IEMA/IOA NOISE IMPACT ASSESSMENT GUIDELINES – UPDATE

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1. INTRODUCTION

Over ten years ago, the Institute of Acoustics (IOA) and the Institute of Environmental Assessment (as it was called then, it is now known as the Institute of Environmental Management and Assessment (IEMA)) formed the Noise Impact Assessment Working Party. This arose from some workshops held by the Environmental Noise Group of the IOA when it was identified that the quality of noise impact assessments was very variable and that there was a lack of information available to help those undertaking noise assessments.

Much work was put into the guidelines by the Working Party – but very much in their spare time. It is a complex subject but eventually in the Spring of 2002 a draft document was published for consultation by the IOA and IEMA. It was around 100 pages long and provided a wealth of information and advice regarding the process of undertaking a noise assessment, either as part of a full environmental impact assessment, or on its own as a support for a small planning application.

The document proved popular and there were several offers of comments made, but it took some time for them to be forthcoming. The deadline put on for the receipt of comments proved to be no more than a general guideline rather than anything more robust.

Comments were eventually received (after about 18 months (!)) and these were reviewed. A revised document was drafted, the working party met again to discuss the issues of substance that arose from the comments and the IEMA are now in the process of putting the final (hopefully) touches to the document. If the working party is content with the final amendments, the final version will be published in 2006.

This paper sets out some of the issues that arose from the comments made and provides a reminder of the key elements of the guidelines.

2. CONSULTATION

The draft guidelines were placed onto the IOA and IEMA web-sites in April 2002. It was hoped that the advice contained in the guidelines would

- Assist the noise assessor cover all the relevant issues;
- Enable the reviewer to check that everything has been properly carried out in the noise assessment; and
- Make those commissioning such assessments appreciate just what is involved.

It was acknowledged that Government consultations tended to contain specific questions to be answered. Consideration was given to adopting a similar approach but, in the end, it was decided to give consultees free reign to comment in as much or as little detail as they felt appropriate.

A range of comments were received from seven organisations, covering consultancies, local authorities and government agencies, and in general the comments were gratifyingly complimentary:

> *I am very impressed with the guidance overall…*
>
> *Represents a useful and comprehensive guide…*
>
> *….your committee's excellent document.*

Having said that one consultee confirmed a feeling that some of the committee were having about the document in that it was too large

> *Reads like a rather rambling discourse rather than the succinct advice needed..*

Many of the comments helpfully picked up specific points about individual paragraphs, many of which have been adopted in the revision.

Even though relatively few people responded to the consultation, it was clear that the draft guidelines were being used and quoted. Since their publication, the IOA and IEMA have regularly received enquiries about the progress of the document and reference to the guidelines can be found in many noise impact assessments.

However, what has been generally quoted is just one element, from chapter 7, which will be discussed further in Section 4 below.

3. THE DRAFT GUIDELINES

As a reminder, the guidelines, although published in draft as a single document, came in two parts. The first covered the principles of environmental impact assessment and noise rating. The second considered noise impact assessment in practice. In that second part, following an introduction to assessing noise impacts, chapters dealt with:

- Baseline Noise Levels;
- Prediction of Noise Levels;
- Noise Assessment;
- Noise Mitigation;
- Presentation of Results; and
- Review & Follow Up

Arguably the key section was Noise Assessment. Here the principle was established of trying to take account of all the factors that might affect the conclusions drawn about the nature and extent of the noise impact. An assessment framework was proposed that started from the basis of determining the likely noise change, probably, but not necessarily, in terms of the indicator L_{Aeq}. From that difference a view could be formed. So, for example, assuming an increase in level has been predicted a judgement could be made regarding:

- Whether the noise change is so small as not to be noticeable; or
- Whether it is large enough to be noticed but not so large as to cause a significant effect; or
- Whether it is a very large increase such that it would potentially cause a large increase in annoyance or disturbance.

