



London Borough of Southwark Technical Guidance for Noise

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Rev 2

Contents

Contents	1
1.0 Introduction.....	3
2.0 Background	4
PART A: Policy Background	5
3.0 Noise Policy Context	6
3.1 National Policy	6
3.1.1 Noise Policy Statement for England.....	6
3.1.2 National Planning Policy Framework.....	7
3.1.3 National Planning Practice Guidance.....	7
3.1.4 Permitted Development Rights.....	8
3.1.5 Noise Mapping.....	8
3.2 Greater London Policy	9
3.2.1 The London Plan and Mayor’s Ambient Noise Strategy	9
3.3 Local Planning Policy.....	10
3.3.1 Saved Southwark Plan Policies and the New Southwark Plan	10
3.3.2 The Core Strategy	11
3.3.3 Borough-Wide Supplementary Planning Documents.....	11
3.3.4 Local Area Supplementary Planning Documents.....	12
4.0 Planning Conditions and S.106 Obligations in Southwark.....	14
PART B: Technical Standards and Guidance.....	15
5.0 Assessing Noise and Vibration Impacts and Required Standards in L.B. Southwark	16
5.1 Standards Required of Noise Consultants	17
5.2 Noise from Fixed Plant and Industry.....	17

5.2.1 Mitigation of Commercial Noise Impacts	18
5.3 Noise and Vibration from Transportation Sources.....	19
5.4 Good Acoustic Building Design	20
5.5 Internal transference of noise within buildings.....	21
5.6 Noise from Entertainment and Leisure Venues.....	23
5.7 Construction Noise and Vibration	24
5.8 Noise from Servicing Commercial Uses	26
5.9 Other Noise Sources (children’s playgrounds and nurseries, sports pitches, beer gardens etc.)	26
5.10 Quiet Areas and Places of Relative Tranquillity	27
5.11 Noise Standards in Applications for Prior Consent for Permitted Development	28
Appendix A: Glossary.....	29
Appendix B: Abbreviations	30

1.0 Introduction

This technical guidance for noise provides details of expected acoustic standards for various types of development. It is intended:

- To help ensure consistency in the approach to dealing with noise and planning in Southwark;
- To highlight the existing policy framework in London and Southwark, and emphasise the importance of noise as a material planning consideration;
- To provide guidance on measures that can be implemented to mitigate the potentially harmful impacts of noise, both as a result of new noise sources, and as a result of placing new sensitive receptors close to existing noise sources;
- To provide guidance on the use of planning conditions and Section 106 obligations to reduce noise exposure;
- To provide guidance on the requirements of noise assessments and the circumstances under which these will be required;

Part A of this TGN details the policy background for noise and planning in Southwark. **Part B** of this TGN details the actual standards and guidance. Specific compliance standards in Part B are written in embedded text boxes. Other text provides background information and guidance, and details the approach that would be expected in order to comply with the standards.

2.0 Background

The London Borough of Southwark is an inner London borough of approximately 11 square miles, stretching from London Bridge and Canada Water on the River Thames in the North down to Dulwich in the South. In the 2011 census Southwark had the 9th highest population density of any Local Authority in England and Wales. Southwark is experiencing rapid population growth and extensive development in buildings and infrastructure. As a densely populated urban borough, many developments in Southwark involve a risk of new noise impacts, either through new exposure or new sources of noise, both during the construction and operational phases.

The Environmental Protection Team (EPT) at the London Borough of Southwark (LBS) receives hundreds of planning consultation enquiries each year. National, Regional and Local Planning Policy dictate the policy context through which EPT operate. Further guidance is taken from British Standards and documents issued by relevant institutes such as the Institute of Acoustics and the Chartered Institute of Environmental Health. This TGN has been produced to provide the detail of technical standards expected and how policy translates into practical constraints and obligations, accounting for local context in Southwark.

All expected standards detailed within this TGN comply with the National Planning Policy Framework, National Planning Practice Guidance and Regional and Local Planning Policy.

PART A: Policy Background

3.0 Noise Policy Context

3.1 National Policy

3.1.1 Noise Policy Statement for England

The overarching framework for national noise policy is the Noise Policy Statement for England (NPSE). The long term vision identified in the policy is to:

'Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.'

The aims of the policy are:

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 introduces the concept of adverse effects common to toxicology to the assessment of 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.

- *SOAEL – Significant Observed Adverse Effect Level*

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

Noise effect levels are not set at fixed figures but vary depending on the context and character of the noise and site specific factors which may impact on the severity of the effect. The NPSE 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.'

Further information and discussion relating to possible objective levels for NOELs SOAELs and LOAELs is available at:

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=18157>

3.1.2 National Planning Policy Framework

The concepts outlined in the NPSE are incorporated into the National Planning Policy Framework (NPPF). Paragraph 123 relates to noise:

123. 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, 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 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.

3.1.3 National Planning Practice Guidance

Practical guidance on how the NPPF should be applied is contained within the National Planning Practice Guidance (NPPG). The guidance includes qualitative examples of how to interpret adverse effect levels in a Planning context.

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.	Significant Observed Adverse Effect	Avoid

	Quality of life diminished due to change in acoustic character of the area.		
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 NPPG also gives further guidance on the factors influencing whether noise may be a concern at the planning stage and how adverse effects can be mitigated, including through the use of good acoustic design.

3.1.4 Permitted Development Rights

The General Permitted Development (England) Order 2015 (GPDO) contains details of developments which are permitted by prior notification rather than full planning consent. The Order was amended in 2016 by an Amendment Order which added responsibilities in relation to noise to certain classes of permitted development.

Class O of the Order deals with changes of use from offices to dwellinghouses. The GPDO (as amended) requires that in such conversions the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—

(d) impacts of noise from commercial premises on the intended occupiers of the development

Class P of the Order deals with changes of use from Storage and Distribution to dwellinghouses. The GPDO (as amended) requires that in such conversions the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—

(v) noise impacts of the development,

Class PA of the Order deals with changes of use of light industrial to dwellinghouses. The GPDO (as amended) requires that in such conversions the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—

(iv) where the authority considers the building to which the development relates is within an area that is important for providing industrial services or storage or distribution services or a mix of those services (which includes, where the development relates to part of a building, services provided from any other part of the building), whether the introduction of, or an increase in, a residential use of premises in the area would have an adverse impact on the sustainability of the provision of those services

For further details of Permitted Development rights see the Order itself or the following website:

<http://planningguidance.communities.gov.uk/blog/guidance/when-is-permission-required/what-are-permitted-development-rights/>

In each of the above cases noise is a material consideration and so must be adequately assessed in planning applications and conditions may be applied in respect of noise.

