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PROPOSED RETIREMENT APARTMENTS
SOUTHAMPTON ROAD, LYMINGTON

NOISE ASSESSMENT

Technical Report: R9201-1 Rev 0

Date: 27th August 2021

For: Planning Issues Ltd
Churchill House
Parkside
Ringwood
BH24 3SG

24 Acoustics Document Control Sheet

Project Title: Proposed Retirement Apartments, Southampton Road, Lymington - Noise Assessment

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For and on behalf of 24 Acoustics Ltd				

Document Status and Approval Schedule

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1.0 INTRODUCTION

1.1 24 Acoustics Ltd has been appointed by Planning Issues Ltd to undertake a noise assessment for the proposed retirement apartments at the former police station on Southampton Road, Lymington.

1.2 The primary source of noise in the area is road traffic and the council has expressed concern with regard to noise from the proposed electrical substation. Accordingly, this noise impact assessment considers:

- Environmental noise monitoring
- Noise arising from road traffic
- Noise levels within the proposed dwellings

1.3 This report presents the results of the assessment, following environmental noise measurements undertaken between 11th to 17th August 2021.

1.4 All sound pressure levels quoted in this report are in dB relative to 20 µPa. A glossary of the acoustic terminology used in this report is provided in Appendix A.

2.0 SITE DESCRIPTION

2.1 The site is located on the junction of Queen Elizabeth Avenue and Southampton Road. The surrounding properties are residential and the site is primarily affected by noise from vehicles on Southampton Road.

2.2 The proposed scheme comprises redevelopment of the site to form 32 retirement apartments including communal facilities and parking.

2.3 The site location is described in Figure 1 and the proposed typical floor plan is provided in Figure 2.

3.0 STANDARDS AND GUIDANCE

National Planning Policy Framework and Noise Policy Statement for England

3.1 The National Planning Policy Framework (NPPF) [Reference 1] states that planning policies and decisions should ensure that new development is appropriate for its location taking into account the likely 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 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

3.2 The NPPF also refers to the Noise Policy Statement for England (NPSE) [Reference 2] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term vision 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' which 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

3.3 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'.

3.4 In 2019 the Planning Practice Guidance (PPG) was updated. This is written to support the NPPF with more specific planning guidance. The PPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also states that opportunities should be taken, where practicable, to achieve improvements to the acoustic environment. The PPG states that noise can over-ride other planning concerns but should not be considered in isolation from the other economic, social and environmental dimensions of the proposed development.

3.5 The PPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system.

3.6 None of the documents referred to above provide specific noise criteria. The following guidance documents are considered appropriate (technically and objectively) to assess noise impact on the proposed development.

Professional Practice Guidance on Planning & Noise (ProPG)

3.7 The Professional Practice Guidance on Planning and Noise (ProPG) [Reference 4] was published jointly by the Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health in May 2017. The guidance relates to the consideration of existing sources of transportation noise upon proposed new residential development and strives to:

- 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
- Improve understanding of how to determine the extent of potential noise impact and effect
- Assist the delivery of sustainable development

3.8 The guidance describes a recommended approach for new residential development, which includes four key elements of the assessment process, identified below:

(i) Good acoustic design process
(ii) Internal noise level guidelines
(iii) External amenity area noise assessment
(iv) Assessment of other relevant issues

3.9 It is important to note that the guidance in ProPG does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy.

BS 8233:2014 and WHO Guidelines

3.10 BS 8233:2014 [Reference 8] provides design guidance for dwelling houses, flats and rooms in residential use and recommends that internal noise levels in dwellings do not exceed 35 dB $L_{Aeq,16\ hour}$ in living rooms and bedrooms during the day, 40 dB $L_{Aeq,\ 16\ hour}$ in dining rooms during the day and 30 dB $L_{Aeq,\ 8\ hour}$ in bedrooms at night.

3.11 The standard states that the above limits apply to steady external noise sources without specific character, and also states the following:

> *"Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."*

3.12 BS 8233:2014 also notes that "Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night."

3.13 Although the guidelines have no formal standing, the World Health Organisation (WHO) provides guidance on desirable internal noise levels to minimise the risk of sleep disturbance. The WHO 2000 guidelines [Reference 9] suggest internal night-time noise levels not exceeding 30 dB $L_{Aeq,\ 8\ hour}$ or regularly (10 – 15 times per night) exceeding 45 dB $L_{Amax,f}$ for 'a good night's sleep'.

