



Worcestershire Regulatory Services

Noise Control Technical Guidance – Development Control

1st Edition

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Version 1.2.4



Introduction

This document is intended to provide guidance to Worcester Regulatory Services (WRS) Officers when providing advice to local developments control authorities (LDA) on matters relating to noise and vibration. Noise and Vibration consultants offering advice to developers and applicants may also find this guide useful when preparing noise and vibration assessments and the development of subsequent mitigation schemes.

The document draws on information to be found in a number of international, national and local documents and supports and promote the guiding principles in the National Planning Policy Framework (NPPF) and the Noise Policy Statement for England (NPSE).

The document is for guidance only and is not policy. Occasionally, the review of a planning application may raise issues not fully addressed in this guidance, and other guidance or criteria may then be utilised and contact with officer of WRS may be required to discuss specific concerns.

Acknowledgement

Notwithstanding the references to technical papers in the “Standards & Guidance” section, the source document for this publication was originally produced by Birmingham City Council “*PCGN 1 - Noise & Vibration Edition 3 February 2013*” and is reproduced with their kind permission. Any deviances from this original document are intentional as it is modified for use within the Worcestershire conurbation.

1. Policy & Background

National Planning Policy Framework 2012

The National Planning Policy Framework (NPPF) sets out the Government's policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

Paragraph 123 of the NPPF

Planning policies and decisions should aim to:

Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development. 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 established; 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.

The explanation of significant adverse impact and adverse impacts are provided in the Explanatory Note for the Noise Policy Statement for England (see below)

National Noise Policy for England 2010

In March 2010 the Government issued a Noise Policy Statement for England (NPSE). The aim of this document is to “provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.”

The NPSE sets out the long-term vision for Government noise policy 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

The NPSE categorises noise exposure into “no observed effect level”, “significant adverse” and “adverse” These concepts have been developed by the World Health Organisation and they follow established concepts from toxicology to noise impacts:

NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level This is the level above which adverse effects on health and quality of life can be detected.

The NPSE expands these terms leading to the concept of a Significant Observed Adverse Effect Level.

SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.

The NPSE goes on to state that it is not possible to have a single objective noise-based measure that defines SOAEL that will be applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times.

Values of SOAEL and LOAEL

In the absence of nationally published and agreed values for SOAEL and LOAEL for residential properties, Worcestershire Regulatory Services (WRS) have derived these values from recognised sources and existing Local and European standards.

2. WRS application of national Policy (NPPF)

General Statement

Noise sensitive developments such as residential should not be exposed to high levels of ambient noise from future development proposals.

Noise sensitive developments will be discouraged in areas that are so noisy that they satisfy the criteria for the preparation of noise action plans.

Throughout the planning process applicants should be encouraged to consult all relevant partners to ensure the best use is made of land whilst minimising noise impacts.

Developers should :

- Maximise the distance between noise sources and noise-sensitive uses.
- Use landscaping and non noise-sensitive uses to provide screening to noise- sensitive areas
- Carefully consider the implications arising from the existing night-time use of the locality.

3. WRS application of NPSE

1st Aim

Significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development (NPSE paragraph 1.8).

This aim is underpinned by the NPPF which states that “planning policies and decisions should avoid noise giving rise to significant adverse impacts on health and quality of life”.

To support this aim WRS will normally advise the LPA that they should consider refusal of applications where the noise impact on sensitive receptors exceeds the SOAEL.

2nd Aim

Noise Policy Statement for England aims to mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development. This refers to the situation where the noise impact lies somewhere between **LOAEL** and **SOAEL**. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (NPSE paragraph 1.8). This does not mean that development cannot take place where such adverse effects will occur.

This aim is reflected by the NPPF which states that “planning policies and decisions should mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions”.

To support these aims WRS will normally advise that the LPA should consider imposing conditions to mitigate noise impacts where noise levels exceed the LOAEL but are less than the SOAEL.

3rd Aim

Noise Policy Statement for England seeks, where possible, to positively improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development (NPSE paragraph 1.8), recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

WRS will normally advise that the LPA should consider imposing conditions or refusal of developments where the noise impact is so significant that it would detrimentally transform the noise characteristics of identified quiet areas.