3.1.5 Noise Mapping

The Environmental Noise Directive requires European Member States to establish, through the process of noise mapping, the number of people exposed to noise levels above 55 dB(A) L_{den} and 50 dB(A) L_{night} from major roads, major railways, major airports and in agglomerations (large urban areas). In these urban areas, noise from all other roads, railways, aircraft movements and significant industrial premises has been mapped, in addition to other major sources.

In England the Directive is implemented through The Environmental Noise (England) Regulations 2006. Those areas/noise sources in England for which noise mapping has occurred are identified in The Environmental Noise (Identification of Noise Sources) (England) Regulations 2007.

The Environmental Noise (England) Regulations 2006 require noise action plans to be developed on a five year rolling programme. Action plans have to be developed for the major noise sources and areas for which maps have been produced. The action plans will seek to manage noise issues and effects including noise reduction if necessary, based on the results obtained through the mapping process.

Noise sources included in the noise mapping 2012 can be found at: -

<https://www.gov.uk/government/publications/open-data-strategic-noise-mapping>

Details of noise action plans can be found at:

<https://www.gov.uk/government/publications/noise-action-plans-large-urban-areas-roads-and-railways>

3.2 Greater London Policy

3.2.1 The London Plan and Mayor's Ambient Noise Strategy

Policy 7.15 of the London Plan is entitled Reducing and Managing Noise and contains the following requirements:

Strategic

A The transport, spatial and design policies of this plan will be implemented in order to reduce and manage noise to improve health and quality of life and support the objectives of the Mayor's Ambient Noise Strategy.

Planning decisions

B Development proposals should seek to manage noise by:

- a.) avoiding significant adverse noise impacts on health and quality of life as a result of new development;*
- b.) mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens on existing businesses;*
- c.) improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquility);*
- d.) separating new noise sensitive development from major noise sources (such as road, rail, air transport and some types of industrial development) through the use of distance, screening or internal layout – in preference to sole reliance on sound insulation;*
- e.) where it is not possible to achieve separation of noise sensitive development and noise sources, without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through the application of good acoustic design principles;*
- f.) having particular regard to the impact of aviation noise on noise sensitive development;*
- g.) promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.*

LDF preparation

C Boroughs and others with relevant responsibilities should have policies to:

- a.) *manage the impact of noise through the spatial distribution of noise making and noise sensitive uses;*
- b.) *identify and nominate new Quiet Areas and protect existing Quiet Areas in line with the procedure in Defra's Noise Action Plan for Agglomerations.*

The London Plan can be viewed at:

<https://www.london.gov.uk/what-we-do/planning/london-plan>

The Mayor's published Ambient Noise Strategy contains policies and proposals on noise related to road and rail traffic, aircraft, water transport and industry. The London Plan addresses the spatial implications of the Ambient Noise Strategy.

The Strategy is available at:

https://www.london.gov.uk/sites/default/files/mayors_noise_strategy.pdf

3.3 Local Planning Policy

The Local Plan is a set of borough-wide planning policy documents that are used to set out how Southwark will be regenerated and protected. It sets out masterplans, development sites and is used to decide if development proposals should be given planning permission. It consists of two adopted planning policy documents: The saved Southwark Plan policies (2007) and the Core Strategy (2011).

3.3.1 Saved Southwark Plan Policies and the New Southwark Plan

The saved Southwark Plan policies (2007) are available at:

http://www.southwark.gov.uk/downloads/download/4441/core_strategy_and_saved_southwark_plan_policies

The local plan is currently being reviewed and updated. The New Southwark Plan is currently in its second draft and further consultation will be taking place. Details of the new draft plan are available at this webpage:

http://www.southwark.gov.uk/downloads/download/4346/new_southwark_plan_preferred_option

Some saved policies from the 2007 Southwark Plan that are relevant to noise and acoustic standards are:

Policy 3.1 - Environmental Effects

Planning permission for the establishment of uses that would cause material adverse effects on the environment will not be granted, and proposals for activities that will have a material adverse impact on the environment and quality of life will be refused.

Policy 3.2 – Protection of Amenity

Planning permission for development will not be granted where it would cause loss of amenity, including disturbance from noise, to present and future occupiers in the surrounding area or on the application site.

Policy 3.3 – Sustainability Assessment

Planning permission will not be granted for Major Development unless the applicant demonstrates that the economic, environmental and social impacts of the proposal have been addressed through a Sustainability Assessment. The level of detail required in the Sustainability Assessment should correspond to the scale and complexity of the development.

Policy 4.2 - Quality of Residential Accommodation

Planning permission will be granted for residential development, including dwellings within mixed use schemes, provided that they:

i. Achieve good quality living conditions; and

ii. Include high standards of:

- Accessibility, including seeking to ensure that all new housing is built to Lifetime Homes standards;
- Privacy and outlook;
- Natural daylight and sunlight; Ventilation;
- Space including suitable outdoor/green space;
- Safety and security; and
- Protection from pollution, including noise and light pollution.

