



Planning and Noise



Specific Guidance Note 1 South Gloucestershire Council

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1.0 Aims and Objectives

This document has been prepared by South Gloucestershire Council (SGC) and is intended to provide all those involved in the planning of new or modified developments, including developers and their noise consultants, with a clear idea of the standards expected in relation to noise and vibration.

The document provides details as to how the Government drive for sustainable development, with specific regard to noise, has been interpreted and implemented by SGC. Wherever possible SGC wishes to encourage the development and adoption of 'good' acoustic design which proactively improves the acoustic environment within their region, rather than merely focussing on preventing a worsening of the acoustic environment through 'adequate' acoustic design. This will require careful consideration of any adverse noise impact, both in terms of an existing noise climate's suitability to accommodate new noise sensitive development and in terms of the impact on existing noise sensitive areas any development which brings with it new sources of noise.

SGC promote detailed consideration of noise throughout the development process, starting with the conceptual layout, with the primary aim being to deliver an external noise climate that is considered to be sustainable. As an authority we strongly believe that developments which can achieve this goal are desirable and that development proposals should be acoustically suitable for the proposed location based on the most current relevant guidance.

By reference to the information contained within this document, applicants who are seeking to gain planning consent for new or modified developments are encouraged to consider noise and vibration in a reasoned and proportionate manner and to provide, from the outset, all noise related technical information as may be necessary to allow planning applications to be properly determined in a timely manner.

2.0 Introduction

Sound can have an effect on quality of life. The presence of some sound in our lives is beneficial, providing us with information about our surroundings and the means to communicate. However, not all sound is so welcome. Sound which evokes a negative reaction becomes unwanted and is termed 'noise'.

There is increasing evidence that exposure to such noise, even at relatively modest levels, can result in adverse effects on health and well-being. However, whether or not a particular sound becomes noise depends on the context in which that sound is heard. For this reason it is generally not possible to set universally applicable objective limits for noise.

The planning system provides an opportunity not just to encourage design aimed at preventing unacceptable noise effects, but also the opportunity to proactively improve the acoustic environment. This intent is embodied in the core aims of sustainable development set out in the Government's current planning policy documents, in which sustainable development is defined in the context of all three of social, economic and environmental considerations. Current policy requires that noise should not be considered in isolation. Rather, noise should form one element of a raft of considerations that, in their totality, contribute towards sustainability.

The approach that SGC takes in regards to vibration is similar to that proposed for noise, as discussed above. The uncertainties involved in predicting vibration effects means that each case will be considered individually and an appropriate assessment methodology and associated criteria agreed.

This document provides specific guidance on how SGC wishes current Government guidance on both noise and vibration to be applied within its region in order to achieve the central goal of sustainable development. The advice contained herein is relevant to all those involved in the planning process, and in particular to developers and their noise consultants.

The document has been written to reinforce SGC's commitment to implement the Government's drive towards truly sustainable development, as set out in current national policy.

3.0 Government Policy on Noise and Sustainable Development

Government advice underpinning the consideration of noise in the context of sustainable development, and the definition as to what is meant by the term ‘sustainable’ in this context, can be found in the following documents:

3.1 Noise Policy Statement for England (NPSE)

The Visions and Aims of the NPSE, which relates to all types of noise other than that experienced in the workplace, state:

- Noise Policy Vision – Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development
- Noise Policy Aims – Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
 - avoid significant adverse impacts on health and quality of life;
 - mitigate and minimise adverse impacts on health and quality of life; and
 - where possible, contribute to the improvement of health and quality of life.

These visions and aims are to be interpreted within the Government’s sustainable development strategy, the guiding principles of which are summarised in the NPSE as:

- Guiding principles of Sustainable Development –
 - Ensuring a Strong Healthy and Just Society – Meeting the diverse needs of all people in existing and future communities, promoting personal wellbeing, social cohesion and inclusion, and creating equal opportunities for all.
 - Using Sound Science Responsibly – Ensuring policy is developed and implemented on the basis of strong scientific evidence, whilst taking into account scientific uncertainty (through the precautionary principle) as well as public attitudes and values.
 - Living Within Environmental Limits – Respecting the limits of the planet’s environment, resources and biodiversity – to improve our environment and ensure that the natural resources needed for life are unimpaired and remain so for future generations.
 - Achieving a Sustainable Economy – Building a strong, stable and sustainable economy which provides prosperity and opportunities for all, and in which environmental and social costs fall on those who impose them (polluter pays), and efficient resource use is incentivised.
 - Promoting Good Governance – Actively promoting effective, participative systems of governance in all levels of society – engaging people’s creativity, energy and diversity.

The explanatory notes of the NPSE further expand on these visions, aims and guiding principles to advise as to how their adoption should impact on the consideration of noise in planning and development. In summary:

- The application of the NPSE should mean that noise is properly taken into account at the appropriate time such that the opportunity for cost effective management of noise is not missed (paragraph 2.6).
- Noise should be considered alongside other relevant issues and not in isolation such that the wider benefits of a particular development are given adequate weight when assessing noise implications (paragraph 2.7);
- Sustainable development is a core principle underpinning all government policy. For the UK Government the goal of sustainable development is being pursued in an integrated way through a sustainable, innovative and productive economy that delivers high levels of employment and a just society that promotes social inclusion, sustainable communities and personal wellbeing. The goal is pursued in ways that protect and enhance the physical and natural environment, and that use resources and energy as efficiently as possible (paragraph 2.17).
- There is a need to integrate consideration of the economic and social benefit of the activity or policy under examination with proper consideration of the adverse environmental effects, including the

impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focussing solely on the noise impact without taking into account other related factors (paragraph 2.18).

Importantly, the NPSE additionally recognises the difficulty of setting universally applicable numerical noise limits, acknowledging at paragraph 2.22 that the significance of noise impact is likely to vary for different noise sources, for different receptors and at different times. The document therefore introduces the concept of evaluating noise impact in terms of various ‘effect levels’:

- **NOEL – No Observed Effect Level**
The level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- **LOAEL – Lowest Observed Adverse Effect Level**
The level above which adverse effects on health and quality of life can be detected.
- **SOAEL – Significant Observed Adverse Effect Level**
The level above which significant adverse effects on health and quality of life occur.

This same terminology then feeds into Planning Practice Guidance (PPG) on Noise (see below).

3.2 National Planning Policy Framework (NPPF)

The NPPF, under the heading ‘Achieving Sustainable Development’, fully reflects the NPSE in terms of the guiding principles of sustainable development and also expands upon the three dimensions of sustainable development identified in outline in the NPSE as being economic, social and environmental:

- an economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;
- a social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community’s needs and support its health, social and cultural well-being; and
- an environmental role – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

The means by which noise should be accounted for within the foregoing framework is set out at paragraph 123 of the NPPF, in which it is stated that planning policies should aim to:

- avoid noise from giving rise to significant adverse impacts¹ on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts¹ on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established²; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

3.3 Planning Practice Guidance (PPG) – Noise

More targeted advice concerning noise is presented in the Noise section of the PPG in which the relevance of noise in the context of development is discussed. The PPG advises that local planning authorities should take account of the acoustic environment and in so doing should consider:

¹ See Explanatory Note to the Noise Policy Statement for England (Department for the Environment, Food and Rural Affairs).

² Subject to the provisions of the Environmental Protection Act 1990 and other relevant law.

- whether or not a significant adverse¹ effect is occurring or likely to occur;
- whether or not an adverse effect¹ is occurring or likely to occur; and
- whether or not a good standard of amenity² can be achieved.

In line with the NPSE, this would include identifying where the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, relative to the various effect levels for the given situation.

Table 1 presents the summary given in the PPG of the noise exposure hierarchy, based on the likely response.

Table 1 - Design Criteria for Proposed Noise-Sensitive Uses

| Perception | Examples of Outcomes | Increasing Effect Level | Action |
|---------------------------------------|--|---|----------------------------------|
| Not Noticeable | No Effect | No Observed Effect | No specific measures required |
| Noticeable and not intrusive | Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life. | No Observed Adverse Effect | No specific measures required |
| | | Lowest Observed Adverse Effect Level | |
| Noticeable and intrusive | Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close 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 |
| | | Significant Observed Adverse Effect Level | |
| Noticeable and disruptive | The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area. | Significant Observed Adverse Effect | Avoid |
| Noticeable and very disruptive | Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory | Unacceptable Adverse Effect | Prevent |

The colouring of this table has been added to reflect the design criteria proposed in Section 5.0

Further advice to supplement Table 1 is provided on the influencing factors as to whether noise could be a concern owing to the subjective nature of human response. These factors include:

- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night.
- For non-continuous sources of noise, the number of noise events, the frequency and pattern of occurrence of the noise.
- The spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features). The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

3.4 Draft Local Policy PSP21 – Environmental Pollution and Impacts

South Gloucestershire Local Policy document PSP21 – Environmental Pollution and Impacts, currently in draft, has also been taken into account when writing this guidance document. The Policy considers potential impacts from existing sources of pollution, including noise, on proposed developments considered to be sensitive to the effect of pollution. The Policy additionally considers the impact associated with the introduction of a potentially polluting development on existing sensitive receptors.

With specific regard to noise the draft local policy states:

Noise generating development that would lead to significant adverse effects, including cumulative effects, on health and amenity from noise and vibration will not be permitted, unless an appropriate scheme of noise mitigation through design is provided.