Having formed that view, the guidance then encourages other factors or features to be taken into account that may alter the conclusion initially drawn from that basic noise change. These factors are summarized in Table 1 below:

Table 1
Framework Summary from Draft Guidelines

FACTOR	ISSUE
Averaging Time Period	Is the averaging time so long that it might mask a greater impact, or does the impact occur for only a small proportion of the time and can therefore be considered a smaller impact?
Time of Day	Is the change occurring at a time of day which might cause a different impact?
Nature of the Noise Source	Is there a change in the nature of the noise source which might alter the impact?
Frequency of Occurrence	How does the frequency of the occurrence of the noise source affect the impact?
Spectral Characteristics	Is there a change in the spectral characteristics which might affect the impact?
Absolute Level	How does the change relate to guidelines?
Noise Indicator	Has the change which would be heard been identified?

Examples of a couple of these issues are set out below:

For Time of Day - a particular proposal may simply cause a four fold increase in traffic between 22:00 and 23:00 hours, with no change at any other time of day. For traffic noise much guidance exists that suggests that traffic noise should be assessed in terms of the $L_{A10,18h}$ indicator. However, the noise change in terms of that indicator is only likely to show at most a few tenths of a decibel increase. At first sight, this would not appear to be a major impact. Yet such an increase in traffic and hence noise at that time of the evening could be significant. Thus although guidance may point to the use of $L_{A10,18h}$ indicator for the assessment of traffic noise, the sole use of that indicator may not adequately describe the impact of the change that will occur.

Regarding absolute level, a comment is often made that a noise assessment cannot be based on the change in level alone, but consideration has to be given to absolute level. This is quite true, if for no other reason than a change from 50 – 55 dB(A) is unlikely to cause the same effect as a change from 70 – 75 dB(A). The proposed framework, though, does takes account of absolute level as one of the factors.

There are two aspects to this element:

- How the existing or before level compares with the appropriate guideline; and
- How the change in level relates to the guideline.

A proposal which would cause an increase on an existing level which is already well above an existing guideline should probably be regarded as worse than if the existing level were below the guideline. If the existing noise environment is regarded as so unsatisfactory that ideally every effort should be made to reduce it, then almost any increase regardless how small is an impact which should be considered.

In a similar vein but at the other end of the scale, for an area which is recognised for its tranquillity (i.e. the existing level is very low), even a very small increase is an impact which should be considered as a potentially significant because the existing special tranquillity would be eroded.

In general, in terms of the relationship with guidelines, a noise increase arising from a development falls into one of three categories:

1. The existing level and the future level are below the relevant guideline;
2. The existing level is below the guideline but the future level is above the guideline; and
3. Both the existing and future level are above the guideline.

But is the impact from each of these situations the same?

To an extent, this example demonstrates one of the principles of the guidelines. They do not necessarily provide the definitive answer, but, hopefully, at least ensure that the question is considered.

Having taken account of the various factors, the assessor will be able to form a view regarding whether the impact is properly reflected by the basic noise change, or whether it is worse than or better than that implied by the change. And it is at this point, the one element of the guidelines that has caused more discussion in the working party than any other is reached.

Set out below are paragraphs 7.65 – 7.67 of the draft guidelines:

7.65 Whilst there is a precedent for suggesting numerical corrections to the basic noise change to reflect the effect of the various factors described, no such corrections are recommended here. Each situation encountered is likely to be different, and there is no single correction that would apply to all situations. Consequently, it will be for the person undertaking the assessment to determine and justify any corrections adopted.

7.66 To provide some assistance in this process, the basic noise changes have been categorised as follows:

Example of Categorising the Significance of the Basic Noise Change

NOISE CHANGE (dB)	*CATEGORY*
0	*No Impact*
0.1 - 2.9	*Slight Impact*
3.0 - 4.9	*Moderate Impact*
5.0 - 9.9	*Substantial Impact*
10.0 and more	*Severe Impact*

N.B. The use of one decimal place is merely intended to avoid ambiguities over the categorisation boundaries. It is not to be interpreted as an endorsement of the accuracy to be used in the noise assessment. This should be determined by the assessor, based on the particular circumstances of the assessment.

7.67 IT IS IMPORTANT TO NOTE that the table in Para 7.66 is merely an example of how the significance of a range of basic noise changes might be categorised. The table should not be used to define the description of the noise change (i.e. it should not be used as a justification for saying that a +2 dB change is slightly significant). In any assessment, the words used to describe the impact should be determined by

the assessor based upon the evidence. There is no formulaic approach for relating noise change to a verbal description.

