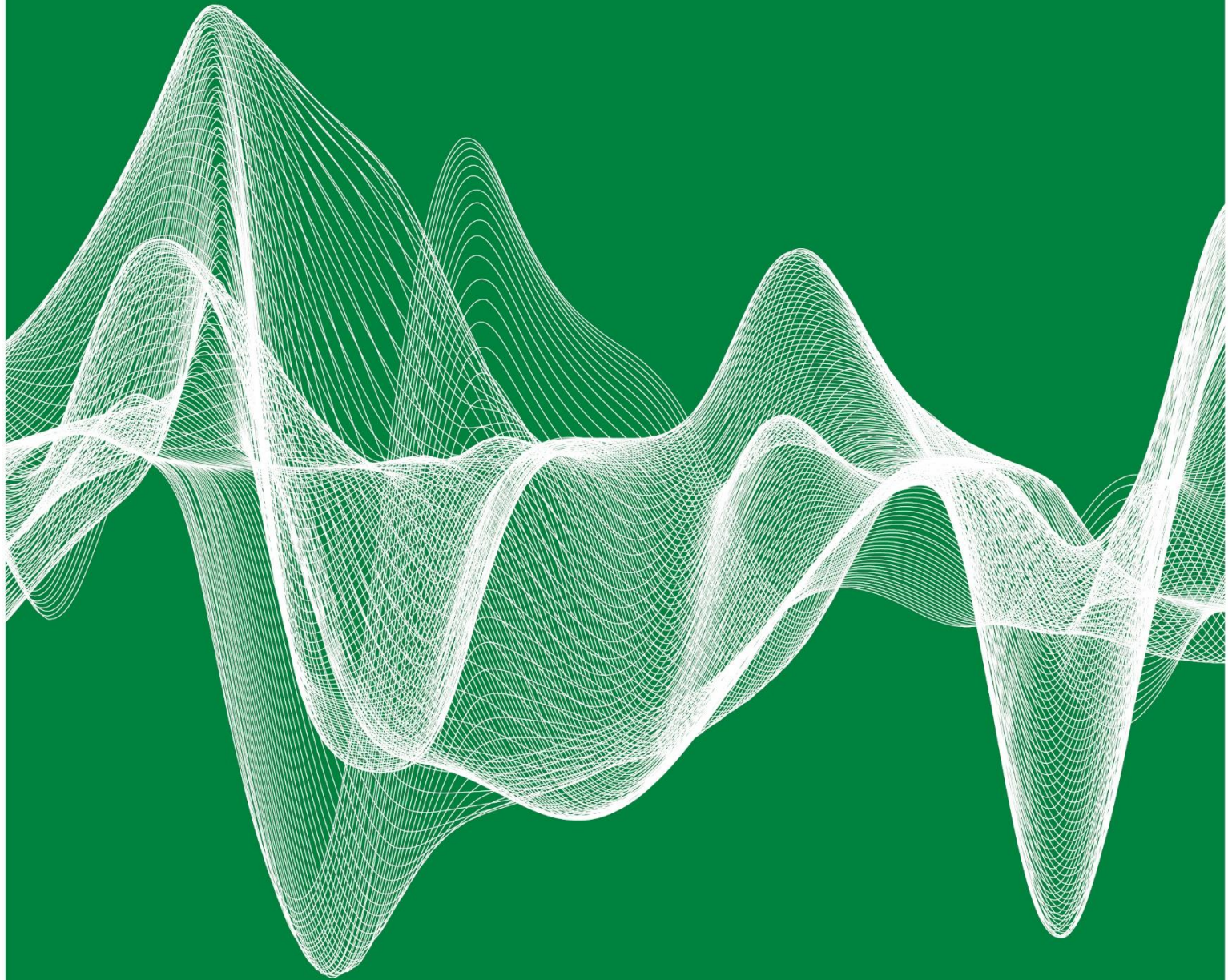




Planning Consultation Guidance Note

Noise and Vibration

Wiltshire Council

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1. Purpose of this Document

This document is intended to provide guidance to Wiltshire Council Environmental Control and Protection Officers when reviewing planning applications and making recommendations to the Development Management service on matters relating to noise and vibration.

The document may also assist those seeking planning permission, and their advisors, by drawing to their attention the noise and vibration issues that may need to be addressed. The aim is to provide clarity for developers in understanding our expectations where there is no national guidance or where national guidance may be open to interpretation in certain circumstances. Where complex development or challenging locations are proposed, advice may be sought from the Environmental Control and Protection service (ECP) in respect of specific applications. The consideration of acoustical matters in support of a planning proposal is a complex and technical matter and it is expected that competent persons will be engaged by the developer to deliver this service.

The document provides general guidelines, drawing on information to be found in a number of international, national and local documents. Occasionally, the review of a planning application may raise issues not fully addressed in this guidance; and other guidance or criteria may then be utilised.

Wiltshire is a rural county, interspersed with villages, market towns and the city of Salisbury. Three Areas Of Outstanding Natural Beauty (AONB) are present in Wiltshire; The Cotswolds in the north-west of the county, the North Wessex Downs encompasses land in north-east Wiltshire and Cranbourne Chase to the south of Wiltshire. Salisbury Plain, a restricted military area is present in the centre of the county. Background noise levels in much of Wiltshire at night are therefore low, commonly below 30dB LA 90 in towns, with lower levels in rural areas.

Areas close to the M4 corridor, which runs through the north of the county experience higher noise levels, as do areas near major roads and the railway network. Industrial areas and commercial centres within the towns and city are also associated with higher noise levels.

This document is intended to support and promote the policies concerning noise in the Wiltshire Council Core Strategy and reflect the guidance concerning noise in the National Planning Policy Framework (NPPF) and the Noise Policy Statement for England (NPSE). This document considers common and frequently occurring situations which arise in planning applications; situations that have not been considered in this document will be assessed in line with the policies in the Core Strategy and the guidance associated with the NPPF. In all cases the evaluation of an application is based on a balanced assessment of the proposed development and the resulting impacts on acoustic amenity.

Where this guidance refers to a named document (e.g. National / International Standard, Guidance Document or policy document) the relevant version is the one listed in this guidance. However, if the named document has been updated or revised, the new version may be used as a source of guidance provided it continues to address issues relevant to this guidance.

2. Statement of the Principles of ECP planning guidance

Recommendations to Development Management concerning the noise impact of any proposed development will be based on the following aims:

- a) The avoidance of significant adverse impacts on noise-sensitive receptors from existing or new potentially noisy developments and/or the avoidance of significant adverse impacts on existing noise generating uses as a consequence of the siting of new noise-sensitive developments.
- b) That suitable mitigation to minimise adverse impacts from noise and vibration will be provided where appropriate.
- c) The improvement of health and quality of life through high quality design and place shaping.

To assess the likely impacts it is expected that applications will be supported with an effective and relevant noise assessment as outlined below:

1. Any development including any noise generating uses shall be supported by an assessment of the impact of any noise and vibration generated by the development on the amenity of any noise sensitive use. Where an adverse impact is predicted the development proposals shall include details of how this adverse impact will be avoided or reduced.
2. Any development containing noise sensitive uses shall be supported by an assessment of the impact of any existing sources of noise and vibration on the amenity of the proposed occupants of the development. Where an adverse impact is predicted the development proposals shall include details of how this adverse impact will be avoided or reduced.

Further guidance on the determination of the impacts of proposals is included in Section 4 but the following approach will be taken in principle to support the delivery of the principles in the NPSE¹;

- Where proposals are expected to have a significant adverse impact then this department will recommend the application is refused. This is the level above which the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present.
- Where the proposals are expected to have no observed effect then this department will not object on noise grounds. Noise is regarded as having no adverse effect so long as the exposure is such that it does not cause any change in behaviour or attitude. Where mitigation is needed to achieve these levels ECP will recommend that appropriate conditions are attached to any permission.
- Where the proposals are predicted to have an adverse impact then ECP recommendations will be based on the context of each application.

Further guidance on mitigation of noise impacts is included in Section 5 but the design of mitigation measures should follow the principles of good acoustic design.

¹ Noise Policy Statement for England (NPSE), March 2010, Defra

Good acoustic design takes an integrated approach to achieve optimal acoustic conditions in both internal and external noise-sensitive locations and does not just focus on compliance with recommended internal and external noise exposure standards.

For the purposes of this document noise-sensitive premises are taken to be places where the building occupants may be resting, sleeping or studying which includes residential premises, hotels, hostels, hospitals and schools. In assessing mitigation schemes the hierarchy of measures in Figure 1 should be considered in descending order of preference. These measures expanded on in more detail in section 5.