Summary

3.14 The impact of road traffic noise upon the proposed development shall be assessed using the following internal noise criteria:

- An upper internal daytime level of 35 dB $L_{Aeq,\ 16\ hour}$ for lounges or living rooms and a night-time level for bedrooms of 30 dB $L_{Aeq,\ 8\ hour}$ will apply
- A maximum night-time internal level of 45 dB $L_{Amax,\ fast}$ will apply in bedrooms for regular events

3.15 Consideration has been given to the absolute noise levels from the proposed substation, which are expected to be very low.

4.0 ENVIRONMENTAL NOISE MEASUREMENTS

4.1 Environmental noise measurements were undertaken at the site between 11th and 17th August 2021 to determine the prevailing noise levels at the site. Measurements were undertaken using the following equipment:

- 2 No. Rion precision sound level meters Type NL-52
- Brüel & Kjær acoustic calibrator Type 4231

4.2 The noise monitoring equipment was located on the eastern boundary of the site at a height of approximately 2.5 metres and in free-field conditions. The measurement location is approximately six metres closer to the road than the future building façade, as described in Figure 1.

4.3 Noise measurements were undertaken in samples of 5 minutes in terms of the octave-band and free-field A-weighted L_{eq}, L_{90} and $L_{max,f}$ parameters. Measurements were made in accordance with BS 7445:1991 "Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use" [Reference 10].

4.4 The instruments' calibration was verified before and after the survey in accordance with the manufacturer's instructions and no significant drift in calibration was recorded. Calibration of 24 Acoustics' equipment is traceable to National Standards.

4.5 All instrumentation was fitted with environmental weather shields during the surveys. Weather conditions during the surveys were generally dry with wind speeds lower than 5 m/s during the site visits. Measurement results are therefore not considered to have been affected by weather.

Noise Measurements

4.6 The results of the long-term ambient noise measurements are shown graphically in Appendix B and summarised in Table 1.

Representative Noise Levels, dB		
Daytime $L_{Aeq,\ 16\ hr}$ (07:00 to 23:00 hours)	**Night-Time (23:00 to 07:00 hours)**	
	$L_{Aeq,\ 8\ hr}$	**Typical $L_{Amax,f\ 5\ min}$**
66	56	78

Table 1 - Measured Ambient Noise Levels (Roadside)

4.7 24 Acoustics determines the typical maximum noise event to be the tenth highest value during the measurement period.

4.8 Typical background noise levels were in the region of 47 dB $L_{A90, 1hr}$ during the daytime (07:00 to 23:00 hours) and 22 dB $L_{A90, 15min}$ during the night-time (23:00 to 07:00 hours).

5.0 INTERNAL NOISE LEVELS AND MITIGATION MEASURES

5.1 Calculations have been undertaken to determine the acoustic requirements for glazing and ventilation to the proposed building, which will ensure that the internal noise levels meet the requirements in Section 3. The calculations are based on the floorplans and elevations provided to 24 Acoustics in August 2021.

5.2 The building has been divided into acoustic zones A (roadside) and B (rear), as described on the proposed plan in Figure 2.

Non-Glazed Elements

5.3 Non-glazed elements of the façade shall be designed and specified to achieve a minimum sound insulation performance of 53 dB R_w. This performance is to be met by the entire external wall system as a whole, including frames, seals, any insulated panels, opaque glazed elements, louvres, etc.

5.4 The required performance is readily achieved by traditional masonry facades. For lightweight façade elements, it is recommended (subject to review) that provision be made for an inner leaf of plasterboard comprising two layers 15mm standard density plasterboard and mineral wool insulation in the cavity in addition to any rigid PIR thermal insulation.

Glazing

5.5 The required sound insulation performance for glazing in each zone, at all floors of the building, is described in Table 2.

Zone	Room Type	Minimum Octave (Hz) Band Sound Reduction Index, dB					
		125	250	500	1k	2k	4k
Zone A Roadside	Bedrooms and Living Rooms	26	28	33	42	44	40
Zone B Rear	Bedrooms and Living Rooms	21	20	25	35	37	31

Table 2 - Glazing Sound Insulation Specification

5.6 In making a comparison with the values in Table 2, it is important that the glazing figures used are the result of tests in accordance with ISO 10140, Part 2: 2010. The quoted minimum sound reduction specifications must be achieved by the entire glazing system as a whole, including frames, seals, any insulated panels and not just the glass. The requirements also apply to any external doors to habitable rooms.

