THE EVOLUTION OF NOISE POLICY AND NOISE MANAGEMENT DURING THE LIFE OF THE IOA

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1 INTRODUCTION

In 1973, one year before the IOA was founded, the first Government guidance document on Planning and Noise was published. That year also saw the advent of the Land Compensation Act which allowed the Noise Insulation Regulations to be laid. In 1974, the Control of Pollution Act was published and the following year saw the first version of BS 5228 and the Noise Insulation Regulations revised. This paper will examine the evolution of noise policy and noise management during the lifetime of the IOA including the publication in 2014 of the Planning Practice Guidance on noise.

2 A BRIEF HISTORY OF NOISE MANAGEMENT

One of the earliest examples of noise management can be found in the Bible, in the first book of Kings, chapter 6 verse 7 where it states:

> *In building the temple, only blocks dressed at the quarry were used, and no hammer, chisel or any other iron tool was heard at the temple site while it was being built.*

This can be regarded as an early example of construction noise management.

No consideration of the evolution of noise policy can begin without noting that the underpinning principles of the law date back to medieval times with the need to eradicate the nasty and unpleasant elements of everyday life. The term “nuisance” evolved in Common Law meaning that which causes offence, annoyance, trouble or injury, and to this day there exists both private and public nuisance.

Viewed in this historic context, the protection of people from noise nuisance has been developing over a very long period of time, much longer than the 40 year existence of the IOA. Legal history texts are littered with examples of common law cases concerned with the stopping of noise nuisance from all manner of sources, including from rattling carriages on cobbled streets, to steam hammers in workshops, through to the playing of fairground organs for eight hours a day.

The concept of statutory nuisance emerged with the Industrial Revolution and it was fundamental to the social legislation that was first enacted in the 1840s and 1850s, and that arguably continued into the twentieth century in the Public Health Act of 1936.

Noise was first introduced into the statutory nuisance framework by the Noise Abatement Act 1960 (thanks to the efforts of John Connell and the Noise Abatement Society) which amended the Public Health Act 1936 to include noise nuisance. The Act simply stated that “noise or vibration which is a nuisance shall be a statutory nuisance”. However, this one sentence had the effect of bringing the complexities of Common Law nuisance, and legal precedent, into the statutory control of noise. It can be seen that, from the outset, the control of noise has never been a purely technical issue, and has always been entwined in wider social, legal and economic considerations.

Regulation of building construction was introduced in London by the London Building Act of 1667 following the Great Fire of London in 1666. In 1936 an Act required Local Authorities to make and enforce local building byelaws. A Government information manual was produced in 1944 and included some advice on sound insulation, but there was no national legislation controlling the sound insulation between new build attached dwelling houses until the Building Regulations in the mid 60's.

In July 1963, a Government "Committee on the Problem of Noise" published the seminal document "Noise - Final Report", known as the Wilson Report. This document remains a thorough and insightful review of the state of noise management in the UK in the early 1960's and the challenges that lay ahead. The Wilson Report also recognized the complexity of the subject where it stated that solving "noise problems must involve people and their feelings, and its assessment is a matter rather of human values and environments than of precise physical measurement". The Report laid the foundations of much of the noise control initiatives that occurred over the following 10 years or so up until the formation of the IOA.

3 NOISE MANAGEMENT TOOLS AVAILABLE AT THE START OF 1974

At the beginning of 1974, the landscape of noise management included the following tools that were available to be used (in no particular order):

- The Noise Insulation Regulations 1973;
- Planning and Noise 1973
- The Noise Abatement Act 1960
- British Standard 4142:1967
- BS Code of Practice CP3 Chapter 3
- Building Regulations 1972
- Design Bulletin 26 New housing and road traffic noise
- Advisory Leaflet 72 about Noise from Construction Sites
- Code of Practice for the reduction of the Exposure of Employed Persons to Noise, 1972

The tools comprised a mixture of legislation, regulations, guidance and British Standards. In the 40 years of the IOA that mixture has remained and grown. During that time, one recurrent feature has been an arguably piecemeal approach, with new legislation or guidance appearing to address the issues of the day such as a new noise sources and new situations.

This paper will now consider the evolution of some of these tools in more detail.

4 THE NOISE INSULATION REGULATIONS

The Noise Insulation Regulations (NIR) 1973, were promulgated under the auspices of the Land Compensation Act 1973. That Act included a power to make regulations concerning the insulation of buildings against noise.

The NIR applied to dwellings exposed to noise from new or improved highways and required the offer of sound insulation treatment if certain acoustic criteria were met. These were a facade exposure of at least 68 dB, L_{A1018h} caused or expected to be caused from the operation of the new or improved highway, together with an increase of 1 dB(A). These criteria applied to dwellings up to 300m from the scheme.

