

# The assessment of dog barking noise from boarding kennels

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## Introduction

The number of dog boarding kennels in the UK and Ireland is currently estimated at over 4500, with at least an additional 1000 animal welfare establishments. One of the key issues affecting such establishments is dog vocalisations, chiefly barking, but which may also include whining, howling and yelping (DEFRA, 2005). Barking may be audible over extended distances, giving rise to nuisance at up to 500 m (EPA Victoria, 2008). On occasions, a number of dogs may contribute to an extended barking frenzy, giving rise to potentially severe noise nuisance at neighbouring dwellings (An Bord Pleanála, 2001; *Manley v New Forest DC*, 2007).

In the 1999-2000 national UK noise attitude survey conducted by the BRE, 65 % of over 5000 respondents listed barking dogs as a noise source which 'bothered the respondent to some degree', constituting the fourth most common source of noise nuisance (Grimwood et al, 2002). While the respondents did not distinguish between barking noise originating from a neighbour's dog, and noise from boarding kennels, it is likely that some of the respondents were affected by the latter. Kamst & Eddington (1988) noted that barking ranks in the top three sources of noise annoyance in Australia, with complaints registered at separation distances as far as 800 m. A more recent Australian document indicates that complaints of dog barking received by several Local Authorities exceeded all other complaints approximately ten-fold between 2004 and 2008 (EPA New South Wales, 2013).

Given the community response to barking noise, it is somewhat surprising that, to date, no comprehensive noise guidance documents have been issued with respect to boarding kennels in the UK nor in Ireland. In the absence of such guidance, approaches adopted by local authorities and noise consultants in the assessment of kennel noise vary widely. This article is a brief review of current assessment practices in the UK and Ireland.

## Current dog boarding kennel legislation & guidance

In the UK, boarding kennels are regulated through the *Animal Boarding Establishments Act 1963* which requires each kennel operator to obtain a licence from the Local Authority. The *Breeding Of Dogs Act 1973* (as amended), almost identical in wording to the 1963 Act, sets out similar provisions applicable to operators of dog breeding kennels. Licenses are generally renewed annually. Both Acts provide for Local Authorities, to attach to a licence,

conditions relating chiefly to animal welfare and disease control. No reference is made in the Acts to impacts on amenity or the environment, and dog vocalisations are not mentioned. In Ireland, the *Dog Breeding Establishments Act 2010* sets out a similar registration procedure, again without any reference to impacts on amenity or the environment.

In an attempt to raise dog kennelling standards, and to introduce an element of consistency between Local Authorities in their licensing of boarding kennels, the Chartered Institute of Environmental Health issued *Model licence conditions and guidance for dog boarding establishments* (CIEH, 1995). As with the 1963 Act, the CIEH conditions relate almost entirely to kennel standards and animal welfare. Little or no reference is made to barking noise or impacts on amenity, and indeed the CIEH document indicates at the outset that its focus is almost solely on animal welfare. While the document refers to the extreme importance of preventing noise nuisance, no further guidance is offered in relation to kennel noise measurement or control.

Although several UK Local Authorities have issued guidance documents in relation to the kennel licensing procedure, all such documents reviewed include conditions drawn from the CIEH model conditions document, and thus focus almost entirely on kennel structure and dog welfare. The Environment Agency document *Scoping the environmental impacts of kennels, catteries and stables* (2002) offers little or no advice with respect to noise impacts. Guidance issued by the Irish Department of the Environment, Community & Local Government (2011) offers a single paragraph of noise guidance. In a guidance note targeting dog owners encountering difficulty in controlling their barking dog(s), DEFRA (2005) makes a single reference to boarding kennels, ironically as a temporary mitigation measure to provide the owner's neighbours with some relief from barking noise!

The only kennel-specific noise guidance document issued in these islands to date is *Supplementary planning guidance: Location of premises for the boarding and breeding of dogs and other animals – Noise issues* (South Holland District Council, 1999). Prepared by the in-house EHOs, the document sets out a method to assess noise impacts arising from proposed boarding or breeding kennels, or those seeking to expand their kennelling provision. Guidance with respect to barking noise attributable to existing kennels is not offered in the document.