The scheme must be provided to an appropriate standard. Account will be taken of:

1. The location, design and layout of the proposed development; and
2. Existing levels of background noise and the potential for a cumulative impact; and
3. Measures to reduce or contain generated noise; and
4. Hours of operation and servicing.

Development that would introduce noise-sensitive receptors in locations likely to be affected by existing sources of noise shall be accompanied by an assessment of environmental noise and an appropriate scheme of mitigation measures.

In assessing such a scheme, account will be taken of:

5. The location, design and layout of the proposed development; and
6. Measures to reduce noise within the development to acceptable levels including both internal and external areas; and
7. The need to maintain adequate levels of natural light and ventilation to habitable areas of the development.

4.0 Minimum Information Requirements

In order to enable SGC to properly establish the merits of any planning application, the breadth and depth of supporting information must be sufficient to allow the application to be evaluated in terms of the aforementioned policy statements and guidelines.

This section provides advice aimed at assisting applicants in ensuring that the required information is provided from the outset. Figure 1 and Figure 2 set out the 'headline' considerations for proposed noise sensitive and noise generating developments respectively. These subsequently determine the relevant minimum information requirements, including those advisory documents and standards which should be referenced. It is recognised that some developments may be both noise sensitive and noise generating.

Figure 1 - Noise Sensitive Development Considerations

| Development Contains | Reference in Guide | Further reading* |
|----------------------|--------------------|---------------------------|
| Dwellings | Section 6.1 | BS 8233 WHO Guidelines |
| School | Section 6.2 | BB93 |
| Offices | Section 6.3 | BS 8233 BCO Guides |
| Hospital | Section 6.4 | HTM 08-01 |
| Hotel | Section 6.5 | BS 8233 |

*Most recent version of document to be used

Figure 2 - Noise Generating Development Considerations

| Development Contains | Reference in Guide | Further reading* |
|--------------------------------|--------------------|--|
| Industrial / commercial | Section 7.1 | BS 4142 BS 8233 |
| Entertainment premises | Section 7.2 | CoP for Concerts CoP for Pubs and Clubs |
| Sports / recreational facility | Section 7.3 | Relevant CoP / guidance document |

*Most recent version of document to be used

In situations where the headline considerations indicate that a dedicated noise report is required to support an application, it is important that the noise report is prepared by suitably qualified personnel. Listed below is a guide to some of the key information expected to be reported.

- description of the proposed development, including sufficient detail so as to ensure that areas likely to be noise sensitive and / or generate noise are identifiable, include any relevant information regarding how noise has been accounted for throughout the project design process;
- detailed scaled site plan showing noise sources, sensitive receptors, monitoring locations, acoustic features etc.
- description of the policy and guidance documents relevant to the assessment;
- details of the methodologies employed in the assessment, referring back to any guidance documentation where relevant;
- details of any baseline noise surveys carried out, including a description of the noise sources observed, dates and times of the survey, details of the field calibration, a description of the weather conditions during the survey, a description of each of the survey locations including justification of why the position(s) was (were) chosen, photographs of the equipment in-situ and any other information relevant to the assessment;
- where predictions of noise levels have been carried out as part of the assessment, details of the calculation method and any relevant parameters employed shall be included;
- presentation of the relevant parameters for the noise being assessed including its magnitude and any acoustic characters or features present: for noise generating developments demonstrate how the noise climate at existing receptors is expected to change both in magnitude and character;

- a clear presentation of the results of the assessment and where they lie against relevant assessment criteria, including the LOAEL and SOAEL;
- details of any mitigation required and the effect it will have on the noise levels in terms of residual effects;
- a clear and concise conclusion of the assessment.

5.0 Proposed Design Criteria

Three basic design criteria have been set for proposed developments, these being aimed at guiding applicants as to the degree of detailed consideration needed to be given to noise in any planning application:

- **Green:** where noise is considered to be at an acceptable level regardless of other planning considerations, at levels relating to no observed effects and most likely also below levels corresponding to the lowest observed adverse effects.
- **Amber:** where noise is observed to have an adverse effect but at a level that may be considered acceptable when assessed in the context of the other sustainability merits of the development; and
- **Red:** where noise is observed to have a significant adverse effect;

These criteria can be applied to proposed developments which are either noise sensitive or noise generating and are discussed in further detail in Section 6.0 and Section 7.0 respectively.

The boundaries between these criteria have been defined by the LOAEL and the SOAEL, as set out in Table 2. The values of LOAEL and SOAEL will vary depending on many elements and may require context specific factors to be taken into account when determining specific applications. However, for guidance purposes, Appendix B and Appendix C provide example LOAEL and SOAEL thresholds for various noise sensitive and noise generating developments respectively, as derived from interpretation of available published guidance. Section 6.0 and Section 7.0 provide an overview of the key design considerations for noise sensitive and noise generating developments respectively and are subdivided into types of development where the potential noise impacts are separated, where relevant, depending on the type of noise or the sensitivity of the receptor. For larger schemes SGC would expect the majority of the development to be in Green as set out in Table 2.

Table 2 - Design Criteria for Proposed Development

| Criteria | Corresponding Effect Level | Description of Noise Assessment Required |
|--------------|--|--|
| Green | Noise levels up to the threshold of the LOAEL described in PPG as 'Noticeable and not intrusive' | Noise need not be a determining factor when considering the application and therefore, minimal assessment needed. |
| Amber | Noise levels above LOAEL up to the SOAEL described in the PPG as 'Noticeable and intrusive' | Assessment required with evidence of consideration to noise expected to be present in the scheme design. The assessment should demonstrate that noise impacts have been minimised (in the context of the NPSE) and also justify why residual noise is considered to be acceptable. |
| Red | Noise levels above the SOAEL described in PPG as 'Noticeable and very disruptive' | Development unlikely to be acceptable unless the noise climate of the site is changed, through sustainably credible mitigation. |

6.0 Advice for Proposed Developments likely to be Sensitive to Noise

Special consideration will need to be given to noise sensitive developments that are proposed in areas which are, or expected to become, subject to levels of noise likely to have an adverse effect. The threshold of acceptability of the noise will primarily depend on two factors: the intended use of the noise sensitive development and the source of the noise experienced, or likely to be experienced.

It is not possible to provide a singular noise criterion that covers all uses of noise sensitive development, as different factors are important for each use. For example, it is important that night-time noise experienced in a bedroom of a dwelling does not disturb sleep, whereas the level of night-time noise experienced at a non-boarding school would not be significant. Therefore, this section discusses the important design considerations relevant to different types of noise sensitive development to enable applicable values for LOAEL and SOAEL to be derived for each development proposal. To assist with this process, Appendix B provides a series of example effect levels for noise sensitive developments.

6.1 Dwellings

6.1.1 Design considerations

For proposed dwellings, the acoustic considerations relevant to planning are:

- for bedrooms, the acoustic effect on sleep;
- for other rooms, the acoustic effect on resting, listening and communicating; and
- for external amenity spaces, the acoustic effect on relaxation and the enjoyment of these spaces.

6.1.2 Control of external noise

Where possible, the development layout should consider the positioning of buildings and structures that are less sensitive to noise in such a way that amenity areas or facades containing windows to habitable rooms are protected from high levels of environmental noise. Consideration of appropriate development placement, layout and room orientation within the individual dwellings from the outset of the design process can reduce the reliance on high levels of mitigation.

Sustainability concepts are paramount in design. For example, the ability to open a window for fresh air purposes should normally take precedence over the requirement for mechanical ventilation solely to meet internal noise level criteria. SGC acknowledges that mitigation measures, such as acoustic ventilation, may be required for certain developments in order to meet internal noise criteria. The application of British Standard 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' assists in ensuring the appropriate use of such mitigation measures for any proposed development. Internal noise level criteria shall be achieved when both external noise intrusion and noise from internal building services are considered.

Areas that are intended to be used for amenity are to be designed to the criteria outlined within BS 8233.

6.1.3 Acoustic separation between areas of different use

Separation between commercial and residential units will require a high standard of sound insulation, greater than the standard between dwellings, if the risk of nuisance to future occupant is to be minimised. There may, for example, be situations where commercial space is proposed directly beneath habitable rooms. In such cases, noise generated by commercial operations shall be kept to such a level that, when combined with other appropriate controls that may be implemented, it should be reduced to an indiscernible level within that dwelling. These controls could include physical mitigation measures, but must also account for the normal ambient sound conditions within the dwelling. This is to avoid risk of adverse effect and nuisance to neighbouring residential occupants.

6.2 Schools

6.2.1 Design considerations

A good acoustic environment is fundamentally important to schools. Teachers rely on communication with pupils in an environment with minimal distractions. Poorly designed schools can lead to high levels of internal noise which can reduce the audibility of the teacher and introduce distracting sounds that can unreasonably lower the ability of pupils to concentrate.

For the purpose of this document, advice provided for schools includes other educational facilities including, but not limited to, academies, free schools, university technical colleges, sixth form colleges attached to schools and nursery / community & adult education spaces within school complexes. Schools with outdoor playgrounds or teaching spaces should be considered both noise sensitive and noise generating. Further reference to Section 7.3 of this document should be made when considering the impact of noise from playgrounds on nearby sensitive properties.