5.7 For guidance only, the following glazing configurations would be capable of achieving the required sound reduction performance if installed properly (i.e. with appropriate frames and seals, etc.):

Glazing to Zone A (Roadside):
Bedrooms and Living Rooms (39 dB R_w):
8 mm glass / 12 mm air cavity (min)/ 8.8 mm Stadip Silence
Glazing to Zone B (Rear):
Bedrooms and Living Rooms (30 dB R_w):
4 mm glass / 12 mm air cavity (min)/ 6 mm glass

Ventilation

5.8 The required sound insulation performance for each ventilation type is described in Table 3.

Ventilation Type	Minimum Octave (Hz) Band Sound Reduction Index, dB					
	125	250	500	1k	2k	4k
Zone A	40	36	35	33	37	37
Zone B	23	26	29	30	33	33

Table 3 - Ventilation Sound Insulation Specification

5.9 Note that the stated minimum performance value for each ventilation unit is for the open vent and assumes one ventilator per habitable room. If multiple vents are required, it will be necessary to correct the test data to allow for the number of vents required in each room (please confirm if this is the case).

5.10 In making a comparison with the ventilation acoustic specification in Table 3, it is important that the vent manufacturer's test data is the result of laboratory tests undertaken on the specific model, size, and free area of the proposed unit. The tests must be undertaken with the vent open and installed in a manner that is representative of the proposed installation.

5.11 For guidance, manufacturer's data for the following ventilation units would be capable of achieving the required sound reduction performance if installed properly (minimum performance for when vent is open):

Ventilation Type V1 (36 dB $D_{n,e,w}$): *Simon Acoustic EHAS*

Ventilation Type V2 (32 dB $D_{n,e,w}$): *Standard trickle vent*

5.12 Any considerations affecting the acoustic performance that are specific to each model of vent (e.g. angle of incidence) should be considered by the ventilation unit's supplier/manufacturer and factored into the quoted sound insulation performance.

6.0 SUBSTATION

6.1 Noise emitted from power transformers tends to be tonal in nature with larger units producing a characteristic hum. For many transformers, the principal component is at a frequency of 100 Hz with the first harmonic at 200 Hz.

6.2 24 Acoustics Ltd has undertaken noise measurements on similar units located at other sites (in Eastleigh and Shirley, Southampton). In both cases, the transformers were housed in a Glass Reinforced Plastic (GRP) enclosure, as will be the case for the proposed development.

6.3 Tests were undertaken with the transformers operational and under moderately heavy load due to cold weather conditions. The measured overall A-weighted sound pressure level (which has been calculated using the dominant 100 Hz and 200 Hz 1/3 octave band component values) is shown in Table 4.

Location and Distance	**1/3 Octave Sound Pressure Level (dB L_{eq})**		**dB L_{Aeq}**
	100 Hz	**200Hz**	
Eastleigh - 3m from unit	39	37	21
Shirley - 0.5m from unit	48	45	30

Table 4 - Summary of Measured Sub-Station Noise Levels

6.4 It is relevant to note that at both sites, noise from the transformer was difficult to perceive when standing next to the enclosed unit. Any tonal component is therefore unlikely to be perceptible at the nearest existing and proposed residential properties (approximately 15 metres) so a correction for tonality is not applicable.

6.5 On the basis of the above levels, it is considered that the noise level arising from the new transformer (in a brick enclosure) will be lower than 10 dB L_{Aeq} at the nearest residential properties and below 25 dB L_{eq} at 100Hz and 200Hz. Noise from the substation would therefore be substantially lower than the typical background noise levels measured at site (22 dB L).

6.6 The predicted transformer noise levels indicate a very low risk of disturbance and are therefore considered acceptable.

7.0 CONCLUSIONS

7.1 24 Acoustics Ltd has been instructed by Planning Issues Ltd to undertake a noise assessment for the proposed retirement apartments at the Former Police Station on Southampton Road, Lymington.

7.2 Consideration has been given to noise from the proposed electrical substation, which is presents a very low risk of disturbance and hence acceptable in planning terms. This report has also considered the impact of noise from road traffic on the proposed development.

7.3 Environmental noise measurements have been undertaken at the site to determine the prevailing ambient noise levels.

7.4 Performance specifications have been provided for acoustic double-glazing and ventilation to habitable rooms.

7.5 It is concluded that with the measures set out above, noise within habitable rooms would comply with the established maximum internal noise levels.