3.3.2 The Core Strategy

The Core Strategy (2011) is available at:

http://www.southwark.gov.uk/downloads/download/4441/core_strategy_and_saved_southwark_plan_policies

The current Core Strategy (2011) contains relevant local policy. In particular:

Strategic Policy 1 – Sustainable development

Which requires that *'Development will improve the places we live and work in and enable a better quality of life for Southwark's diverse population. It will help meet the needs of a growing population in a way that respects the limits of the planet's resources and protects the environment.'*

And;

Strategic Policy 13 – High environmental standards

This Policy includes a commitment that *'Development will help us live and work in a way that respects the limits of the planet's natural resources, reduces pollution and damage to the environment and helps us adapt to climate change.'*

The policy aims to achieve this commitment by *'Setting high standards and supporting measures for reducing air, land, water, noise and light pollution and avoiding amenity and environmental problems that affect how we enjoy the environment in which we live and work.'*

3.3.3 Borough-Wide Supplementary Planning Documents

In addition to Policy there are local supplementary planning documents and guidance which give further detail on required standards. The Sustainable Design and Construction SPD contains details on *'Designing out pollution and nuisance'* including through the use of site layout, building form and massing; landscaping; building design and materials and mechanical systems. The SPD states:

- *Existing sources of high and frequent noise near the site need to be considered when planning the layout of a site and the form and massing of buildings. Noise sensitive uses, such as hospitals, schools and residential developments, and amenity areas should be separated from noise sources.*
- *The most effective solution is likely to be by considering how the design and layout of the development can buffer background noise levels, for example by acting as a shield to a busy road. Buildings should not make*

background noise levels worse by channeling or amplifying existing noise – for example by creating a canyon effect.

- *Consideration should be given as to how landscaping can screen and contain noise and light, such as through earth mounds and expanses of dense, tall foliage.*
- *Development should maximise the use of passive design features that provide natural background ventilation. These include making effective use of landscaping, the site's microclimate and the layout of buildings. Dwellings that only have windows that open onto busy roads or railways are not supported by the council. Glazing should be used on windows to reduce noise levels inside buildings. However, this will only be effective when windows are closed and so should be used in conjunction with other solutions.*
- *Noise generating developments should contain noise through appropriate sound insulation and other noise reducing technologies.*
- *Mechanical systems should only be used as a complement to natural ventilation to ensure a constant standard of indoor air quality. They should not create a noise nuisance and should be efficient, where possible including technology to recover heat energy for other uses. Where mechanical systems are used, careful consideration will need to be given to ensure air intakes are positioned appropriately.*
- *Where mechanical ventilation is used, it should be designed to ensure no noise nuisance is caused to occupiers of other properties and that noise disturbance does not affect the property in which ventilation is situated.*

Within section 11 'Design Standards for Major Developments', section 11.4 'Standards For Avoiding Pollution And Environmental Nuisance' contains the following guidance*:

Indoor noise levels

Residential development should be designed so that noise levels for indoor spaces are below

L_{Aeq} 16 hour 35 dB (07.00-23.00) and L_{Aeq} 8 hour 30 dB

L_AF_{max} 45 dB (23.00-07.00)

Non-residential buildings should be designed to meet the recommended levels set out in British Standard BS8233:1999 (in particular Tables 5 and 6).

For changes of use/conversions, the building should be adapted so that it meets the British Standard levels for the proposed use. Information on how a development has been designed to minimize noise impact and meet the guidance in section 5.2 should be included as part of the Design and Access Statement.

Where noise sensitive uses are proposed in locations that may be affected by noise, such as from railways, busy roads and industrial activity, applications should include a formal acoustic study that explains how noise impacts have been mitigated.

*Note: Since this SPD BS8233:2014 has been released. It is now expected that standards in BS8233:2014 and Part B of this TGN are followed.

3.3.4 Local Area Supplementary Planning Documents

Southwark Council has adopted a number of area-based SPDs which cover specific regions of the Borough.

The adopted SPD for Blackfriars Road includes the following requirements in relation to noise:

Management plans

There is a need to ensure effective and coordinated management of development to minimise the impact on residents, workers and visitors. This is important both during and post construction. Planning conditions, or s106 planning obligations, will require that construction management plans are in place for development along the Blackfriars Road corridor. Developers and contractors will be strongly encouraged to engage with the Bankside and London Bridge Logistics Group which has been established to coordinate all aspects of the construction process in the opportunity area, including traffic management, noise and pollution control, local employment and public realm works. In order to reduce the impact of construction on existing residents and businesses, developers and contractors will be encouraged to work together, and the logistics group aims to achieve excellence in construction management, as certified by the national Considerate Contractors Scheme.

Similarly, planning conditions or s106 planning obligations will require delivery and servicing plans to address the delivery and servicing arrangements for completed developments. This could include hours of operation being managed within reasonable parameters. Travel plans will be sought and we will encourage membership of the Bankside and Borough travel planning groups, coordinated by Better Bankside and Waterloo Quarter Business Improvement Districts.

The adopted SPD for Dulwich includes the following requirements in relation to noise:

The evening economy generates jobs and has the potential to add vitality to the town and local centres as well as making them safer by increasing activity, patterns of movement and opportunities for natural surveillance. However, it can also be associated with noise, crime, anti-social behaviour and community safety problems, particularly in the case of nightclubs, large drinking establishments and late-night take-aways.

Proposals for development that would provide for evening and night activity will be supported provided that the proposal is in a suitable location within a district town or local centre. However the volume of evening economy uses needs to be managed to ensure that impact on residential amenity and community safety is taken into account. The location of residential neighbours, the proposed hours, activities and any potential disturbance arising will be taken into account.

The adopted SPD for Elephant and Castle includes the following requirements in relation to noise:

The Sustainable Design and Construction SPD internal noise standards are repeated.

Developers should give careful consideration to the design and layout of proposed development to ensure that future occupiers have a satisfactory standard of amenity, particularly where there is a risk that occupiers could be exposed to high levels of noise. A range of measures can be used, including the provision of non-residential space as a buffer or orienting windows and balconies away from potential noise sources. Dwellings that only have windows that open onto busy roads or railways are not supported by the council. Glazing should be used on windows to reduce noise levels inside buildings. However, this will only be effective when windows are closed and so should be used in conjunction with other solutions, such as mechanical ventilation.

The noise standards set out in the policy will help ensure appropriate sound insulation so that future occupiers and users of development do not suffer a loss of amenity from transportation and other environmental sources, including, in the Enterprise Quarter, the Ministry of Sound. We will require the submission of a noise assessment to ensure all potential noise impacts and mitigation measures have been properly considered. There is further guidance on this issue set out in our Sustainable Design and Construction SPD 2008.

The introduction of residential or other noise sensitive developments close to existing significant noise sources e.g. (road or rail and commercial premises) in the area will need to include design measures which will help reduce and mitigate the impacts of the noise. The measures and standards set out in policy SPD 5 will help enable residential use to coexist with other noise generating uses.

