

Annex 3

Detailed Guidance On The Assessment Of Noise From Different Sources

Noise from road traffic

1. For established roads it will normally be sufficient to base assessments on the current measured noise level (paragraph 8 of Annex 1 refers). When considering potential new development near major new or recently improved roads, local planning authorities should ascertain forecast noise levels (eg over the next 15 years) with the assistance of the local highway authority. In some cases highway authorities will have prepared predictions of the effects of traffic noise for the purposes of the Noise Insulation Regulations 1975 and the Noise Insulation Amendment Regulations 1988. Otherwise highway authorities should be consulted on the traffic flow data needed for the preparation of predictions in accordance with "Calculation of Road Traffic Noise" (Department for Transport (DOT) and Welsh Office, 1988). Use by highway authorities of traffic management schemes and powers in the Road Traffic Regulation Act 1984 may also be appropriate. Research undertaken by the Transport Research Laboratory for DOT indicates that structural damage of buildings through vibration from road traffic is unlikely to occur. Advice is available in "Design Manual for Roads and Bridges" Vol 11, Section 3, Part 7 - "Traffic Noise and Vibration". But if vibration remains a concern, advice on acceptable levels can be found in BS 6472:1992, and advice on levels that may result in damage to structures in BRE Digest 353 "Damage to structures from ground-borne vibration".

Noise from railways

2. Railway noise emanates from a variety of sources. For noise from operational railway lines the noise exposure categories in Annex 1 will be appropriate; local noise from station activities, freight distribution depots, and marshalling yards should be treated in the same way as noise from industrial and commercial sources. Local planning authorities are advised to ask the developer to provide details of the present levels of noise; and to consult the railway operator to find out if there are proposals for significant operational changes.

3. In considering the long distance traffic effects of developments which would result in the use of rail transport (for example the carrying of aggregates from extraction sites, or goods from freight terminals), it will be appropriate to take into account the railway noise aspect.

4. The likelihood of significant ground-borne vibration will depend on the nature of the ground and the types of train. The possibility of vibration and re-radiated noise caused by trains running in tunnels should not be overlooked. Advice on acceptable levels of vibration can be found in BS 6472:1992.

5. In October 1993 the DOT published draft noise insulation regulations for new railway lines, with the aim of providing equity with The Noise Insulation Regulations 1975 (as amended)

which apply to new roads. Draft technical guidance, in a form similar to "Calculation of Road Traffic Noise" (DOT and Welsh Office, 1988), was made available at the same time.

Noise from aircraft

6. For major aerodromes, NNI contours have been produced for many years to aid development control. In September 1990 the Department for Transport adopted a new index and now expresses noise exposure contours in terms of $L_{Aeq,T}$ dB(A) over the period 07.00-23.00. This index is equivalent to $L_{Aeq,T}$ used for other types of noise. General advice on this index can be obtained from the Department for Transport, CA4, 2 Marsham Street, London SW 1P 3EB (Tel: 071 276 6289). Technical advice on the index and on production of noise contours can be obtained from the Department of Safety, Environment and Engineering, Civil Aviation Authority, 45-59 Kingsway, Holborn, London WC2B 6TE (Tel: 071 379 7311).

7. Using forecast contours, it should be possible to determine approximately which areas are likely to fall within the different noise exposure categories. For small aerodromes local planning authorities should not rely solely on L_{Aeq} where this is based on less than about 30 movements a day. Local planning authorities should also be aware that in some circumstances the public perceive general aircraft noise levels as more disturbing than similar levels around major airports.

8. Recommended noise exposure categories for new dwellings exposed to aircraft noise are given in Annex 1, but 60 L_{Aeq} dB(A) should be regarded as a desirable upper limit for major new noise sensitive development. Where replacement schools, clinics, and other community facilities are needed to serve the existing population in high noise areas, expert consideration of sound insulation measures will be necessary. When determining applications to replace schools and build new ones in such areas, local planning authorities should have regard to the likely pattern of aircraft movements at the aerodrome in question which could cause noise exposure during normal school hours/days to be significantly higher or lower than shown in average noise contours.

9. Where land is, or is likely to become, subject to significant levels of aircraft noise, local planning authorities should determine approximately which areas are likely to fall within the different noise exposure categories. In order to do this, they will need to seek the co-operation of the aerodrome management to arrive at the most appropriate longer-term forecasts of air traffic (and its effect on the noise contours). The objective will be to achieve a clear and stable pattern of constraints against which development control policies can be formulated and incorporated in local plans and Part II UDPs.

10. Beyond the extremities of the published contours, noise will still be audible near the arrival and departure routes. The former are generally predetermined by the orientation of the runway and safety considerations; however, departure routes can usually be designed to avoid, as far as possible, noise in built-up areas. The use of these routes may change over time because of changes in aircraft mix and operations. The departure routes often comprise a wide corridor of tracks. Local planning authorities should consult National Air Traffic Services where appropriate.

11. Information concerning noise from Heathrow, Gatwick and Stansted airports is available

from the Department for Transport (CA4, 2 Marsham Street, London SW1P 3EB, Tel: 071 276 5323) and for most other aerodromes from the appropriate aerodrome management. Where noise contours expressed in $L_{Aeq,T}$ are not available, local planning authorities should approach the aerodrome management to secure early compilation of contours.

