values are offered within the NPSE, as the document does indicate that each site should be considered on its own merits. Consequently, consideration of the observed effects is made through an assessment methodology as detailed below.

### **British Standard BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings (2014)**

- 3.15 The scope of BS 8233 is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.
- 3.16 This Standard suggests suitable internal noise levels within different types of buildings, including residential dwellings. It suggests that an internal noise level of 30 dB  $L_{Aeq, T}$  within bedrooms is a 'desirable' standard. For living areas during the daytime, the standard recommends 35 dB  $L_{Aeq, T}$  as a desirable standard for resting.
- 3.17 Whilst BS 8233 recognises that a guideline value may be set in terms of SEL or  $L_{AFmax}$  for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated. Accordingly, reference has been made in this assessment to the World Health Organisation (WHO) 1999: *Guidelines for Community Noise*.



- 3.18 The Standard also states that “*where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.*”

***The Institute of Environmental Management & Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment (2014)***

- 3.19 The Institute of Environmental Management and Assessment (IEMA) have recently published the ‘*Guidelines for Environmental Noise Impact Assessment*’. The guidelines are applicable to noise impact assessment for any scale of development proposal, including core principles to achieve effectively integration with the EIA, and provide advice on the issues that need to be considered in a noise impact assessment and whether the appropriate conclusions are being reached. The factors include:

- The appropriateness of the noise parameters used for the situation;
- The reference time period used in making the assessment;
- The level, character and frequency content of the noise sources under investigation; and,
- How the predicted noise levels relate to relevant Standards and guidelines.

- 3.20 The guidelines also recommend that the assessor should determine the degree of impact based on evidence derived from the assessment.

***The Professional Practice Guidance on Planning and Noise (2017)***

- 3.21 The ‘*Professional Practice Guidance on Planning and Noise*’ (ProPG) was produced by a Working Group consisting of representatives of the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH) to provide acoustical practitioners with guidance on the management of noise within the planning system in England.

- 3.22 The reparation of the ProPG acknowledges and reflects the Government’s overarching NPSE, the NPPF and Planning Practice Guidance (including PPG-Noise), as well as other authoritative sources of guidance. It provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers which complements Government planning and noise policy and guidance and, in particular, aims to:



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- advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
  - encourage the process of good acoustic design in and around new residential developments;
  - outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
  - promote appropriate noise exposure standards; and,
  - assist the delivery of sustainable development.



## 4 NOISE ENVIRONMENT

4.1 Noise conditions within the vicinity of the Proposed Development have been determined based on information provided within the existing ES Noise Chapter.

4.2 Traffic flows on surrounding roads for the baseline and future years of 2019 and 2035, respectively, are presented in Table 1 below.

**Table 1: Traffic Data**

Year	Link Name	18-hour AAWT	% HGV	Speed, kph
2019	Capstone Road	11020.716	2.0	96.0
	Capstone Road S	5712.156	2.4	48.0
	Pear Tree Lane	10451.076	1.6	48.0
	Lords Wood Ln	3852.948	1.8	97.0
	Shawstead Rd	1198.668	9.3	64.0
	N Dane Way (N of S access)	9982.032	1.4	64.0
	N Dane Way	7699.836	1.0	64.0
	Princes Ave	13071.42	2.9	48.0
2035	N Dane Way	18988.404	2.5	80.0
	Capstone Road	16441.992	1.1	96.0
	Capstone Road S	9436.632	1.8	48.0
	Pear Tree Lane	20271.912	1.2	48.0
	Lords Wood Ln	7488.948	1.0	97.0
	Shawstead Rd	4873.452	1.0	64.0
	N Dane Way (N of S access)	10746.804	1.2	64.0
	N Dane Way	12107.88	1.0	64.0
	Princes Ave	17683.08	1.5	48.0
	N Dane Way	13396.236	1.3	80.0

4.3 The traffic flows have been adopted for the derivation of a computer noise model to inform assessment in accordance with BS 8233; to determine the level of glazing/ventilation required to reduce the likelihood of adverse effects relating to the Proposed Development.