For proposed schools, the acoustic considerations relevant to planning are:

- for classrooms and indoor teaching areas, the acoustic effect on concentration and learning;
- for outdoor teaching areas, minimum provision of an area where noise levels are suitable for outdoor teaching activities; and
- noise from playgrounds and outdoor areas affecting nearby noise sensitive properties.

6.2.2 Control of external noise

Where a new school is to be developed in South Gloucestershire, reference shall be made to the acoustic standards defined in BREEAM 2014 as a reference for good sustainable design. It is expected that school developments will achieve a minimum of three credits under Hea 05: Health and Wellbeing of BREEAM 2014. This requires that all sound insulation, indoor ambient noise levels and reverberation time performances are designed and constructed in accordance with performance standards of 'Acoustic Performance Standards – Performance Standards for the Priority Schools Building Programme.' It should be noted that where the APS document is superseded, the most current document shall be targeted as the minimum performance standard.

It is required that a programme of pre-completion testing is carried out in accordance with the 'ANC Good Practice Guide – Acoustic Testing of Schools' in order to demonstrate compliance with required performance standards, where applicable. Additional demonstration of compliance through constructed design details shall be included where specified within BREEAM 2014 Hea 05 credit objectives.

6.3 Offices

6.3.1 Design considerations

For proposed offices, the main acoustic consideration relevant to planning is the minimisation of intrusive external noise. Furthermore, consideration should be given to any noise impact likely to be created by the introduction of the proposed offices on nearby noise sensitive properties. Additional reference to Section 7.1 of this document should be given when considering the impact of noise from plant or activity within the development on nearby sensitive properties.

6.3.2 Control of external noise

To promote the overarching development quality objectives, any office development is to utilise BREEAM 2014 standards as a reference for good sustainable design.

BREEAM 2014 Hea 05 three credit criteria shall be achieved in line with relevant design guidance documents. Sound insulation, internal ambient noise level and reverberation performance shall be designed and constructed in accordance with BS 8233.

It is required that a programme of pre-completion testing is carried out to demonstrate compliance in accordance with BREEAM 2014 'Additional information section'.

6.4 Hospitals and Medical Sites

6.4.1 Design considerations

For the purpose of this document, advice provided for hospitals includes other healthcare facilities including, but not limited to, laboratories, GP surgeries and treatment clinics. Large hospitals are likely to require extensive plant and have areas that will generate noise. Further reference to Section 7.1 of this document should be given when considering the impact of noise from hospital plant on nearby sensitive properties. Specialist consideration should be given where the hospital has a helipad or an A&E department that is likely to result in vehicle sirens being sounded.

For proposed hospitals, the main acoustic consideration relevant to planning is to provide an acoustic climate that promotes well-being and minimises unwanted sound.

6.4.2 Control of external noise

To promote the overarching development quality objectives, any Healthcare development is to utilise BREEAM 2014 standards as the basis for good sustainable design.

Three credits shall be targeted as part of Hea 05 credit criteria in line with relevant guidance. Sound insulation, internal ambient noise levels and reverberation times shall be designed and constructed in accordance with Health Technical Memorandum 08-01: Acoustics (HTM-08-01).

It is required that a programme of pre-completion testing is carried out in accordance with Section 7 of HTM08-01 in order to demonstrate compliance with required performance standards, where applicable. Additional demonstration of compliance through constructed design details shall be included where specified within BREEAM 2014 Hea 05 credit objectives.

6.5 Hotels

6.5.1 Design considerations

For the purpose of this document, advice provided for hotels extends to other similar living accommodation, including but not limited to, student halls of residence, school boarding houses, hostels, hospices and residential care homes. Hotels are likely to require plant and have service areas that have the potential to generate noise. Further reference to Section 7.1 of this document should be given when considering the impact of noise from hotel plant on nearby sensitive properties.

For proposed hotels the acoustic considerations relevant to planning are:

- the acoustic effect on sleep during the night-time; and
- the acoustic effect on resting and relaxing at all other times

6.5.2 Control of external noise

To promote the overarching development quality objectives any Hotel development is to utilise BREEAM 2014 standards as a toolkit for good sustainable design. This document should be used as a reference for outlining design performance standards.

Specific hotel developer acoustic performance standards shall be targeted for both design and construction. Reference should be made to BREEAM 2014 guidance where applicable in order to ensure sufficient acoustic design.

7.0 Advice for Proposed Developments likely to Cause Noise

Proposed development that is likely to generate noise during its operation may detrimentally impact the noise climate already being experienced at nearby noise sensitive properties. It is important that proper consideration is given to any such development to ensure that nearby noise sensitive properties are not subject to significant impacts. The threshold of acceptability of the noise will depend on several factors, including the need for the development in the wider context of Government Policy, the type of noise being introduced, the time of day, and the sensitivity of the existing receptor(s) to noise.

Given the wide variety of development that has the potential to generate noise, it is not feasible to provide a singular noise criterion that covers them all. Therefore, this section groups noise sources together where appropriate and discusses the important design criterion relevant to each different type of noise generating development to enable applicable values for LOAEL and SOAEL to be derived for each development proposal. To assist with this process, Appendix C provides a series of example effect levels at a range of noise sensitive properties resulting from the introduction of a potentially noise generating development.

7.1 Industrial and Commercial Noise Sources

7.1.1 Design considerations

For the purpose of this guide, advice provided for industrial and commercial noise includes all noise generated from activity or plant within the development site post construction.

Heavy industrial facilities can generate high levels of noise and are best sited on dedicated land, such as within an industrial estate, which is located away from noise sensitive properties. Noise inside industrial facilities can reach high levels, which with prolonged exposure may damage hearing of staff working in the building. Whilst this is not a material planning consideration and is covered by the Control of Noise at Work Regulations, it is considered good practice to minimise the generation of noise at the source through the appropriate selection and installation of machinery.

For proposed industrial and commercial developments, the main acoustic consideration relevant to planning is the minimisation of noise emitted from the site such that any adverse effects at neighbouring noise sensitive properties are considered to be not significant. Reference should be made to British Standard 4142: 2014 '*Methods for rating and assessing industrial and commercial sound*' (BS 4142).

7.2 Entertainment Premises

7.2.1 Design considerations

For the purpose of this guide, advice provided for entertainment premises includes, but is not limited to, public houses, night-clubs, wine bars, restaurants, fast food establishments, hotels, community or village halls and venues where amplified or live music will be played. Special consideration will have to be given if the proposed entertainment premises shares a party wall or floor with, or is within the same building as, a noise sensitive property to ensure that noise is not transmitted through the building structure. If external plant or extractor fans are proposed as part of the development it will be necessary to consider the noise from these units, treating it as an industrial and commercial noise source. Further detail is provided in Section 7.1. Similarly, delivery and collection activities should also be treated as industrial and commercial noise. Particular consideration must be given to any specific noisy activities, for example the collection of empty bottles can result in high levels of short-term noise which may not be acceptable.

Amplified music and speech can result in a greater contribution to the overall A-weighted noise level from lower frequencies than more typical sources of environmental noise. As sound propagates from source to receiver, air absorbs some of the energy. However, high frequency sound reduces at a greater rate than low frequency sound. In addition, building elements such as windows, offer less protection against low frequency sound than mid to high frequency sound. Therefore, consideration should be given to 1/3 or octave band data in addition to the overall A-weighted level.

For proposed entertainment premises, the main acoustic consideration relevant to planning is the minimisation of noise emitted from the site, such that any adverse effects at neighbouring noise sensitive properties are considered to be not significant.

7.3 Sports and Recreational

7.3.2 Design considerations

Sport and recreation can provide economic and social benefits to a large proportion of the local community. Some activities associated with this use can generate noise which, if experienced at a high enough level at a noise sensitive property, can result in an adverse impact.

Sports and recreational developments cover a wide range of activities from team sports to hobbies such as model aircraft flying. The level and character of noise generated at such developments can vary significantly, as too can the effect this noise can have.

Proposals for sports and recreational facilities must consider any guidance or best practice advice available for the type of sport proposed to take place at the facility. Sporting activities that are inherently noisy, such as motor sports, shall be controlled by way of a Noise Management Plan. Compliance with the requirements of an approved Noise Management Plan should be considered best practice in minimising any adverse effect of noise from the development in conducting its normal day to day

activities. However, compliance does not, and cannot, restrain SGC's ability to take formal action in respect of acts or activities giving rise to a Statutory Nuisance.

If external plant is proposed as part of the development it will be necessary to consider the noise from this source as industrial and commercial and further detail is provided in Section 7.1 relating to the design considerations.

8.0 Vibration Advice for Proposed Developments

8.1 Design considerations

Vibration is to be considered where a development would lead to vibration sensitive premises being in close proximity to a source of vibration, such as industrial / commercial activities or railway lines. General guidance and advice on the acceptable level of vibration can be found in British Standard 6472-1: 2008 '*Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting*' (BS 6472).

Vibrations transmitted through the structure of a building can be detected by its occupants and can result in adverse effects. Depending on the timing and the nature of the vibration, occupants may have disturbed sleep or struggle to work efficiently. Significantly greater magnitudes of transient vibration would be required to cosmetically damage a building, with minor structural damage occurring at even greater magnitudes. Therefore, by ensuring that the magnitude of any vibration is sufficiently low so as to prevent adverse impact on the occupants, the building structure should not be at risk of damage.