4. Standards & Guidance

Reference Document	Summary
Guidelines for Community Noise World Health Organisation 1999	The Guidelines for Community Noise have been prepared as a practical response to the need for action on community noise at the local level, as well as the need for improved legislation, management and guidance at the national and regional levels. It provides criteria for the assessment of the acoustic environment for a variety of situations.
Night Noise Guidelines for Europe World Health Organisation 2009	This document presents the conclusions of the WHO working group responsible for preparing guidelines for exposure to noise during sleep. This document can be seen as an extension of the WHO Guidelines for community noise.
British Standard 8233:1999 'Sound insulation and noise reduction	This Code of Practice provides guidance on the design of buildings that have internal acoustic environments appropriate to their

for buildings – Code of Practice’	functions. It includes design criteria and deals with the control of anonymous noise from outside the building and noise from plant and services within.
British Standard 4142:1997 ‘Method for Rating industrial noise affecting mixed residential and industrial areas’	This standard is intended to be used for assessing the measured or calculated noise levels from both existing premises and new or modified premises, for noise of an industrial nature. It recognizes that the standard may be helpful in certain aspects of environmental planning and may be used in conjunction with recommendations on noise levels and methods of measurement published elsewhere
British Standard 6472-1:2008 ‘Guide to evaluation of human exposure to vibration in buildings’	This standard provides guidance on predicting human responses to vibration in buildings and includes advice on measurement methods to be employed. Methods of assessing continuous, intermittent and impulsive vibration are presented.
Building Bulletin 93: ‘Acoustic Design of Schools’	This document provides acoustic design criteria for schools and has been referenced in this document particularly with regard to criteria to ensure that schools are not subject to unacceptable levels of external noise.
Institute of Acoustics Good Practice Guide on the Control of Noise from Pubs and Clubs.	This document provides guidance for the assessment and control of noise affecting noise-sensitive properties from public houses and clubs, and other premises holding similar events. The main noise sources considered are music, singing and public address systems

	as well as noise from other ancillary activities.
Department of Health 'Health Technical Memorandum 08-01 Acoustics'	This document provides acoustic design criteria for healthcare premises and has been referenced in this document particularly with regard to criteria to ensure that hospitals are not subject to unacceptable levels of external noise.

5. WRS integration of National Guidance & NPSE

For residential Properties

SOAEL and LOAEL values for residential properties have been derived for common noise sources. These are included in the table below. The criteria selected will depend upon the specific proposal (i.e. new residential development or introduction of a noise source to existing residential development).

Noise source	Assessment Location	LOAEL	SOAEL	Times
General environmental noise, road traffic, rail traffic	Outdoor living space Façade	50 dB LAeq,1hr ^(A)	55 dB LAeq,1hr ^(D)	Day 07:00 – 23:00
	Facade	50 dB LAeq,16hr ^(A)	72 dB LAeq,16hr ^(E)	Day 07:00 – 23:00
	Façade	45 dB LAeq,8hr ^(B)	67 dB LAeq,8hr ^(F)	Night 23:00 – 07:00
	Habitable room	30 dB LAeq,8hr ^(C)	40 dB LAeq,8hr ^(G)	Night 23:00 – 07:00
	Habitable room	35 dB LAeq,16hr ^(C)	45 dB LAeq,16hr ^(G)	Day 07:00 – 23:00
Air traffic	Façade	50 dB LAeq,16hr ^(A)	69dB LAeq,16hr ^(E)	Day 07:00 – 23:00
	Façade	45 dB LAeq,8hr ^(B)	64 dB LAeq,8hr ^(F)	Night 23:00 – 07:00
Commercial noise or noise of industrial nature (not anonymous)Note criteria selected will depend on both nature of the source and the assessment location	Facade	b/g – 10 dB ^(H)	b/g + 10 dB ^(H)	Noise Source Hours of Operation
	Facade		55 dB LAFmax ^(B)	Evening / night 19:00 – 07:00
	Habitable room	30 dB LAeq,8hr ^(C)	40 dB LAeq,8hr ^(G)	Night 23:00 – 07:00
	Habitable room		45 dB LAFmax ^(G)	Evening / night 19:00 – 07:00
	Habitable room	35 dB LAeq,16hr ^(C)	40 dB LAeq,16hr ^(G)	Day 07:00 – 23:00
	Outdoor living space	45 dB LAeq,1hr ^(I)	50 dB LAeq,1hr ^(I)	Day 07:00 – 23:00
	Facade	No change to ambient ^(J)	ambient 5dB LAeq increase ^(J)	Noise Source Hours of operation

References in superscript (A – J) are defined on the following pages

6. Noise Sources (anonymous)

A

The most widely observed effect is community annoyance. The World Health Organisation¹ (WHO) suggest that to protect the majority of people from moderate annoyance during the day time outdoor noise levels should not exceed 50dB LAeq. This should be considered as the LOAEL for residential development subject to transportation noise. At sites where daytime levels from transportation noise are less than 50 dB LAeq noise will not be a consideration. Where the external noise is 50 dB LAeq internal noise levels (open windows) will be acceptable (35-40 dB LAeq).