4.4 For the purpose of this assessment, traffic data for the future year 2035 has been adopted.

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## 5 NOISE ASSESSMENT

### Ambient Noise Levels

- 5.1 Noise emission levels affecting the Proposed Development have been calculated using predictive computer noise modelling. The noise modelling software (Cadna-A) uses algorithms based on ISO 9613 'Attenuation of sound during outdoor propagation' to predict noise levels generated at receiver locations by noise sources.
- 5.2 The traffic data for the year 2035 has been used to calculate the noise emissions from the nearby roads. An indicative masterplan has been modelled in order to demonstrate noise propagation across the site with the introduction of the Proposed Development. Noise levels have been presented as contours, calculated across the site at a height of 1.5m and 4m above ground level for day and night-time periods, respectively.
- 5.3 The calculated daytime and night-time noise contours are presented in Figures B1 and B2 of Appendix B. The required façade reductions at the proposed residential buildings have been calculated based on the reduction required to achieve the BS 8233 criteria for habitable rooms. The highest required façade reductions have been presented for each proposed residential façade and are presented in Figure B3 Appendix B.
- 5.4 The typical façade reduction afforded by insulated double glazing and attenuated trickle ventilation is given within BS 8233 as 33 dB. For partially open windows the reduction is given as 15 dB.
- 5.5 With consideration to the typical reduction for closed windows, specific consideration of glazing/ventilation is unlikely to be required across the site. However, facades overlooking North Dane Way will require windows to be closed to meet the BS 8233 internal criteria.
- 5.6 The reduction provided within BS 8233 indicates that typical insulated double glazing and trickle ventilation are likely to provide adequate attenuation at the Proposed Development. However, it would be prudent to select suitable glazing and ventilation options to ensure items are selected to achieve the calculated reductions as a minimum. Items should be selected with consideration to Figure B3.
- 5.1 To ensure the  $R_w$  values take account of possible low frequency noise, the sound reduction index of each element should include a correction for the  $C_{tr}$  urban traffic noise spectrum. Ventilation should achieve this value when open, to allow ventilation to the dwelling.



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Additionally, the glazing and ventilation installation must maintain the integrity of the façade with regard to noise insulation.

- 5.2 Daytime noise levels are calculated to fall below the BS 8233 upper guideline noise level at all external amenity areas screened from North Dane Way. Where amenity areas are sited with a direct line of site to the road suitable border fencing should be specified.
- 5.3 Adequate fencing should comprise suitably dense close-boarded solid timber fencing, which would be suitably treated to prevent warping and rot due to weathering and have a mass per unit of surface area in excess of  $12 \text{ Kg/m}^2$  and be of a continuous/close-boarded construction with a minimum thickness of 15 mm and a height of at least 1.8m.
- 5.4 The WHO Guidelines states that indoor noise levels should not exceed approximately 45 dB  $L_{Amax}$  more than 10-15 times a night to ensure there are no negative health effects related to sleep disturbance.
- 5.5 Considering the façade sound reduction from typical design, as used in the BS 8233 assessment, maximum night time noise levels at both monitoring locations with windows closed and are unlikely to exceed the WHO criteria.

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## 6 MITIGATION

- 6.1 Measured ambient noise levels at dwellings overlooking North Dane Way are considered to satisfy the criteria provided within BS 8233 and WHO with typical insulated double glazing and attenuated trickle ventilation. Windows are however not required to be sealed and may remain openable to be used at the discretion of occupants.
- 6.2 Required façade reductions are calculated to be below the typical reduction due to closed windows and specific consideration of mitigation is not required. However, it would be prudent to specify glazing and ventilation to achieve the values presented in Figure B3 as a minimum. Glazing and ventilation should be specified to achieve the calculated reductions and include correction for the  $C_{tr}$  urban road traffic spectrum. Any passive ventilation should achieve this value when open, to allow ventilation to the dwelling. Additionally, the glazing and ventilation installation must maintain the integrity of the façade with regard to noise insulation.
- 6.3 Amenity noise levels are likely to be suitable when garden areas overlooking North Dane Way are screened with suitable fencing. Specification for suitable barrier fencing has been provided and such fencing should be employed at gardens closest to the road.

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## 7 CONCLUSIONS

- 7.1 An assessment of the potential noise impacts attributable to the existing ambient environment has been undertaken for the Proposed Development at East Hill, Chatham.
- 7.2 The assessment has been based on a computer noise model informed by traffic data as presented within the existing Environmental Statement and presented within this report. Calculated ambient noise levels achieve the criteria provided within BS 8233:2014 and the WHO Guidelines for Community Noise.
- 7.3 Typical insulated double glazing and attenuated trickle ventilation is calculated to be sufficient across the site. For properties overlooking the road, it would be prudent that glazing and ventilation items should be selected to achieve the reductions presented in Figure B3. However, windows are not required to be sealed and may remain openable for rapid or purge ventilation or to be opened at the occupant's discretion.
- 7.4 External amenity noise levels are calculated to fall below the upper guideline noise level for external amenity; provided screening is employed at gardens overlooking North Dane Way.



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## APPENDIX A – INTRODUCTION TO NOISE

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB.

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs. For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest.

In the UK, traffic noise is measured as the  $L_{A10}$ , the noise level exceeded for 10% of the measurement period. The  $L_{A90}$  is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level,  $L_{Aeq}$ . This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS 4142 specifies background noise measurement periods of 1 hour during the day and 5 minutes during the night. The noise levels are commonly symbolised as  $L_{A90(1\text{hour})}$  and  $L_{A90(5\text{mins})}$ . The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125 ms.