12. If the construction or development of an aerodrome with a basic runway length of 2,100 metres or more is proposed, it will fall within Schedule 1 to the Town and Country Planning (Assessment of Environmental Effects) Regulations 1988 (see paragraph 22 of this PPG), and environmental assessment (EA) will be mandatory. If the construction of an aerodrome is proposed which does not fall within Schedule 1 to the Regulations, EA will be required if the development is likely to have significant environmental effects. Where a major aerodrome is the subject of a proposal which will affect its capacity, there will be a need to prepare or revise forecast noise contours to estimate the resulting noise climate.

Military aerodromes

13. The noise exposure categories should be used for assessing proposals for new developments near military aerodromes. Because many of these are in rural locations, however, there will often be the flexibility to ensure that new residential developments are located within noise exposure category A, while still taking full account of other planning constraints. This option will not apply to proposals for residential development involving extension, conversion, or change of use of existing buildings. When determining such applications local planning authorities should take account of the differences between civil and military operations. Military jet aircraft can generate very high noise levels, particularly during take off, and occasionally the effectiveness of noise abatement flight procedures normally adopted may be limited by operational requirements. Changes in aircraft type and number of movements may also occur over a short period, resulting in unpredictable changes in noise levels. However, military flying is usually concentrated into weekday working hours when the public sensitivity to noise is at its lowest.

14. For aerodromes where a Ministry of Defence (MOD) noise insulation grant scheme has been introduced, authorities will already hold an MOD map showing $L_{Aeq,T}$ contours. These are based on a 12 hour period, not a 16 hour period as is used at designated civil aerodromes. Other information and advice may be obtained from the Ministry of Defence, DLS, Leatherhead Road, Chessington, Surrey, KT9 2LU (Tel, 081 397 5266 or 081 391 3459). Liaison with the aerodrome commander and the MOD Land Agent may also be helpful.

Helicopters and heliports

15. When determining a planning application for a heliport the predicted noise should not be assessed in isolation - account should be taken of local circumstances including the existing level of noise disturbance in the area surrounding the site and factors such as whether the area is already exposed to noise from fixed wing aircraft. Local planning authorities will need to consider the effect of further disturbance resulting from the proposal.

16. Helicopter noise has different characteristics from that from fixed wing aircraft, and is often

regarded as more intrusive or more annoying by the general public. The noise exposure categories should be applied with caution. Further research on this subject has been commissioned by the Department for Transport and should be published in 1994.

17. Helicopter routes may be established over cities and near aerodromes, although often their use will not be mandatory. Planning applications for helicopter landing/take-off facilities should be accompanied by information about the proposed take-off/landing flight paths and air traffic routes where appropriate. Preferably, these paths should have been discussed and agreed in principle with National Air Traffic Services (NATS) beforehand. Where such information does not accompany the application, but is considered necessary, the local planning authority should request it and suggest that the applicant has discussions with NATS.

18. Increased use of helicopters has led to movements from the gardens of private houses and from commercial premises, such as factories, offices and hotels. For safety reasons, helicopters may only operate from elevated sites if given special approval by the Civil Aviation Authority. All these movements can cause local annoyance. However, they may often be incidental or ancillary to the principal use of the land and as such do not generally require a separate planning permission. The construction of hardstanding, installation of landing lights etc may be regarded as development requiring planning consent.

Noise from industrial and commercial developments

19. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that: "A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance." Since background noise levels vary throughout a 24 hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (eg day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987, and guidance on the control of noise from surface mineral workings can be found in MPG 11.

20. Commercial developments such as fast food restaurants, discos, night clubs and public houses pose particular difficulties, not least because associated activities are often at their peak in the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the attendant problems of noise that may be made by customers in the vicinity. The disturbance that can be caused by traffic and associated car parking should not be underestimated.

Noise from construction sites

21. Detailed guidance on assessing noise from construction sites can be found in BS 5228, parts 1-4. In particular, Part 1: 1984, "Code of practice for basic information and procedures for noise control" will be useful because as well as giving general advice it describes a method for predicting noise from construction sites.

Noise from recreational and sporting activities

22. For these activities (which include open air pop concerts), the local planning authority will have to take account of how frequently the noise will be generated and how disturbing it will be, and balance the enjoyment of the participants against nuisance to other people. Partially open buildings such as stadia may not be in frequent use. Depending on local circumstances and public opinion, local planning authorities may consider it reasonable to permit higher noise emission levels than they would from industrial development, subject to a limit on the hours of use, and the control of noise emissions (including public address systems) during unsocial hours. A number of sports activities are the subject of Codes of Practice, and further details of these can be found in annex 7. Some noisy activities enjoy permitted development rights granted by Part 4 of Schedule 2 to the Town and Country Planning General Development Order 1988, and so may not require specific planning permission provided that they only occur on a temporary basis. However, this permission may be withdrawn by making a direction under Article 4 of the Order. Further details are contained in annex 7. Additional advice on sport and noise can be found in PPG17 "Sport and Recreation".