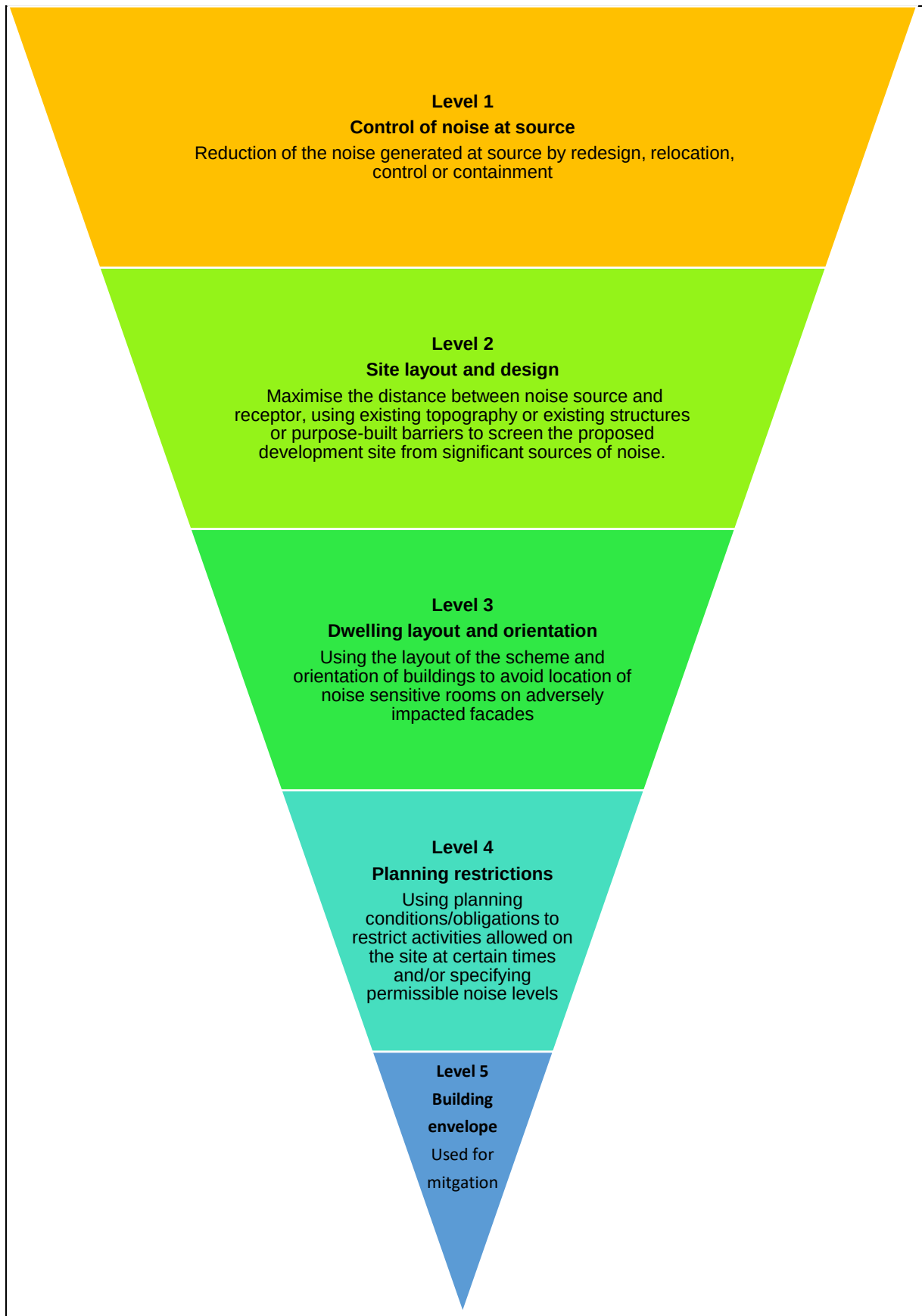


Figure 1. Hierarchy of noise mitigation required to protect noise-sensitive premises

3. Information required to determine the noise impact of a proposal

3.1 Noise Assessment methodology requirements

The impact of noise must be considered for each application where proposed or existing noise sensitive occupiers may be affected by proposed or existing noise sources as a result of the development. The assessment must be carried out by a suitably qualified person² who has appropriate training and experience in the field of environmental acoustics.

In addition, there shall be a consideration of potential noise impacts arising from demolition and construction works for the proposed development. For large schemes or where there is likely to be prolonged or significant impacts, a demolition/construction management plan will be required.

In some cases, a noise assessment may simply show by predictive calculation that a proposal will have no noise implications, and in others a detailed and complex study with proposals for further mitigation measures may need to be considered and the effectiveness analysed. ECP officers work closely with Planning Officers where such proposals may materially affect the application (e.g. a high acoustic barrier may not be acceptable on visual grounds).

Tables 1 and 2 detail requirements and guidance that must be considered when preparing and undertaking any noise assessment. Appendix 1 contains a checklist of what should be included in a noise assessment.

² **Suitably qualified person:** A person having a suitable combination of formal training and experience in the assessment of noise. Advice in the identification of suitably qualified persons can be obtained from the Association of Noise Consultants. <http://www.association-of-noise-consultants.co.uk/>

3.2 Table 1 Methodology Guidance

Requirement	Guidance
Information on noise sources	It is important to know what noise sources exist in the locality of a proposed development and the extent of their impacts (e.g. operating hours and activities of source premises). Consideration should also be given to presenting the impact of each source on the development and including details of any remedial measures proposed to reduce the impact.
Assessing impact of existing noise sources	It is expected that noise levels are measured at both the source and potential receptor location, rather than predicted values based purely on calculation. Consideration of distance, noise barriers and orientation where appropriate is acceptable. Noise from road traffic or railways should be based on measured data.
Noise Sources not in full operation at time of assessment	The noise impact assessment must reflect the impacts based on current conditions but also consider potential impacts if the premises were to operate in full use of the existing planning consent. The worst case scenario must be considered in these circumstances. This includes consideration of the planning use class. Planning use classes are defined by the Town and Country Planning (Use Classes) Order 1987 (as amended). For example B2 use covers most industrial processes and activities that may be carried out under this use class may have significant noise breakout and emissions to air.
Draft Acoustic reports	The submitted noise report must be the final version rather than a draft version. This department does not have the resources to review and correct draft reports and may recommend refusal where draft or incomplete reports are submitted.
Background and Ambient Noise Levels	Worst case scenarios must be considered, • averaged values for L_{AFmax}, $L_{Aeq,T}$ or $L_{A90,T}$ will not normally be accepted; • background noise measurement times must be representative of quieter periods when noise generating activities are expected to occur; • background and ambient noise levels shall be representative* of the existing noise levels at the most sensitive time during the proposed period(s) of operation. * The choice of representative background sound level is not a simple matter of identifying a minimum or modal value over a particular period, but recognising that several periods of measurement may be necessary and that a more thorough analysis of the data is normally required. Measurement time periods for noise indices must be appropriate to the location and situation. Where this guidance stipulates time periods, these should be used unless there are specific circumstances why they are not appropriate, which should be stated and justified.

Unattended measurements	These are not appropriate for assessing the impact of commercial, industrial or entertainment noise as the measured data cannot be correlated with specific activities at the premises being assessed. Where unattended measurements are used for railway or road traffic noise, unless individual noise events can be clearly attributed to a source (such as from sound recording or railway timetables) we will not accept assumptions of the source of noise particularly where it is intended to discount a discrete event.
Assessment of L_{AFmax}	It is normally appropriate to discount the highest values (based on the comments in WHO Guidelines for community noise) ³ ; in order to discount data the noise survey must cover the entire night time period and consist of measurements over suitable averaging periods ⁴ to permit effective statistical assessment.
Extrapolation of percentile levels (ie L_{A90})	Percentile levels determined over a certain time interval cannot accurately be extrapolated to other time intervals ⁵ . The mean average of a series of measured background sound levels is not numerically equal to the overall period background sound level that would otherwise be obtained by a single measurement spanning individual measurement periods ⁶ . Therefore ECP will not normally accept values of $L_{A90,1hr}$ or $L_{A90,15min}$ derived from shorter measurement periods. Section 8 of BS 4142:2014+A1:2019 provides additional guidance on the measurement of background noise levels.
Deviation from guidance	Any deviation from guidance or British Standards needs to be detailed in the report along with the reason for these deviations.

³ Guidelines for Community Noise Edited by B. Berglund et al WHO 1999 (paragraph 3.4)

⁴ Assessing L_{max} for Residential Developments: The AVO Guide Approach - Proceedings of the Institute of Acoustics Vol. 41. Pt. 1. 2019

⁵ BS8233:2014 Paragraph 3.1.8

⁶ BS 4142:2014 + A1:2019 Paragraph 8.1.4 Note 2

3.3 Table 2 Requirements for assessment

Development type	Noise source	Noise survey requirements
Residential	Major road ⁷ / motorway	24-hour noise survey – however the assessment may need to be extended to reflect possible variations between weekday/night and weekend/night. See Section 6.4
	Railway	Noise survey - based on timetable to include freight where applicable. The LAeq (16hr day and 8hr night), should be measured. In addition, suitable shorter term LAeq, LA90, LA10 and LAfmax would be expected in order to give a clearer picture of the existing noise environment. Additionally, a ground-borne vibration assessment in accordance with BS6472 by a competent person will be required if the development within 30m of a railway line. See Section 6.4
	Airfield	Noise Survey – monitoring timed and for a duration that covers typical airfield use and based on flight log evidence. The LAeq (16hr day and 8hr night), should be measured. In addition, suitable shorter term LAeq, LA90, LA10 and LAfmax would be expected in order to give a clearer picture of the existing noise environment
	Commercial noise	Attended survey to determine worst and typical cases – BS4142 Assessment of impact both daytime and night-time where noise may occur at times throughout the 24-hour period. See section 6.5
	Industrial noise	Attended survey to determine worst and typical cases – BS4142 Assessment of impact both daytime and night-time where noise may occur at times throughout the 24-hour period. See section 6.5
	Entertainment noise	Attended survey and assessment of impact See Section 6.7
	No significant transportation or other noise sources in proximity	Survey not normally required; however, consideration should be given to other sources that impact on the noise environment such as major construction.