For further details and other relevant Local Planning Policy please refer to the Policy Documents themselves.

4.0 Planning Conditions and S.106 Obligations in Southwark

In respect of Planning Conditions the NPPF requires that:

'Planning conditions should only be imposed where they are necessary, relevant to planning and to the development to be permitted, enforceable, precise and reasonable in all other respects.'

The Environmental Protection Team will recommend planning conditions in relation to noise where these meet the above tests and allow development to proceed that would otherwise be considered unacceptable. Details of the types of conditions and necessary standards are given in section 5 of this TGN.

In respect of Planning Obligations the NPPF requires that:

'Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition.'

Planning obligations should only be sought where they meet all of the

following tests:

- *necessary to make the development acceptable in planning terms;*
- *directly related to the development; and*
- *fairly and reasonably related in scale and kind to the development.'*

In respect of noise, the Southwark Section 106 Planning Obligations & CIL SPD states that:

'planning obligations may also be sought, on a case by case basis where there are identified direct impacts from development to address the following areas:

...

- *Measures to improve and address negative impacts on air quality and noise*
- *Servicing, construction management and management agreements'*

PART B: Technical Standards and Guidance

5.0 Assessing Noise and Vibration Impacts and Required Standards in L.B. Southwark

Table 1. Summary of TGN Noise Standards

Standard	Page
Standards required of noise consultants	17
Commercial and industrial plant	18
Internal noise levels for residential dwellings	19
L _{Amax} levels for residential dwellings	19
Ventilation for residential dwellings	19
Standards for residential amenity areas	20
Vibration for residential dwellings	20
Re-radiated noise for residential dwellings	20
Requirement for good acoustic building design	21
Internal sound intrusion into residential dwellings in mixed-use buildings	22
Sound insulation standards between residential and non-residential uses	22
Requirement for sound insulation validation testing	22
Enhanced partition insulation standards for acoustically insulated buildings	22
Entertainment venue noise limits (façade)	23
Entertainment venue noise limits (internal sound transference)	23
Construction Environmental Management Plan requirements	24
Construction noise levels and monitoring	25
Restricted delivery hours	26
Service management plans	26
Non-standard acoustic assessment requirements	26
Noise management plans	27

5.1 Standards Required of Noise Consultants

Most suitably qualified consultants will be Members of the Institute of Acoustics (MIOA) and/or Members of the Association of Noise Consultants in addition to holding relevant technical qualifications such as a Diploma or Degree in Acoustics or related engineering fields.

All noise assessments must be conducted by persons suitably qualified in the field of Acoustics and the assessment should contain details of the assessor's qualifications, competency, professional memberships and experience.

When providing information to support planning applications consultants are expected to act at all times honestly, impartially and objectively and to gather evidence and report findings in a scientifically rigorous manner. Assessments should be open and clear in respect of the level of uncertainty attached to their conclusions.

5.2 Noise from Fixed Plant and Industry

The methodology of BS4142:2014 should be followed in full when assessing the impacts from the following noise sources:

- *sound from industrial and manufacturing processes;*
- *sound from fixed installations which comprise mechanical and electrical plant and equipment;*
- *sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and*
- *sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.*

BS4142:2014 should not be used to assess noise sources outside of its intended scope and inappropriate use of the standard will not be accepted as valid acoustic assessment for the purposes of planning applications.

The BS4142:2014 methodology involves predicting or measuring the specific sound level from the source in question and applying rating penalties for acoustic character features such as tonality, impulsivity or irregularity. This rated sound level is then compared to the existing typical L_{A90} background sound level. Impacts are assessed as follows:

- a) Typically, the greater this difference, the greater the magnitude of the impact.*
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- d) 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.*

It is necessary to submit a noise assessment for any development which could result in a change in noise impact on any sensitive receptor (a sensitive receptor is any receptor that may be adversely impacted by noise such as residential dwellings, schools, hospitals etc.). Examples of such developments are those that involve installing new noise-generating plant, new work processes or equipment or making changes to buildings or structures that affect sound transmission.

It is also necessary to submit a noise assessment for any development which places new sensitive receptors where they may be affected by noise from existing commercial uses. Examples of this would be a new residential flat on a

High Street served by air conditioning and kitchen ventilation plant or a new housing development on the edge of an existing industrial estate. When locating sensitive uses near to existing commercial noise sources it is essential to use good acoustic design to minimise noise impact. See section 5.4 of this guidance for further information.

Southwark is a densely populated Borough and the Council receives many applications for commercial and industrial plant each year. In many areas existing noise levels already cause adverse or significantly adverse effects. It is essential that assessments consider not only the impact of the new noise source but also the cumulative impact of the new source in addition to existing noise in order to prevent gradually creeping background levels.

In order for planning permission to be recommended it is required that the assessment Rating sound level does not exceed the typical minimum L_{A90} (15 minute) background sound level at any time. Furthermore in order to prevent gradually creeping background levels over time it is required that the unrated 'Specific' sound level does not exceed 10dB below the typical minimum L_{A90} (15 minute) background sound level at any time. The 'Specific', 'Rating' and 'Background' sound levels shall be calculated fully in accordance with the methodology of BS4142:2014.

The same standard is applied for all fixed plant, including permanent backup generators and other systems which may only run for part of the time. In exceptional cases it may be possible to deviate from this standard, however, this must be by special agreement which would usually only be given where the following apply:

- The existing background level is very low (below 30dB L_{A90})
- It is impossible to achieve the required standard despite using all reasonable means of mitigation AND there is no significant adverse effect from the plant

In such cases it would be expected that plant noise adverse effects are mitigated and minimised as far as possible in line with the requirements of paragraph 123 of the NPPF.

5.2.1 Mitigation of Commercial Noise Impacts

In all cases where plant does not meet the required standards it is necessary to use mitigation measures. The following should be considered:

- Relocation of plant or noise-generating activity
- Substitution for alternative or quieter plant or processes
- Reduction in source noise levels via engineering methods (e.g. lower-noise fans, flow smoothing on duct bends etc.)
- Change in working practices or processes to reduce noise (e.g. changing times of operation, reducing fan/jet power)
- Use of duct attenuators
- Use of acoustic barriers
- Use of acoustic absorption
- Vibration isolation and/or damping
- Enclosure of plant in insulating enclosures
- Insulation of building envelopes

Applicants are advised to consider plant choice, engineering methods and working practices as the favoured means of reducing noise. These can save energy and lead to significant savings in operating costs. Pathway methods such as barriers, enclosure and absorption can be expensive and in some cases also lead to higher ongoing costs.