It was only 2 years later that these regulations were amended and in fact re-issued as the NIR 1975. The key difference was an addition of a further criterion for eligibility which stated that the

> *Noise caused or expected to be caused by traffic using or expected to use that highway makes an effective contribution to the relevant noise level of at least 1 dB(A).*

It was the nature of road traffic flow forecasts in 1973 that caused this change. The 'expected to be caused' phrase covered a 15 year period from the year of opening and at that time virtually every road was expected to show an increase in flow that was sufficient to cause an increase of 1 dB(A). Consequently, many properties within 300m of the scheme became eligible even though they had not been affected by the scheme. The contribution criterion had the effect of constraining the extent of eligibility to those directly affected by the new or improved highway.

The 1973 regulations included some description of the method to be used for calculating eligibility. The origins of that methodology can be traced back to publications from the Building Research Establishment in the late 1960s. The method subsequently appeared in Design Bulletin 26 and this document is referenced in the NIR 1973. The re-issuing of the NIR in 1975 was accompanied by the publication of Calculation of Road Traffic Noise (CRTN) a methodology familiar to many and one that has probably been used by someone almost every day since then.

It was a revision to CRTN in 1988 that caused the NIR for highways to be amended that year simply to make reference to the new CRTN. However, the amendment regulation document contained no more content than the reference change. All the information remained in the 1975 document. Consequently, it did require some thought about how to refer to the regulations after that. For the most part, the 'Noise Insulation Regulations 1975 (as amended 1988)' was the text used.

Having had 3 versions of the roads version of the NIR, railways attracted their own regulations in 1996. It had a longer title "The Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996. They were modelled on the roads regulations but with some differences. The noise was described in terms of the L_{Aeq} indicator. There was a daytime criterion (18 hours from 0600-2400) and a separate night-time criterion (2400 – 0600). Both also required a 1 dB(A) increase. These regulations, however, did not require the contribution criterion as there are fewer railway corridors than roads.

As with the NIR 1975, these regulations were accompanied by a railway noise prediction method entitled Calculation of Railway Noise (CRN). The railway regulations were amended in 1998 to include a reference to a supplement to CRN that covered Eurostar trains.

Both the road and railway regulations include schedules that are very precise about the specification of the treatment. This includes the installation of a second pane of glass and alternative mechanical ventilation, and of course both these regulations apply today. When the NIR first came in they were very effective. Survey work showed that people appreciated the additional sound insulation provided (it could be an increase of 20dB). The ventilators were not so popular especially those that looked as if they should be in the bathroom. However, since then the prevalence of what the railway regulations describe as 'double-glazed' windows in the majority of homes must question whether the offer of such sound insulation treatment has the same value as it once did. Maybe this is an issue for the next 40 years of the IOA.

4.1 Road and Rail Noise Prediction Models

As indicated above, CRTN and CRN were both developed primarily to enable eligibility for sound insulation. CRTN, in particular, was designed so that the calculation could be carried out by hand. It was very easy to generate a pile of calculation sheets several inches high for a scheme. Both methods became used for any form of road or rail noise prediction and computer software applications for both were developed. The use of CRTN for impact assessment was consolidated by the Design Manual for Roads & Bridges that set out, *inter alia,* how to assess the environmental impacts of a new road scheme. A few years ago, a revision of DMRB amended the prediction method slightly so that the DMRB method was not quite identical to the formal CRTN document.

Work to amend CRTN to align the two methods has occurred (the changes are primarily associated with road surface type corrections) but the revised CRTN has not yet been published.

The implementation of Directive 2002/49/EC, the Environmental Noise Directive (END), with its requirement for noise mapping caused a further development of the use of these methods. The END stipulated that results had to be produced at least in terms of L_{den} and L_{night}, both L_{Aeq} based indicators. For CRN it was relatively straightforward to adapt the calculation method to meet this need, but for CRTN, it was necessary to seek some form of conversion. TRL were commissioned by Defra to explore how this might be done and the colloquially known 'back-end' corrections were developed and used.

In 2014, agreement was reached in the EC to an amendment to Annex II of the END which describes the method to be used for strategic noise mapping. This method will have to be transposed into law by 31st December 2018. The common method will not have to be used for Round 3 (in 2017) but will have to be used for future rounds of mapping. An issue we will have to address going forward is whether we keep CRTN/CRN and the END common method, or should we have just one formally approved method for predicting road and rail noise.