8.2 Existing sources of vibration

The most common sources of vibration that a proposed development is likely to be exposed to are railways and industrial or commercial sites. Where a vibration sensitive development is proposed in an area that vibration is anticipated to be present then an appropriate vibration survey or prediction exercise is expected to be carried out.

Factors such as distance and ground conditions have an effect on the level of vibration experienced at a receptor. There is currently little published guidance in the UK which recommends minimum distances at which a vibration assessment would be necessary. An American study '*Transit noise and vibration impact assessment*', Hanson et al, 2006, recommends that a vibration screening assessment should be carried out if a residential development is proposed within 60 m of an existing railway line. This distance decreases to 35 m for developments that are considered to be less sensitive to vibration, such as schools and offices. These distances are considered to be very conservative based on the UK rolling stock and it is therefore considered appropriate to use reduced distances without risk of vibration impacts.

A vibration assessment is to be carried out for residential, hospital and hotel developments when the proposed building would be within 40 m of an existing source of vibration. Proposed developments that are less sensitive to vibration, for example schools and offices, require a vibration assessment if the building containing this use is within 25 m of an existing source of vibration.

In circumstances where a vibration assessment is required, reference to BS 6472 should be made. Any measurements of existing levels of vibration should be conducted at a location to represent the proposed buildings in closest proximity to the source of vibration. Vibration measurements can be carried out within existing structures that are either to be retained as part of the development proposals or that are considered to provide a representative result for sensitive buildings. An alternative location may also be used provided that an appropriate transfer function is applied when assessing the likely vibration dose values. Any vibration assessment should ensure that the highest anticipated levels of vibration likely to impact on the new development are appropriately represented and assessed.

8.3 Proposed development likely to cause vibration

It is possible to minimise vibration effects of a development through detailed design. This can include sensible layout such that any uses likely to generate vibration are separated from existing or proposed vibration sensitive receptors. For proposed industrial developments it is recommended that machinery is selected that is inherently free of vibration and that, where this is not feasible, mitigating measures such

as isolation and inertia blocks are introduced where necessary. For proposed railways, jointed rail could be replaced by continuous welded rail where lines pass near to sensitive receptors. Rail vibration isolation systems such as resilient rail fastenings, ballast masts and floating slabs can be used to reduce vibration propagation.

For developments that are likely to generate vibration which are proposed within 60 m of a building used as a dwelling, hospital or hotel, or within 35 m of a school or office building, or within 185 m of a building that contains highly vibration-sensitive equipment, such as an electron microscope, then a vibration assessment is required. The assessment is to make reference to BS 6472.

Appendix A - Glossary of Terms

| TERMINOLOGY | DESCRIPTION |
|---|--|
| <i>A-weighting</i> | a filter that weights low frequency and high frequency sound to better represent the frequency response of the human ear when assessing the likely effects of noise on humans |
| <i>acoustic character</i> | one or more distinctive features of a sound (e.g. tones, whines, whistles, impulses) that set it apart from the background noise against which it is being judged, possibly leading to greater subjective effects than the level of the sound alone might suggest |
| <i>ambient noise</i> | all-encompassing noise associated with a given environment, usually a composite of sounds from many sources both far and near, often with no particular sound being dominant |
| <i>audible sound</i> | a sound that can be heard above all other ambient sounds |
| <i>audio frequency</i> | any frequency of a sound wave that lies within the frequency limits of audibility of a healthy human ear, generally accepted as being from 20 Hz to 20,000 Hz |
| <i>background noise</i> | the noise level rarely fallen below in any given location over any given time period, often classed according to day-time, evening or night-time periods (for the majority of the population of the UK the lower limiting noise level is usually controlled by noise emanating from distant road, rail or air traffic) |
| BREEAM | Building Research Establishment Environmental Assessment Methodology. The world's longest established and most widely used method of assessing, rating and certifying the sustainability of buildings. |
| <i>dB</i> | abbreviation for 'decibel' |
| <i>dB(A)</i> | abbreviation for the decibel level of a sound that has been A-weighted |
| <i>decibel</i> | the unit normally employed to measure the magnitude of sound |
| <i>equivalent continuous sound pressure level</i> | the steady sound level which has the same energy as a time varying sound signal when averaged over the same time interval, T, denoted by $L_{Aeq,T}$ |
| <i>external noise level</i> | the noise level, in decibels, measured outside a building |
| <i>façade measurement</i> | noise measurements made outside an external wall of a structure (usually 1 metre from the wall) |
| <i>filter</i> | a device for separating components of an acoustic signal on the basis of their frequencies |
| <i>frequency</i> | the number of acoustic pressure fluctuations per second occurring about the atmospheric mean pressure (also known as the 'pitch' of a sound) |
| <i>frequency analysis</i> | the analysis of a sound into its frequency components |
| <i>habitable room</i> | a room used for sleeping or recreation/relaxation |
| <i>hertz</i> | the unit normally employed to measure the frequency of a sound, equal to cycles per second of acoustic pressure fluctuations about the atmospheric mean pressure |
| <i>impulsive sound</i> | a sound having all its energy concentrated in a very short time period |
| <i>instantaneous sound pressure</i> | at a given point in space and at a given instant in time, the difference between the instantaneous pressure and the mean atmospheric pressure |
| <i>internal noise level</i> | the noise level, in decibels, measured inside a building |
| L_{Aeq} | the abbreviation of the A-weighted equivalent continuous sound pressure level |
| L_{Amax} | the abbreviation of the maximum A-weighted sound pressure level |

| TERMINOLOGY | DESCRIPTION |
|---|--|
| <i>level</i> | the general term used to describe a sound once it has been converted into decibels |
| <i>loudness</i> | the attribute of human auditory response in which sound may be ordered on a subjective scale that typically extends from barely audible to painfully loud |
| <i>masking</i> | the effect whereby an otherwise audible sound is made inaudible by the presence of other sounds |
| <i>noise</i> | physically: a regular and ordered oscillation of air molecules that travels away from the source of vibration and creates fluctuating positive and negative acoustic pressure above and below atmospheric pressure. subjectively: sound that evokes a feeling of displeasure in the environment in which it is heard, and is therefore unwelcomed by the receiver |
| <i>noise nuisance</i> | an unlawful interference with a person's use or enjoyment of land, or of some <i>right</i> over, or in connection with it |
| <i>octave band frequency analysis</i> | a frequency analysis using a filter that is an octave wide (the upper limit of the filter's frequency band is exactly twice that of its lower frequency limit) |
| <i>outdoor amenity area</i> | 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 (will include gardens, landscaped areas, balconies) |
| <i>receiver</i> | a person or property exposed to the noise being considered |
| <i>residual noise</i> | the ambient noise that remains in the absence of the specific noise whose effects are being assessed |
| <i>sound</i> | physically: a regular and ordered oscillation of air molecules that travels away from the source of vibration and creates fluctuating positive and negative acoustic pressure above and below atmospheric pressure subjectively: the sensation of hearing excited by the acoustic oscillations described above (see also 'noise') |
| <i>sound level meter</i> | an instrument for measuring sound pressure level |
| <i>sound pressure level</i> | a measure of the sound pressure at a point, in decibels |
| <i>sound power level</i> | the total sound power radiated by a source, in decibels |
| <i>spectrum</i> | a description of the amplitude of a sound as a function of frequency |
| <i>third-octave band frequency analysis</i> | a frequency analysis using frequency bands one third of an octave wide |
| <i>threshold of hearing</i> | the lowest amplitude sound capable of evoking the sensation of hearing in the average healthy human ear (0.00002 Pa) |
| <i>tone</i> | the concentration of acoustic energy into a very narrow frequency range |

Appendix B - Example Effect Levels for Noise Sensitive Developments



Appendix B - Example Effect Levels for Noise Sensitive Developments

This appendix provides example threshold LOAEL and SOAEL values applicable to noise sensitive development proposed in areas of existing noise and relates them to the design criteria discussed earlier in Section 5.0, specifically Table 2, which is reproduced below as Table B1. Consideration has been given in general terms to the nature of the dominant noise source; however it is expected that the applicant will take account of the actual noise environment that the proposed noise sensitive development is expected to be exposed to, including the perceived annoyance or any special characteristics contained within the noise. These values have been derived from a range of relevant guidance documentation and standards current at the time of writing, but it is important to understand that they provide examples and cannot necessarily be universally used on all proposed developments.

Explanations are provided of how these example values have been derived immediately below each table, as it is possible that future guidance may be published which justifies the derivation of alternative values for LOAEL and SOAEL. Reference to any value provided for LOAEL and SOAEL should be considered as an example.

Table B1 - Design Criteria for Proposed Development

| Criteria | Corresponding Effect Level | Description of Noise Assessment Required |
|--------------|--|--|
| Green | Noise levels up to the threshold of the LOAEL described in PPG as 'Noticeable and not intrusive' | Noise need not be a determining factor when considering the application and therefore, minimal assessment needed. |
| Amber | Noise levels above LOAEL up to the SOAEL described in the PPG as 'Noticeable and intrusive' | Assessment required with evidence of consideration to noise expected to be present in the scheme design. The assessment should demonstrate that noise impacts have been minimised (in the context of the NPSE) and also justify why residual noise is considered to be acceptable. |
| Red | Noise levels above the SOAEL described in PPG as 'Noticeable and very disruptive' | Development unlikely to be acceptable unless the noise climate of the site is changed, through sustainably credible mitigation. |

Dwellings

Table B2 sets out example threshold LOAEL and SOAEL values as experienced at proposed dwellings for a range of environmental noise sources.