B

Night time noise limits: The over riding concern is to prevent sleep disturbance. The WHO published their finding on the impact of night time noise in 2009². Table 5.4 in the WHO night time noise guidance summarises much of the findings. At levels below 30 dB L_{night, outside}, outside there are no observed effects and this may be considered the NOEL. When levels increase to 40 dB L_{night, outside} adverse effects are observed. It should be noted in addition to a steady level effects were also observed for transient events where maximum levels exceeded 42 dB LAF_{max, inside}. It is suggested that for sleep disturbance the LOAEL is 45 dB

¹ *Guidelines for Community Noise Edited by B. Berglund et al WHO 1999 (paragraph 4.3.1)*

² *Night Noise Guidelines for Europe WHO 2009*

L_{night, outside}, and 45 dB LAF_{max, inside} (i.e. 55 dB LAF_{max, outside} with open windows). When external levels increase above this level it will be necessary to close the windows and provide alternative ventilation to ensure that the internal noise levels continue to be acceptable. Research carried out in Sweden suggests that where external noise levels exceed 42-46 LAeq_(22:00 – 06:00) fewer people sleep with their windows open (WHO² figure 1.7).

C

The values provided in the guidance in WHO² Table 4.1 1 can be considered to be the LOAEL within habitable rooms.

D

WHO² state : 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 LAeq. This should be considered the SOAEL for gardens and outdoor living spaces.

E

For indoor spaces there is, in theory, no restriction to the outdoor noise level as long as the building envelope provides sufficient insulation although this will result in a very poor outdoor environment. The Future of Air Transport (Government White Paper)³ made the following recommendations:

Accordingly, with immediate effect, we expect the relevant airport operators to:

- *offer households subject to high levels of noise (69dBA Leq or more) assistance with the costs of relocating; and*
- *offer acoustic insulation (applied to residential properties) to other noise-sensitive buildings, such as schools and hospitals, exposed to medium to high levels of noise (63dBA Leq or more).*

This suggests that a noise level greater than 69 dB LAeq due to aircraft is unacceptable. Therefore it would be unwise to permit the development of new noise sensitive premises where noise levels (due to aircraft noise) exceed 69 dB LAeq and may be considered the SOAEL for aircraft noise. As the community response is generally less sensitive to other transportation sources⁴ it is suggested that the day time SOAEL for rail and road traffic should be 72 dB LAeq.

³ *Department for Transport. The Future of Air Transport. Presented to Parliament by the Secretary of State for Transport by command of Her Majesty December 2003 (Para 3.21 and 3.24)*

⁴ *EU Future Noise Policy, WG2-Dose/Effect. Position paper on dose response relationships between transportation noise and annoyance*

F

For indoor spaces there is, in theory, no limit as long as the building envelope provides sufficient insulation although this will result in a very poor outdoor environment. As the WHO suggests that sound pressure levels during the evening and night should be 5 – 10 dB lower than during the day (Section 4.2.7). The values of SOAEL for transportation noise at night are 5 dB less than the values adopted for daytime.

G

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 LAeq with open windows this would result in an internal noise level of 40-45 dB LAeq . A value of 45 dB LAeq is the SOAEL for daytime. As the WHO suggests that sound pressure levels during the evening and night should be 5 – 10 dB lower than during the day (Section 4.2.7). A value of 40 dB LAeq is the SOAEL for night time.

7. Other Noise Sources (identifiable)

The limits derived above refer to anonymous noise sources; there is less published research on the impact of other specific sources. Possible methods include the following:

- Relative levels (i.e. compare the noise level from the source to the ambient or background noise);
- Lower the criteria provided by the WHO¹ guidance (table 4.1) to allow for the non anonymous nature of the noise source.
- Consider the change to the overall noise level due to the introduction of the noise source

H

The comparison of the source level to the ambient (or background noise level) will take account of the existing acoustics environment. This methodology is described in BS 4142. Based on this we can obtain the following values for SOAEL and LOAEL.

LOAEL is where complaints are unlikely (i.e. rating of source is 10 dB less than background noise level)

SOAEL is where complaints are likely (i.e. rating level exceeds background by 10 dB)

Whilst this is intended for noise of an industrial nature it can provide a basis for assessing other noise sources, for example music or entertainment noise which usually includes a significant quantity of bass can be assessed by undertaking a similar analysis in octave (or third octave) bands. When using this type of assessment we should still ensure that levels provided in WHO Table 4.1¹ are not exceeded.