5 PLANNING AND NOISE

5.1 Circular 10/73: Planning and Noise

The first Government guidance on the control of noise through using the land use planning system was published in 1973. This guidance, known as Circular 10/73 "Planning and Noise", was part of the Government's commitment to *"enhance the quality of the surroundings in which people live"* in the context of *"containing, and where possible, reducing the impact of noise".*

Of technical interest is this comment in 10/73:

> *Ideally a single index should be used to measure and correlate people's reactions to noise from all sources and from mixtures of them. Further research is needed to find out whether a satisfactory all-purpose index can be produced; and this is already in hand.*

Indeed, it was that research that led to the domination of the Leq indicator. It is noteworthy that only 10 years before, the Wilson Report commented how noise was complicated, that noise control should put people at the centre and that precise physical measurements would not represent an adequate approach. Forty years on, there are still many people who believe that Leq does not properly describe the impact and effect of the noise they experience.

In a section regarding new roads, 10/73 stated that an important factor to take into account was whether the noise levels would be "acceptable". However, "acceptable" was not defined. Similarly 10/73 stated that

> *New noise sensitive development should not be permitted if it would – now or in the foreseeable future – be exposed to unacceptable levels of traffic noise.*

However, "unacceptable" was not defined.

The main advice given was to try to separate noise sensitive developments from what 10/73 called 'primary road networks'. For new residential developments, some more specific advice was given:

> *There should be a strong presumption against permitting residential development in areas which are or are expected to be subjected to excessive noise.*

The guidance went on to state that the *"strong presumption should certainly apply where noise levels are in excess of 70 dB(A)"* ($L_{A10,18h}$), clarifying that the Noise Advisory Council had stressed that this level constitutes the *"limit of the acceptable rather than a standard of what is desirable."*

The criteria found in the Design Bulletin 26 "New Housing and Road Traffic", were reproduced in 10/73. In summary they were:

- No development if external level> 70 dB(A) ($L_{A10,18h}$)
- Build barriers to achieve external level ≤ 70 dB(A)
- In any event - internal (windows closed) ≤ 50dB(A) (minimum)
- Good standard – internal (windows closed) = 40 dB(A)

With the benefit of hindsight it can be seen that full compliance with these standards would have been quite challenging in 1974.

Comparing the advice in 10/73 with the NIR 1975, there was a slight unevenness in approach. The 70 dB(A) in 10/73 and the 68 dB(A) in the NIR 1975 were designed to be equivalent (the eligibility allowing a 2 dB margin over the 10/73 level). However, there could be many situations where existing dwellings were exposed to more than 70 dB(A) and there was no process for securing mitigation. Furthermore, whereas alternative ventilation was required under the NIR, there was no mention of it in 10/73.

5.2 PPG24 Planning and Noise

PPG 24 was published in 1994 following recommendations from the Report of the noise review working party 1990, known as the "Batho report".

In the first paragraph it states:

> *The aim of this guidance is to provide advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business*

There is a clear change in language. 'Acceptability' has been replaced by ''minimise'. That of course, does still allow the situation to exist where the noise impact might be 'minimised' but could still be at a level that is unacceptable. Furthermore the economic balance is more overtly stated (it had been previously touched on by the guidance issued by the former Greater London Council in the mid-seventies).

PPG24 clearly stated that the impact of noise can be a material consideration in the determination of planning applications. It continued,

> *The planning system has the task of guiding development to the most appropriate locations. It will be hard to reconcile some land uses, such as housing, hospitals or schools, with other activities which generate high levels of noise, but the planning system should ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development). It is equally important that new development involving noisy activities should, if possible, be sited away from noise-sensitive land uses."…*

It went on

> *Where it is not possible to achieve such a separation of land uses, local planning authorities should consider whether it is practicable to control or reduce noise levels, or to mitigate the impact of noise, through the use of conditions or planning obligations*.

PPG24 introduced four Noise Exposure Categories (NECs), ranging from A-D, to help local planning authorities in their consideration of applications for residential development primarily near transport-related noise sources. Category A represented the circumstances in which noise is unlikely to be a determining factor, while Category D related to the situation in which development should normally be refused.

A table contained a recommended range of noise levels for each NEC covering day and night-time periods. The Table in Annex 1 defines NEC "D" as being an $L_{Aeq,16h}$ of > 72 dB(A). The supporting information in Annex 2 explains that this figure was derived from research that showed that the NIR insulation package was inadequate for road traffic noise levels of ≥ 78 dB(A), $L_{A10,18h}$ at the facade. The arithmetic is:

78 ($L_{A10,18h}$) facade = 75 ($L_{A10,18h}$) freefield
$L_{A10,18h} = L_{Aeq,16h} + 2$
So 75 ($L_{A10,18h}$) freefield = 73 ($L_{Aeq,16h}$) freefield.