Table B2 – Example LOAEL and SOAEL values for Proposed Dwellings

| Dominant noise Source | Assessment Location | Design period | LOAEL (Green) | LOAEL to SOAEL (AMBER) | SOAEL (Red) |
|---|---|---|--|--|--|
| Anonymous noise such as general environmental noise, road traffic and rail traffic | Outdoor living space (free field) | Day | <50 dB L _{Aeq,16hr} | 50 dB to 55 dB L _{Aeq,16hr} | >55 dB L _{Aeq,16hr} |
| | Outside living room window (façade) | Day | <50 dB L _{Aeq,16hr} | 50 dB to 72 dB L _{Aeq,16hr} | >72 dB L _{Aeq,16hr} |
| | Outside dining room window (façade) | Day | <55 dB L _{Aeq,16hr} | 55 dB to 72 dB L _{Aeq,16hr} | >72 dB L _{Aeq,16hr} |
| | Outside bedroom window (façade / free field – see footnote) | Day | <50 dB L _{Aeq,16hr} ³ | 50 dB to 72 dB L _{Aeq,16hr} ³ | >72 dB L _{Aeq,16hr} ³ |
| | | Night | <45 dB L _{Aeq,8hr} ³ <40 dB L _{night} ⁴ | 45 dB to 62 dB L _{Aeq,8hr} ³ >40 dB L _{night} ⁴ | >62 dB L _{Aeq,8hr} ³ |
| | Inside a living room | Day | <35 dB L _{Aeq,16hr} | 35 dB to 45 dB L _{Aeq,16hr} | >45 dB L _{Aeq,16hr} |
| | Inside a dining room | Day | <40 dB L _{Aeq,16hr} | 40 dB to 45 dB L _{Aeq,16hr} | >45 dB L _{Aeq,16hr} |
| | Inside a bedroom | Day | <35 dB L _{Aeq,16hr} | 35 dB to 45 dB L _{Aeq,16hr} | >45 dB L _{Aeq,16hr} |
| Night | | <30 dB L _{Aeq,8hr} <42 dB L _{Amax, fast} | 30 dB to 40 dB L _{Aeq,16hr} 42 dB to 73 dB L _{Amax, fast} | >40 dB L _{Aeq,8hr} >73 dB L _{Amax, fast} | |
| Air traffic | Any dwelling façade | Day | <45 dB L _{Aeq,16hr} | 45 dB to 69 dB L _{Aeq,16hr} | >69 dB L _{Aeq,16hr} |
| | Outside bedroom window (façade) | Night | <45 dB L _{Aeq,8hr} <57 dB L _{Amax, fast} | 45 dB to 59 dB L _{Aeq,8hr} 57 dB to 103 dB L _{Amax, fast} | >59 dB L _{Aeq,8hr} >103 dB L _{Amax, fast} |
| Non-anonymous noise | <i>See guidance note on non-anonymous noise</i> | | | | |

The periods in Table B2 correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The following paragraphs provide an explanation of the derivation of example values for LOAEL and SOAEL contained within Table B2 separated by dominant noise source.

Anonymous noise sources: General environmental noise, road traffic and rail traffic

Outdoor living space (free field)

The World Health Organization 'Guidelines for Community Noise' (WHO) suggests that to protect the majority of people from moderate annoyance during the day time outdoor noise levels should not exceed 50 dB L_{Aeq,T}. For this example, this criterion level has been considered as the LOAEL for outdoor living spaces. This is supported within British Standard 8233:2014 'Guidance on sound Insulation and Noise Reduction for Buildings' (BS 8233) section 7.7.3.2. WHO report that to prevent the majority of people becoming seriously annoyed during the daytime the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq,T}, which is the value used in this example for the SOAEL for outdoor living spaces. This is supported within BS 8233 section 7.7.3.2, which does permit an increase in these guideline values in the case of desirable development.

³ L_{Aeq, T} values specified in Table B2 for outside a bedroom window are façade levels

⁴ L_{night} values specified in Table B2 for outside a bedroom window are free field levels

Outside living room, dining room or bedroom window day and night

The LOAEL values in Table B2 have been derived for these external environment categories from Table 4 in BS 8233, with internal levels used to derive external (façade) levels. Specific reference to the individual location and design period has been accounted for, with the relevant values from BS 8233 applied. As the values for LOAEL and SOAEL are external levels and the levels from BS 8233 Table 4 are internal, certain assumptions have been applied. There has been an addition of 15 dB applied to account for the attenuation afforded by an open window, as discussed in the World Health Organization documents '*Night Noise Guidelines for Europe*' (NNG) and '*Guidelines for Community Noise*'. For the case of the night-time outside a bedroom window an additional criterion has been added of 40 dB $L_{\text{night, outside}}$, which represents the yearly average of night noise, as discussed in the NNG. It should be noted that the $L_{\text{night, outside}}$ parameter used in the NNG has been derived from L_{night} as defined in the European Noise Directive, 2002/49/EC (END). Annex 1 of the END defines L_{night} as a free field value, which is reflected in Table B2.

The SOAEL values have been derived from the document *The Future of Air Transport* (Government White Paper) which made a recommendation that set a noise level of 69 dB L_{Aeq} for assistance with costs for relocating. This suggests any level greater than this would be unacceptable. As the community response is generally less sensitive to other transportation sources, such as road and rail traffic, the level of 72 dB $L_{\text{Aeq,16hr}}$ is suggested. The SOAEL figure for the night design period is based upon that used for the day for the same category, but set at 10 dB lower as stated within the WHO which suggests this difference between the sound pressure levels during the evening and night with the daytime.

Inside a living room, dining room or bedroom day and night

The LOAEL values provided for the L_{Aeq} internal environment criteria have been derived from the same source as used for the external environment previously discussed, with the same assumptions applied. For the night-time period in bedrooms only additional consideration should be given to the level of noise from individual events using the $L_{\text{Amax, fast}}$ parameter, as they have potential to disturb sleep. Section 4.10 of the NNG discusses appropriate thresholds of conscious awakening by transportation noise and concludes that the no observed effect level (NOEL) for transportation noise is at most 42 dB L_{Amax} . Therefore this has been taken as the threshold of LOAEL.

The SOAEL have been derived from the level of 55 dB L_{Aeq} contained within the WHO report as being the level that should not be exceeded externally during the daytime to prevent the majority of people becoming seriously annoyed. The subtraction of 15 dB has been applied to this figure for attenuation afforded by an open window, resulting in an internal level of 40 dB L_{Aeq} . Note 7 of section 7.7.2 of BS 8233 which states where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. This addition of 5 dB results in the SOAEL level contained in the above table. For the night-time period in bedrooms only the example value for SOAEL with respect to noise events using the L_{Amax} parameter has been derived from guidance found within section 3.1.6 of the NNG. Within this section of the NNG a value of 73 dB L_{Amax} is described to give a 10 % probability of noise-induced electroencephalography (EEG) awakening.

Air Traffic

The criterion level from Table 4 in BS 8233 has been used to derive the LOAEL, with the addition of 15 dB for the attenuation afforded by an open window. The L_{Amax} level for the LOAEL has been derived from section 4.10 of the NNG as described above, with the addition of 15 dB for the attenuation afforded by an open window.

The SOAEL set has been derived from the document *The Future of Air Transport* (Government White Paper) which makes a recommendation that sets a noise level of 69 dB L_{Aeq} for assistance with costs for relocating. This suggests that a noise level of greater than 69 dB L_{Aeq} due to aircraft is unacceptable.

The SOAEL figure for the night design period is based upon that used for the daytime for this category, being set at 10 dB lower as stated within the WHO which suggests this difference between the sound pressure levels during the evening and night with the daytime. The L_{Amax} level for the SOAEL has been derived from the NNG section 3.1.6 value of 73 dB L_{Amax} , with a 30 dB addition provided for a high-specification façade sound insulation as an alternative to the earlier mentioned 15 dB attention through an open window.

Non-anonymous noise

A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 5 dB below background should be considered as the design criterion.

Schools

Table B3 sets out the example threshold LOAEL and SOAEL values as experienced at proposed schools for a range of environmental noise sources. More stringent values may be appropriate for schools that are proposed for children with hearing or learning difficulties.

Table B3 - Example LOAEL and SOAEL values for Proposed Schools

| Dominant noise Source | Assessment Location | Design period | LOAEL (GREEN) | LOAEL to SOAEL (AMBER) | SOAEL (RED) |
|--|--|-------------------|--|---|--|
| Anonymous noise such as general environmental noise, road traffic and rail traffic | Outdoor teaching areas (free field) | 0900 – 1600 hours | <50 dB L _{Aeq,30min} | 50 dB to 60 dB L _{Aeq,30min} | >60 dB L _{Aeq,30min} |
| | Outside classroom window (façade) | 0900 – 1600 hours | <50 dB L _{Aeq,30min} | 50 dB to 70 dB L _{Aeq,30min} | >70 dB L _{Aeq,30min} |
| Air traffic | Outdoor teaching areas (free field) | 0900 – 1600 hours | <50 dB L _{Aeq,30min} <60 dB L _{A1,30min} | 50 dB to 60 dB L _{Aeq,30min} 60 dB to 70 dB L _{A1,30min} | >60 dB L _{Aeq,30min} >70 dB L _{A1,30min} |
| | Outside classroom window (façade) | 0900 – 1600 hours | <75 dB L _{A1,30min} | 75 dB to 95 dB L _{Aeq,30min} | >95 dB L _{A1,30min} |
| Non-anonymous noise | See guidance note on non-anonymous noise | | | | |

The design periods in the above table have been selected to represent the likely times of occupation for this type of development and should be amended according to the times of operation of the establishment under consideration. The following paragraphs provide an explanation of the derivation of the example values for LOAEL and SOAEL separated by dominant noise source.