5.3 Noise and Vibration from Transportation Sources

Transportation noise should be assessed when a development gives rise to the possibility that any sensitive receptor may be exposed to adverse impacts from transportation noise. Examples would be locating housing on a busy road, adjacent to a railway line or within airport noise contours. The noise assessment should cover a period sufficient to be representative of the prevailing noise climate. In most cases this will require assessment covering midweek and weekends. The assessment should also include full details of the proposed building construction and composite façade calculations to predict the internal noise level in habitable rooms.

Residential dwellings shall achieve the following internal sound standards:

Bedrooms - 35dB $L_{Aeq T \dagger}$, 30 dB $L_{Aeq T}^*$, 45dB $L_{AFmax T}^*$

Living rooms- 35dB $L_{Aeq T} \dagger$

Dining room - 40 dB $L_{Aeq T} \dagger$

*** - Night-time 8 hours between 23:00-07:00**

† - Daytime 16 hours between 07:00-23:00.

Where there is any concern over the efficacy of measures submitted to comply with these standards or for all major developments (over 10 dwellings or over 1000m² in size), post-completion verification testing will be required in a sample of the most affected rooms.

With respect to the night-time L_{AFmax} noise levels, the WHO Guidelines for Community Noise state:

'For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10–15 times per night'

Regular individual noise events (for example, passing aircraft, trains, and loud road vehicles) can cause sleep disturbance. Buildings shall be designed to ensure that individual noise events do not exceed 45dB L_{AFmax} more than 10 times in any night inside any bedroom. The 10th highest individual L_{AFmax} event in any night shall be determined and the noise level from this event shall be used to inform the mitigation design target.

Where there is any concern over the efficacy of measures submitted to comply with this standard or for all major developments (over 10 dwellings or over 1000m² in size), post-completion verification testing will be required in a sample of the most affected rooms.

L_{AFmax} should be reported for individual noise events. Time-based reporting periods (such as L_{AFmax} per 5 minute periods) should only be used where it can be demonstrated that only one significant event occurs in each reporting period. It may be necessary to use the sound level trace to verify when individual events have occurred. It is important that assessment of L_{AFmax} events covers enough time to gain a representative picture of the typical level and regularity of such events.

Where it is unavoidable to rely on closed windows to achieve L.B. Southwark environmental noise standards there must be a suitable alternative means of ventilation provided which is sufficient to ventilate the premises and to adequately control excess heat in the summer months. When designing ventilation to mitigate noise, due consideration must be given to the impact of local air quality and the need to minimise exposure to poor air quality.

The following standard should be achieved in external private residential amenity areas:

50dB $L_{Aeq, 16hr}$ †
†Daytime - 16 hours between 07:00-23:00hrs.

Where this is not possible to achieve despite implementing all reasonable mitigation measures, the standard can be relaxed by 5dB so that the sound level in private gardens and balconies does not exceed 55dB $L_{Aeq, 16hr}$.

In very high noise areas where the less stringent standard of 55dB $L_{Aeq, 16hr}$ cannot reasonably be achieved, with careful design it should be achieved in some parts of the amenity space.

BS8233:2014 gives further advice on sound insulation and noise reduction for buildings. Where transportation noise affects schools, the requirements of Department for Education Building Bulletin 93 'BB93: Acoustic design of schools - performance standards' should be followed.

Transportation can also be a source of vibration; in particular railways and subway systems. Where there is a risk that a development may lead to adverse effects from vibration (either through creating a new vibration source or more commonly through placing sensitive receptors close to existing vibration sources), a vibration assessment will be required. The following standard should be achieved:

All developments must be designed to ensure that habitable rooms in the residential element of the development are not exposed to vibration dose values (VDV) in excess of 0.13 m/s during the night-time period of 23.00 – 07.00hrs

Where assessment shows that habitable rooms will be exposed to unacceptable levels of vibration, expert advice should be sought on vibration mitigation measures and proposals submitted to LBS in advance of determination of the application.

Developments must be designed to ensure that re-radiated noise within habitable residential rooms does not exceed 35dB $L_{Amax(s)}$.

5.4 Good Acoustic Building Design

The NPPG guidance on design states:

'Good quality design is an integral part of sustainable development. The National Planning Policy Framework recognises that design quality matters and that planning should drive up standards across all forms of development. As a core planning principle, plan-makers and decision takers should always seek to secure high quality design.'

'Local planning authorities are required to take design into consideration and should refuse permission for development of poor design.'

It is therefore essential that developments use good acoustic design to achieve internal sound standards as far as is reasonably practicable. In order to do this successfully noise and vibration must always be considered at the initial design stage. If noise and vibration are only considered after site and building plans have been finalised (for example when specifying performance requirements of the building envelope), then the development is very unlikely to comply with the requirements of planning policy.

Good acoustic design will include:

- Location of buildings on the site to minimise noise exposure (this will include maximising separation of noise sources and sensitive receptors and use of buildings or topography to screen noise)
- Layout of habitable rooms within buildings to reduce noise exposure to more noise-sensitive rooms

- Ensuring dwellings exposed to high noise levels are dual aspect to provide each unit with access to a relatively quiet façade when possible
- Access to relatively quiet external amenity space
- Measures to reduce noise at source and/or on the transmission path where possible
- Design and insulation of the building envelope

Such measures should always be implemented in preference to sole reliance on insulation of the building envelope. In cases where the methods above would be effective in reducing noise exposure, relying only on sound insulation of the building envelope will not be regarded as good acoustic design. Such an approach leads to unsatisfactory development where dwellings are unnecessarily sealed from their environment and provide relatively poor amenity.

It is essential that developments use good acoustic design to achieve internal sound standards in preference to sole reliance on insulation of the building envelope. Where good acoustic design principles are not applied a development does not comply with the NPPF. In such cases a recommendation to refuse the application will be made, even where required internal sound standards are achieved.