What also occurred was arguably a change of emphasis in policy. In 1973, the focus was very much on the external level, with sound insulation being a last resort to achieve satisfactory internal levels. Although external levels were still important in PPG24, the Annex 2 references to internal levels effectively resulted in there being no bar to new housing development if the external level (at the facade) was not greater than 77 dB(A) ($L_{A10,18h}$). This is 7 dB(A) higher than the value used in Circular 10/73. Of course, what did happen over the years, as touched on earlier, was the increased use of 'thermal' double glazed units – for energy insulation purposes. These units were found to give reasonably good sound insulation performances. Thus it did become relatively straightforward to reduce high levels of external noise down to "acceptable" internal levels.

5.3 National Planning Policy Framework (NPPF) 2012

In the late 1990s, devolution occurred and that included the responsibility for noise policy. Consequently, England, Wales, Scotland and Northern Ireland could go their separate ways. In England, the NPPF was published, replacing over a thousand pages of national planning policy, including PPG24. The resulting 50 pages or so was designed to allow *"people and communities back into planning*."

The NPPF sets out key requirements for the planning system and provides a framework by which local policy should be made to reflect local needs and priorities. It provides the Government's key planning policies for England and how these are expected to be applied. The NPPF must be taken into account in the preparation of local and neighbourhood plans, and is a material consideration in planning decisions. Paragraph 14 of the NPPF states that:

> *At the heart of the National Planning Policy Framework is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking.*

At Paragraph 6 the purpose of the planning system is described as *"to contribute to the achievement of sustainable development*".

The planning system has to perform a number of roles – economic, social and environmental. When expanding on these roles the NPPF encourages

- *creating a high quality built environment;*
- *contributing to protecting and enhancing our natural, built and historic environment*; and to
- *minimise waste and pollution*.

Paragraph 17 of the NPPF states that planning should

- *contribute to conserving and enhancing the natural environment and reducing pollution* and
- *always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings*.

There are two paragraphs (Paragraphs 109 and 123) in the NPPF that directly mention noise.

> *109.The planning system should contribute to and enhance the natural and local environment by… preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability…* and
>
> *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.*

Conspicuously absent from the NPPF are any noise exposure values that can be used to determine whether or not a site is suitable for residential development.

The publication has caused a divide in the acoustic community in England. On the one hand, for some, it has been seen as providing a suitable opportunity to look afresh at what might be achieved from the consideration of noise in the planning process. The NPPF empowers local planning authorities to move beyond a mechanistic assessment of the suitability of a site for new residential development and to focus instead on achieving better acoustic outcomes and to deliver appropriate and good quality acoustic design in the built environment. The other viewpoint is that the lack of numerical guidance has led to uncertainty amongst both local planning authorities and developers with development not occurring where it might, or the optimum noise management outcome not being achieved.

5.4 Planning Practice Guidance Noise 2014

Following the publication of the NPPF, Lord Taylor of Goss Moor undertook a further independent review of the underpinning guidance that had existed. One of his conclusions was that *"there must be a managed process for updating or cancelling (guidance) documents as time passes"*.

Lord Taylor felt that guidance embeds the dependency culture of waiting to see what Government spells out rather than enabling those making the decisions to decide for themselves.

> *Whilst the right guidance is essential to all involved in the planning process, there are limitations to what guidance can achieve. Guidance can never replace local judgment and the application of professional expertise - it can merely assist….*

The Taylor Review did support the need for additional guidance on noise. It had to be web-based (to enable easy updating) and focused more on advising what factors or features need to be considered rather than providing the answer. Following the publication of a so-called beta version in October 2013, the Planning Practice Guidance Noise (PPG (N)) was published in March 2014 along with a suite of other such guidance.

Although no numerical values are included the PPG (N) states that

> *Local planning authorities working with local communities and businesses may decide to develop and include in their Local Plans specific standards to apply to various forms of proposed development and locations in their area*.

It cautions though that

> *Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed*.

The PPG (N) includes guidance on how to recognise when noise could be a concern in planning decisions. There is also assistance on how the requirements of Paragraphs 109 and 123 of the NPPF can be met. The PPG (N) confirms that noise can override other planning concerns but clearly states that noise must not be considered in isolation, separately from the economic, social and other environmental dimensions of proposed development.