REFERENCES

1. Department for Communities and Local Government. National Planning Policy Framework, 2021.

2. DEFRA. Noise Policy Statement for England, 2010.

3. Department of Communities and Local Government. Planning Practice Guidance, March 2014.

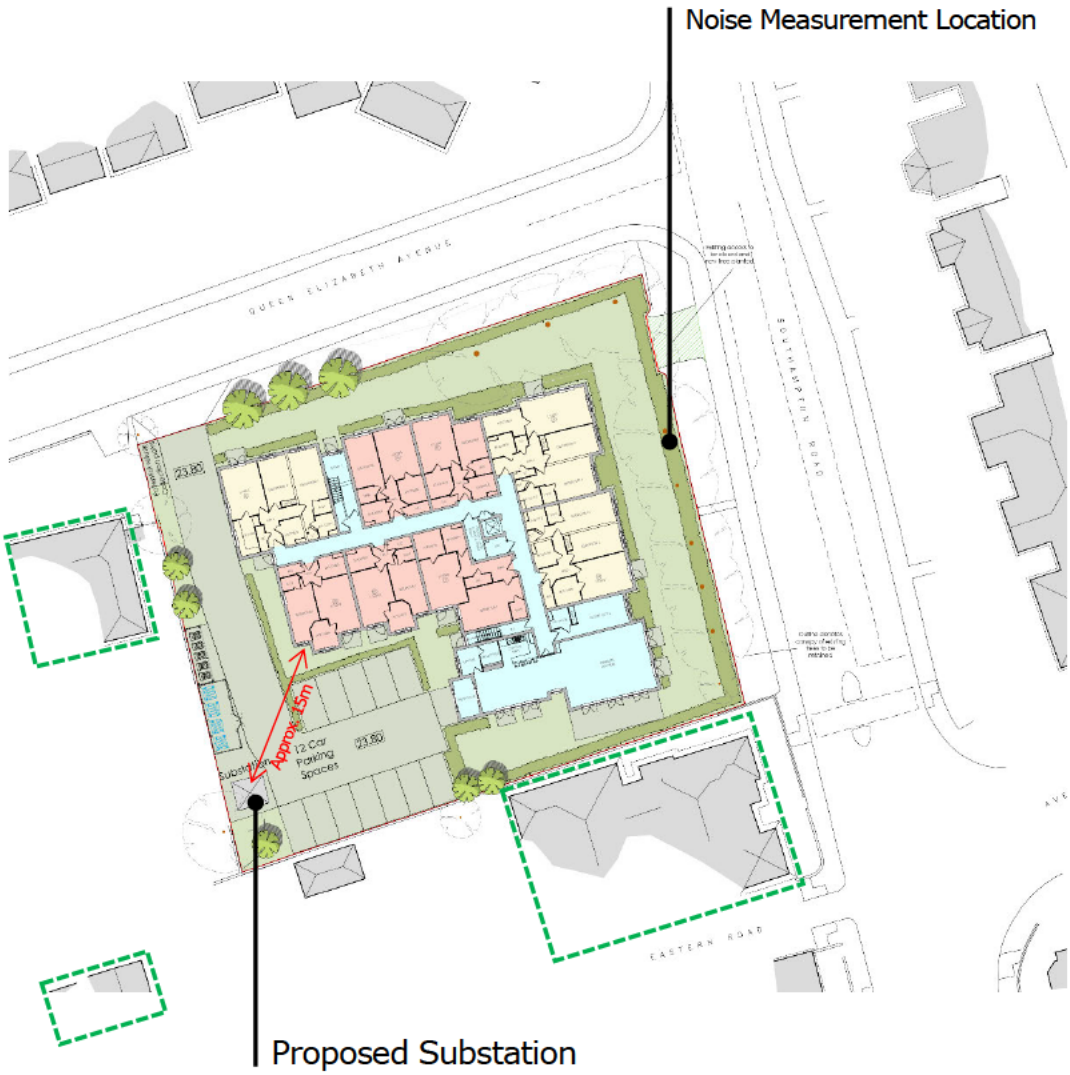
4. Professional Practice Guidance on Planning & Noise (ProPG), 2017