⁷ A major road should be regarded as any classified A or B road, bus routes and roads subject to significant freight movements

Industrial and or Commercial		BS4142:2014+A1:2019 impact assessment for noise sensitive premises and consideration of transport impacts and possible ground-borne vibration. See Section 6.6
Entertainment		Impact assessment based on octave / third octave band data and consideration of noise generated by patrons. See Section 6.7
Hotel		Location of an hotel is a commercial decision. ECP do not make recommendations for road traffic noise. BS8233:2014 provides guidance on this. However, if the hotel is adjacent to significant noise generating industrial, commercial or entertainment sources a detailed assessment of noise will be required due to the potential impacts on existing businesses. See Section 6.7

4. Determination of impact of proposal involving commercial or industrial noise

Where a BS4142:2014+A1:2019 assessment is applicable this table gives a guide as to how BS4142 might interact with the Noise Hierarchy. However all applications will be judged on a case by case basis.

4.1 Table 3 Summary of noise hierarchy from PPG (Noise)

Response	Examples of outcomes	Effect Level	Action	Approximate BS 4142 assessment
Not present	No effect	No Observed effect	No specific measures required	-10
Present and not intrusive	Noise can be heard but does not cause any change in behaviour, attitude, or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No observed adverse effect	No specific measures required	-3
				-2
				-1
Lowest observed adverse effect level (LOAEL)				
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude, or other physiological response e.g. turning up volume of television: speaking more loudly, where there is no alternative ventilation closing windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum	0
				+2
				+4
Significant observed adverse effect level (SOAEL)				
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response e.g. avoiding certain activities during periods of intrusion, where there is no alternative ventilation provision having to keep windows closed most of the time. Potential for sleep disturbance resulting in premature awakening and difficulty getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant observed adverse effect	Avoid	+7
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable adverse effect	Prevent	+8
				+9
				+10

5. Good Acoustic Design

5.1. Introduction to the section

This chapter reviews a number of elements relating to how noise impacts for residential development can be mitigated. The principles for mitigation of noise impacts are outlined below and follow the hierarchy pyramid principles set out in Figure 1. Hierarchy levels must be considered starting with level 1. The assessor should only move on to the next level when they have fully considered and implemented all reasonable measures that may be applied and where necessary justified why a measure is not practical for the application. The principles of good acoustic design must be followed. Noise should be a consideration at the earliest stages of planning a new development. We expect that ProPG: Planning & Noise, New Residential Development: Supplementary Document 2 Good Acoustic Design will be followed.

Hierarchy Level 1

Control of noise at source to enable noise sensitive development

Where there is an existing noise source such as from a separate industrial, commercial or entertainment premises, the first option for consideration is reduce the noise from that source. The noise assessment should detail the options that have been considered, which may include operational controls to minimise the source noise (such as hours of use), insulation or attenuation at source, enclosure of outdoor sources or provision of a noise barrier. The applicant will need to agree an approach with the responsible party. ECP will in turn evaluate the technical merits of the proposed solution. In these circumstances these source-control measures must be in place prior to the occupation or operation of the new development. Where such options exist, there may be an economic benefit to the applicant to assist in reducing noise at source rather than to meet increased insulation requirements and this will also provide for greater protection for external amenity areas or minimise the impacts on the new receptors.

The NPPF has introduced the 'agent of change' principle which requires an applicant introducing a new land use to manage the impact of that change.

In the case of a residential development, this requires the 'agent of change' i.e. the applicant/developer to identify the noise from existing businesses that have an adverse effect on new residents or users. The agent of change will need to consider not only the current activities, but also those activities that businesses or other facilities are permitted to carry out, even if they are not occurring at the time of the application being made. The applicant will need to explore mitigation options and if possible, agree a detailed mitigation scheme with the responsible third party to control the noise at source. ECP will in turn evaluate the technical merits of the proposed solution. In these circumstances these source-control measures between the agent of change and any third party must be clearly set out in a agreed via a unilateral legal agreement which clearly details the following:

- the scope of mitigation works.
- who is responsible for carrying out the work and by when.
- confirmation that the mitigation will be in place prior to the occupation or operation of the new development.

There may be other elements that will need to be included in the agreement in addition to those stated above. Any legal agreement must be approved by ECP and the council's planning department prior to planning permission being approved.

It can also be helpful for developers to provide information to prospective purchasers or occupants about mitigation measures that have been put in place, to raise awareness and reduce the risk of post-purchase/occupancy complaints.

Hierarchy Level 2

Site layout and design

Many potential noise problems can be resolved through the careful design and layout of a site.

The checklist below should be considered as early as possible in the design of a residential scheme.

Measure	Detail
Distance attenuation	Maximising the distance between noise sources and receptors.
Topography and existing screening	Topography or existing screening, that will be present for the lifetime of the development, may be used to screen the proposed receptors from the noise source.
Noise barriers	Noise barriers such as bunds and barrier blocks, may be included in the scheme to provide screening.
Layout	The layout of a scheme may be used to reduce noise propagation across the site.

Hierarchy Level 3

Dwelling layout and orientation

Many potential noise problems can be resolved through the careful design of noise-sensitive premises. The following checklist should be considered as early as possible in the design of a scheme.

Measure	Detail
External dwelling layout	Locate non sensitive uses such as bin stores and garages on the side facing the noise source. Protect gardens with the building structure.
Internal dwelling layout	Avoid windows to habitable rooms such as bedrooms and living rooms facing towards the noise source.
Building height	Consider low rise dwellings that may be better shielded/protected by the topography or screening, or consider location and orientation of taller buildings that may provide screening for other parts of the site.
Innovative design strategies	Consider innovative design strategies including, but not limited to, courtyards, acoustic balconies, and single aspect dwellings to protect sensitive areas.

Hierarchy Level 4 Planning restrictions

Planning conditions may be used to control the source of the noise if it is part of the planning application. This may include restrictions on hours of use (e.g. to avoid noise sensitive times such as late evening, night-time and early mornings), restrictions on power levels of equipment, restrictions on music or equipment, sound levels or a requirement for a noise management plan or quiet delivery plan implementation. If noise levels are dependant on restrictions of this nature, the application must suggest appropriate restrictions that may be included in conditions. These conditions must meet the planning 6 tests as set out in the NPPF.

Hierarchy Level 5 Building envelope

Reliance on the building envelope must be the last consideration once all other reasonable measures have been utilised. The noise exposure hierarchy table in the PPG Noise identifies having to close windows, where there is no alternative ventilation, to reduce noise levels as an adverse impact. The severity of the impact depends upon how often it is necessary to close the windows. An option that is sometimes considered to achieve a satisfactory internal noise environment is sealing of the building envelope (i.e. through the provision of non-openable windows). However, this is considered a poor acoustic solution and as such should only be considered where this is necessary for air quality reasons. Where reliance on closed windows for part of a dwelling is deemed appropriate it will be necessary to avoid overheating and to provide sufficient ventilation to provide comfort cooling. In such circumstances, trickle vents are not considered appropriate. The provision of an alternative form of natural ventilation will be required to aid thermal comfort. If this is impracticable then a Mechanical Ventilation Heat Recovery (MVHR) system with fully automated summer bypass may be acceptable. A separate overheating assessment for the development may also be necessary in such circumstances.

For noise from transportation sources, the ProPG⁸ (which provides guidance on new residential development) concurs with the PPG(Noise) when it comes to the need to close windows in order to achieve a satisfactory noise climate within habitable rooms. The ProPG includes the following statements with regard to opening windows and indoor noise levels:

'Using fixed unopenable glazing for sound insulation purposes is generally unsatisfactory and should be avoided; occupants generally prefer the ability to have control over the internal environment using openable windows, even if the acoustic conditions would be considered unsatisfactory when open. Solely relying on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other methods could reduce the need for this approach, is not regarded as good acoustic design. Any reliance upon building envelope insulation with closed windows should be justified in supporting documents. (Paragraph 2.22).'

and

⁸ Planning and Noise. Professional Practice Guidance on Planning and Noise, New residential development. IoA, ANC and CIEH May 2017.

‘It should be noted that the acoustic performance of the building envelope will be reduced in the event windows are opened for ventilation or cooling purposes, typically reducing the insulation to no more than 10 to 15 dB(A). Most residents value the ability to open windows at will, for a variety of reasons, and LPAs should therefore normally request that designers principally aim, through the use of good acoustic design, to achieve the internal noise level guidelines in noise-sensitive rooms with windows open. Where internal noise levels are assessed with windows closed the justification for this should be included in the Acoustic Design Statement’. (Paragraph 2.33)

The ProPG only considers noise from transportation sources. Occupants are usually more tolerant of a noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. (BS 8233:2014 (Para 7.7.1)). Therefore, this department will not normally accept closed windows and alternative ventilation to mitigate noise from entertainment, industrial and commercial uses.

Summary:

- i) ECP will not accept any strategy that recommends the use of non-openable windows for residential properties as a means of securing the internal acoustic environment.
- ii) Where openable windows are provided, ECP will not accept a strategy that relies on the occupier of the noise sensitive premises having to close the window during noisy activities.
- iii) A mitigation strategy that includes closed windows for noise without character will only be considered by ECP once all other acoustic mitigation measures have been considered and implemented where possible. In these circumstances, the number of closed windows must be restricted to a minimum of habitable rooms and never for a whole dwelling.

5.2 Ventilation

The primary document for determining any standard of ventilation is Approved Document F, Ventilation, issued under the Building Regulations 2000. Ventilation within any residential or hotel premises must comply with the provisions of this document.