Noise from landfill waste disposal sites

23. Conditions attached to waste disposal licences generally set limits on the amount of waste, frequency of deliveries and hours of operation, and prescribe screening requirements. These will have indirect effects on the amount of noise generated, but site licence conditions can also relate specifically to noise control in the interests of protecting local amenity. This will be particularly relevant when dealing with sites where the operator is working with the benefit of an Established Use Certificate (as defined in section 38(2) of the Environmental Protection Act 1990) or a planning permission not subject to a noise condition. Local planning authorities and waste regulation authorities should consult closely at an early stage when considering the need for specific noise controls to be imposed by appropriate conditions in any planning permission or in the subsequent site licence.

24. The main sources of noise will be from vehicular movement, tipping operations, and site plant. Appropriate planning or licensing conditions might therefore relate to hours of working; the number and/or capacity of vehicles using the site and their points of ingress and egress; and the provision of acoustic screening. Useful information on predicting the noise will be found in BS 5228: Part 1: 1984. In addition, general guidance can be found in paragraph 9 of MPG 11.

Annex 6

Insulation Of Buildings Against External Noise

1. Noise from outside a building can enter a room through windows, ventilators, walls, roof and doors. In most cases, however, windows provide the main path and it is therefore important to ensure that their insulation is specified correctly. This Annex summarises the main issues to be considered in specifying adequate sound insulation of windows. More detailed guidance is given in BRE Information Paper IP 6/94 "The sound insulation provided by windows".

2. The sound insulation of a window increases with the thickness (or mass) of glass subject to other limiting factors, such as air gaps. Therefore to provide good insulation a window must be fitted with effective seals.

3. Double windows can provide higher levels of sound insulation than single panes, and in general the wider the spacing between the panes the higher the insulation. However, the insulation over a band of frequencies can be seriously reduced by a resonance in the cavity between the panes. The frequency of this resonance is dependent on the cavity width and mass of the panes, and is usually in the range 50 to 300 Hertz (Hz). This should be considered when specifying windows to provide protection against low frequency noise such as traffic. For example, secondary window systems have a wider cavity (and a lower resonance frequency) than thermal double glazing; the effect of this is that secondary windows provide better insulation than thermal windows against noise with energy at high frequencies, such as electric trains, but may be only marginally better against noise with low frequency energy such as that from road traffic (see Table 1). Proprietary systems can be designed to optimise the performance.

4. Because the sound insulation of a window (and other components of the building envelope) varies with the frequency (or pitch) of the sound, the overall noise reduction provided by a window will depend, among other factors, on the spectrum of the external noise. Table 1 shows typical reductions in noise levels from common sources which would be expected from various types of window installations fitted in brick/block walls in a dwelling. For other buildings such as offices and schools the proportion of glazing to brickwork may be greater and this will result in a lower noise reduction. In addition, the type of furniture in these buildings will absorb less sound than domestic soft furnishings. The insulation provided by any type of window when partially open will be in the region of 10-15 dB (A).

Table 1: Typical noise reduction of a dwelling facade with windows set in a brick/block wall

Difference between dB(A) levels outside and inside

Noise Source	Single Glazing	Thermal Double Glazing	Secondary Glazing

Road Traffic	28	33	34
Civil Aircraft	27	32	35
Military Aircraft	29	35	39
Diesel Train	28	32	35
Electric Train	30	36	41

Note: The values in the Table are the difference between dB(A) levels measured outside and inside typical dwellings; they have not been corrected for reverberation time or window area, and so cannot be compared with values obtained under other conditions. The Table is intended to give an idea of the insulation likely to be achieved in practice - not under ideal conditions. Secondary glazing systems in particular will perform better in installations where sound insulation is not limited by poor sealing or by flanking sound paths such as through doors or acoustically weak parts of window bays. The values for single glazing are representative of well sealed windows.

5. If the walls or roof are constructed from lightweight materials they may allow transmission of significant amounts of sound into the building. This could limit the overall improvement achieved by improving the performance of other elements such as the windows.

6. To provide adequate insulation against external noise it is necessary to keep closed those windows and ventilators which have not been designed to provide sound insulation (even when closed some ventilators may still not be adequately sealed). Therefore alternative methods of providing ventilation and control of summertime temperatures must be considered. Sound insulating ventilators may be "whole house" systems or individual units installed where necessary. Ventilators of the type specified in the Noise Insulation Regulations will limit the insulation against traffic noise to about 38 dB(A). Further guidance can be found in BRE Digests 338 "Insulation against external noise" and 379 "Double glazing for heat and sound insulation".

7. The sound insulation of building elements such as windows is often measured in a laboratory. The insulation is expressed in terms of R_w (BS 5821: Part 3: 1984). This is a single number that describes the insulation over a frequency range of 100 Hz to 3150 Hz. The value allows different products to be compared, but it cannot be used directly to determine the sound insulation that will be achieved when the element is installed in a building.

8. Guidance on suitable internal noise levels can be found in BS 8233: 1987.

Note: the transmission of airborne and impact noise between new or converted dwellings is controlled under Part E of the Building Regulations (see Annex 7, paragraphs 9 and 10).