Anonymous Noise sources: General environmental noise, road traffic and rail traffic

Outdoor teaching areas (free field)

The example LOAEL has been derived from Building Bulletin 93: 2003 'Acoustic Design in Schools' (BB93) section 2.2, with specific reference to the text that states that there should be at least one area suitable for outdoor teaching activities where noise levels are below this level. The example SOAEL value has been obtained from BB93 section 2.2, which states that this should be regarded as the upper limit for external noise at the boundary of external premises used for formal and informal outdoor teaching and recreational areas.

It is noted that at the time of writing Building Bulletin 93 'Acoustic design of schools: performance standards' is currently under review and a version dated December 2014 has been published which supersedes section 1 of the 2003 edition. Sections 2 to 7 and therefore the information on which the above example LOAEL and SOAEL values have been derived, will be superseded by 'Acoustics of Schools: a design guide', to be published in 2015 by Acoustics & Noise Consultants and the Institute of Acoustics. Until this design guide is published section 2 of BB93: 2003 should be used.

Specific Guidance Note 1 – Planning and Noise

Appendix B – Example Effect Levels for Noise Sensitive Developments

Outside classroom window (façade)

The LOAEL has been derived from BB93: 2014 Table 1, specifically in reference to the upper limit for newly built primary and secondary school classrooms with a 15 dB addition applied for attenuation afforded by an open window. The SOAEL value has been derived from BB93: 2003 section 2.2.

Air traffic

Outdoor teaching areas (free field)

The example LOAEL for this category has been derived from BB93: 2003 section 2.2, with specific reference to the text that states that there should be at least one area suitable for outdoor teaching activities where noise levels are below this level. The example SOAEL value has been obtained from BB93:2003 section 2.2, which states that this should be regarded as the upper limit for external noise at the boundary of external premises used for formal and informal outdoor teaching and recreational areas. The L_{A1} for the LOAEL and SOAEL have been derived from section 1.1.2 in BB93: 2014, where it is advised that 'to protect students from regular discrete noise events, e.g. aircraft or trains, indoor ambient noise levels should not exceed 60 dB $L_{A1, 30min}$ '. It is assumed that if this value can be achieved in an outdoor teaching space it is a good indication that there would be little or no adverse effects and hence has been used to define LOAEL. In recognition of the subjects taught in outdoor teaching areas being less likely to require high levels of concentration and the overall expectation of greater levels of environmental noise in such spaces when compared to indoor classrooms, a 10 dB(A) increase has been applied for the example value for the SOAEL.

Outside classroom window (façade)

The L_{A1} for the LOAEL has been derived from section 1.1.2 in BB93: 2014, with 15 dB applied to represent the attenuation afforded by an open window. The SOAEL for this category has been derived from the same source and manner as the LOAEL, with a further 30 dB addition applied to represent a high-specification façade sound insulation as an alternative to the earlier mentioned 15 dB attention through an open window.

Non-anonymous noise

A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise, recognising the need for teaching spaces to be relatively free from distractions. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 5 dB below background should be considered as the design criterion.

Offices

Table B4 sets out example threshold LOAEL and SOAEL values as experienced at proposed offices.

Table B4 - Example LOAEL and SOAEL values for Proposed Offices

| Dominant noise Source | Assessment Location | Design period | LOAEL (GREEN) | LOAEL to SOAEL (AMBER) | SOAEL (RED) |
|-----------------------|--------------------------------|-------------------|----------------------|------------------------------|----------------------|
| Any | Outside office façade (façade) | 0800 – 1800 hours | <50 dB $L_{Aeq,1hr}$ | 50 dB to 80 dB $L_{Aeq,1hr}$ | >80 dB $L_{Aeq,1hr}$ |

The design periods in Table B4 have been selected to represent the likely times of occupation for this type of development and should be amended according to the times of operation of the establishment under consideration.

The figures contained in Table B4 have been derived from Table 6 Typical noise levels in non-domestic buildings for the LOAEL and Table 2 for the SOAEL, both from BS 8233.

The lower design range value for an executive office of 35 dB $L_{Aeq,T}$ with the addition of 15 dB for an open window has been applied for the LOAEL, while the upper design range of 50 dB $L_{Aeq,T}$ for an open plan office with a high-specification façade sound insulation applied providing an additional 30 dB for the SOAEL as an alternative to the earlier mentioned 15 dB attention through an open window.

Hospitals and Medical Sites

Table B5 sets out the example threshold LOAEL and SOAEL values as experienced at proposed hospitals and health care establishments.

Table B5 - Example LOAEL and SOAEL values for Proposed Hospitals

| Dominant noise Source | Assessment Location | Design period | LOAEL (GREEN) | LOAEL to SOAEL (AMBER) | SOAEL (RED) |
|-----------------------|--|---------------|---|---|---|
| Any | Outside ward, consultation and office windows (façade) | Day | <55 dB $L_{Aeq,1hr}$ | 55 dB to 70 dB $L_{Aeq,1hr}$ | >70 dB $L_{Aeq,1hr}$ |
| | | Night | <50 dB $L_{Aeq,1hr}$ <60 dB $L_{Amax,f}$ | 50 dB to 65 dB $L_{Aeq,1hr}$ 60 dB to 75 dB $L_{Amax,f}$ | >65 dB $L_{Aeq,1hr}$ >75 dB $L_{Amax,f}$ |

The periods in Table B5 correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night.

The following paragraphs provide an explanation of the derivation of example values for LOAEL and SOAEL contained within Table B5.

Outside ward, consultation and office windows (façade) day / night

The LOAEL values in Table B5 have utilised Table 1 from the Department of Health Specialist Services Health Technical Memorandum 08-01: Acoustics (HTM-08-01), with the addition of 15 dB applied for an open window to the level for the room type small office type spaces for the day design period and a ward-single person room type for the night.

The SOAEL has been derived from the same source as the LOAEL for this category, with an additional 30 dB applied to represent a high-specification façade sound insulation as an alternative to the earlier mentioned 15 dB attention through an open window. The principles applied to obtain the L_{Amax} levels are the same as those applied to obtain the L_{Aeq} levels.

Hotels

Table B6 sets out example threshold LOAEL and SOAEL values as experienced at proposed hotels.

Table B6 - Example LOAEL and SOAEL values for Proposed Hotels

| Dominant noise Source | Assessment Location | Design period | LOAEL (GREEN) | LOAEL to SOAEL (AMBER) | SOAEL (RED) |
|-----------------------|---------------------------------|---------------|---|---|---|
| Any | Outside bedroom window (façade) | Day | <45 dB $L_{Aeq,1hr}$ | 45 dB to 70 dB $L_{Aeq,1hr}$ | >70 dB $L_{Aeq,1hr}$ |
| | | Night | <40 dB $L_{Aeq,1hr}$ <60 dB L_{Amax} | 40 dB to 65 dB $L_{Aeq,1hr}$ 60 dB to 85 dB L_{Amax} | >65 dB $L_{Aeq,1hr}$ >85 dB L_{Amax} |

The periods in Table B6 correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night.

Table H.3 contained in BS 8233 has been used to obtain the example LOAEL values, with the lowest value in the range used with a 15 dB addition applied for the attenuation afforded from an open window. The example SOAEL values have been obtained from the same source as the LOAEL, but have used the upper most value in the range with an addition of 30 dB applied assuming a high-specification façade sound insulation as an alternative to the earlier mentioned 15 dB attention through an open window. The principles applied to obtain the L_{Amax} levels are the same as those applied to obtain the L_{Aeq} levels.

Appendix C - Example Effect Levels for Noise Generating Developments

This Appendix provides example threshold LOAEL and SOAEL values caused by the introduction of a proposed noise generating development at an existing noise sensitive property and relates them to the design criteria discussed in Section 5.0, specifically Table 2, which is reproduced below as Table C1. These example values have been derived from a range of relevant guidance documents and standards at the time of writing.

Explanations are provided of how these values have been derived immediately below each table, as it is possible that future guidance may be published which justifies the derivation of alternative values for LOAEL and SOAEL. Reference to any value provided for LOAEL and SOAEL should be considered as an example.