The widespread application of BS 4142:1997 to the assessment of dog barking noise is evident. The revised version, introduced in 2014, has been entirely reworked to reflect the standard's widespread application to situations for which it was not originally intended. The fundamental methodology, whereby specific source levels are compared to background levels to assess the degree of impact, remains unaltered. However, one of several changes relates to the standard's scope: the 2014 version for the first time clearly precludes itself from several categories. Included in these is 'domestic animals'. It therefore appears that BS 4142 is now precluded from application to boarding kennels. While it is possible that the authors of the standard had only domestic situations in mind, such as dog barking at a neighbouring dwelling, the standard does not include any clarification in this regard.

At the time of writing, it is too early to tell if BS 4142 will see continued use with respect to the assessment of boarding kennel noise. Given the absence of any other standards relating to either kennels or the assessment of noise complaints, it is possible that Noise Consultants will see no alternative but to apply the standard, particularly given that:

- The standard notes that it is applicable to the assessment of sound from 'sources of an industrial and/or commercial nature' (p.1). Boarding kennels are indeed commercial premises.
- Section 1.3 of the standard lists eight exceptions to which the standard should not be applied, including domestic animals. It is noted that other noise standards exist for most of the exceptions, and indeed the last exception listed is 'other sources falling within the scope of other standards or guidance' (p.1). As no official standards or guidance exist for boarding kennels, it is possible that innovative Noise Consultants will view this as justification for continued use of BS 4142 on commercial kennel projects.

## Planning authorities & kennel noise

UK Local Authorities do not benefit from any national guidance on how boarding kennel noise should be assessed. Ultimately, kennel noise issues appear to be managed through planning controls, or, failing this, through statutory nuisance legislation. A 2015 search of planning files/applications available online indicates a wide range of approaches adopted by Local Authorities in assessing planning applications for boarding kennels. The approaches adopted include:

- A minimum separation distance equal to 10 times the number of dogs proposed (Boston Borough Council, pers. comm).
- A 400 m separation distance, adopted from the Authority's guidance on intensive animal units (Hertfordshire County Council, 2009).
- A night-time  $L_{Aeq\ 5\ min}$  limit of 30 dB applicable internally at surrounding receptors, with no daytime limit (Angus Council, 2002).
- A relative limit (background +5 dB) at receptors, with an additional night-time absolute  $L_{Aeq\ 5\ min}$  limit of 40 dB, inexplicably applicable only to properties within 1 km of the kennel (Dumfries & Galloway Council, 2013).
- No noise limit; as an example, six other kennel planning consents issued by Dumfries & Galloway Council during the period 2010-2013 did not include any noise limits, or indeed any reference to noise.
- A general noise condition without any reference to limits, e.g. 'the kennel shall not give rise to nuisance' (Durham County Council, 2013).
- No reference to criteria or nuisance, instead specifying certain kennel works and management practices (North Lincolnshire County Council, 2008; Durham County Council, 2011). In at least one case (Teignbridge District

Council, 2011), the Planning Officer recommended inclusion of several conditions relating to such works due to his apparent reservation that noise criteria are insufficient at protecting amenity from barking noise. In another case, (Taunton Deane Borough Council, 2013), the EHO conditioned the erection of a hay bale wall of height 7 m, to be maintained for the lifetime of the proposed kennel adjacent to an acoustic barrier conditioned separately

In contrast to UK Local Authorities, a clear preference for the inclusion of noise limits, particularly absolute limits, is evident in conditions attached to kennel planning consents granted by Irish Planning Authorities. In 25 An Bord Pleanála (ABP, the Irish planning appeals board) consents granted between 2001 and 2014, daytime 55 dB and night-time 45 dB criteria appear in the majority of those which included a noise condition, applied either to the kennel site boundaries or to offsite receptors. Nonetheless, inconsistencies abound; for example, night-time hours variously applied are 2000-0800 h and 2200-0800 h. A night-time limit of 40 dB has been applied in three of the reviewed cases (ABP, 2006; 2010a; 2013). A 45 dB limit has been specified on a 24 h basis in one case (ABP, 2003) while a much more lenient 55 dB limit has been conditioned over 24 h in three cases (ABP, 2005a; 2005b; 2009). A relative limit (background +5 dB) has been specified on one occasion (ABP, 2010b). Measurement intervals specified typically vary from 15 minutes to 30 minutes. Additional criteria include various limits on the maximum number of dogs allowed, and the overnight confinement of dogs internally during specified hours, typically 1800-0800 h. While a small number make reference to rated values to account for impulses, most do not make any reference to tonal or impulsive characteristics. Although it is possible that some of the variation noted in noise conditions may be a result of differing local noise environments, it is unlikely to account for the entire variation, particularly as many of the reviewed files relate to locations with relatively similar noise environments.