The issues that have arisen are discussed in the next section.

4. THE SEMANTIC SCALE

The problem of semantic scales and noise changes has always been with us. Acousticians identify the expected noise change (say, a 4 dB(A) increase), at which point, decision makers and members of the public ask – what does that mean?

So, what the guidelines were *trying* to say that, in any assessment, the assessor may have to translate the findings into a semantic scale in order to make the conclusions more accessible, and the table shown above was included as an *example* of a semantic scale that may be used.

There were two outcomes from the consultation process. The first was that the words in Para 7.67 were ignored and some subsequent noise impact assessments have included sentiments such as:

According to the draft IEMA/IOA guidelines, a 2 dB(A) increase represents a slight impact..

Which, of course, is not what the draft guidelines stated!

The second response was a desire for the guidelines not to lose touch with semantic scales that have evolved over the years (mainly in connection with transportation schemes).

Table 2 below shows the semantic scale previously used (and provided to the working party by one consultee):

Table 2
Traditional Semantic Scale

Noise Change (dB)	Impact
<3	None
3 – 5	Slight
6 – 10	Significant
11 – 15	Substantial
> 15	Severe

Comparing this table with the example quoted in the draft guidelines, a couple of differences can be noted. Firstly, there are two categories in the draft guidelines covering changes up to 3 dB. Secondly, the word significant does not appear the draft example.

As has been shown above, one of the issues raised by the guidelines is that changes of less than 3 dB can have an impact depending on the detail of the change and the averaging time of the indicator used to quantify the change. Thus, the traditional semantic scale cannot be used in all cases as a means of describing the scale of the impact.

The absence of the word ‘significant’ in the draft example has been recognised by the working party, especially given that one of the tenets of environmental assessment is determining whether or not an impact is ‘significant’.

The working party also received a copy of a paper by Manning[1], in which a semantic scale for the assessment of railway noise (the Channel Tunnel Rail Link) was included. This is reproduced in Table 3 below:

Table 3
Semantic Scale for CTRL (*from Ref 1)*

Predicted Change in $L_{Aeq,24hr}$	Semantic Scale Rating
Decrease of more than 3 dB	Significant decrease
Decrease of less than 3 dB	No significant impact
No change in noise level	No significant impact
Increase of less than 3 dB	No significant impact
Increase of 3 – 5 dB	Slight increase
Increase of 6 – 10 dB	Moderate increase
Increase of 11 – 15 dB	Substantial increase
Increase of more than 15 dB	Severe increase

Compared to the traditional semantic scale, this scale clearly specifies the indicator (i.e. $L_{Aeq,24hr}$). Again, though, the averaging time of this indicator is sufficiently long that a change of less than 3 dB might not always result in 'no significant impact', depending on the nature of the change. It is also worth noting that although a decrease of less than 3 dB attracts the description 'significant decrease', the table is silent on the increase required for it to be described as significant.

Elsewhere in that reference, the semantic table used for the Thameslink 2000 assessment in 1997 is set out. This is reproduced in Table 4.

Table 4
Semantic Scale used for Thameslink 2000 Assessment[1]

Predicted Noise Change $L_{Aeq,16hr\ day}$ or $L_{Aeq,8hr\ night}$	Scale Rating	
Less than 3 dB	No Significant Impact	
Increase of 3 – 5 dB	Slight increase)	
Increase of 6 – 10 dB	Moderate increase)	Significant Effect
Increase of more than 10 dB	Substantial increase)	

In addition, a significant effect will occur if the maximum baseline noise level due to trains is not more than 85 dB L_{Amax} outside a habitable window between 2300 and 0700, and the maximum noise due to Thameslink 2000 trains exceeds 85 dB L_{Amax} outside a habitable window between 2300 and 0700.

These descriptions applied to residential buildings by day and night, and non-residential buildings by day only.

It can be seen that this scale referred to two indicators, the 16 hour and 8 hour L_{Aeq} average. Furthermore, not only is there a description of the change, but also a commentary on whether or not the change is significant, with, in this case, all increases of more than 3 dB being so described.