I

The values provided in the guidance in WHO Table 4.1¹ can be applied to the situation, in cases where the noise is easily attributable to a specific source (i.e. it is NOT anonymous) a 5 to 10 dB reduction to the value for outdoor living spaces may be appropriate.

The impact of an increase (or reduction) in noise level is provided in a variety of documents including DMRB⁵.

Change in noise level (N)	Magnitude of Impact
$N \geq 5$	Major adverse
$3 \leq N < 5$	Moderate adverse
$1 \leq N < 3$	Minor adverse
$0 < N < 1$	Negligible adverse
$N = 0$	No change

In this case an increase of 5 dB would be considered a significant impact and be regarded as the SOAEL and should be avoided.

Again when using this type of assessment we should still ensure that levels provided in WHO Table 4.1¹ are not exceeded

⁵ *Design Manual Roads and Bridges, Volume 11 environmental assessment, Section 3 environmental assessment techniques Part 7 (Table 3.1)*

8. Submission of Noise Assessments

Noise assessments should be submitted to WRS for consideration in support of planning applications where proposed or existing noise sensitive occupiers may be affected by proposed or existing noise sources as a result of the development. **They should have been carried out by a competent person who has appropriate training and experience in the field of environmental acoustics.**

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

Assessment Requirements

Key requirements for noise assessment reports include:

A clear plan indicating locations of noise sources, sensitive receptors, measurement positions and any mitigation measures if appropriate :-

Consideration of worst case scenarios (e.g. averaged values for LAeq,T or LA90,T will not normally be accepted and background noise measurement times must be representative of quieter

periods whilst noise generating activities are ongoing)⁶.

Measurement time periods for noise indices should be appropriate to the location and situation. This guidance stipulates time periods for some circumstances, which should be used unless there are specific circumstances why they are not appropriate (which should be stated, and preferably agreed with the WRS).

An indication of uncertainty or errors associated with measurements or assessment.

Where mitigation is necessary for a development to satisfy noise criteria provided in this report the report should include a full specification of the mitigation. For example barrier height, location or location(s) maximum sound power level(s) for items of plant. Use of mitigation schemes and calculations must be appropriate for the noise source.(e.g. utilising a noise bund calculation in CRTN for an industrial point source with discrete low frequency noise components is not appropriate).

Further general guidance on the contents of a noise assessment report can be found in **Appendix II**. If an applicant is in any doubt as to the need for, or any requirements of, a noise assessment then this should be discussed with the WRS.

⁶ *Arithmetic averaging is not generally appropriate for noise indices. WRS will however accept averaged values of LA10,1hr in accordance with the procedure in Calculation of Road Traffic Noise.*

Criteria for external and internal noise levels

Design documents generally specify acceptable noise levels within the building. Where there is a need to specify an external noise level then it is recommended this be done by adding 10 dB to the internal criteria. This adjustment is based on the assumed noise reduction of a partially open window.

How to deal with multiple site / façade standards

Where two or more performance criteria apply for a point on a site or façade then the highest standard of noise mitigation shall be applied. If in doubt the developer should seek advice from the WRS.

Consideration of local noise sources

In order to better guide the decision making process it is important to know what noise sources exist in the locality of a proposed development and also the extent of their impacts (e.g. operating hours of source premises). Consideration should also be given to presenting the impact of each source on the development and including details of any remedial measures proposed to reduce the impact.

The onus for gathering this information will lie with the applicant as part of a full and comprehensive acoustic survey (See Appendix II).

Where this is not undertaken this may result in the WRS

identifying information which could impact upon the application under consideration and this could result in an unfavourable recommendation made to the Local Planning Authority or lead to time consuming discussions and further work on behalf of the applicant.

It is therefore in the interests of all parties that suitable time be set aside for the acoustic survey to ensure it is as comprehensive as possible.

Measurement of internal noise levels

Internal noise levels in residential dwellings can be very low, particularly late at night and in the early hours of the morning when entertainment venues may still be operating. In some cases the noise levels may be significantly below the lower measurement limits of the instrumentation used to measure the noise. Care must be taken to ensure that the measured noise levels are not influenced by the noise floor of the instrumentation used. Advice should be sought from the WRS if necessary.

Instrumentation

Instrumentation used for undertaking field measurements should be integrating Type 1 specification and compliant with IEC 61672 : 2003 & IEC 60942 : 2003. The measurement system should be accompanied with a valid UKAS certification of compliance in accordance with BS 7580 part 1 and be available on request. Vibration instrumentation must be compliant with BS EN ISO 8041:2005.