5. Acoustics, Ventilation and Overheating Residential Design Guide V1.1 (January 2020)

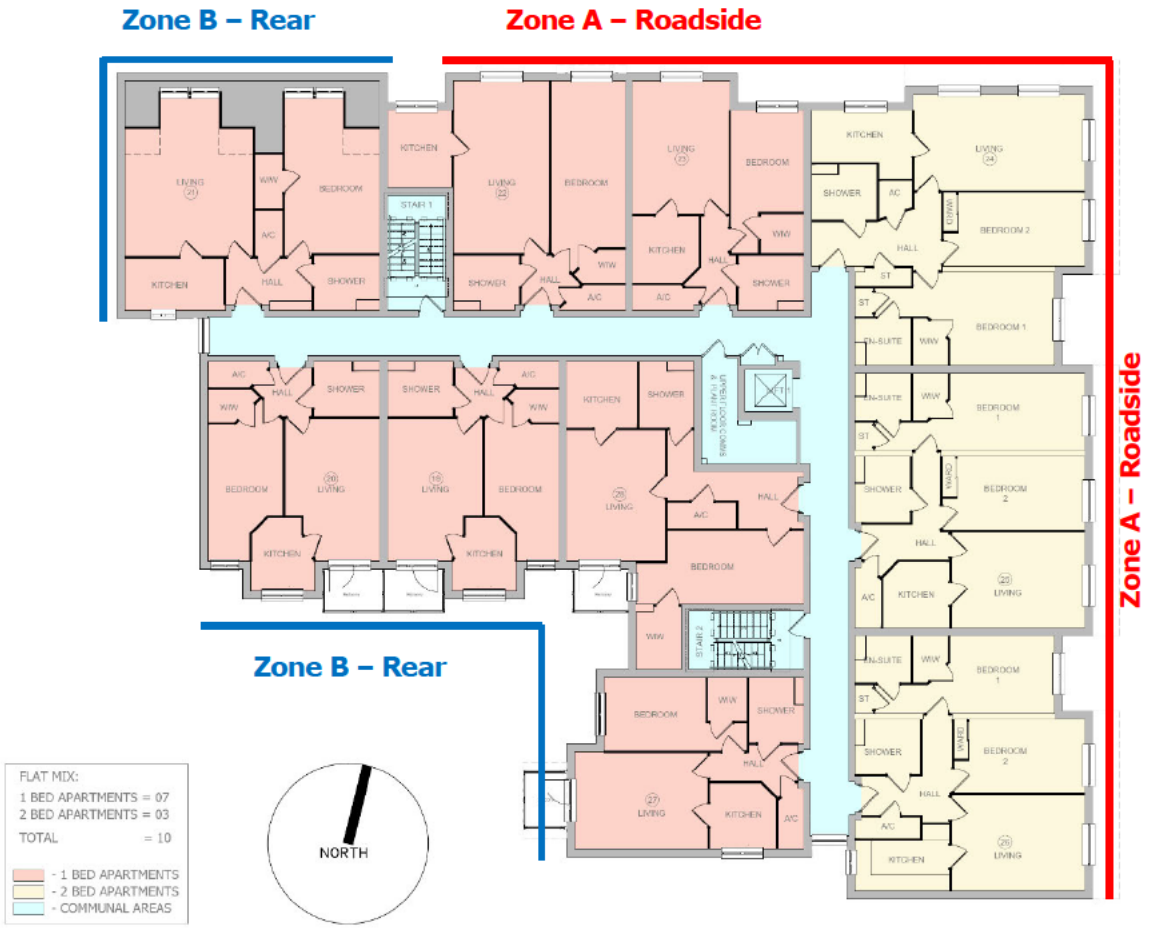
6. British Standards Institution. British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings, 2014.

7. World Health Organisation. Guidelines for Community Noise, 2000.

8. British Standards Institution. British Standard 7445:1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use, 1991.



Project: Former Police Station, Lymington	**Title:** Site Location Plan and Measurement Location	
DWG No: Figure 1	**Scale:** N.T.S.	**Rev**: -
Date: August 2021	**Drawn By:** NM	**Job No**: 9201



Project: Former Police Station, Lymington	**Title:** Proposed Typical Floor Plan and Acoustic Zones (all habitable rooms on all floors)	
DWG No: Figure 2	**Scale:** N.T.S.	**Rev**: -
Date: August 2021	**Drawn By:** NM	**Job No**: 9201

APPENDIX A – ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dB is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dB corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time internal, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

APPENDIX B – ENVIRONMENTAL NOISE MEASUREMENTS