If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended. External amenity areas such as balconies and gardens should be protected from noise as far as is reasonably practicable. The following mitigation measures should be considered:

- Building design, location and layout to shield amenity areas or place them away from noise sources where possible
- Use of acoustic fencing with a gap-free joining system and a minimum density of 12Kg/m² (or solid blockwork walls) to gardens
- Use of high, solid and imperforate balustrades to balconies and terraces
- Use of Class A acoustic absorption (suitable for outdoor areas) on balcony undersides and soffits
- Enclosure of balconies and terraces to form 'winter gardens'

It is expected that the IOA's professional practice guidance on Planning and Noise is followed for all new developments: <http://www.ioa.org.uk/publications/proppg>

5.5 Internal transference of noise within buildings

Approved Document E of the Building Regulations 2010 details legal standards for buildings for resistance to the passage of sound. In addition to the Regulation requirements, Part E states:

'The performance standards set out in tables 1a and 1b are appropriate for walls, floors and stairs that separate spaces used for normal domestic purposes. A higher standard of sound insulation may be required between spaces used for normal domestic purposes and communal or non-domestic purposes. In these situations the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space. Specialist advice may be needed to determine if a higher standard of sound insulation is required, and, if so to determine the appropriate level.'

It is necessary to submit an assessment of internal sound transference for any development which includes domestic spaces adjacent to non-domestic or commercial uses. It is also necessary to submit an assessment of internal sound transference for any development which may increase noise impacts in existing multi-use buildings. Some examples of where an assessment would be required are:

- A new development incorporating an A4 bar on the ground floor and residential flats above

- Conversion of an existing ground floor A1 shop to an A3 restaurant where there is an existing residential flat above
- Conversion of an office sharing a party wall with a light industrial use into a residential dwelling
- Any situation where an assessment is required as a result of other standards (such as BB93)

Habitable rooms within a development sharing a party ceiling/floor element with commercial premises shall be designed and constructed to provide reasonable resistance to the transmission of sound sufficient to ensure that noise due to the commercial premises does not exceed NR25 when measured as an L_{10} across any 5 minute period.

In some cases an airborne sound insulation standard will be specified rather than requiring compliance with a noise rating criterion. In such cases the standards will usually be as follows:

Party walls, floors and ceilings between the commercial premises and residential dwellings shall be designed to achieve the following minimum airborne sound insulation weighted standardized level difference:

- For A4 premises, D1\D2 premises such as places of worship, concert halls, community space for hire or B2\B8 industrial premises, standards will be judged on a case by case basis depending on the exact nature of the use. Greater than 60dB $D_{nT,w} + C_{tr}$ is likely to be necessary.
- For A3 or A5 premises or large A1 cafes, shops and supermarkets: At least 55dB $D_{nT,w} + C_{tr}$
- For small A1 café or shop: At least 50dB $D_{nT,w} + C_{tr}$

Where commercial uses are placed above residential dwellings, an impact sound insulation limit will also be specified. These will be determined on a case by case basis and in such cases specialist advice and assessment will be necessary.

In most cases sound insulation can be improved by installing secondary ceilings and floors separated by a gap from existing and structurally isolated by resilient acoustic mounts. Use of layers of high density plasterboard with staggered joints can provide the necessary mass. Workmanship in installation is crucial to avoid gaps where boards join or around edges and care must be taken to retain structural isolation and prevent structural or flanking sound transmission. Works should be specified and actively supervised by a suitably qualified acoustic consultant.

Building Regulations 2010 Approved Document E and BS8233:2014 provide further details on sound insulation.

In situations considered particularly sensitive, post construction validation testing will be required to demonstrate that standards are met. Testing should be fully in accordance with the methodology of BS EN ISO 140-4:1998 (for airborne sound) and BS EN ISO 140-7:1998 (for impact sound).

Where dwellings (or parts of dwellings) within larger blocks are acoustically insulated against environmental noise, occupants tend to perceive internal sound transference from other dwellings as more disruptive. To counter this, the following standard is applied:

Where dwellings (or parts of dwellings) within larger blocks are acoustically insulated against environmental noise, sound insulation standards are required to exceed the requirements of Building Regulations Approved Document E by 5dB such that airborne sound insulation weighted standardised level difference is increased by 5dB $D_{nT,w} + C_{tr}$ and the maximum allowable weighted standardised impact sound pressure level is reduced by 5dB $L_{nT,w}$.

5.6 Noise from Entertainment and Leisure Venues

Where developments incorporate entertainment venues such as public houses, bars, night clubs, sports venues, leisure venues, performance spaces etc. an acoustic assessment must be submitted to detail the impact of this on sensitive receptors. An acoustic assessment would also be necessary in the case of placing new sensitive receptors where they may be affected by noise from existing entertainment and leisure venues.

The assessment should include measurement of the background sound level at times appropriate to the operation of the premises; identify sensitive receptors; and predict the specific noise level from the venue at the façade (and in external amenity areas where appropriate). Noise from entertainment venues may include amplified sound, music, PA systems, and noise from people drinking, smoking outside and dispersing from the premises.

The following standards should be achieved:

The L_{Fmax} sound from amplified and non-amplified music and speech shall not exceed the lowest L_{90} (5min), 1m from the facade of any sensitive receptor in all third octave bands between 31.5Hz and 8 kHz.

Noise from people in beer gardens, terraces and other outdoor areas to licensed premises can cause significant disruption to residents. Where applications include outdoor areas (or changes to outdoor areas) an assessment of noise impact will be required. Details of what an assessment should cover can be found in section 5.9 of this TGN.

Outdoor areas to licensed premises may be considered unacceptable in principle in some cases, depending on the level of impact. In other cases conditions may be imposed to mitigate and minimise impact. Such conditions may cover:

- Design (including location, barriers, absorption)
- Hours of use
- Capacity
- How the area is used and managed

Where entertainment venues are located alongside sensitive receptors in mixed use buildings, unacceptable impacts on residential amenity from internal or structure-borne noise must be avoided.

All new residential units shall be designed to ensure that the internal noise levels shown below are not exceeded as a result of entertainment noise. Predictions and measurements should be made inside the relevant residential units with windows and doors closed.

