

Appendix 12.2 Legislation and Policy related to Noise

Legislation

Control of Pollution Act

- 12.1 Part III of the Control of Pollution Act 1974 (CoPA)¹ is specifically concerned with pollution. With regards to noise, it covers construction sites; noise in the street; noise abatement zones; codes of practice and best practicable means (BPM).
- 12.2 Section 60, Part III of the CoPA refers to the control of noise on construction sites. It provides legislation by which local authorities can control noise from construction sites to prevent noise disturbance occurring. The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015² approved British Standard (BS) 5228-1:2009+A1:2014³ and BS 5228-2:2009+A1:2014⁴ for the purpose of giving guidance on appropriate methods for minimising noise from construction and open sites in exercise of the powers conferred on the Secretary of State by sections 71(1)(b), (2) and (3) of the CoPA.
- 12.3 The CoPA enables the local authority, in whose area work is going to be undertaken, or is being undertaken, the power to serve a notice imposing requirements as to the way in which construction works are to be carried out. This notice can specify, the plant or machinery that is or is not to be used, the hours during which the construction work can be carried out, the level of noise and vibration that can be emitted from the premises in question or at any specified point on these premises or that can be emitted during specified hours, or for any change of circumstances.
- 12.4 Section 61, Part III of the CoPA refers to prior consent for work on construction sites. It provides a method by which a contractor can apply for consent to undertake construction works in advance. If consent is given, and the stated method and hours of work are complied with, then the local authority cannot take action under Section 60.
- 12.5 Section 71, Part III of the CoPA refers to the preparation and approval of codes of practice for minimising noise.
- 12.6 Section 72, Part III of the CoPA refers to BPM, which is defined as:
- “reasonably practicable, having regards among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications.”

Whilst 'Means' includes:

¹ Control of Pollution Act, (1974), Her Majesty's Stationary Office (HMSO).

² Statutory Instruments No. 227, The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015, (2015), HMSO.

³ British Standard 5228-1:2009+A1:2014, 'Code of practice for noise and vibration control on construction and open sites – Noise', (2014), British Standards Institution (BSI).

⁴ British Standard 5228-2:2009+A1:2014, 'Code of practice for noise and vibration control on construction and open sites – Vibration', (2014), BSI.

“the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic structures.”

- 12.7 If BPM is applied, then it can provide a defence against prosecution by the local authority.

Environmental Protection Act

- 12.8 The Environmental Protection Act 1990 (EPA)⁵ deals with statutory nuisance, including noise.
- 12.9 Section 79, Part III of the EPA, 'Statutory nuisances and inspections therefor', places a duty on local authorities to regularly inspect their areas to detect whether a statutory nuisance exists. This section also considers and defines the concept of BPM which originates from Section 72, Part III of the CoPA.
- 12.10 Where the local authority is satisfied that a statutory nuisance does exist, or is likely to occur or recur, it must serve an abatement notice. Section 80, Part III of the EPA, 'Summary proceedings for statutory nuisances', provides local authorities with the power to serve an abatement notice requiring the abatement of the nuisance or prohibiting or restricting its occurrence or recurrence; and/or carrying out such works or other action necessary to abate the nuisance.
- 12.11 Section 82, Part III of the EPA, 'Summary proceedings by persons aggrieved by statutory nuisances', allows a Magistrates' court to act on a complaint made by any person on the grounds that he is aggrieved by a statutory nuisance, such as noise.
- 12.12 The procedures for appeals against abatement notices are detailed in the Statutory Nuisance (Appeals) Regulations 1995.

National Policy

National Planning Policy Framework

- 12.13 The National Planning Policy Framework (NPPF)⁶ sets out the Government's planning policies for England and how these are expected to be applied. The emphasis of the Framework is to allow development to proceed where it can be demonstrated to be sustainable. In relation to noise, Paragraph 180 of the Framework states:

“Planning policies and decisions should ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from the development - and avoid noise giving rise to significant adverse impacts on health and the quality of life;

⁵ Environmental Protection Act, (1990), HMSO.

⁶ National Planning Policy Framework, (2021), Ministry of Housing, Communities and Local Government, HMSO.

- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

12.14 The point 'a)' refers to 'significant adverse impacts' which relates to the 'significant observed adverse effect level' (SOAEL) in the Noise Policy Statement for England (NPSE)⁷, though the term 'effect' is used instead of the term 'impact' although these have been deemed to be interchangeable in this context. Therefore, given the comments above on the NPSE with regard to assessment methods and criteria, the current content of the NPPF does not require any change in previously adopted approaches.

Noise Policy Statement for England

12.15 The Noise Policy Statement for England (NPSE)⁷ aims 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.

12.16 Paragraph 1.6 of the NPSE sets out the long-term vision and aims of Government noise policy:

"Noise Policy Vision

Promote good health and a 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."

12.17 The aims require that all reasonable steps should be taken to avoid, mitigate and minimise adverse effects on health and quality of life whilst also taking into account the guiding principles of sustainable development, which include social, economic, environmental and health considerations.

12.18 With regard to the terms 'significant adverse' and 'adverse' included in the 'Noise Policy Aims', these are explained further in the 'Explanatory Note' as relating to established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation (WHO) which are:

"NOEL - No Observed Effect Level

⁷ Noise Policy Statement for England, (2010), Department for Environment, Food and Rural Affairs, HMSO.

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on human health and quality of life due to noise."

"LOAEL - Lowest Observed Adverse Effect Level

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

Defra has then extended these concepts for the purpose of the NPSE to introduce the concept of:

"SOAEL - Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur."

12.19 The accompanying explanation states:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is 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. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

Planning Practice Guidance - Noise

12.20 The Government has published Planning Practice Guidance on a range of subjects including noise (PPGN)⁸. The guidance forms part of the NPPF and provides advice on how to deliver its policies. The PPGN reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and BSs and contains examples of acoustic environments commensurate with various effect levels. Paragraph 006 of the PPGN explains that:

"The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation."

12.21 According to the PPGN, factors that can influence whether noise could be of concern include:

- the source and absolute level of the noise together with the time of day it occurs;
- for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- the spectral content and the general character of the noise;

⁸ National Planning Policy Framework, (2021), Ministry of Housing, Communities & Local Government, HMSO.

- the local topology and topography along with the existing and, where appropriate, the planned character of the area;
- where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time;
- in cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur;
- where relevant, Noise Action Plans, and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations;
- the effect of noise on wildlife;
- if external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces; and
- the potential effect of a new residential development being located close to an existing business that gives rise to sound should be carefully considered. This is because existing sound levels from the business, even if intermittent (for example, a live music venue), may be regarded as unacceptable by the new residents and subject to enforcement action. To help avoid such instances, appropriate mitigation should be considered, including optimising the sound insulation provided by the new development's building envelope. In the case of an established business or community facility, the ('agent of change') policy set out in paragraph 182 of the NPPF should be followed.

12.22 Paragraph 182 of the NPPF states:

"182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

12.23 The PPGN provides a relationship between various perceptions of noise, effect level and required action in accordance with the NPPF. This is reproduced in Table 12.1.1, below.

Table 12..1: Noise Exposure Hierarchy based on the Likely Average Response

Perception	Increasing Effect Level	Action
Not noticeable	No Observed Effect	No specific measures required
Noticeable and not intrusive	No Observed Adverse Effect	No specific measures required
LOAEL		
Noticeable and intrusive	Observed Adverse Effect	Mitigate and reduce to a minimum
SOAEL		
Noticeable and disruptive	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Unacceptable Adverse Effect	Prevent

12.24 The PPGN describes sound that is not noticeable to be at levels below the NOEL. It describes exposures that are noticeable but not to the extent there is a perceived change in quality of life as below the LOAEL and need no mitigation. With reference to the definition of noise in the NPSE, such immissions are 'sound' and not 'noise'. On this basis, the audibility of sound from a development is not, in itself, a criterion to judge noise effects that is commensurate with national planning policy.

12.25 The PPGN suggests that noise exposures above the LOAEL cause small changes in behaviour. Examples of noise exposures above the LOAEL provided in the PPGN is having to turn up the volume on the television; needing to speak more loudly to be heard; where there is no alternative ventilation, closing windows for some of the time because of the noise; or, a potential for some reported sleep disturbance. In line with the NPPF and NPSE, the PPGN states that consideration needs to be given to mitigating and minimising effects above the LOAEL but taking account of the economic and social benefits being derived from the activity causing the noise.