Where enhanced glazing or other mitigation to the building envelope is necessary to ensure the indoor noise climate is acceptable, it will be necessary to provide a scheme of ventilation to remove the need to open windows other than for purge ventilation. The ventilation scheme will be expected to provide thermal comfort during summer months; acoustic trickle vents will not be sufficient in such circumstances.

Overheating is regulated through Building Regulations Approved Document O. The Association of Noise Consultants⁹ also provides guidance.

Any requirement for ventilation shall be met either via acoustic vents, a scheme of mechanical ventilation, or another method of ventilation which is comparable to the

⁹ Association of Noise Consultants - Acoustics Ventilation and Overheating – Residential Design Guide; January 2020

above. In any case the ventilation proposed must not compromise the acoustic integrity of the building envelope. Trickle vents are only suitable where the overall noise mitigation of the building envelope meets acceptable internal criteria with windows open. Where overheating is a factor Approved Document O is relevant.

Where some form of mechanical ventilation is proposed, resultant noise levels due to the operation of the ventilation system at maximum rate should not exceed NR25 (However, the combined impact of noise break-through from the building envelope and noise generated by any mechanical ventilation at maximum rate shall at all times meet the requirements of this section and the internal noise criteria provided in Section 7.7 of BS 8233.

In all instances where mechanical ventilation is proposed, the design statement should consider the air quality around the development to ensure the highest quality of intake air.

6. Specific Guidance for Proposed Developments

6.1 Introduction to the section

Where applications contain noise sensitive uses or noise sources which may have an impact upon existing noise-sensitive uses, the applicant will be required to provide supporting information to allow this impact to be evaluated. The assessment of developments should be in line with the NPPF and supporting guidance and Wiltshire Council Development Management guidance. This section provides guidance on specific development types.

6.2 Outline, Speculative and Mixed-Use Applications

Some planning applications, such as outline applications, contain very little information on which an assessment of the potential noise impact can be based. An outline application submitted should provide enough information to allow us to determine whether the nature of a development is suitable for residential development. However, where there is a likelihood of an adverse or significant adverse impact from noise, it is important sufficient evidence is provided at outline stage and noise assessments that are submitted with outline applications must demonstrate suitable noise levels are achievable across the site and incorporate, where relevant, the principles of good acoustic design.

Sometimes we receive applications for speculative commercial developments when there is little information about the likely end-user. In such circumstances, to ensure that the amenity of residents of nearby noise sensitive premises is safeguarded, ECP will make an assessment based on the likely worst-case scenarios with respect to noise impact. This may lead to us recommending refusal or multiple conditions to address all foreseeable situations. Clearly the more detail that is provided by the applicant, the more we will be able to limit uncertainties and thereby reduce the number of conditions required. In circumstances where, even with reasonable mitigation measures, the development is unlikely to satisfy the requirements of this document then we will usually recommend refusal.

Where a mixed-use development is to be considered, we will assess the parts of the development containing noise sources as if the proposed noise sensitive areas already exist based on a worst-case commercial use. For example, a Class E mixed use ground floors without specific end use defined prior to development will be required to prove insulation suitable for indoor sport such as a gym and address noise from kitchen extraction systems.

6.3 Residential Developments

The impact of any proposal will be based upon the noise hierarchy in the Planning Practice Guidance (PPG) Noise, included as Figure 1 in this document.

When building residential developments, the following steps should be taken:

1. Consider the impact from rail and road transportation.
2. Consider the impact from commercial and industrial noise sources.
3. Give regard to any entertainment premises in the vicinity.

4. If the application site may be subject to vibration the application may need carry out an assessment in line with the guidance in Section 7.

Where two or more standards apply for a site or façade then the highest standard of insulation shall be applied. If in doubt the developer should seek advice from ECP.

Where mitigation schemes involving noise insulation are provided for industrial, commercial or entertainment noise sources or where secondary glazing is specified, ECP may require commissioning testing of the insulation scheme prior to occupation. Where commissioning testing is required, it shall demonstrate that:

1. The building envelope achieves the approved sound reduction performance, and
2. the internal noise environment to habitable rooms shall (under all conditions of the test) meet:
 - the proposed noise criteria of the scheme,
 - the daytime and night-time internal noise level criteria requirements detailed in section 7 and in particular Table 4 of British Standard 8233:2014 'Guidance on sound insulation and noise reduction for buildings',
 - the 2017 ProPG on Planning and Noise – 'New residential developments', and
 - the requirements of this document.

6.4 Noise from road and rail transport impacting new residential developments

The Council has adopted the following noise limits for residential properties impacted by transport noise:

- Bedrooms (night-time - 23.00 - 07.00) 30 dB LAeq (individual noise events should not normally exceed 45 dB LAFmax by more than 10 times)
- Living Rooms (daytime - 07.00 - 23.00) 35 dB LAeq
- Gardens and terraces (daytime 07:00 – 23:00) 50 dB LAeq

Internal noise levels should be calculated using the methods provided in BS 8233:2014 and/or BS EN 12354:3. In accordance with the ProPg and the hierarchy in section 5 of this document the acoustic design scheme shall aim to achieve the internal noise levels with windows open.

Where openable windows are provided ECP will not accept a strategy that relies on the occupier of the noise sensitive premises having to close the window during noisy activities other than for noise without character such as transportation noise. Closed windows to mitigate transport noise will only be considered if all other reasonable measures in the hierarchy have been utilised and only for an absolute minimum of rooms. Designs that result in whole dwellings needing windows close to mitigate transport noise will not be accepted.

6.5 Noise from industrial and commercial sources impacting new residential developments

To assess the impact of existing industrial and commercial noise sources on new residential developments, applicants should undertake an assessment in line with BS 4142:2014 + A1:2019. The noise mitigation hierarchy in section 5 shall be used with the aim of achieving a rating level of the industrial or commercial sound source level

no greater than the representative background sound, where practicable when measured in accordance with BS 4142:2014 + A1: 2019. There may be instances, for specific sites, where a rating level at 5 dB below background is deemed appropriate. This can be determined through discussion with the Local Planning Authority (LPA).

In addition, maximum noise levels at night attributable to the industrial or commercial source should not exceed 60 dB L_{AFmax} at the façade.

ECP will not consider schemes which rely on closed windows and alternative ventilation to mitigate noise from industrial and commercial uses. ECP recommendation will be based on the context of each individual application but a scheme that uses closed windows in this way will normally be refused.

6.6 Introduction of a new Industrial or Commercial Noise Source

For most proposed industrial and commercial noise sources, an assessment in line with BS 4142 should be carried out at the façade of noise sensitive premises. One of the indications of the impact of a BS 4142 assessment is the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

New developments should contribute and enhance the area in which they are located and where possible i.e. prevent 'noise creep', contribute to the improvement of people's health and quality of life as per the NPSE. Therefore, the design objective should be:

'The development should be designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location.'

Where this criterion cannot be achieved, the various noise control measures considered as part of the assessment should be fully explained (i.e. relocation of noise sources, use of quieter equipment, enclosures, screening, restriction of the hours of operation) and the achievable noise level should be identified. This information will allow a judgement to be made concerning the application and its likely impact on the surrounding area. In addition to the above, maximum noise levels should also be adequately controlled.

Background and ambient noise levels shall be representative of the existing noise levels at the most sensitive time during the proposed period(s) of operation. Where different operating regimes are proposed (for example daytime, evening and night-time), background and ambient noise levels shall be determined for each operating period.

In addition to the above assessment, the applicant should assess the maximum noise levels (L_{AFmax}) from the development that are expected to occur between the hours of 19:00 and 07:00. Overnight monitoring will be necessary where the external L_{AFmax} sound levels are likely to exceed 60 dB during the night period at the façade of the nearest noise sensitive dwelling.

Deliveries and collections are usually controlled by restricting operational hours but depending on the extent of these activities, a Noise Management Plan (NMP) may be

requested, which would include an assessment of noise. This would usually involve assessing the noise upon arrival, loading/unloading period and then departure.

The NMP may also need to include controls such as acoustically sealed delivery bays, and restrictions on vehicle mounted refrigeration units, audible alarm systems or white noise reversing beepers. Where applicable, the noise assessment will take account of multiple noise sources operating simultaneously and report the cumulative impact.

Noise from fixed plant or equipment should be selected, located and designed to achieve the criteria above.

Where available, product specification data for new items should be submitted with the acoustic report. Consultants should be using these to compare with data from the noise survey and propose mitigation where the levels are above those specified in the criterion. Where this information is not available a consultant may choose to measure the noise, levels generated by the equipment in question where the equipment has already been installed elsewhere (and in accordance with BS 4142).

Where fixed plant, equipment or machinery is attached to a building the vibration caused by it can pass through the building structure and cause structure borne noise elsewhere in the building. Where it is to be installed in or on a building containing a noise sensitive use, structure borne noise should be considered in the noise assessment and adequate control measures should be proposed to prevent vibrations. An example of where this would be required is where there is a proposal to install ventilation equipment on the roof of a residential apartment block or it could be an air source heat pump attached to the side of a building.

6.7 Noise from entertainment premises

There are likely to be four types of noise source associated with entertainment venues that have the potential to impact amenity:

- Entertainment noise, for example recorded and live music
- Patrons accessing (including queuing), using (both internal and external spaces) and leaving the premises. Designated smoking areas can also give rise to noise.
- Fixed plant, for example air conditioning or extraction units
- Servicing the premises (deliveries and waste management)

The application will need to address all of the above.