Entertainment Venue – LdB S reference curve

Frequency (Hz)	31.5	63	125	250	500	1k	2k	4k	8k	
L_{Smax} (dB) 5 min measurements for 24hrs	60	47	38	26	19	15	12	9	7	
L_{ASmax} dB										27

When locating sensitive uses near to entertainment venues it is essential to use good acoustic design to minimise noise impact. See section 5.4 of this guidance for further information.

More information and practical and management advice on controlling noise at source from entertainment venues can be found in Southwark’s Licensing Policy at:

5.7 Construction Noise and Vibration

Construction and demolition sites are a significant source of complaints to the Local Authority. Where developments are expected to have a significant impact on the local area during the construction phase, submission of a Construction Environmental Management Plan (CEMP) will be required.

The CEMP shall oblige the applicant, developer and contractors to commit to current best practice with regard to construction site management and to use all best endeavours to minimise off-site impacts, and will include the following information:

- **A detailed specification of demolition and construction works at each phase of development including consideration of all environmental impacts and the identified remedial measures;**
- **Site perimeter automated noise monitoring;**
- **Engineering measures to eliminate or mitigate identified environmental impacts e.g. hoarding height and density, acoustic screening, sound insulation, location of specific activities on site, etc.;**
- **Arrangements for a direct and responsive site management contact for nearby occupiers during demolition and/or construction (signage on hoardings, newsletters, residents liaison meetings, etc.)**
- **A commitment to adopt and implement the Considerate Contractor Scheme;**
- **Site traffic – Routing of in-bound and outbound site traffic, arrangements on site, location of lay off areas, etc.;**

Where a CEMP is required through the planning process it will relate to factors beyond just noise. For example, site waste management, air quality and emissions, dust management, site contamination and other issues. The above standard relates only to the noise aspects of a CEMP and is therefore not an exhaustive list of likely requirements.

Further information is available from the following sources:

- S61 of Control of Pollution Act 1974,
- BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites',
- BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from ground-borne vibration,
- BS 6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings - vibration sources other than blasting,
- Relevant CIRIA practice notes, and
- BRE practice notes.

Whilst Best Practicable Means must be used at all times in the control of noise from construction sites it is recognised that construction sometimes involves high noise levels. The following parameters should be used:

Parameter	Trigger (Amber)	Action (Red)
Environmental Noise Unit – dB(A)	75 dB L _{Aeq} 5min (short term)	80 dB L _{Aeq} 5min
	70 dB L _{Aeq} 10hr (daily)	75 dB L _{Aeq} 10hr (daily)

Vibration	<p>1mm/sPPV for occupied residential and educational buildings</p> <p>3mm/sPPV for occupied commercial premises where work is not of an especially vibration sensitive nature or for potentially vulnerable unoccupied buildings</p> <p>5mm/sPPV for other unoccupied buildings</p>
Hoardings	<p>Min height 2.3m</p> <p>Min density 7Kg/m²</p>

Standard permitted site hours are:

Monday to Friday – 08.00 – 18.00hrs
Saturday – 09.00 – 14.00hrs
Sundays & Bank Hols – no works

Trigger levels can give advanced warning of a potential problem whilst action levels indicate a need to reduce noise or stop works.

Full details of expected practice in respect of all construction and demolition sites (whether or not a CEMP is required) are available in the Southwark Council Environmental Code of Construction Practice available at:

<http://beta.southwark.gov.uk/assets/attach/1477/Technical%20Guidance%20for%20Construction%20-%202016.pdf>

Any programmed/expected work required outside the standard site hours will require permission from Southwark's Environmental Protection Team under S61 of the Control of Pollution Act 1974 (e.g. regular extensions for set-up and clean down periods, extended concrete pours, the delivery and collection of abnormal loads, etc.). An application form can be found on the Southwark website at the following location:

https://forms.southwark.gov.uk/ShowForm.asp?fm_fid=900

Follow the instructions on the web page to the form, complete it and submit it on-line. Forms need to be submitted a minimum of 28 working days before permission is needed to be in place for regular extended site hours and 5 working days before permission is needed to be in place for a short, temporary extension to site hours (i.e. lasting less than 8 weeks in total).

Where changes need to be made to existing issued S.61 consents, details of the dispensation and variation procedure can be found in the schedule to the consent.

5.8 Noise from Servicing Commercial Uses

Noise from servicing of commercial uses can cause complaints. This is particularly problematic where servicing takes place at night or in the late evenings or early mornings. The following standards apply:

**Deliveries or collections to commercial units shall only be between the following hours:
08.00 – 20.00hrs Mon – Sat and 10.00 – 16.00hrs Sundays and Bank Holidays**

In some cases it may be possible to agree variations to these times. This will depend on the number and scale of deliveries, the context of the application and the character of the area. Any variation to these standards will be assessed individually where suitable information can be submitted to demonstrate that deliveries and collections will not cause disturbance to nearby sensitive receptors. Where there is doubt over the impact it is necessary to submit a full acoustic assessment to examine this.

For larger commercial uses or in areas of particular sensitivity a service management plan shall be submitted detailing how all elements of the site are to be serviced and the controls and mitigations that will be put in place.

Full details of good practice, principles and processes for ‘quiet deliveries’ including practical advice and sector-specific guidance can be found at:

<https://www.gov.uk/government/publications/quiet-deliveries-demonstration-scheme>

<https://tfl.gov.uk/info-for/deliveries-in-london/delivering-efficiently/retiming-deliveries>

5.9 Other Noise Sources (children’s playgrounds and nurseries, sports pitches, beer gardens etc.)

There are various noise sources which do not fall into the specific categories previously described in this TGN and/or which are not covered by existing recognised standards. Any noise source that may impact on sensitive receptors should be assessed as part of a planning application. Examples would include new car parks; children’s play in playgrounds and nursery play areas; multi-use games areas; sports pitches; skate parks; etc.

Where no relevant standards exist to guide an acoustic assessment, the assessment should include:

- Comprehensive measurement of examples of the noise source from existing sites operating elsewhere†
- Comparison and verification of measured data against existing data sources where possible (e.g. from scientific literature or international standards)
- Assessment of the existing background level at the receptor location
- Calculation of the predicted specific noise level at the façade, gardens and amenity areas of sensitive receptors, based on relevant obtained data
- Comparison of noise levels to relevant general standards such as WHO standards and BS8233:2014
- Full consideration of the impact of L_{AFmax} noise (for example from door slams, ball strikes, shouts or whistles)
- Consideration of the character of the noise and whether this may exacerbate the impact on amenity
- Full consideration and reporting of assessment uncertainty*

† Acoustic consultant’s ‘stock’ or ‘library’ data can only be accepted in assessments where full details of how, where and when it was obtained are provided.