12.26 The PPGN suggests that noise exposures above the SOAEL cause material changes in behaviour. Examples of noise exposures above the SOAEL provided in the PPG-N are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present; and/or there is a potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. In line with the NPPF and NPSE, the PPGN states that effects above the SOAEL should be avoided and that whilst the economic and social benefits being derived from the activity causing the noise must be taken into account, such exposures are undesirable.

12.27 The PPGN suggests that a noise impact may be partially offset if the residents of affected dwellings have access to a relatively quiet part of their dwelling, private external amenity area and/or external public or private amenity space nearby.

Local Policy

Adoption Arun Local Plan 2011-2031

12.28 The Arun Local Plan⁹ covers the period 2011 to 2031 for the area of Arun District (excluding the area covered by the South Downs National Park Authority) and was adopted in July 2018. Noise

⁹ Arun Local Plan 2011 to 2031, (2018), Arun District Council.

is specifically covered in chapter 21 'Quality of the environment', section 21.2 'Noise pollution'.

12.29 Policy QE DM1 states:

"Noise pollution

1. New noise sensitive development

Residential development likely to experience noise from road, rail or air, in particular development in close proximity to:

- A284/A259 Wick roundabout
- Stretches of the A27 around Arundel and Fontwell
- Sections of the A29 and A259 in Bognor Regis
- A284 in Littlehampton and
- The stretch of railway line that runs through Barnham station

must:

- a. Be supported by a noise exposure category (NEC) assessment and designed to ensure that residents will not be adversely affected by noise.
- b. Consider both the likely level of exposure at the time of application and any increase that might be reasonably expected in the foreseeable future.

To safeguard the continued use of existing industrial and commercial uses and to protect amenity, noise sensitive development should not normally be permitted where:

- c. High levels of noise will continue throughout the night, especially during the hours when people are normally sleeping.
- d. There is a likelihood of complaints about noise from industrial development. ⁽⁸¹⁾

2. New noise generating development

Developers proposing new noise generating development must seek advice from an early stage to determine the level of noise assessment required. Proposals will need to be supported by:

- a. Evidence to demonstrate that there are no suitable alternative locations for the development.
- b. A noise report which provides accurate information about the existing noise environment, and the likely impact of the proposed development upon the noise environment. The report must also demonstrate that the development meets appropriate national and local standards for noise, as set out in Annex 1 of the Planning Noise Advice Document: Sussex, and any mitigation measures required to ensure noise is managed to an acceptable level.
- c. Evidence to demonstrate that the development will not impact upon areas identified

and valued for their tranquillity, including Gaps Between Settlements which are important to the enjoyment of Arun's countryside, its habitats and biodiversity.

81 this may be assessed, where appropriate, using guidance in BS 4142:2014.”

12.30 The areas listed under bullet point 1 are defined as ‘First Priority Locations’ and can be identified in the strategic noise mapping¹⁰ carried out by the Department of Food and Rural Affairs (DEFRA) as a requirement of the Environmental Noise Regulations¹¹, where the “noise index is at least 76 dB according to the results of the noise mapping”.

12.31 It is noted that Site A of proposed development is not identified in the DEFRA ‘Road Noise $L_{Aeq,16hr}$ England Round 3’ strategic noise mapping for the daytime period (07:00 to 23:00 hours), ‘Road Noise L_{den} England Round 3’ strategic noise mapping for the day evening night period (00:00 to 24:00 hours) or ‘Road Noise L_{night} England Round 3’ strategic noise mapping for the night-time period (23:00 to 07:00 hours), as being in an area that exceeds 76 dB.

12.32 It is also noted that BS 4142:2014 has now been replaced by BS 4142:2014+A1:2019; however, the changes are relatively minor, such as correcting typos.

British and International Standards

British Standard 7445 'Description and measurement of environmental noise'

12.33 BS 7445 is a three-part standard that comprises:

- BS 7445-1:2003 'Description and measurement of environmental noise - Part 1: Guide to quantities and procedures'¹²;
- BS 7445-2:1991 'Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use'¹³; and
- BS 7445-3:1991 'Description and measurement of environmental noise - Part 3: Guide to application to noise limits'¹⁴.