9. Proposed Developments Containing Noise Generating Uses

Introduction

Where applications contain noise sources which may have an impact upon existing noise-sensitive uses, the applicant will be required to provide supporting information to allow this impact to be evaluated, in line with the provisions of this section. For the purposes of this document noise sensitive premises are taken to be places where the building occupants may be resting, sleeping or studying, or spending recreational time. This includes residential premises, hotels, hospitals and schools. Noise sources including plant, deliveries, car parking, hospitals, schools and hotels shall be assessed using the guidelines in this section.

General Noise Sources

For the majority of general noise sources an assessment should be carried out at the façade of noise sensitive premises to demonstrate that the following three criteria would be met:

The rating level (calculated in accordance with BS 4142) is at least 10 dB below the existing ambient noise level (LAeq)

The rating level (calculated in accordance with BS 4142) is at least 5dB below the existing background noise level (LA90)
Between the hours of 19:00 and 07:00 the maximum noise levels

(LAFmax) from the development shall not exceed the LA90 by more than 10 dB, however where the existing background noise level is 45 dB LA90 or less, the maximum noise levels shall not exceed 55 dBLAFmax.

The noise level of the source shall be reported as LAeq,T where T shall normally follow the guidance in BS 4142 (1 hour for daytime and 5 minutes for night time). Where a single cycle of a night time operation exceeds 5 minutes the LAeq for a complete cycle shall be measured.

Remember noise characteristics and levels can vary substantially according to their source and the type of activity involved. In the case of industrial development for example, the character of the noise should be taken into account as well as its level. Sudden impulses, irregular noise or noise which contains a distinguishable continuous tone may require special consideration.

Where two or more performance criteria apply at a receptor on a site or façade then the more stringent criteria shall apply. If in doubt the developer should seek advice from the WRS.

Where specific noise sources do not lend themselves well for assessment under this section WRS may recommend the use of alternative criteria.

Two specific type of noise sources that have already been identified as requiring alternate assessment criteria are detailed below (places of worship and entertainment noise / amplified music).

Measurement of background and ambient noise levels

Background and ambient noise levels shall be representative of the existing noise levels at the most sensitive time during or immediately before or after the proposed period(s) of operation.

Where different operating regimes are proposed (for example daytime, evening and night time) background and ambient noise levels shall be determined for each operating period.

For most developments a 20minute measurement of background noise will not normally be sufficient.

Speculative developments

Some planning applications contain very little information on which an assessment of the potential noise impact can be based. This is common for outline planning applications but is also an issue with some full applications where there is little information about the likely end-user, for example with speculative commercial developments.

In such circumstances, to ensure that the amenity of residents of nearby noise sensitive premises is safeguarded, WRS will make an assessment based on the likely worst case scenarios with respect to noise impact. This may lead to WRS recommending that the LPA Subject the application to a large number of

conditions to address all foreseeable situations. Clearly the more detail that is provided by the applicant, the more WRS will be able to limit uncertainties and thereby reduce the number of conditions required.

In circumstances where, even with reasonable mitigation measures, the development is unlikely to satisfy the requirements of this document then WRS may recommend that the LPA may wish to refuse such applications.

Places of Worship

Many aspects surrounding such premises may be covered by sections 6 and *entertainment premises* of this document (see below). This section specifically covers the use of loudspeakers or other such devices which are used to call the faithful to prayer or make some other announcement or accompaniment to song.

Developers should be aware of the following planning restrictions, which are likely to be attached to consents for any such venue:

The maximum noise level from the loudspeaker shall not exceed 81dB LAFmax when measured under free field conditions at a distance of 75 metres from the loudspeaker.

The use of loudspeakers is limited to twice in any day and only between the hours of 09.00 and 18.00.

The loudspeakers shall not be operated for more than 2 minutes on any occasion.

Noise from entertainment premises

It is assumed that pubs, clubs, community halls and similar premises will be used for holding regular entertainment events. Therefore it will be necessary to design these premises to reduce the emission of music and associated noise.

It is expected that all applications for this type of premises should properly address noise issues. As a general principle music and noise from customer activity (talking, shouting and applauding) emanating from any entertainment premises including external areas (balconies, gardens and smoking areas) should not be audible within any noise sensitive premises.