Table C1 - Design Criteria for Proposed Development

| Criteria | Corresponding Effect Level | Description of Noise Assessment Required |
|--------------|--|--|
| Green | Noise levels up to the threshold of the LOAEL described in PPG as 'Noticeable and not intrusive' | Noise need not be a determining factor when considering the application and therefore, minimal assessment needed. |
| Amber | Noise levels above LOAEL up to the SOAEL described in the PPG as 'Noticeable and intrusive' | Assessment required with evidence of consideration to noise expected to be present in the scheme design. The assessment should demonstrate that noise impacts have been minimised (in the context of the NPSE) and also justify why residual noise is considered to be acceptable. |
| Red | Noise levels above the SOAEL described in PPG as 'Noticeable and very disruptive' | Development unlikely to be acceptable unless the noise climate of the site is changed, through sustainably credible mitigation. |

Industrial and Commercial Noise Sources

For proposed industrial and commercial developments the main acoustic consideration relevant to planning is the minimisation of noise emitted from the site, such that any adverse effects at neighbouring noise sensitive properties are considered to be minimised. Table C2 sets out the example threshold LOAEL and SOAEL values for industrial and commercial noise at nearby noise sensitive properties.

Where proposed industrial and commercial sources are being introduced next to dwellings, South Gloucestershire Council would expect the rating level to be no greater than the background level both day and night as defined by BS4142

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Appendix C – Example Effect Levels for Noise Generating Developments

Table C2 - Example LOAEL and SOAEL Values Applicable to Proposed Industrial and Commercial Developments

| Existing Noise-Sensitive Receptor | Assessment Location | Design period | LOAEL (GREEN) | LOAEL to SOAEL (AMBER) | SOAEL (RED) |
|-----------------------------------|---|-------------------|--|---|---|
| Dwellings | Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade) | Day | 'Rating Level' ⁵ more than 5 dB below background | 'Rating Level' between 5 dB below and 5 dB above background | 'Rating Level' greater than 5 dB above background |
| | Outside bedroom window (façade) | Night | 'Rating Level' more than 5 dB below background and no events exceeding 57 dB L _{Amax} | 'Rating Level' between 5 dB below and 5 dB above background or noise events between 57 dB and 88 dB L _{Amax} | 'Rating Level' greater than 5 dB above background and/or events exceeding 88 dB L _{Amax} |
| Schools | Outdoor teaching areas (free field) | 0900 – 1600 hours | 'Rating Level' more than 5 dB below background and no events exceeding 60 dB L _{A1,30min} | 'Rating Level' between 5 dB below and 5 dB above background or noise events between 60 dB and 70 dB L _{A1,30min} | 'Rating Level' greater than 5 dB above background or noise events exceeding 70 dB L _{A1,30min} |
| | Outside classroom window (façade) | | 'Rating Level' more than 5 dB below background and no events exceeding 75 dB L _{A1,30min} | 'Rating Level' between 5 dB below and 5 dB above background and no noise events exceeding 75 dB L _{A1,30min} | 'Rating Level' greater than 5 dB above background or noise events exceeding 75 dB L _{A1,30min} |
| Offices | Outside office façade (façade) | 0800 – 1800 hours | <50 dB L _{Aeq,1hr} | 50 dB to 65 dB L _{Aeq,1hr} | >65 dB L _{Aeq,1hr} |
| Hospitals | Outside ward, consultation and office windows (façade) | Day | <45 dB L _{Aeq,1hr} | 45 dB to 60 dB L _{Aeq,1hr} | >60 dB L _{Aeq,1hr} |
| | | Night | <40 dB L _{Aeq,1hr} <50 dB L _{Amax,f} | 40 dB to 50 dB L _{Aeq,1hr} 50 dB to 60 dB L _{Amax,f} | >50 dB L _{Aeq,1hr} >60 dB L _{Amax,f} |
| Hotels | Outside bedroom window (façade) | Day | <45 dB L _{Aeq,1hr} | 45 dB to 55 dB L _{Aeq,1hr} | >55 dB L _{Aeq,1hr} |
| | | Night | <40 dB L _{Aeq,1hr} <60 dB L _{Amax} | 40 dB to 50 dB L _{Aeq,1hr} 60 dB to 70 dB L _{Amax} | >50 dB L _{Aeq,1hr} >70 dB L _{Amax} |

The periods in Table C2 correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The design periods in Table C2 have been selected to represent the likely times of occupation and use for these types of development and should be amended according to the times of operation of the establishment under consideration. The following paragraphs provide an explanation of the derivation of example values for LOAEL and SOAEL contained within Table C2 under separate headings for the different noise sensitive receptors and assessment locations.

⁵ As defined in British Standard 4142 'Methods for rating and assessing industrial and commercial sound'

Dwellings

For noise from proposed commercial or industrial developments impacting on existing dwellings reference has been made to BS 4142 to obtain the example values for both LOAEL and SOAEL. The difference between the noise from the proposed development (expressed in terms of the rating level) and the existing background noise has been used to derive the example LOAEL and SOAEL. BS 4142 states that if the rating level does not exceed the background noise level, then this is an indication of the specific sound source having a low impact, and a difference of +10 dB is likely to be an indication of a significant adverse impact. The advice regarding these impacts is dependent on the context and to account for this when determining the example values for LOAEL and SOAEL it is assumed that the character of the residual background noise is different to the character of the specific noise from the proposed development and a 5 dB reduction is applied. If it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required.

Additional criterion is specified for the night time period. The L_{Amax} value for the LOAEL is derived from section 4.10 in the NNG document, with a 15 dB addition applied for the attenuation afforded by an open window. The L_{Amax} value for the SOAEL has been derived from section 3.1.6 of the NNG, where a level of 73 dB L_{Amax} is given as the 10 % probability of noise-induced electroencephalography awakening with an addition of 15 dB applied as per the LOAEL value for an open window.

Schools

In addition to the criteria related to the rating level and background noise, which has been derived using BS 4142 as described above, additional criterion relating to the $L_{A1, 30min}$ noise parameter has been specified for the example LOAEL and SOAEL given in Table C2 for schools. Section 1.1.2 within BB93: 2014 advises that '*to protect students from regular discrete noise events, e.g. aircraft or trains, indoor ambient noise levels should not exceed 60 dB $L_{A1, 30min}$* '. This value has been used for the example criterion for outdoor teaching spaces, where it is assumed that if a proposed industrial or commercial development does not exceed this value at outdoor teaching spaces it is a good indication that there would be little or no adverse effects and hence has been used to define LOAEL. In recognition of the subjects taught in outdoor teaching areas being less likely to require high levels of concentration and the overall expectation of greater levels of environmental noise in such spaces when compared to indoor classrooms, a 10 dB(A) increase has been applied for the example value for the SOAEL. An increase of 15 dB higher has been applied for outside classroom windows accounting for the attenuation afforded by an open window. No increase is considered appropriate in this criterion for SOAEL as previously applied in outdoor teaching areas or for proposed schools as the existing school may rely on open windows for its only form of ventilation.

Offices

The LOAEL value has been derived from Table 6 of BS 8233, with the lowest value in the range for executive office location used with a 15 dB addition applied for the attenuation afforded by an open window. SOAEL has been derived from the upper design range contained in Table 2 of BS 8233 for the typical situation of an open plan office, with a 15 dB addition applied for an open window as per the LOAEL.

Hospitals

Reference has been made to Table 1 contained in document HTM-08-01, using the room type single bed ward. To obtain an external LOAEL this internal level has assumed a 15 dB addition for the attenuation afforded by an open window. To this external level 10 dB was then subtracted, to ensure that any new industrial noise would be at a highest level of equal to 10 dB below the HTM-08-01 value and therefore would not increase the resultant ambient noise level above that recommended in HTM-08-01.

The SOAEL limit is derived using the same principle and table in document HTM-08-01; however, the less stringent criterion for a multi bed ward was used. For the night-time period example $L_{Amax,f}$ values are given using the same principle and table in HTM-08-01.

Hotels

Table H.3 indoor ambient noise level ranges for hotel bedrooms contained in BS 8233 have been used to obtain the example LOAEL and SOAEL values, using the lowest and highest values in the range respectively with a 15 dB addition applied for the attenuation afforded from an open window. It is not felt reasonable to derive an example SOAEL based on a higher-specification sound insulation as the existing hotel may currently rely on open windows for ventilation.

Entertainment Premises

Example values for the LOAEL and SOAEL associated with general customer noise either breaking out from within entertainment premises or from outdoor spaces are given in Table C3. For the purpose of this guide ‘outdoor spaces’ includes, but not limited to, noise from beer gardens, play areas, outdoor dining areas and car parks.

Table C3 - Example LOAEL and SOAEL Values Applicable to Proposed Entertainment Premises – General Customer Noise

| Noise Sensitive Receptor | Assessment Location | Design period | LOAEL (GREEN) | LOAEL to SOAEL (AMBER) | SOAEL (RED) |
|--------------------------|--------------------------------------|---------------|--|---|---|
| Dwellings | Garden used for amenity (free field) | Day | The higher of: 55 dB $L_{Aeq,5min}$ or 10 dB below existing $L_{Aeq,5min}$ without entertainment noise | 56 dB to 60 dB $L_{Aeq,5min}$ or 9 dB below to 3 dB below existing $L_{Aeq,5min}$ without entertainment noise | The higher of: 61 dB $L_{Aeq,5min}$ or 2 dB below existing $L_{Aeq,5min}$ without entertainment noise |
| | | Evening | The higher of: 50 dB $L_{Aeq,5min}$ or 10 dB below existing $L_{Aeq,5min}$ without entertainment noise | 51 dB to 55 dB $L_{Aeq,5min}$ or 9 dB below to 3 dB below existing $L_{Aeq,5min}$ without entertainment noise | The higher of: 56 dB $L_{Aeq,5min}$ or 2 dB below existing $L_{Aeq,5min}$ without entertainment noise |
| | | Night | The higher of: 45 dB $L_{Aeq,5min}$ or 10 dB below existing $L_{Aeq,5min}$ without entertainment noise | 46 dB to 50 dB $L_{Aeq,5min}$ or 9 dB below to 3 dB below existing $L_{Aeq,5min}$ without entertainment noise | The higher of: 51 dB $L_{Aeq,5min}$ or 2 dB below existing $L_{Aeq,5min}$ without entertainment noise |

The example daytime fixed LOAEL value has been derived from the Code of Practice on the Control of Noise from Pubs and Clubs (CoPP&C) section 5.4.2 target criterion, while the second LOAEL limit set relative to existing noise has also from the CoPP&C and would ensure no increase in ambient level. SOAEL has been derived from the same source as the LOAEL with the addition of 5 dB to this fixed level. The second level proposed for SOAEL would ensure that entertainment noise is not the dominant noise source.