12.34 The Standards define various acoustic parameters, including acoustic terminology, instrumentation, methodology procedures, information to be recorded, data acquisition and guidelines for the ways in which noise limits should be specified and the procedures to be used for checking compliance with such limits.

12.35 Although not explicitly stated in the Standards, the term 'environmental noise' is taken to have

¹⁰ [Strategic noise mapping \(2017\). GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/618812/Strategic_noise_mapping_2017.pdf).

¹¹ Statutory Instruments 2006 No. 2238. The Environmental Noise (England) Regulations 2006, (2006), HMSO.

¹² British Standard 7445-1:2003, 'Description and measurement of environmental noise - Part 1: Guide to environmental quantities and procedures', (2003), BSI.

¹³ British Standard 7445-2:1991, 'Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use', (1991), BSI.

¹⁴ British Standard 7445-3:1991, 'Description and measurement of environmental noise - Part 3: Guide to application to noise limits', (1991), BSI.

the definition contained within Article 3 the Environmental Noise Directive (END)¹⁵, which states:

"'environmental noise' shall mean unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic, and from sites of industrial activity such as those defined in Annex I to Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control."

12.36 On this basis, 'environmental noise' in BS 7445 is broadly synonymous with 'noise' as defined in the NPSE. However, the description of 'environmental noise' in the END: unwanted or harmful outdoor sound from transport and industry; differs from that in the NPSE: unwanted or harmful sound from transport. The NPSE describes unwanted or harmful sound from industry as 'neighbourhood noise'. The discussion below summarises the guidance contained in BS 7445 in terms of the nomenclature of the NPSE.

12.37 BS 7445-1:2003 states that noise is best described by the equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$, and is defined in the Standard as the 'value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time'. In more straightforward terms, it is a measure of energy within the varying noise.

12.38 BS 7445-2:1991 states that noise levels shall be reported in terms of the equivalent continuous A-weighted sound pressure levels for each reference time interval, T, ($L_{Aeq,T}$). The Standard states that the reference time intervals shall be specified to cover the typical human activities and variations in the operation of the sources. Different reference time intervals may be chosen for daytime and night-time. For example, BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'¹⁶ defines the reference time interval for the specific sound to be 1-hour during the daytime and 15-minutes during the night-time; BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'¹⁷ provides guideline values for internal ambient noise levels for rooms used for resting, dining and sleeping with reference time intervals of 16-hours during the daytime and 8-hours during the night-time.

12.39 BS 7445-2:1991 states that noise levels shall also be reported and in terms of the long-term average sound levels ($L_{Aeq,LT}$) over the long-term time interval, LT. LT should be chosen so that the long-term variations in noise emission(s) from the source(s) and propagation conditions are covered. The Standard states that LT is frequently of the order of several months.

12.40 When noise levels are determined from measurements, it is necessary to disaggregate between the of 'immissions' of sound from environmental and or neighbourhood noise sources (i.e. transport and/or industry) and other sources of sound, such as wind, rain, wildlife and local anthropogenic sound in the neighbourhood; all of which may influence the measured levels to various extents.

¹⁵ Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise, (2002), The European Parliament and the Council of the European Union.

¹⁶ British Standard 4142:2014+A1:2019, 'Method for rating and assessing industrial and commercial sound', (2019), BSI.

¹⁷ British Standard 8233:2014, 'Guidance on sound insulation and noise reduction for buildings', (2014), BSI.

British Standard 5228 'Code of practice for noise and vibration control on construction and open sites'

12.41 BS 5228 is a two-part standard which comprises:

- BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise'; and
- BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 2: Vibrations'.

12.42 The BS provides guidance, information and procedures on the control of noise and vibration from demolition and construction sites. The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015 approved BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 for the purpose of giving guidance on appropriate methods for minimising noise from construction and open sites in exercise of the powers conferred on the Secretary of State by sections 71(1)(b), (2) and (3) of the CoPA.

12.43 There are no set standards for the definition of the significance of construction noise effects, however, for noise, example criteria are provided in BS 5228-1:2009+A1:2014 Annex E and for vibration, example criteria are provided in BS 5228-2:2009+A1:2014 Annex B. The assessment of whether changes in noise levels due to construction activity constitute significant effects will be dependent on the absolute levels of ambient and construction noise, as well as the magnitude, duration, time of occurrence and frequency of the noise change.