The applicant should provide an acoustic assessment covering the period when the noise from the proposed entertainment premises is expected to have the greatest impact on nearby noise sensitive premises

The level of the noise emanating from the entertainment premises ($L_{eq,5min}$) must be least 10 dB less than the background noise ($L_{90,5min}$ measured in the absence of the entertainment noise) in octave bands from 63 Hz to 4 kHz.

Between the hours of 19:00 and 07:00 the maximum noise levels (LA_{Fmax}) from the development shall not exceed the background noise level (LA_{90}) by more than 10 dB, however where the existing background noise level is 45 dB LA_{90} or less, the maximum noise levels shall not exceed 55 dB LA_{Fmax} .

General sound insulation criteria

Where a development containing the noise source(s) is attached to noise sensitive premises, for example in the case of a parade of shops with flats above, the applicant shall submit a scheme of noise insulation to demonstrate that the following criteria would be met:

- In all cases sound insulation between the two uses shall be at least 60dB $D_{nT,W}$.
- For some applications it may be necessary to undertake a noise assessment to demonstrate that the level of inside the noise sensitive premises arising from the activities in the noise generating premises ($L_{eq,5min}$) will be at least 10dB below the indoor ambient noise level ($L_{eq,5min}$) in octave bands over an appropriate frequency range.

In both instances it is advisable that the applicants contact WRS for advice.

Consideration should also be given to structure borne noise and vibration from machinery, fixed plant and ventilation systems, and from footfall, the opening and closing of doors, etc.

For vibration the guidance in Section 10 shall be followed.

Quiet areas and amenity space

Worcestershire has no areas affected by the Environmental Noise (England) Regulations 2006 as of publication.

However it is expected that careful consideration should be given to areas identified as having very quiet background noise that are persistently $<30dB(A)L_{90}$ at night or areas that are generally

considered tranquil where the introduction of a new noise source would significantly change the noise characteristics of the area.

Development proposals will therefore be expected to be sympathetic and in keeping with the general noise climate of the area.

It will also be necessary to demonstrate that the proposed development does not overtly conflict with any nearby amenity space, for example gardens, parks, sports fields, canal towpaths etc.

In preparation of noise reports it is advised that consultants should contact WRS in advance/during the undertaking of any assessments to discuss such sensitive locations.

Specific criteria for schools and hospitals

The design of schools and hospitals is covered within specific technical documents, which contain a large number of design criteria for the differing types of rooms. Schools are covered within Building Bulletin 93 and the criteria are reproduced in Appendix IV of this document.

Hospitals are covered within Health Technical Memorandum 08-01 and the criteria are reproduced in Appendix V of this document.

Where applications are received for schools or hospitals WRS will not specify any noise levels to be met at the planning stage. WRS will recommend that consideration be given to the levels within the relevant document as a comment attached to the planning consultation response but this will be unlikely to be in the form of an actual condition.

Specific Criteria for Hotels

The location and construction of a hotel will normally be based on a business case. The WRS will not prescribe noise and vibration criteria for hotel bedrooms. We recommend that hotel bedrooms shall be designed and located such that the unoccupied noise levels do not exceed the criteria specified for a good standard in Table 5 of BS8233:1999.

Similarly we recommend that hotel bedrooms shall be designed and located such that vibration levels do not exceed 0.14 mm/s peak particle velocity or the assessment of vibration levels results in a low probability of adverse comment when assessed in accordance with BS 6472.

Energy Generation & Waste Management

Wind Farms/Turbines

Current guidance on this topic is insufficient and outdated. For this reason WRS will treat each application on its own individual merits due to the 'amplitude modulation' phenomena that is currently unaccounted for in existing guidance.

10. Vibration

Introduction to the section

Although vibration issues are not encountered frequently in the planning process it is something that should be considered where the development would lead to vibration sensitive premises being in close proximity to industrial/commercial activities or to railway lines. Because of the uncertainties involved in predicting vibration effects each case will be considered individually, and appropriate criteria agreed. In all appropriate cases the applicant is encouraged to contact WRS at the earliest opportunity to discuss vibration issues.

Vibration from railway traffic

For existing buildings within 30m of a railway line where change of use to residential use is proposed a vibration survey within the building should be carried out. For new-build developments within 30m of a railway line a vibration survey must be carried out on the building lines closest to the railway. It will be important to survey at times when the highest levels of vibration are likely to occur, and it should be noted that a number of railway routes in the north of Worcestershire carry freight traffic at night.

For small developments (for example a single house or semi-detached pair) within 30m of a railway line WRS may undertake a limited, daytime, vibration survey at the proposed development site. In situations where these measurements suggest a potential problem then the applicant may be required to undertake a more detailed study.