When developing a noise assessment for an entertainment premises the noise impact must be predicted using noise levels representative of those found in 'typical' venues of the kind being applied for. This is because although an applicant may only be planning a relaxed or acoustic venue the planning approval would remain in place as long as the development exists. A new business could move in in the future which wishes to provide much louder entertainment. The assessment must provide rationale and references for the source noise levels used.

A lively bar can operate around 95dB LAeq and nightclubs can be even higher at 105dB LAeq. The range of levels at 63Hz and 125Hz octave bands is wider than the A-weighted levels and can be up to 115dB Leq and 110dB Leq respectively (Davies et al 2005).

There is no recognised standard for assessing the impact of people noise on amenity for planning purposes. The impacts of outside people noise can be especially problematic when noise sensitive premises are close by.

6.7.1 Loud music from entertainment premises

The design aim should be for music to be 'inaudible' within habitable rooms.

Noise is considered to be inaudible when it is at a sufficiently low level such that it is not recognisable as emanating from the source in question and it does not alter the perception of the ambient noise environment that would prevail in the absence of the source in question. The building structure is therefore key and will usually involve a high performing solution in loud music venues.

Appendix 2 provides analysis of guidance around low frequency noise and inaudibility. A criterion that would achieve a condition of 'inaudible' / 'virtually inaudible' which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be:

'Music noise levels in the 63Hz and 125Hz octave centre frequency bands (Leq) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq,5min), respectively'.

This criterion may also be applicable for new residential developments that are structurally separate from an existing entertainment venue.

A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is:

Music noise Level (LAeq,5min) should be controlled to 5dB below the typical background noise level (LA90) in each octave band at facade of the nearest noise sensitive property.

Depending on the circumstances it could be that both the above criteria are applicable for the same development (new entertainment venue). In order to control music noise levels so as not to exceed any agreed maximum permissible operating levels, as a last resort, a suitable noise limiting device may be necessary to install, in addition to structural acoustic treatments such as uprated lobby systems and size, location and fixing of loudspeakers.

6.7.2 People noise from entertainment premises

Any noise assessment for entertainment premises must assess the impact of people noise on residential dwellings. This is especially important if there are outdoor areas where people will use/congregate. For such locations, we expect the noise assessment to assume that each person is talks in raised voices at a level 64dB LAeq – this assumes a 50/50 split between male and female. This level is derived from "Handbook of Acoustical Measurements and Noise Control" (Harris 1991). The

study looked at noise data from groups of people communicating with each other for different types of communication. The results from this study are summarised in table 3.

Table 3

Type of communication	Noise Levels L_{Aeq} , dB at 1 metre	
	Male	Female
Casual	53	50
Normal	58	55
Raised	65	62
Loud	75	71
Shout	88	82

Noise calculations should assume that 50% of people are talking at any given time. This data can then either be modelled or used in a simple source distance calculations such as the one used below for a venue with a capacity of 80 persons.

Base level at 1 metre	64dB L_{Aeq}
Factor up for 80 patrons ($10 \log 80$)	+19dB
Correction for 50% "on time" ($10 \log 0.5$)	-3dB
Attenuation from acoustic barrier	-5dB
Correction for distance ($20 \log 1/57$)	-35
Total sound level at nearest residential receptor (L_{Aeq} 1 Hr)	40 dB
Background level at nearest residential receptor (LA_{90} 30 mins)	35 dB
Difference between people noise and background (Total – Background)	5dB

When assessing people noise, it is important for any noise assessment to consider the context of the location where any impact occurs and an assessment in consideration of background levels calculated at the most sensitive period of the entertainment venue's operating hours is an important part of this impact assessment process. The final 30 minutes prior to closing is considered the most appropriate time to calculate the background level as this is the time when roads are likely to be quietest and occupiers in nearby residential dwellings will be trying to sleep. It is the comparison between the background and ambient sound levels that identifies whether mitigation is considered necessary and whether this mitigation is adequate to reduce the noise impact from patrons.

People noise ($L_{Aeq,5min}$) should not exceed the typical background noise level (LA_{90}) at the façade of the nearest noise sensitive location.

6.7.3 New residential development with entertainment premises nearby

The design aim should be for music to be 'inaudible' within habitable rooms with windows open.

We expect the methodology for assessing this will be consistent with the approach taken in section above (or appendix) regarding entertainment noise.

6.8 Multi Use Game Areas (MUGA)

Multi Use Games Areas (MUGA) can include a combination of facilities such as football pitches, hockey pitches, basketball pitches, net ball pitches etc. and are usually community-based projects or within school premises. Guidance has been produced by Sport England on the acoustic implications and design considerations for artificial grass pitches which should be considered for MUGA proposals¹⁰.

It is expected that a noise assessment will be provided in support of an application for a MUGA. Ball impact noise on kick boards and fencing is a significant factor as well as noise from whistles and people noise. Any assessment will need to consider these sources and include measurement of the existing noise environment and predicted impacts from the development on the amenity of noise-sensitive receptors.

Noise mitigation measures may include:

- Ensuring kick boards are no more than 30cms in height from ground level.
- Acoustic treatment of kickboards.
- Ensuring that chain fencing is supported with rubber mounts.
- Restriction of hours.
- Siting MUGA's away from residential properties.
- Boundary treatment (noise barriers, fencing material or bunds).
- Management measures.

MUGA proposals within the curtilage of a school may be treated differently where the site has already been used as a children's play area, particularly if the play area will not be used at night and there were no complaints.

Recommendation for approval will depend upon proximity of the development to neighbouring residents, the size of the development, background noise levels and the predicted impacts and proposed mitigation.

6.9 Skate Parks

When a new skate park is proposed it is often desirable to locate them on existing green space. Changing the use from agricultural field or common/parkland to a skate park introduces an activity that can result in noise that has a significant adverse impact on people living or working nearby. Skate ramps constructed of concrete result in less noise than other materials. Where possible hours of operation and any management controls should be stated.

For us to be able to make informed decision about a skate park proposal we would request the following:

¹⁰ Sport England Design Guidance Note – Artificial Grass Pitches (AGP) Acoustics 2015 - <https://www.sportengland.org/media/4515/agp-acoustics-planning-implications.pdf>

1. A comprehensive noise impact assessment which demonstrates that there will be no adverse impact on any noise sensitive receptor. We would recommend a design criterion that does not exceed background noise levels.
2. Such an assessment may be carried out in the spirit of BS 4142:2014+A1:2019, to assess the likely impact externally at 'off-site' receptors.
3. The assessment shall include:
 - Worst-case noise generated for one hour.
 - Worst-case noise likely- to be assessed (rated) in BS4142 terms i.e. compared against the measured background noise (LA90).
 - An assessment of the L_{Amax}'s (instantaneous noise events) likely to be produced from board slap/tricks/landings.
4. To obtain the worst-case noise levels the consultant may have to measure the same (or very similar) configuration and construction of ramps etc elsewhere when in full use by skaters, and then transpose the data to the chosen site where the background noise will have to be measured.
5. The assessment should 'factor in' any mitigation measures that exist or are recommended e.g. topographical features/walls etc.

6.10 Criteria for schools, hospitals, and hotels

The design of schools and hospitals is covered within specific technical documents, which contain a large number of design criteria for the differing types of rooms. The key documents are:

- Schools are covered within Building Bulletin 93,
- Hospitals are covered within Health Technical Memorandum 08-01.

Where applications are received for schools or hospitals ECP will not specify any noise levels to be met at the planning stage but will recommend that consideration be given to the achieving the levels within the relevant document.

The location and construction of an hotel will normally be based on a business case. The ECP will not usually prescribe noise and vibration criteria for hotel bedrooms where the noise source is road traffic. In such cases we recommend that hotel bedrooms shall be designed and located such that the unoccupied noise levels do not exceed the criteria specified in Table 4 of BS 8233:2014 (alternative criteria used by some hotel groups are provided in Annex H of BS 8233 2014). We further recommend that hotel bedrooms shall be designed and located such that vibration levels do not exceed 0.14 mm/s peak particle velocity, or the assessment of vibration levels results in a low probability of adverse comment when assessed in accordance with BS 6472.

However, where the proposed location of an hotel is such that the bedrooms are potentially impacted by commercial, industrial or entertainment noise we would expect a detailed assessment of noise impacts due to the potential impacts on the existing businesses should disturbance occur.

6.11 Day Nurseries

There are two principle noise sources – firstly noise associated with indoor activities which in most cases can be mitigated by good acoustic design, upgraded insulation and layout. However, where the building is attached to a noise-sensitive use we would expect the application to include a scheme for noise insulation appropriate to the intended use and the existing structure.

The second source (which can result in adverse impact and complaint) is noise from the outdoor areas of nurseries and other childcare facilities which are used for play and assembly. The use of objective measurements to assess noise generated by human activity (e.g. children playing, large groups of people etc) is very difficult as the noise levels vary continuously with bursts of noise interspaced by periods of relative quiet. In addition to this children are active and so the noise produced isn't in a fixed location. Noise from children playing, talking, crying etc will be potentially intrusive if it is audible within either adjacent premises or adjacent residential amenity space.

Any application including an outdoor use should be supported by a noise assessment. This assessment should determine the noise impact from the use of the outdoor areas and should be based on measured levels for the source noise (where it exists currently) and representative ambient/background noise levels at the potentially affected noise-sensitive premises.

In most cases as the noise source will not exist it will be acceptable for measurements to be provided from a suitable comparable facility and the assessment shall include all raw monitoring data, details of the activities during the measurements, a suitable site plan for the data provided indicating the measurement location and source and shall be for a period of at least 30 minutes.