## Noise consultant reports on public files

A sample of 14 Noise Consultant reports (**Table 1**) available through online planning files relating to UK and Irish boarding kennel applications were reviewed to provide a flavour of the assessment methods applied. Up to 50 % of the assessments applied the BS 4142:1997 methodology, in some cases at the specific request of the Planning Authority. WHO (1999) criteria were referenced in five cases, some of which used the WHO criterion for  $L_{AFmax}$  levels and BS 4142:1997 criteria for  $L_{Aeq}$  levels. BS 8233:1999 was applied in three cases, and one Consultant also applied CIEH guidance with respect to clay target shooting (CIEH, 2003). Just three (21 %) applied the SHDC guidance, suggesting that the document has not circulated outside a limited area.

Most Consultants who applied BS 4142:1997 included a statement in their reports that the standard is not specifically applicable to barking noise, adding that its use was necessitated by the absence of any other

guidance, and that, regardless of relevance, its use provides an indication of impact. The Consultant who applied CIEH shooting guidance included a similar statement. Several Consultants appear to have been criticised for selecting their various methodologies, whether based on BS 4142:1997 or WHO criteria.

Consultants not using SHDC guidance variously obtained typical barking noise levels by direct measurement or by reference to literature. Barking noise descriptors used consisted of the  $L_{Aeq}$ ,  $L_{AFmax}$ , 95<sup>th</sup> percentile  $L_{AFmax}$ , and, in one case, the  $L_{AE}$ . Barking noise  $L_{Aeq}$  levels applied ranged from 84 dB at 5 m to 108 dB at 1 m. Where possible, most Consultants measured noise from large dogs such as a Doberman or a Pyrenean mountain dog in order to adopt a worst case scenario.

Approximately one half of the reviewed reports factored the character of barking into their assessments. One firm applied a 5 dB impulsive penalty in a 2014 assessment, despite concluding separately in a 2008 assessment, by direct measurement, that barking noise was not impulsive! In predicting noise levels at receptors, another report applied two source heights (0.6 m and 2 m) when calculating barrier screening, depending on whether dogs would be on all four legs, or standing upright on their hind legs, when barking.

The various approaches to barking noise adopted by Noise Consultants is also apparent in legal cases relating to barking noise nuisance and anti-social behaviour. By way of example, the outcome of a case relating to a kennel used to house 46 German shepherds in Scotland was significantly influenced by contrasting methodologies applied by noise experts appearing for the plaintiffs and the defendant (Moray Council v Andrew Deshwar Debedin, 2012). The decision by Local Authority EHOs, giving evidence on behalf of the plaintiffs, to apply BS 4142:1997 was found to be unsuitable for several reasons, whereas the judge found favour with the use of WHO absolute criteria, modified by the addition of a 5 dB penalty for impulsive character, as applied by the Noise Consultant retained by the defendant. The judge was also critical of the EHOs' use of a 99 dB barking noise level at 1 m, determined by averaging measured levels, and used to form the basis of a predictive assessment, preferring a 95 dB level applied by the Consultant.

Year	Authority	Methodology
2007	Lichfield District Council	Barking noise level measured using single large dog, and on-time corrected for 10 s each hour. Levels at receptors predicted for both normal dog height (0.6 m) and standing on rear legs (2 m). Impacts assessed using BS 4142:1997.
2008	Clare County Council (accessed through An Bord Pleanála, 2008)	Measured $L_{Aeq}$ and $L_{AFmax}$ while dogs provoked, then used these data to predict levels at receptors. $L_{Aeq}$ prediction assumed dogs barking 10 % of time. Compared levels to WHO 50 dB daytime and 45 dB night-time $L_{Aeq}$ criteria, and 55 dB day/night $L_{AFmax}$ façade level based on WHO internal 45 dB night-time criterion +10 dB. Also concluded that data suggested barking not impulsive.
2008	St. Helens Metropolitan Borough Council	Measured $L_{Aeq}$ levels at similar kennels, then used data to predict levels at receptors. These compared to measured ambient levels in loose approximation of BS 4142:1997.