5.5 Sustainability

The concept of sustainability emerged in the 1980s with a definition being put forward by the Brundtland Commission in 1987. Noise was originally thought NOT to be a sustainability issue by many policy makers, partly because it was regarded as inherently transient. It took many years before noise was recast in terms of sustainability in recognition of the pervasiveness of many types of transport noise, and the longer term adverse health effects that can occur from exposure to noise. In the context of the management of environmental noise, sustainability concerns have gradually increased in importance since the early 90's. It means that risks must be balanced – the need for housing against the possible health effects of building in locations already exposed to high noise levels, the need for new transport infrastructure against the seemingly inevitable increase in noise that may occur and adversely affect the quality of life for local communities. It reinforces the need for decisions to be made in the wider context of a long-term goal, and the benefit to future generations, rather than be measured solely against a particular precise noise standard.

In the context of the acoustic design of buildings, sustainability concerns require developers, planners and policymakers, not only to have regard to the acoustic environment but also the materials used and the potential future use of buildings. This is one of the topics being considered by the IOA Sustainable Design Task Force that has recently been established. Specific guidance on materials will recognize life cycle analysis and signpost responsible resourcing, and should encourage informed choice by practitioners.

6 NOISE POLICY STATEMENT FOR ENGLAND 2010

An article in the Independent newspaper of 17th March 2010 opened with the following

> *Official policy statements from Whitehall tend to be bland and full of sincere-sounding generalities, but just now and then something important, perhaps even revolutionary, can be glimpsed in their pages*

The author was referring to the Noise Policy Statement for England (NPSE), which in two pages of policy and 4 pages of explanatory notes set out the overarching policy for noise management in England. It did not change policy. It simply describes the outcome government is seeking to achieve by managing noise, and states that the guiding principles of Government policy on sustainable development is to be used to assist in its implementation. The policy sets a framework against which all new policies and any noise management measures should be assessed. It contains the vision of promoting

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

This vision is supported by three aims

> *Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*
> *i. avoid significant adverse impacts on health and quality of life;*
> *ii. mitigate and minimise adverse impacts on health and quality of life; and*
> *iii. where possible, contribute to the improvement of health and quality of life.*

The application of the NPSE should mean that noise is consistently and properly taken into account at the appropriate time. In the past, the opportunity for the cost effective management of noise has been missed because the noise implications of a particular policy, development or other activity have not been considered at an early enough stage. In addition, the application of the NPSE should enable noise to be considered alongside other relevant issues and not to be considered in isolation.

Before 2010, policy and guidance on noise issues was not comprehensive. Some subjects were very well covered, e.g. noise from construction sites, but for others there was very little information available. The NPSE provides the over-arching policy to be met, regardless of noise source or circumstance. It may be there is little evidence to help determine, say, whether a significant adverse effect is occurring in a certain situation, but at least it is clear that such effects should be avoided, subject to the social and economic benefits of the activity causing the noise.

Since its publication, policy documents from across Whitehall are increasingly reflecting the NPSE, including the National Policy Statements for nationally significant infrastructure projects; the Aviation Policy Framework, the noise action plans promulgated under the END and, as can be seen above, the NPPF and the PPG(N).

7 CONCLUSIONS

This paper has presented a brief (and selective) overview of the evolution of noise policy and noise management over the life of the Institute. The policy principles have broadly remained unchanged although the NPSE has sought to articulate the desired outcomes more precisely. Over that time also, there has been the recognition that noise cannot be treated in isolation with overall sustainability policy aiming to deliver environmental, social and economic gain. Policy has also moved from the position in 1973 where it was hoped that there could be one single index for all sources to realizing that Wilson was right in that noise is far more complicated than that.

The paper has also identified a couple of issues that will probably have to be addressed in the future, regarding noise insulation and noise calculation models. One further question for the future is this: How should we determine whether or not we are meeting the vision of the NPSE? The nature of our society and how we as individuals react to noise probably means that we will never eradicate significant adverse effects due to noise. Given that, when will we know that we have achieved the best we can? It is likely to be a multi-faceted approach embracing

- a measure of noise exposure (perhaps the proportion of population living where noise levels are > x dB),
- a measure of noise complaints (perhaps the proportion of the population making justified complaints about noise sources),
- a measure of attitudes to noise (perhaps the proportion of the population highly annoyed),
- a measure of the health effects of noise (perhaps using a WHO approved approach), and
- a quantification of the standard of sound insulation in the housing stock (maybe the proportion of dwellings meeting certain standards)

DISCLAIMER

The views in this paper are those of the authors and are not necessarily those of our clients or employers. Every attempt has been made to achieve factual accuracy but this paper spans many years and covers a broad range of issues, please check before relying upon the details for other purposes.

REFERENCES

Most the documents mentioned here can be found via the usual internet search engines (although some of the early documents may be out of print). If any difficulties are encountered please contact the authors who may be able to assist.