12.44 BS 5228-1:2009+A1:2014 provides basic information and recommendations for methods of noise control relating to construction and open sites where work activities/operations generate significant noise levels. It includes sections on: community relations; noise and persons on site, neighbourhood nuisance; project supervision; and control of noise. However, annexes include: information on legislative background; noise sources, remedies and their effectiveness (mitigation options); current and historic sound level data on site equipment and site activities; significance of noise effects; calculation procedures estimating sound emissions from sites and sound level monitoring; types of piling; and air overpressure.

12.45 BS 5228-2:2009+A1:2014 covers basic information and recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration levels. It includes sections on: community relations; vibration and persons on site; neighbourhood nuisance; project supervision; control of vibration and measurement. BS 5228-2:2009+A1:2014 refers to BS ISO 4866:2010¹⁸; BS 7385-2:1993¹⁹; BS 6472-1:2008²⁰ and BS 6472-2:2008²¹ for further advice on the significance of vibration.

¹⁸ British Standard ISO 4866:2010, 'Mechanical vibration and shock - Vibration of fixed structures - Guidelines for the measurement of vibrations and evaluation of their effects on structures', (2010), BSI.

¹⁹ British Standard 7385-2:1993, 'Evaluation and measurement for vibration in buildings - Part 2: Guide for damage levels from groundborne vibration', (1993), BSI.

²⁰ British Standard 6472-1:2008, 'Guide to evaluation of human exposure to vibration in buildings - Part 1: Vibration sources other than blasting', (2008), BSI.

²¹ British Standard 6472-2:2008, 'Guide to evaluation of human exposure to vibration in buildings - Part 2: Blast-induced vibration', (2008), BSI.

British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

- 12.46 The foreword to BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' provides the following introduction for the assessment of human response to sound:

"Response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact, for example, can depend on such factors as the margin by which a sound exceeds the background sound level, its absolute level, time of day and change in the acoustic environment, as well as local attitudes to the source of the sound and the character of the neighbourhood."

- 12.47 The note to paragraph 8.5 of BS 4142:2014+A1:2019 is relevant to the assessment of the proposed development, and states:

"Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it should be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation."

- 12.48 BS 4142:2014+A1:2019 primarily provides a numerical method by which to determine the significance of sound of an industrial nature (i.e. the 'specific sound' from the proposed development) at residential NSRs. The specific sound level may then be corrected for the character of the sound (e.g. perceptibility of tones and/or impulses), if appropriate, and it is then termed the 'rating level', whether or not a rating penalty is applied. The 'residual sound' is defined as the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

- 12.49 The specific sound levels should be determined separately in terms of the $L_{Aeq,T}$ index over a period of $T = 1$ -hour during the daytime and $T = 15$ -minutes during the night-time. For the purposes of the Standard, daytime is typically between 07:00 and 23:00 hours and night-time is typically between 23:00 and 07:00 hours.

- 12.50 BS 4142:2014+A1:2019 states that measurement locations should be outdoors, where the microphone is at least 3.5 m from any reflecting surfaces other than the ground and, unless there is a specific reason to use an alternative height, at a height of between 1.2 m and 1.5 m above ground level. However, where it is necessary to make measurements above ground floor level, the measurement position, height and distance from reflecting surfaces should be reported, and ideally measurements should be made at a position 1 m from the façade of the relevant floor if it is not practical to make the measurements at least 3.5 m from the facade.

- 12.51 With regards to the rating correction, paragraph 9.2 of BS 4142:2014+A1:2019 states:

"Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention."

- 12.52 The commentary to paragraph 9.2 of BS 4142:2014+A1:2019 suggests the following subjective

methods for the determination of the rating penalty for tonal, impulsive and/or intermittent specific sounds:

"Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible."

"Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible."

"Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. ... If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

"Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

12.53 BS 4142:2014+A1:2019 requires that the background sound levels adopted for the assessment be representative for the period being assessed. The Standard recommends that the background sound level should be derived from continuous measurements of normally not less than 15-minute intervals, which can be contiguous or disaggregated. However, the Standard states that there is no 'single' background sound level that can be derived from such measurements. It is particularly difficult to determine what is 'representative' of the night-time period is because it can be subject to a wide variation in background sound level between the shoulder night periods. The accompanying note to paragraph 8.1.4 states that

"A representative level should account for the range of background sound levels and should not automatically be assumed to be either the minimum or modal value."