Vibration surveys

In circumstances where vibration is a potential source of disturbance it is expected that an appropriate vibration survey or prediction be carried out. Initially, to avoid complex investigations being carried out unnecessarily a screening survey should be carried out. If monitored vibration levels do not exceed 0.14 mm/s peak particle velocity in any axis then no further survey is necessary. If this level is exceeded then it is expected that an assessment would be carried out with reference to BS6472. Where re-radiated noise is a potential problem then this should also be assessed. Data from these assessments should be made available to WRS for consideration.

Appendix I

Glossary of Terms

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

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

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

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

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

Ctr Spectrum adaptation term: A correction added to a sound insulation quantity (such as R_w) to take account of a specific (traffic noise) spectra. See BS EN ISO 717-1:1997. For example the difference between internal and external

traffic noise levels in dB(A) is calculated using $RW + C_{tr}$ (equivalent to $R_{traffic}$)

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

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

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

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

ISO 717-1: 1997

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

WRS: Worcestershire Regulatory Services
Environmental Health, Trading Standards
& Licensing, PO BOX 866, Worcester. WR1 9DP.

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

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

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

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

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

LA90,T: Sound pressure level exceeded for 90% of the measurement period “T” or ‘background level’.

LAeq,T: Equivalent continuous sound pressure level measured over the time period “T”

LAmx: The maximum RMS A weighted

sound pressure level

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

Noise: Unwanted sound.

Noise Action Plans and Quiet Areas:

The Environmental Noise Directive 2002/49/EC (END) and the Environmental Noise (England) Regulations 2006 (as amended) require UK government to:

Prepare strategic noise maps for large urban areas (referred to as agglomerations in the Directive), major roads, major railways and major airports.

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

Noise-sensitive premises /

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

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

Outdoor Amenity Area: An outdoor area adjacent to a residential building which is designed and intended primarily for the

leisure and recreation of the occupants of the dwelling. This will include gardens, landscaped areas, balconies.

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

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

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

Sound insulation: A quantity which is used to characterize the reduction in sound pressure level across an element or partition. (See **R, RW, DnT,W, Dne,W, Ctr**)

Structure borne noise: Noise that propagates via a structure, for example transmitted vibration in building elements then re-radiated as noise.

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

Appendix II

Criteria for the content of Noise Assessments

It should be noted that noise assessment is a skilled operation and should be undertaken only by persons competent in the procedures.

Introduction

Outline the purpose and scope of the report

Include the site address or other location details (e.g. land adjacent to 123 Any Road....)

Methodology

Detail any standards / policies to be used and give a brief outline of why they have been chosen

Provide more detail and justifications why accepted standards have not been used where applicable

Outline the process to be followed

Noise measurements

Detail the location, dates and times of all measured data relied upon and provide summaries of the results obtained.

If it has not been possible to measure at the actual location of the proposed development, state why an alternative location is considered representative.

Provide explanations for any abnormal or anomalous results

Give brief details of the equipment used and a confirmation that it has been verified within an appropriate time (usually bi-annually) and that appropriate site calibration checks were carried out. Note that all equipment used should comply with appropriate standards (e.g. IEC 61672 or its predecessors [for Sound Level Meters])

Detail the meteorological conditions during the monitoring period

- i. Wind speed
- ii. Wind direction
- iii. Temperature
- iv. Precipitation

Note: It will generally be acceptable to state that meteorological conditions were satisfactory for measurement purposes and only provide more detail if they are borderline.

Predictions

Where it has been necessary to predict noise levels, brief explanations of how these have been derived including any assumptions made (e.g. downwind propagation) and what standard have been followed (e.g. CRTN, ISO 9613)

If a software package has been used, a brief description of it (e.g. Lima, Cadna, NoiseMap, SoundPlan) brief details of the geographical and source data used details of any validation checks carried out

Assessment

Give details of the assessments made based on the measured and/or predicted data. State any assumptions made.

Show any calculations made to sufficient detail that they could be checked for accuracy. If the calculations are complicated, the details may be included as an appendix.

Mitigation

Give details of any mitigation measures that are / may be required and the anticipated effect

- i. Enhanced glazing and doors
- ii. Reorientation of buildings
- iii. Barriers or bunds
- iv. Alternative plant or machinery

Recommendations

Detail what steps should be taken by the developer to meet the relevant criteria

- i. Glazing specification
- ii. Ventilation specification
- iii. Heights, locations and specifications of barriers or bunds
- iv. Appropriate technical specifications for plant or machinery (e.g. refrigeration compressors, extract systems)
- v. Any other data required by the developer to meet the required noise standards /guidance

Conclusions

A brief resume of the process described above and a confirmation that if the recommendations are carried out satisfactorily that appropriate standards / guidance will be complied with.