A final point of note is that in the scales shown in Tables 3 and 4, a noise increase of 10 dB(A) is a 'moderate' increase, whereas in what has been described as the traditional semantic scale (Table 2), a 10 dB increase is significant.

There is not right answer to this issue and in the final version of the guidelines it is hoped that the following points will come across:

- There will probably always be a need for a semantic scale;
- Simply because a semantic scale has been used before, it does not mean that it is appropriate for the current assessment. Any re-use of a scale must be justified.
- It is important not only to ascribe an interpretation to the noise changes, but also to form a view regarding whether such changes are significant.

The recent deliberations of the working party explored the possibility of developing an additional table along the lines of the one shown below in Table 5

Table 5
Possible Scale of Effects for Residential Premises

Perception of Change	Consequence of Change	Significance of Change
Not noticeable	None	Not significant
Noticeable	Non intrusive[1]	Some Impact but not significant
Noticeable	Intrusive[2]	Significant
Noticeable	Disruptive[3]	Significant
Noticeable	Physically Harmful[4]	Significant

1. Causes small changes in behaviour, e.g. turning up volume of television; speaking louder; closing windows. Or, affects the character of the area such that there is a perceived change in the quality of life.

2. Causes small changes in behaviour, e.g. turning up volume of television; speaking louder; closing windows. The cautious approach would be to consider this to be significant. However, there may be circumstances when it can be demonstrated that these small changes in behaviour are not significant.

3. Causes a material change in behaviour, e.g. avoiding certain activities during periods of intrusion; sleep disturbance (non-awaking); moving to different location

4. Significant changes in behaviour and inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. sleep deprivation/awakening; loss of appetite. Also, medically definable harm, e.g. Noise induced hearing loss.

It can be seen that the focus is much more on the effect of the noise change and this may assist in describing qualitatively the numerical change found during the assessment. Even then, this is not the whole story – a noise change may only have one of the effects described for some of the time. So, for example, a non intrusive but noticeable change may not be significant if the volume on the television has to be turned up for only a couple of hours each month. It might be significant if it has to be turned up every night.

Nonetheless, considering the noise impact in the context of Table 5 may help the assessor derive a semantic scale that is right for the assessment being carried out.

5. REVISION TO THE DRAFT GUIDELINES

The new version of the guidelines will be in two separate documents. As indicated above and as was commented upon by one consultee, the original document was long and not readily accessible. The two documents will comprise a summary document that includes the key information, and the

full document (probably on CD) for more detailed reference. The aim is that the summary document is for the specialist who is experienced and has a good understanding of the process and who simply needs to check on specific details. The full document is aimed at a much wider audience, including those training in the profession, so that they can read about the issues and understand the complexity of this subject.

There is some concern in the working party that the summary document will be used by the non-specialist, so it has been recognised that the summary document must clearly cross-reference the main document. Over the years, there has been pressure to make the subject of noise assessment 'accessible' to the non-specialist. This has tended to lead to processes being presented as no more than gathering some input data, putting that data into a 'black box', pressing a button and the answer emerging. As has been demonstrated by the draft guidelines and, hopefully, this paper, properly undertaking a noise impact assessment requires specialist skill and experience. Noise assessment is deceptive and can appear to be easy. However, it is not – but it hoped that these guidelines will assist in improving the quality of noise assessments in the future and help to ensure that all the relevant issues are considered.

IEMA are currently producing final versions of both the summary document and the main document. It is hoped that these versions will be available to the working party before the end of 2005. If the working party is satisfied that the documents achieve what has been intended, then they will go to the parent organisations (IEMA and IOA) for final ratification before publication. If all goes well, the long running saga of the Noise Impact Assessment Guidelines will come to an end in 2006.

6. CONCLUDING REMARKS

This paper has provided an update on the Noise Impact Assessment guidelines being prepared by a working party set up by IEMA and IOA. The outcome of the consultation process has been described and one of the more difficult issues examined in some detail. The possible timetable to publication has been set out.

7. REFERENCES

[1] Chris Manning
"Criteria for the Environmental Assessment, Planning and Mitigation of Railway Noise"
ProcIOA Vol 20 Part 1 (1998) pp 195 – 202.