12.54 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level of the specific sound. In the context of the Standard, adverse impacts include, but are not limited to, annoyance and sleep disturbance. Typically, the greater this difference, the greater is the magnitude of the impact:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

12.55 Whilst there is a relationship between the significance of impacts determined by the method contained within BS 4142:2014+A1:2019 and the significance of effects described in the PPGN, there is not a direct link. It is not appropriate to ascribe numerical rating / background level differences to LOAEL and SOAEL because this fails to consider the context of the sound, which is a key requirement of the Standard.

12.56 The significance of the effect of the noise in question (i.e. whether above or below SOAEL and LOAEL) should be determined on the basis of the initial estimate of impact significance from the BS 4142:2014+A1:2019 assessment with reference to the examples of outcomes described within the PPGN and after having considered the context of the sound. It is necessary to consider all pertinent factors, including:

- the absolute level of the sound;
- the character and level of the residual sound compared to the character and level of the specific sound; and
- the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:
 - facade insulation treatment;
 - ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
 - acoustic screening.

Guidance

Calculation of Road Traffic Noise

12.57 The Department of Transport document, Calculation of Road Traffic Noise (CRTN)²², describes the procedures for measuring and calculating noise from road traffic. These procedures are necessary to enable entitlement under The Noise Insulation Regulations²³ to be determined but they also provide guidance appropriate to the calculation of traffic noise for more general applications (e.g. environmental appraisal of road schemes, highway design and land use planning). The document can also be used to generate scaling factors for expected increases in

²² Calculation of Road Traffic Noise, (1974), HMSO.

²³ Statutory Instruments No. 1763, The Noise Insulation Regulations 1975, Statutory Instrument No. 2000, The Noise Insulation (Amendment) Regulations 1988, 1975 Amended 1988, (1988), HMSO.

road traffic and expected levels of attenuation from barriers.

Design Manual for Roads and Bridges - LA 111: Noise and Vibration

- 12.58 The Design Manual for Roads and Bridges (DMRB LA 111)²⁴ sets out the requirements for assessing and reporting the effects of noise and vibration from construction, operation and maintenance of motorways and all-purpose trunk roads. The document is broken down into four main sections, which include scope, principles and purpose, assessment methodology and monitoring and evaluation.
- 12.59 Under principle and purpose, the level of detail of a noise and vibration assessment shall be proportionate to the quality of data available and the risk of likely significant effects occurring.
- 12.60 Under assessment methodology, there are separate sections addressing construction noise, construction vibration and operational noise, with different study areas and different assessment criteria for each. Operational vibration has been scoped out as it is assumed that a maintained road surface will be free of irregularities as part of the design and general maintenance.
- 12.61 For construction noise, a study area of 300 m from the closest construction activity is normally sufficient to encompass noise sensitive receptors. In addition, a study area of 25 m from the kerb side applies to diversion routes where full carriageway closures are required during the night and a study area of 50 m from the kerb applies to other public roads with the potential for an increase in baseline noise level of 1 dB(A) or more as a result of the addition of construction traffic also applies. Construction noise LOAELs and SOAELs are defined in Table 3.16 of DMRB LA 111 and the magnitude of impact is provided in Table 3.17 of DMRB LA 111.
- 12.62 For construction vibration, a study area of 100 m from the closest construction activity is normally sufficient to encompass vibration sensitive receptors. Construction vibration LOAELs and SOAELs are defined in Table 3.31 of DMRB LA 111 and the magnitude of impact is provided in Table 3.33 of DMRB LA 111.
- 12.63 For operational noise, a study area of 600 m for new road links or roads with links physically changed or bypassed by the project is normally sufficient to encompass noise sensitive receptors. In addition, a study area of 50 m from other public roads with the potential for an increase in baseline noise level of 1 dB(A) or more as a result of the project also applies. Operational noise LOAELs and SOAELs are defined in Table 3.49 of DMRB LA 111 and the magnitude of impact is provided in Table 3.54a for changes in the short-term, between the base year and the opening year and Table 54b in the long-term, between the base year and the future year of DMRB LA 111.

²⁴ Design Manual for Roads and Bridges, LA 111 – Noise and Vibration, (2020), Highways England.