* See University of Salford ‘A Good Practice Guide on the Sources and Magnitude of Uncertainty Arising in the Practical Measurement of Environmental Noise’ [2007] for further details.

As there are no specific standards governing how to assess irregular noise sources, extra care should be taken to ensure that source data and predictions are sufficiently robust and the assessment should be open and clear in respect of the level of uncertainty attached to the conclusions.

In the case of placing new sensitive receptors where they may be affected by existing noise sources such as the above, assessment should follow the same principles as above however the source data should be based on maximum typical existing (measured) noise levels from the sites, accounting for any possible future changes in intensity of use.

Where significant adverse impacts are identified as a result of the assessment the application is likely to be refused. Other adverse effects should be mitigated and minimised as far as possible. Mitigation may involve measures to reduce the noise at source, such as anti-rattle fencing on MUGAs, or measures to reduce or prevent transmission of sound, such as acoustic fencing around a playground or car park.

Noise management measures can be crucial for mitigating behavioural noise sources. It is not always possible to specify sufficiently enforceable or precise noise management measures to form the basis of a reasonable planning condition. In such cases a recommendation for refusal of permission will be made. Where it is judged that specific, precise, reasonable and enforceable noise management measures can be detailed, a condition can be recommended to the Planning Department to cover this requiring an enforceable noise management plan.

In cases where ongoing noise management and control is considered particularly important, a noise management plan (detailing controls and mitigations) will be required.

5.10 Quiet Areas and Places of Relative Tranquillity

The NPPF requires that Local Planning Authorities '*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 NPPG states:

'There are no precise rules, but for an area to be protected for its tranquillity it is likely to be relatively undisturbed by noise from human caused sources that undermine the intrinsic character of the area. Such areas are likely to be already valued for their tranquillity, including the ability to perceive and enjoy the natural soundscape, and are quite likely to be seen as special for other reasons including their landscape.'

As a densely populated urban Borough, areas that are *relatively* quiet are particularly valued. Such areas may include:

- Parks
- Pedestrianised streets and squares
- Waterside areas
- Areas in and around places of worship
- Cemeteries
- Community gardens
- Communal amenity areas to estates and housing blocks

Where applications are received that may adversely affect any spaces prized for relative tranquillity, an assessment of noise impact will be expected.

Where possible, developments will be expected to contribute to the improvement of health and quality of life by creating new quiet spaces and areas of tranquillity or contributing to improvement of existing spaces.

The following are some examples of design good design that can help to reduce noise impact and improve relative tranquillity:

- Using building locations and site layout to form barriers and reduce noise
- Using other physical barriers or ground level changes to provide shielding from noise sources such as roads
- Green walls to reduce noise reflection
- Planting of trees and shrubs
- Plants and ground greening to reduce reflection and encourage wildlife

5.11 Noise Standards in Applications for Prior Consent for Permitted Development

Details of when noise is a consideration for permitted development applications were given in section 3.14 of this TGN. In such cases noise must be assessed exactly as it would in a full planning application, as detailed in section 5 of this TGN. L.B Southwark will apply the same acoustic standards detailed in this TGN to such applications, as far as they are relevant and applicable under the Order.

Appendix A: Glossary

Term	Definition
dB	Decibel. Decibels are not an absolute unit of measurement; they logarithmically express a ratio between two quantities. In this guidance dB refers to Decibels of Sound Pressure relative to a reference value of 2×10^{-5} Pascals.
$D_{nT,w} + C_{tr}$	Weighted standardized level difference (dB). C_{tr} refers to the spectral adaption term. Used for measuring airborne sound insulation in buildings.
L_{Aeq}	A-weighted equivalent continuous noise level. A single sound level with the same energy content over a given time period as the varying acoustic signal measured
L_{AFmax}	A-weighted, fast, maximum, root mean squared (RMS) sound level.
L_{10}	A statistical noise measure to show the noise level exceeded for 10% of the measurement period.
L_{90}	A statistical noise measure to show the noise level exceeded for 90% of the measurement period.
L_{den}	The equivalent continuous noise level over a whole 24-hour period, but with noise in the evening (19:00 to 23:00) increased by 5 dB(A) and noise at night (23:00 to 07:00) increased by 10 dB(A) to reflect the greater noise-sensitivity of people at those times.
L_{night}	The equivalent continuous noise level over the night-time period (23:00 to 07:00). L_{night} does not contain any night-time noise weighting.
$L_{nT,w}$	Weighted standardised impact sound pressure level. Used for measuring impact sound insulation in buildings.
NR	Noise Rating Curves. A method for rating the acceptability of indoor environments for the purposes of hearing preservation, speech communication and annoyance, based on curves developed by Kosten and van Os (1962).
PPV	Peak Particle Velocity. A measure of vibration primarily used for assessing risk to building damage. The greatest instantaneous particle velocity during a given time interval.
Sensitive Receptor	Any receptor that may be adversely affected by the noise or vibration in question. In most cases this would refer to residential dwellings, schools, hospitals etc. but may also refer to sites which may be adversely affected for other reasons (for example containing equipment sensitive to noise or vibration).
VDV	Vibration Dose Value. A cumulative measurement of the vibration level received over an 8-hour or 16-hour period, commonly used for assessing human annoyance response to vibration.

Appendix B: Abbreviations

Abbreviation	Meaning
CEMP	Construction Environmental Management Plan
EPT	Environmental Protection Team
GPDO	General Permitted Development Order
LBS	London Borough of Southwark
LOAEL	Lowest Observed Adverse Effect Level
LPA	Local Planning Authority
MUGA	Multi Use Games Area
NOEL	No Observed Effect Level
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPSE	Noise Policy Statement for England
SOAEL	Significant Observed Adverse Effect Level
SPD	Supplementary Planning Document
TGN	Technical Guidance for Noise