The example values for the evening and night design periods are based upon that used for the day, but set at 5 dB and 10 dB lower respectively as stated within the WHO NNG which suggests this difference between the sound pressure levels during the evening and night compared with the daytime.

For entertainment premises that propose to hold events such as live music or karaoke, the adverse effect levels for entertainment noise may be higher for infrequent events than for events held on a regular basis. Table C4 sets example LOAEL and SOAEL values for entertainment noise at nearby noise sensitive properties for infrequent and frequent events. An explanation of the derivation of example values for LOAEL and SOAEL contained within Table C4 separated by number of events per year is provided below the table.

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Appendix C – Example Effect Levels for Noise Generating Developments

Table C4 - Example LOAEL and SOAEL Values Applicable to Proposed Entertainment Premises – Music, Singing and Speech from Events

| Number of events per year | Assessment Location | Design period | LOAEL (GREEN) | LOAEL to SOAEL (AMBER) | SOAEL (RED) |
|---|---|-------------------|---|--|--|
| 1 to 3 | | | Music Noise Level ⁶ not exceeding the background noise by more than 5 dB(A) over a 15 minute period and a level of 70 dB is not exceeded in either the 63 Hz and 125 Hz octave band frequencies. | Music Noise Level of between 5 dB(A) above background and 65 dB(A) over a 15 minute period or a level of between 70 dB and 80 dB in either the 63 Hz and 125 Hz octave band frequencies. | Music Noise Level of 65 dB(A) over a 15 minute period or a level of 80 dB in either the 63 Hz and 125 Hz octave band frequencies. |
| 4 to 12 (events lasting no more than two consecutive days at any one time and no more than one event per week) | 1 metre from: - a living room window of a dwelling, - a dining room window of a dwelling, - a bedroom window of a dwelling, hotel or hospital, | 0900 – 2300 hours | Music Noise Level at least 10 dB(A) lower than background noise over a 15 minute period and a level of 70 dB is not exceeded in either the 63 Hz and 125 Hz octave band frequencies. | Music Noise Level of between 5 dB(A) above and 15 dB(A) above background over a 15 minute period or a level of between 70 dB and 80 dB in either the 63 Hz and 125 Hz octave band frequencies. | Music Noise Level exceeds the background noise level by 15 dB(A) over a 15 minute period or a level of 80 dB in either the 63 Hz and 125 Hz octave band frequencies. |
| 13 to 30 (events lasting no more than two consecutive days at any one time and no more than one event per week) | - a window to a hospital ward, consulting room, recovery room, on-call room, relatives' room, office or operating theatre. | | Music Noise Level at least 10 dB(A) lower than background noise over a 15 minute period and a level of 70 dB is not exceeded in either the 63 Hz and 125 Hz octave band frequencies. | Music Noise Level of between 10 dB(A) below and 5 dB(A) above background over a 15 minute period or a level of between 70 dB and 80 dB in either the 63 Hz and 125 Hz octave band frequencies. | Music Noise Level exceeds the background noise level by 5 dB(A) over a 15 minute period or a level of 80 dB in either the 63 Hz and 125 Hz octave band frequencies. |
| More than 30 or more frequent than once a week. | | 24 hours | $L_{eq, 5min}$ A-weighted, 63 Hz and 125 Hz levels show no increase in respective $L_{eq, 5min}$ without event | $L_{eq, 5min}$ A-weighted, 63 Hz and 125 Hz levels from entertainment no more than 3 dB higher than respective $L_{eq, 5min}$ without event | $L_{eq, 5min}$ A-weighted, 63 Hz and 125 Hz levels from entertainment 3 dB higher than respective $L_{eq, 5min}$ without event |

⁶ As defined in 'Code of Practice on Environmental Noise Control at Concerts'

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Appendix C – Example Effect Levels for Noise Generating Developments

| Number of events per year | Assessment Location | Design period | LOAEL (GREEN) | LOAEL to SOAEL (AMBER) | SOAEL (RED) |
|---|---|-------------------|---|--|--|
| Up to 30 (events lasting no more than two consecutive days at any one time and no more than one event per week) | 1 metre from: - a bedroom window of a dwelling, hotel or hospital, - a window to a hospital ward, consulting room, recovery room, on-call room, relatives' room, office or operating theatre. | 2300 – 0900 hours | Music noise is just audible and a level of $L_{eq, 5min}$ 70 dB is not exceeded in either the 63 Hz and 125 Hz octave band frequencies. | Music noise audible or $L_{eq, 5min}$ A-weighted, 63 Hz and 125 Hz levels from entertainment no more than 3 dB higher than respective $L_{eq, 5min}$ without event | $L_{eq, 5min}$ A-weighted, 63 Hz and 125 Hz levels from entertainment 3 dB higher than respective $L_{eq, 5min}$ without event |

1 to 3, 4 to 12 and 13 to 30 events per year

LOAEL has been derived from Note 5 of Table 1 of the Noise Councils Code of Practice of Environmental Noise Control at Concerts (CoPC), with the level for octave band frequencies of 70 dB being derived from Note 2 to Guidance 3.4 for the same document. The SOAEL has also been derived from Table 1 of the CoPC from the venue category other urban and rural venues, with the level for octave band frequencies of 80 dB have been derived from Note 2 to Guidance 3.4 of the same document.

More than 30 events per year or more frequent than once a week

Section 5.2.3 of The CoPP&C has been used to derive both LOAEL and SOAEL values. The LOAEL value has been derived from the day period, with this being deemed relatively less sensitive than the night time period, which has been utilised for the SOAEL.

Up to 30 events per year

LOAEL value for octave band frequencies of 70 dB has been derived from Note 2 to Guidance 3.4 of the CoPC.

Sports and Recreational

There is a wide range of sports and recreational activities that can be managed in terms of noise with respect to appropriate standards or codes of practice. As the nature of these activities varies widely, it is not feasible to provide example values for LOAEL and SOAEL that cover all sporting or recreational activities. LOAEL and SOAEL would have to be established for the proposed activity making reference to appropriate guidance. An example is provided in Table C5 which relates specifically to clay pigeon shooting.

Table C5 - Example LOAEL and SOAEL Values Applicable to Proposed Sport and Recreational Uses

| Noise Sensitive Receptor | Assessment Location | Design period | LOAEL (GREEN) | LOAEL to SOAEL (AMBER) | SOAEL (RED) |
|--------------------------|--------------------------------------|---------------|-------------------------------------|--|-------------------------------------|
| Dwellings | Garden used for amenity (free field) | Day | Mean Noise Shooting Level <55 dB(A) | Mean Noise Shooting Level 55 to 65 dB(A) | Mean Noise Shooting Level >65 dB(A) |

In this example the LOAEL and SOAEL have been obtained from the Chartered Institute of Environmental Health document Clay Target Shooting: Guidance on the Control of Noise: 2003 section 6.1. This section states that annoyance is less likely to occur at a mean shooting noise level (mean SNL) below 55 dB(A), and highly likely to occur at a mean shooting noise level (mean SNL) above 65 dB(A).

Appendix D - Reference Documents Used in Guidance Note

- BB93, Acoustic design of schools: performance standards, Department for Education, Education Funding Agency, 2014
- Best practice in the specification for offices, British Council for Offices, 2009
- BREEAM UK new construction non-domestic buildings (England), 2014
- BS 4142 Method for rating and assessing industrial and commercial sound, 2014
- BS 6472 Guide to evaluation of human exposure to vibration in building Part 1: Vibration sources other than blasting, 2008
- BS 8233 Guidance on sound insulation and noise reduction for buildings, 2014
- Clay target shooting – Guidance on the control of noise, Chartered Institute of Environmental Health, 2003
- Code of practice on environmental noise control at concerts, The Noise Council, 1995
- Code of practice on the control of noise from pubs and clubs, 1999
- Guidelines for community noise, World Health Organization, 1999
- Health technical memorandum 08-01: Acoustics, Department of Health, 2013
- Local Policy PSP21 – Environmental pollution and impacts, South Gloucestershire Council, DRAFT
- National planning policy framework, Department for Communities and Local Government, 2012
- Night noise guidelines for Europe, World Health Organization, 2009
- Noise policy statement for England, Department for Environment, Food and Rural Affairs, 2010
- Planning practice guidance, Department for Communities and Local Government, 2014
- The future of air transport, Department for Transport, 2003
- Transit noise and vibration impact assessment, Hanson et al, 2006