Appendices

Scale plans showing the site location and the location of any measurement or prediction positions in sufficient detail to enable them to be readily identified. Aerial photos from online mapping sources may be useful.

Unabridged noise monitoring / measurement results on which the assessment is based.

Details of any calculation(s) relied upon.

Appendix III

Internal Noise Levels for New School Build

Criterion	Room Type/Activity	Specified Level
Reasonable Listening/Study and Work	Music Rooms Large lecture rooms > 50 people Drama Rooms	30 dB $L_{Aeq,T}$ plus 55 dB L_{AFmax}
	Audio visual video conference rooms Assembly halls, multi purpose halls Individual study, withdrawal, remedial work, teacher preparation, interview/counselling General teaching areas, classrooms and class bases, small lecture theatres < 50 people, seminar and tutorial rooms, language laboratories, small lecture rooms Libraries Nursery quiet room Nursery play room	35 dB $L_{Aeq,T}$ plus 55 dB L_{AFmax}
	Science laboratories, metalwork/woodwork classrooms, resource/light craft and practical Offices, staff rooms, open plan classrooms / resource areas Indoor sports / indoor swimming pools	40 dB $L_{Aeq,T}$ 45 dB $L_{Aeq,T}$ 45 dB $L_{Aeq,T}$
	Toilets, coats and changing areas, corridors and stairwells Dining rooms	45 dB $L_{Aeq,T}$ 45 dB $L_{Aeq,T}$

Source: Building Bulletin 93: 'Acoustic Design of Schools'

Appendix IV

Internal Noise Levels for New Hospital Build

Room Type	Example	Criteria for noise intrusion to be met inside the spaces from external sources
Ward – Single Person	Single bed ward, single bed recovery areas and no-call suite, relatives overnight stay	40dB L _{Aeq} (day) 35dB L _{Aeq} (night) 50dB L _{AFmax} (night)
Ward – multi bed	Multi-bed wards, recovery areas	45dB L _{Aeq} (day) 35dB L _{Aeq} (night) 50dB L _{AFmax} (night)
Small office type spaces	Private offices, small treatment rooms, interview rooms, consulting rooms	40dB L _{Aeq,T}
Open medical areas	A&E	45dB L _{Aeq,T}
Circulation spaces	Corridors, hospital street, atria	55dB L _{Aeq,T}
Public areas	Dining Waiting areas	50dB L _{Aeq,T} 45dB L _{Aeq,T}
Personal hygiene (en-suite)	Toilets, showers	45dB L _{Aeq,T}
Personal hygiene (public)	Toilets, showers	55dB L _{Aeq,T}
Small food preparation areas	Ward kitchens	50dB L _{Aeq,T}
Large food preparation areas	Main kitchens	55dB L _{Aeq,T}
Large meeting rooms (>8m)	Lecture theatres, meeting rooms, board rooms	35dB L _{Aeq,T}
Small meeting rooms (<8m)	Meeting rooms, seminar rooms, classrooms	40dB L _{Aeq,T}
Operating theatres	Operating theatres	40dB L _{Aeq,T}

		50dB LAFmax
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Source: Department of Health 'Health Technical Memorandum 08-01 Acoustics'

Appendix V

Methodology for the assessment of transportation noise sources

Road traffic

In order to determine the impact of road traffic on a particular development it will be necessary for an acoustic assessment to be undertaken to determine the $L_{Aeq,T}$. It is recommended by WRS that a full 24-hour assessment be undertaken for all applications.

In some cases it will be sufficient to simply determine $L_{Aeq,T}$ during a continuous 3-hour period during the daytime. Where it is proposed to undertake this shortened methodology it is advised that this should be first discussed with WRS.

The revised version of DMRB (August 2008) Annex 5 suggests that night time measurements should be considered if night time levels are expected to be within 10 dB of daytime levels. Where the proposed development is adjacent to, or in close proximity to, major roads such as motorways or trunk roads then a night-time assessment will be required.

Railway

Noise from rail traffic may affect properties bounding railway lines. To determine the impact of the rail traffic on a particular development then it is necessary for an acoustic assessment to be undertaken to determine the $L_{Aeq,T}$ and L_{ASmax} . As many of the railway lines in Birmingham carry freight during the night it is necessary for a full 24-hour assessment to be undertaken. The assessment should provide both $L_{Aeq,T}$ and details of L_{ASmax} with the frequency of occurrence.