Where possible the distance between the source and measurement location for noise monitoring from a comparable facility should be similar to the separation between the edge of the proposed play space and the noise-sensitive receptor. It will not be acceptable to calculate distance attenuation by considering the play area as a point source at the centre of the play area given that the source is a group of moving children and hence cannot be typified as a point source.

The assessment criteria need to be specific to the proposed use. In general, we will not accept including periods when there is no activity in the play area in any calculated average and also we will not accept the use of BS 8233 as the noise source cannot be typified as 'noise without character' and it is therefore inappropriate. Any recommendations from a noise report should be incorporated into the planning application and outdoor play area management strategy as appropriate.

6.12 Dog Kennels

Noise emissions from commercial kennels are associated with dog barking but may also include whining, howling and yelping. The potential for adverse impacts has been documented with barking audible over extended distances and nuisance conditions at up to 500metres.

A UK noise attitude survey (1999-2000) conducted by the Building Research Establishment (BRE) cites barking dogs as the fourth most common source of noise nuisance. At present there is an absence of specific guidance which defines a methodology to assess the impact of noise from dog kennelling/boarding establishments, which undermines due consideration and full demonstration of achievement of objectives under the NPSE.

No agreed standard or noise assessment methodology currently exists specific to dealing with the prediction of noise impacts from dog kennelling/boarding establishments, this is due to the lack of UK specific guidance, the uncertainty surrounding the applicability of British Standard 4142: 2014 + A1 2019 to the assessment of dog barking noise, and the discrepancy surrounding applicability of World Health Organisation criteria to unsteady distinctive noise.

Such developments create challenging and often contentious consultation work due to the highly characterful nature of dog barking noise. Barking is designed to attract attention and it is highly distinguishable against the background noise environment. Barking is unpredictable and intermittent, consisting of short bursts which last seconds but will recur repeatedly.

The maximum level of noise from larger animals has been measured: LAFmax of **98dB** and collective maximums of **107dB**.

The issues which arise within assessment methodologies at present is that the LAeq which is a time-integrated measure, is deemed to be of limited benefit in predicting the annoyance impact. Effectively the LAeq parameter does not characterise or represent the highly intermittent and impulsive nature of dog barking sound, as these are “smoothed” out over longer duration measurements. There are also uncertainties and inconsistencies with regard to the noise source data, with wide variances adopted, and uncertainty as to whether representative of noise emitted. As such, It is not considered appropriate to use BS 4142:2014+ A1 2019, “Methods for rating and assessing industrial and commercial sound” because of the inability of the reference-time periods to represent such highly characteristic noise.

There is a risk without adoption of a clear representative noise impact methodology that such developments may proceed based upon inadequate noise impact assessments i.e. the proposed development may operate potentially with insufficient safeguards and inadequate levels of noise control which could give rise to noise emissions seriously impacting amenity and/or a further recourse under statutory nuisance.

Any application for Dog kennelling / boarding establishments must demonstrate that the impacts of dog noise have been considered. The applicant will be required to demonstrate that the impact of dog barking is at an acceptable level. The following measures in combination may be considered:

- A reasonable separation distance to receptors thereby reducing the resultant noise level of barking;
- A good structure (typically purpose-built) capable of insulating against noise breakout;
- A layout which limits the disturbance/agitation of the dogs and which uses barriers and shielding to minimise impacts upon nearby receptors;
- Excellent management practices to ensure the minimal barking during, arrival, feeding, exercise and pick-up times.

Management practices shall include the following:

- Kennels should be constructed to visually screen stimuli such as other dogs, animals, traffic or passers-by.
- Access to kennels should be restricted solely to staff.
- Feeding of the dogs should be restricted to the daytime hours of 7.30 am – 6 pm.
- Exercise of the dogs may only be performed between the hours of 9 am and 5 pm.
- A responsible person must be available on site 24 hours per day.
- Kennels should be constructed of such a material so as to provide an appropriate reduction in the emission of noise. Materials such as masonry and cement sheeting would provide a suitable structural basis.
- The kennels should be positioned so as to utilise the ability of the topography to reduce noise.
- A compliant response system should be implemented.

It is considered that an appropriate design standard for a new kennelling operation is one based on control over the maximum barking level.

Applying control to the maximum barking level places reliance upon good design, layout and insulation within the kennels and reduces the reliance upon assumptions of noise impact due to controlled behaviour of the dogs.

Measurements must be undertaken over a sufficient period of time to reflect the variations in operating practice (e.g. peak capacity, high external stimuli, high amenity periods (weekends) etc.)

This technical guidance proposes the use of the LAF max parameter as a proxy for the Sound Power Level L_w of barking. Alternative parameters such as L_{Aeq} 100ms and L peak could provide a similar proxy measure, however LAF max was chosen as published reference values are much more readily available.

An acceptable source noise level shall be a LAFmax of 95dB however where larger dogs are to be housed or could be housed, then a value of LAF max of 100dB should be used.

During the daytime between 08:00hrs and 20:00hrs such developments should be designed such that the L_{Amax} noise impact at nearest receptors should not exceed the background sound level LA_{90} . (BS 4142 provides an appropriate method for the determination of representative background sound levels LA_{90}).

During early morning (07:00hrs to 08:00hrs), evening (20:00hrs to 23:00hrs) and night-time hours (23:00hrs to 07:00hrs) such developments should be designed to ensure the L_{Amax} remains 5 dB below a representative night-time background sound level LA_{90} .

In effect, unless otherwise demonstrated, this is likely to mean that dogs need to be inside within an insulated building during these evening/night-time periods.

6.13 Air Source Heat Pumps (ASHP's)

Heat pumps are an important part of the Government's strategy to reach net zero carbon emissions by 2050. The Wiltshire Climate Strategy has been adopted by full council and forms a part of the council's constitution. It sets out that the council has acknowledged a climate emergency and are seeking to make the county carbon neutral by 2030. This will require radical action to reduce greenhouse gas emissions from our existing and new built environments.

However, ASHP technology generates noise, and units often operate during the night and day. As a result, ASHP's have the potential to cause significant adverse effects to other people nearby, especially where residential dwellings are in close proximity.

Noise is not always a high priority when homeowners or installers are selecting product or location with efficiency, cost and aesthetics often being seen as more important. Technology is continuously improving and there an increasing number of quieter models available.

The selection, location and installation of ASHP's should be considered with noise as a priority concern. In certain circumstances ASHP installations may be considered 'Permitted Development' if they meet the Microgeneration Certification Scheme (MCS) standard. Unfortunately, compliance with this standard does not necessarily mean noise from the ASHP will not have an adverse or significantly adverse impact at neighbouring properties.

There are three main reasons for this. Firstly, the calculation in the standard assumes a background noise level of 40dB LA90, many locations in Wiltshire would be significantly below this at night. Secondly the calculation used a sound measurement that takes no account of whether the unit being assessed is running at maximum capacity or during one of its noisier modes such as the 'defrost' mode. The calculation also takes no account of sound characteristics such as an audible hum, buzz or clunk which may make the sound more annoying.

Compliance with the MCS standard does not mean a ASHP will be exempt it from statutory nuisance legislation. Should complaints about noise nuisance from an ASHP be made to the local authority we would have a duty to investigate under the provisions of the Environmental Protection Act 1990 and serve an abatement notice when appropriate.

The Chartered Institute of Environmental Health (CIEH) and the Institute of Acoustics (IOA) have produced a [Professionals Advice Note](#) which recommends that an absolute rating level target, which takes account of the sound character, is a proportionate approach. The advice note provides a simple calculation for homeowners and installers so they can check if the installation will meet the criteria. Larger heat pump installations or installations in a sensitive location may require a more comprehensive assessment which will need to be carried out by an acoustic professional.

It is recommended the advice note is followed when considering the installation of any ASHP whether or not full planning permission is required.

7. Demolition and Construction Noise

When assessing an application consideration shall also be given to possible noise and vibration impacts during demolition, site preparation and construction. The need for controls will be based on the location, proximity of noise-sensitive receptors and the proposed works. Whilst there are powers to control construction noise under section 61 of the Control of Pollution Act 1974 through a prior consent process, and section 60 through an enforcement notice to control noise and vibration, it is likely we will also seek controls through the planning process, particularly for very sensitive locations or extended construction periods.

The following provides guidance on the issues that should be considered and the type of controls that may be appropriate in respect of noise and vibration management:

1. Hours of use – works that may be audible at the site boundary shall not take place outside the hours of Monday to Friday 8am to 6pm, Saturday 8am to 1pm and no work on Sunday and Bank Holidays,
2. The parking of vehicles of site operatives and visitors,
3. Loading, unloading and storage of plant and materials – consideration shall be given to the type of reversing alarms on delivery vehicles and associated impacts, location of off-loading and storage areas, avoidance of materials being dropped should be considered,
4. Piling - carry out piling operations using the quietest methods available,
5. Noise and vibration control methodologies - there should be a clear statement that the principles of BS5228:2009 will be followed in terms of noise and vibration control and effective site management as outlined below,
6. Mobile plant and machinery - all such plant used on site shall be fitted with white noise reversing alarms,
7. Delivery routing,
8. Working outside the standard hours of work - certain operations (such as concrete power floating, erection and dismantling of towers cranes, work on the highway) cannot always be undertaken within preferred hours of operation for noisy activities. We would seek to avoid such noisy works being carried out whilst residents are sleeping, if however there is no other option, ECP must be notified and local residents informed in writing and provided with a contact telephone number for them to call should they have any queries or problems.