2009	Ribble Valley Borough Council	Compared likely barking $L_{AFmax}$ levels to residual $L_{AF90\ 5\ min}$ levels using BS 4142:1997, although acknowledging that background levels were below 30 dB, thus precluding use of BS 4142:1997.
2011	Allerdale Borough Council	SHDC guidance used to predict $L_{Aeq\ 5\ min}$ levels at receptors, and these assessed using BS 4142:1997 (with 'expected' rather than actual background data applied). Measured $L_{AFmax}$ levels also predicted, and loosely assessed by reference to CIEH shooting noise guidance. As SHDC applies only to daytime external barking, consultant also assessed internal night-time barking impacts by assuming $L_{Aeq\ 5\ min}$ barking noise level of 100 dB, and $L_{AFmax}$ 105 dB, based on experience.
2012	Herefordshire Council	SHDC methodology applied at request of local authority.
2012	Limerick County Council	BS 4142:1997 assessment requested by local authority. Typical barking noise levels obtained from literature, and used to predict levels at receptors. Daytime barking noise corrected for on-time (15 min in any 45 min window). WHO criteria also applied.
2012	Ribble Valley Borough Council	Measured $L_{AE}$ from one dog (in octave bands), and used this to predict $L_{Aeq\ 15\ min}$ at proposed residential development, based on barking at intervals of 2.2 s as observed at existing kennel. Predicted $L_{Aeq\ 15\ min}$ compared to 55 dB criterion taken from WHO daytime recommendation.
2012	Rosendale Borough Council	$L_{Aeq}$ and 95 <sup>th</sup> percentile $L_{AFmax}$ levels determined from existing dogs based on 10 s intervals, and these used to predict offsite levels associated with proposed extension. Internal criteria applied at receptors, from BS 8233:1999.
2012	West Lindsey District Council	Measured barking $L_{Aeq}$ levels at nearby kennels and used these to predict $L_{Aeq}$ levels at receptors, assuming up to 2 min barking in any hour by day, and 1 min in any 5 min by night. Assessed using BS 4142:1997 by reference to measured background levels. 5 dB impulse penalty applied. SHDC methodology also applied, and found to give similar results.
2013	East Riding Of Yorkshire Council	Measured barking $L_{Aeq}$ levels at nearby kennels and used these to predict $L_{Aeq}$ levels at receptors. Assessed using BS 4142:1997. Measured background levels found to be low, so BS 8233:1999 also applied with respect to internal receptor impacts.
2013	Midlothian Council	50 dB daytime & 45 dB night-time $L_{Aeq}$ criteria applied, based on ambient data, without reference to BS 4142:1997. Also 65 dB daytime $L_{AFmax}$ criterion applied, based on WHO night-time 60 dB recommendation. Prediction based on data measured at another site, scaled accordingly. EHO unimpressed by application of WHO guidance to barking, and refusal recommended.
2013	Taunton Deane Borough Council	Barking noise measured at other kennels used to predict levels at receptors, and impacts assessed using BS 4142:1997 & BS 8233:1999. Use of BS 4142:1997 criticised by another consultant, although no alternative offered.
2014	Cork County Council (accessed through An Bord Pleanála, 2014)	Measured barking noise levels used to predict levels at receptors. 55 dB $L_{AFmax}$ criterion applied to daytime & night-time, based on night-time WHO 60 dB $L_{AFmax}$ recommendation, minus 5 dB to account for impulsive nature of barking.