**Table A1: Glossary of Terms**

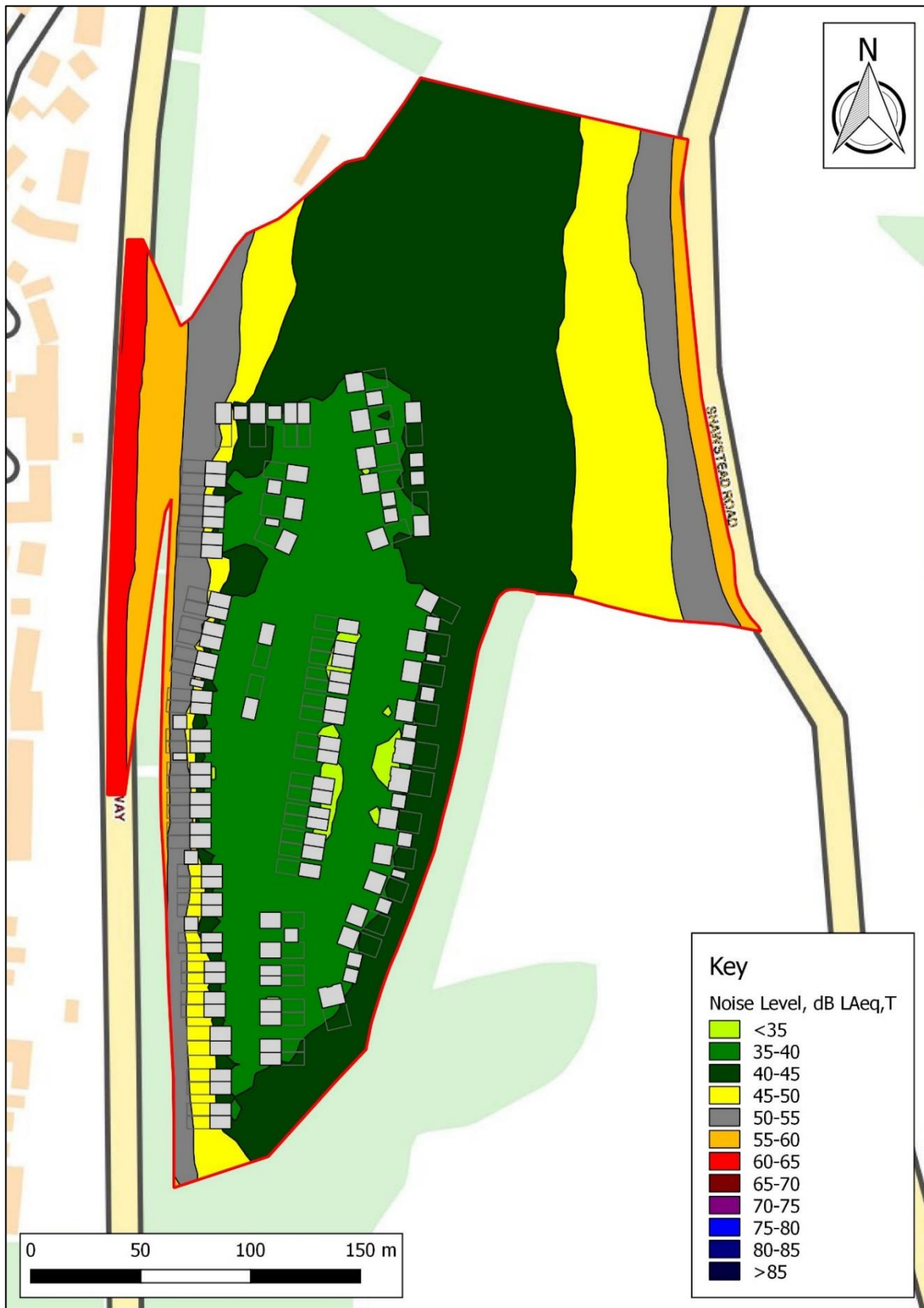
Term	Definition
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds $s_1$ and $s_2$ is given by $20 \log_{10} (s_1/s_2)$ . The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$ .
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period $T$ . This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,F}$	A noise level index defined as the maximum noise level during the period $T$ . $L_{max}$ is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall $L_{eq}$ noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period $T$ . $L_{90}$ can be considered to be the 'average minimum' noise level and is often used to describe the background noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ( $L_{Aeq,T}$ ).
Residual Noise Level	The ambient noise remaining at a given position in a given situation when specified sources are suppressed to a degree such that they do not contribute to the ambient noise level ( $L_{Aeq,T}$ )
Specific Noise Level	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source (the noise source under investigation) over a given time interval ( $L_{Aeq,T}$ )
Rating Noise Level	The specific noise level plus any adjustment for the characteristic features of the noise ( $L_{Ar,Tf}$ ).

## APPENDIX B – FIGURES

Figure B1: Daytime Noise Contour, 1.5m



Figure B2: Night-time Noise Contour, 4m



**Figure B3: Calculated Façade Mitigation Requirements**