Any mitigation for reducing impacts of construction noise should apply effective site management which includes:

- avoidance of amplified music on site,
- not using vehicles with reversing alarms before 08.00,
- not leaving noisy equipment/ vehicles running unnecessarily e.g. at night or early deliveries,
- undertaking the noisiest operations in the middle of the day,
- keep noisy deliveries to the middle of the day especially skip and cement deliveries,
- ensure all materials are carefully loaded and unloaded to avoid unnecessary noise (such as avoiding items being dropped),
- locate noisy static plant (e.g. diesel generators and crushers) away from noise-sensitive properties,
- ensure equipment is properly maintained,

- ensure noisy plant is adequately insulated/screened,
- advise local residents in writing that work is to take place and provide a contact telephone number for them.

8. Mitigation following a recommendation of refusal

Occasionally an application for a noise sensitive development will be submitted and we will recommend refusal because it is deemed that the development will be adversely affected by noise. However, based on the broader planning balance the grant of permission may nonetheless be deemed appropriate.

In these circumstances and upon formal request from the planning officer, we will review the case and seek proportionate mitigation. The mitigation is likely to require a high standard of soundproofing and mechanical ventilation and protecting the internal amenity will be of paramount importance. In such cases we will require a detailed design and specification prior to grant of permission and the approved scheme will be expected to be incorporated into the approved plans.

9. Ground Borne Vibration

9.1. Introduction to the section

Although ground borne vibration issues are not encountered frequently in the planning process, it is something that should be considered where the development would lead to vibration sensitive premises being in close proximity to industrial/commercial activities or to railway lines.

Because of the uncertainties involved in predicting vibration effects, each case will be considered individually, and appropriate criteria agreed.

9.2. Vibration surveys

In circumstances where vibration is a potential source of disturbance, it is expected that an appropriate vibration survey or prediction be carried out. Initially, to avoid complex investigations being carried out unnecessarily a screening survey should be carried out. If monitored vibration levels do not exceed 0.14 mm/s peak particle velocity in any axis, then no further survey is necessary. If this level is exceeded, then it is expected that an assessment would be carried out with reference to BS 6472.

When considering potential impacts and mitigation of vibration, the assessment should consider both the peak particle velocity (PPV) and vibration dose values (VDV) as indicators of potential impact and disturbance. The assessment should consider variations between daytime and night-time vibration and whilst the VDV will give an indication of possible response to vibration the variation in PPV may be a critical concern particularly at night.

Where re-radiated noise is a potential problem then this should also be assessed. Data from these assessments should be made available to us for consideration.

Glossary of Terms

'A' weighting (dB(A)): A frequency dependent correction which weights sound to correlate with the sensitivity of the human ear to sounds of different frequencies.

Ambient Noise: A measure of the typical noise (excluding any unusual events) present at a site. This is usually described in terms of $L_{Aeq,T}$.

Anonymous noise: Noise that cannot be attributed to a single (specific source). For example, noise from cars on a road would be considered anonymous whereas a noisy ventilation unit would not.

Audible: Sound that can be heard or is perceptible by the human ear.

Background Noise: A measure of the underlying noise (excluding any unusual events) which is present at a site before a new noise source is introduced. This is usually described in terms of the L_{A90} level: the sound pressure level exceeded for 90% of the time.

C_{tr} Spectrum adaptation term: A correction added to a sound insulation quantity (such as R_w) to take account of a specific (traffic noise) spectrum. See BS EN ISO 717-1:1997. For example the difference between internal and external traffic noise levels in dB(A) is calculated using $R_w + C_{tr}$ (equivalent to $R_{traffic}$)

Clearly audible: There is no acoustic definition for clearly audible and as such a noise source may be deemed to be clearly audible if it is both easily identifiable and deemed likely to adversely affect the amenity of residents of any (proposed) development.

CTRN: Calculation of Road Traffic Noise (ISBN 0 11 550847 3). A memorandum issued by the Department of Transport in 1988 which provides guidance for assessing the impact of non-complex traffic noise.

CRN: Calculation of Railway Noise (ISBN 0 11 551754 5) A memorandum issued by the Department of Transport in 1994 which provides guidance for assessing the impact of non-complex railway noise.

DMRB: The "Design Manual for Roads and Bridges" (DMRB) was introduced in 1992 in England and Wales. The DMRB sets a standard of good practice that has been developed principally for Trunk Roads. It may also be applicable in part to other roads with similar characteristics. (Volume 11, Section 3, Part 7 covers Noise and Vibration)

$D_{ne,w}$ Weighted element normalized level difference: A single-number quantity which characterizes the airborne sound insulation of a small building element. See BS EN ISO 717-1: 1997

$D_{nT,w}$ Standardised level difference: A single-number quantity which characterizes the airborne sound insulation between rooms. See BS EN ISO 717-1: 1997

Decibel (dB): A unit used for many acoustic quantities to indicate the level of sound with respect to a reference level.

ECP: Environmental Control and Protection Team, a service within the Public Protection department of Wiltshire Council.

Façade measurement: Noise measurements made outside an external wall of a structure (usually 1 metre from the wall).

Habitable room: A room used for sleeping or recreation / relaxation.

Inaudible: Sound that cannot be heard or is imperceptible to the human ear.

Industrial-type noise sources: Noise sources that are industrial in character. For example noise from plant and machinery, materials handling operations, or manoeuvring of heavy vehicles.

Institute of Acoustics: A professional body representing persons at all levels working in the field of acoustics. <http://www.ioa.org.uk/>

$L_{A90,T}$: Sound pressure level exceeded for 90% of the measurement period “T” or ‘background level’.

$L_{Aeq,T}$: Equivalent continuous sound pressure level measured over the time period “T”

L_{Amax} : The maximum RMS A weighted sound pressure level

Mixed Use: Premises or development which will include both residential and non-residential uses

Noise: Unwanted sound.

Noise with a specific character: 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.

Noise assessment: Evaluation of noise climate by a suitably qualified person to assist in the determination of a planning application.

Noise-sensitive premises / developments: Principally comprising residential premises, hospitals, schools and hotels. Other premises types may be deemed such depending upon circumstances.

Noise Nuisance: A legal term used to describe noise at a level that is disturbing as perceived by a reasonable person. The meaning of nuisance is defined by precedent in common law.

Outdoor Amenity Area: An outdoor area adjacent to a residential building which is designed and intended primarily for the leisure and recreation of the occupants of the dwelling. This will include gardens, landscaped areas, and balconies.

R, Sound reduction index: A quantity which characterizes the airborne sound insulation of a material or building element in a stated frequency band. See BS EN ISO 140-3:1995

R_w , Weighted sound reduction index: A single-number quantity which characterizes the airborne sound insulation of a material or building element measured in the laboratory. See BS EN ISO 717-1: 1997

Rating Level: The noise level of an industrial noise source which includes an adjustment for the character of the noise. Used in BS4142.

Sound insulation: A quantity which is used to characterize the reduction in sound pressure level across an element or partition. (See R , R_W , $D_{nT,W}$, $D_{ne,W}$, C_{tr})

Structure borne noise: Noise that propagates through a structure, for example through a building.

Suitably qualified person: A person having a suitable combination of formal training and experience in the assessment of noise. Advice in the identification of suitably qualified persons can be obtained from the Association of Noise Consultants.

<http://www.association-of-noise-consultants.co.uk/>

Appendix 1

Check list of Information required in a Noise Assessment

Introduction	Outline the purpose and scope of the report.	
	A brief description of the proposal considered by the assessment.	
	Site address or other location details (e.g. land adjacent to 123 Any Road....).	
Methodology	Describe any standards / policies to be used and give a brief outline of why they have been chosen.	
	Provide more detail and justifications why accepted standards have not been used.	
	Outline the process to be followed.	
	A clear plan indicating locations of noise sources, sensitive receptors, measurement positions and any mitigation measures if appropriate.	
Noise Measurements	Location, dates, and times of all measured data relied upon and provide summaries of the results obtained.	
	If it has not been possible to measure at the actual location of the proposed development, state why an alternative location is considered representative	
	Explanations for any abnormal or anomalous results.	
	Brief details of the equipment used and a confirmation that it has been verified within an appropriate time (usually bi-annually) and that appropriate site calibration checks were carried out. Note that all equipment used should comply with appropriate standards (e.g. IEC 61672 or its predecessors for Sound Level Meters).	

	Meteorological conditions during the monitoring period i. Wind speed ii. Wind direction iii. Temperature iv. Precipitation Note: It will generally be acceptable to state that meteorological conditions were satisfactory for measurement purposes and only provide more detail if they are borderline.	
Predictions	Where it has been necessary to predict noise levels, brief explanations of how these have been derived including any assumptions made (e.g. downwind propagation) and what standard have been followed (e.g.ISO 9613).	
	If a software package has been used, the package needs to be identified (e.g. Lima, Cadna, NoiseMap, SoundPlan) along with a brief description as to its use and the input data and modelling parameters shall be provided.	
	Brief details of the geographical and source data used – where data for new sources has been derived from measured data at another location the report shall include the original data and details of the assessment carried out.	
	Details of any validation checks carried out.	
	Diagram showing results of modelling.	
Assessment	Give details of the assessments made based on the measured and/or predicted data at the façade of the nearest existing or proposed noise-sensitive premises.	
	State any assumptions made.	
	Show any calculations or predictions made in sufficient detail so that they could be checked for accuracy and validity. If the calculations are complicated, the details may be included as an appendix.	
	An indication of uncertainty or errors associated with measurements or assessment.	