**Table 1: Sample of 14 noise consultant reports reviewed through online publically available Planning Reports**

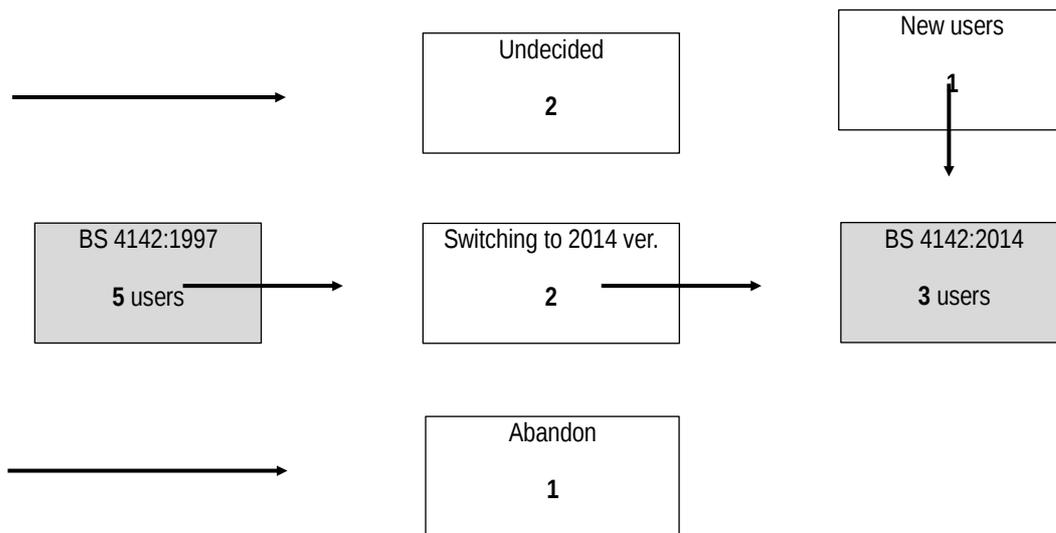
## Noise consultants interviewed

A snapshot of current kennel noise assessment practice was obtained by interviewing eight Noise Consultants across the UK and Ireland by telephone in 2015. All interviewees were practising members of the Institute of Acoustics, and have a minimum of five years' experience. All were employed at well-known consultancies, and all had been involved in kennel noise assessments previously.

WHO criteria have been applied by six of the eight Consultants. BS 4142:1997 has been used by five of the Consultants, with all five noting that they use the standard despite its apparent preclusion from kennel noise, basing their decision on the absence of any other criteria. The CIEH clay target shooting methodology is one of two non-routine methodologies applied by the interviewed Consultants, the other being BS 8233:1999 (now replaced by BS 8233:2014). One of the Consultants has a policy of agreeing the assessment methodology with the relevant EHO in advance, and as a result has been required to apply a different methodology on all four kennel projects to date.

$L_{Aeq\ T}$  criteria alone have been used by two Consultants to quantify barking noise. Similarly,  $L_{AFmax}$  criteria alone have been used by two. The remaining four Consultants have applied both parameters. Where the  $L_{Aeq\ T}$  has been used, the interval T has varied between 1, 5 and 15 minutes. Seven of the eight Consultants have applied a penalty for barking character, considered to be impulsive by all seven. Of these, five have used a subjective assessment of impulsiveness, one has used an objective assessment, and one has used both. The penalty has been 5 dB in almost all cases.

Two of the three Consultants who have relied solely on WHO criteria intend to continue avoiding use of BS 4142:1997, now replaced by BS 4142:2014 (**Figure 1**). The third proposes to apply the revised version in future kennel projects, due to the standard's reference to its suitability for commercial noise sources, as stated in its scope. Two Consultants who have applied BS 4142:1997 in the past also intend to use the revised 2014 version. In contrast, one Consultant who has relied on BS 4142:1997 to date, proposes to base future assessments on BS 8233:2014, which will increase the number of interviewed Consultants who use this standard to two. The two final Consultants who have used BS 4142:1997 to date remain undecided regarding implementation of the revised version, intending to make the decision when forced by a kennel project commission.



**Figure 1: Number of eight interviewed Consultants using BS 4142.**

## The way forward

In light of the plethora of guidance documents available for a wide range of noise sources and activities, the absence of a document specific to dog barking is unfortunate, and a glaring omission in the noise guidance library. In the absence of any existing guidance documents, approaches adopted by Noise Consultants and Local Authority EHOs in the British Isles are highly variable, and no emerging trends are readily apparent, apart from widespread misapplication of BS 4142:1997 when assessing impacts. Although the 2014 version of the standard specifically precludes application to domestic animal noise, several interviewed Consultants indicate that they intend to apply same due to the absence of any other guidance.

All Consultants interviewed acknowledged the need for a kennel noise guidance document which will allow a consistent approach to be adopted by Consultants and planning authorities alike. Such a document might include guidance on measurement methodology, predictive modelling, noise limits, and advice on kennel design and noise management, and would benefit Planning Departments, Environmental Health personnel, kennel operators and Noise Consultants. It is considered that the derivation of suitable noise limits would require some element of social annoyance studies relating to barking noise, in order to identify (a) a suitable noise descriptor and (b) thresholds of annoyance. A barking noise guidance document may benefit from inclusion of an assessment methodology based on a specified number of barks to be measured, similar to the method set out in the CIEH clay target shooting guidance document.

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