Mitigation	Where mitigation is necessary for a development to satisfy noise criteria provided in this document the report should include a full specification of the mitigation. This may include the following:	
	i. Alternative plant or machinery. Including maximum sound power level(s) for items of plant; sound power level at a given distance; tonal analysis appropriate technical specifications; full details of any attenuators and proposed location.	
	ii. Reorientation of buildings or design to avoid noise sensitive receptors on noise-affected facades.	
	iii. Barriers or bunds. Height, location(s), dimensions, material, construction.	
	iv. Building envelope performance including enhanced glazing and doors. This shall also include clearly annotated drawings showing in plan and elevation the recommended treatments.	
	v. Ventilation specification – this shall also include assessment of potential air quality impacts and where mechanical ventilation is being proposed the report shall include design criteria (including ventilation system design, flow rates, an assessment of overheating risk and the combined noise impact of noise break-through from the building envelope and the noise generated by the whole ventilation system inside of the dwelling).	
	vi. Any other data required by the developer to meet the required noise standards / guidance.	
	Confirmation of expected mitigated sound levels.	
	Mitigation details are included in the overall design.	

Conclusions	A brief resume of the process described above and a confirmation that if the recommendations are carried out satisfactorily that appropriate standards / guidance will be complied with and the resulting noise environment will not adversely impact amenity.	
Appendices	Scale plans showing the site location and the location of any measurement or prediction positions in sufficient detail to enable them to be readily identified. Aerial photos from online mapping sources may be useful.	
	Unabridged noise monitoring / measurement results on which the assessment is based.	
	Details of any calculations relied upon.	

Appendix 2

When considering the potential impact of a proposal for an entertainment venue or new residential development near an entertainment venue, consultants should consider the overall noise level (LAeq) and the 63 Hz and 125 Hz octave band noise levels (Leq). Music in the 63 Hz and 125 Hz octave bands, often described as 'bass noise', is particularly difficult to contain and the impulsive and non-steady character of low frequency music noise is particularly disturbing for local residents exposed to it.

Existing noise standards/criteria are not appropriate for evaluating low frequency noise; in almost all other situations the established noise descriptors are based on the A-weighted sound level (dBA), which effectively filters out low frequency sounds (Moorhouse et al 2011). When dealing with noise control, especially at the lower frequencies, it is usual to look at the octave band data as a Z-weighting (linear) and not the A-weighting, due in main to the amount you have to 'take off', resulting in meaningless data (-26.2dB at 63Hz), and also with respect to the sound insulation performance of various constructions materials.

Rather than just A-weighted levels being assessed, e.g. internal noise levels as per BS 8233: 2014, a low frequency band analysis should be carried out (McCullough et al 2004).

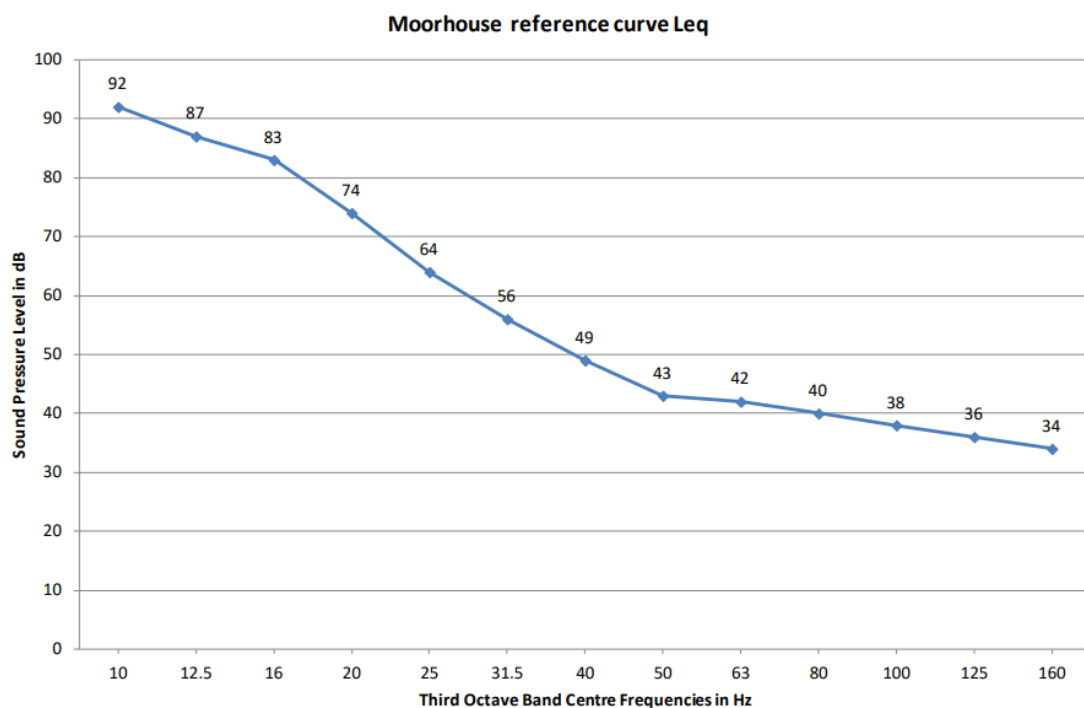


Figure 2. Limits for Low Frequency Noise in Procedure for the assessment of low frequency noise complaints (NANR45) – Revision 1

In the 'Procedure for the assessment of low frequency noise complaints (NANR45) – Revision 1', Moorhouse et al (2011) use limits for low frequency noise levels in 1/3 octave bands between 10Hz and 160Hz.

For the assessment of low frequency music noise, it is more practical to consider the 63 Hz and 125 Hz octave bands. The Noise Council's Code of Practice (1995) on 'Environmental Noise Control at Concerts' suggests limits on both these octave bands.

The DEFRA report 'Noise from Pubs and Clubs – Phase 1' suggests limits on 1/3 octave bands. However, the problem with this suggestion, and one of the reasons it is not widely used, is due to the difficulty in obtaining 1/3 octave band sound insulation performance data for various construction materials.

With regards to assessing music noise, the 63 Hz and 125 Hz octave band levels as shown in Figure 2 have been plotted against the NR 15 curve as shown in Figure 3, and a good correlation at low frequencies is evident (the octave bands were calculated from the 'Moorhouse curve' by logarithmically adding the adjacent 1/3 octave bands).

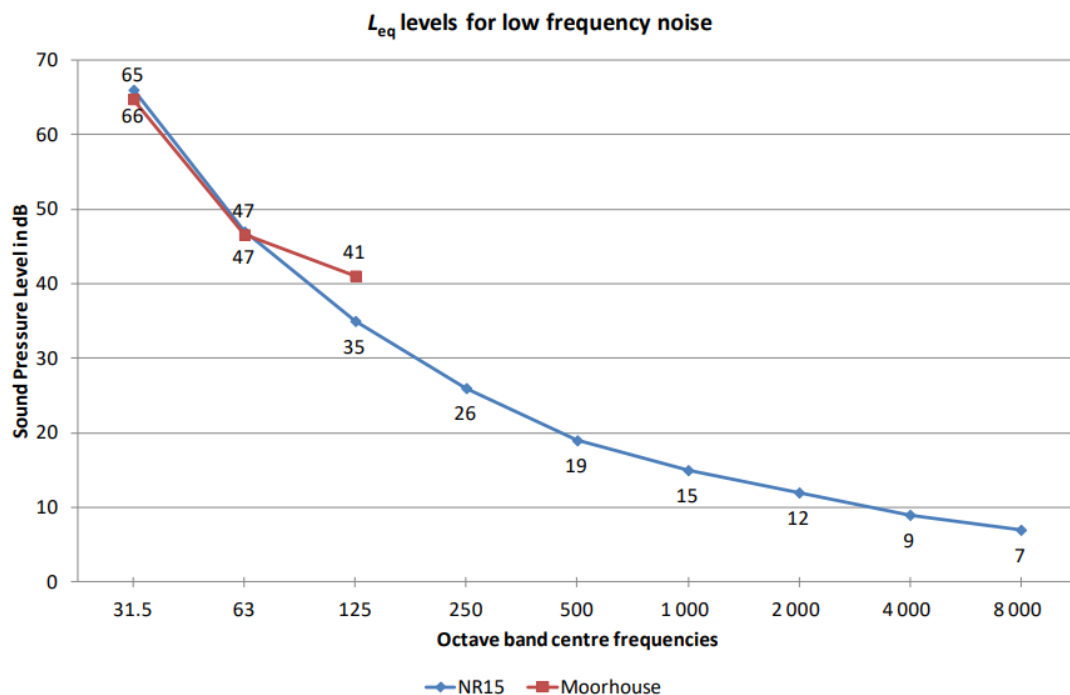


Figure 3. NR15 curve and 63Hz and 125Hz limits from Procedure for the assessment of low frequency noise complaints (NANR45) – Revision 1

However, the NR curve may be too stringent at mid and higher frequencies and may be lower than background noise levels in habitable spaces. Furthermore, the NR curve is most commonly used to set limits for mechanical services noise in buildings, i.e. steady, continuous noise sources. Music noise has different characteristics and as such can be described as unsteady and non-continuous in comparison.

Even though the Moorhouse curve does not specifically relate to entertainment noise (as per the caveat in the revised edition) these levels provide a good practical basis to assess low frequency music noise. They also provide a workable prediction for planning applications and a measurement method and assessment for in-situ low frequency issues in existing habitable spaces.



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