

THE NOISE MAPPING OF ENGLAND PROJECT

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1. INTRODUCTION

Most environmental noise specialists in England will by now be aware of the Government's announcement of a project to generate noise maps of England to provide the evidence base for the development of a national ambient noise strategy. Although first referred to in the Rural White Paper of November 2000, the project aims to cover transport and major industrial sources in the major urban areas of England, along with (at least) the major transport sources in other areas.

The mapping will also prepare us to meet the mapping requirements of the European Environmental Noise Directive (END) which was recently adopted.

The objectives are to undertake pilot mapping work in as many types of situation, urban and non urban, as possible, to identify and hopefully resolve the main difficulties that will arise. The project is essentially applied research. A key requirement placed on all participants is to involve and work co-operatively with those who will generate and use noise maps in future – especially local authorities. Particular emphasis has been placed on the need for those undertaking the noise mapping in this England wide project to provide training in their use and future development for local authority officers and others.

It is hoped that by the end of 2004 we will have:

- Noise maps and associated data to inform the development of the National Ambient Noise Strategy (subject to the results of consultation;
- A good understanding of what needs to be in place to meet the Directive requirements in 2006/7; and
- A platform of databases upon which to update / generate the maps and to be used as a basis for the action plans for the Directive.

This paper provides an update of the current situation on this research project.

2. ORGANISATION OF THE PROJECT

Preparations for the project began in 2001 with the process of appointing project managers who in turn have the responsibility for sub-contracting the various research contracts. These include the production of the map databases, specific research and other specialised tasks, such as organising seminars and training events. Early in 2002, Schal International Management Ltd. with acoustics advisors Rupert Taylor Ltd. were appointed as project managers. In parallel, Defra set up a steering committee including representatives from other Government departments, the Local Government Association and the Environment and Highways Agencies to oversee the project. The steering committee in turn delegated the day to day technical direction and management of the project to a

sub group chaired by Defra. The final organisational preparation was the appointment in June of Casella Stanger both to continue to provide general technical advice to Defra and specifically to advise on, and technically benchmark, the noise mapping process.

3. NOISE SOURCES TO BE MAPPED

The noise sources that will be covered in this research project are road, rail and air traffic, and some industry, but electing to evaluate only these sources does not mean that the word “ambient” has been redefined. The END requires Member States to produce information on these sources, hence it seemed a good starting point.

4. TECHNICAL DECISIONS

In order to proceed with mapping a number of technical decisions have had to be made. While in the long term, best practice guidance on mapping to meet the requirement of the END will be provided by the European Commission, at present the END provides little practical help. Indeed, in some respects the Directive places additional obstacles in the way of practitioners. For example, it suggests for the 2007 mapping the use of the adapted and revised interim methods such as the French road traffic noise calculation procedure, NMPB, and requires that Member States demonstrate that their national methods, should they prefer to use them instead, give “equivalent” results. However, no guidance regarding how to demonstrate such equivalence has yet been produced. Furthermore, the essential data needed to use methods such as NMPB in countries other than France with different traffic fleets is not available at present. The same is true of the Dutch railway noise method recommended as the interim method for that source.

Consequently, for this project, the decision has been taken to adapt the existing UK methods for road and rail noise to generate the Lden indicator required by END. In the case of railways using the Calculation of Railway Noise (CRN) procedure, this is a relatively simple matter of adjusting the LAeq formulae to new time periods. In the case of roads, using the “Calculation of Road Traffic Noise” (CRTN) procedure requires in addition the adaptation from LA10 to LAeq. A subsequent paper in this conference will discuss this adaptation in detail. One of the main reasons for choosing the UK methods is the fact that after the first round of END mapping, it is likely that a switch will have to be made for the second round of mapping (due for completion in 2012) to new EU-wide “Harmonoise” methodologies that are still under development. Hence moving to Interim Methods now would mean two changes of procedure within 10 years. Furthermore, the lack of suitable input data for NMPB etc. and the fact that practitioners are more familiar with CRTN and CRN, than they are with the END interim methods argues for the use of the UK methods at present.

5. OTHER TECHNICAL ISSUES

There have been many papers presented over the past few years on noise mapping showing the most wonderful pictures that can be generated. The recent advances in the sophistication of noise modelling software makes it very important that we aim to make full use of that capability in this project. However, if an ideal time were to be picked to embark on this work, this would probably not be it! Over the past six to nine months the complexity of the potential impact on this project of the concurrent evolution of national databases and the need to manage this interaction has had to be addressed. Consequently, whereas, for example, a few years ago, we would have relied on well understood national datasets such as Landline and OSCAR to provide the basis for mapping, we now have to understand how to make use of the new Ordnance Survey product, Mastermap and the National Street Gazetteer which is still far from complete at the level of detail (“level 3”) required. (A paper on these issues is also being presented at this conference.) Ultimately, though, the research must inform how these datasets should be harnessed so that around 2006 we have in place across

the country nationally compatible datasets that are fit for purpose for noise mapping – and that means starting now.

6. ROAD TRAFFIC

Clearly, the establishment of a system to enable road traffic noise to be effectively mapped was potentially the biggest challenge. Arguably rather ambitiously, the first mapping contracts to go out to tender were for London North and London South.

There were several reasons for choosing to begin with London. Firstly, it is obvious that London will be the largest single sub-contract, even if split into two halves. Unless started early in the life of the project, there would be little prospect of completion by the end of 2004. Secondly, the Greater London Authority is in the unique position of being required by law to produce an ‘ambient’ noise strategy. Finally, it was also known that Transport for London held a substantial amount of data which could act as a basis for mapping the major roads in London.

Once mapping sub-contractors are appointed, they will start to make contact with the key data holders and anticipated users of the maps. As well as training through “events”, the sub-contractors are also required to offer “hands-on” training to staff from the stakeholder organisations. It is hoped that this will not only offer an effective route into practical noise mapping for these staff, but will also help to ensure the involvement and co-operation of their organisations. It is recognised that any involvement by local authorities and others will be purely voluntary, but it is hoped that the offer of such training will be seen as a worthwhile benefit of such involvement.

7. PROGRESS WITH OTHER SOURCES

For railway noise, discussions have been held with Network Rail and more recently the Railway Forum. It is clear that in terms of data, the asset management team of Network Rail has much of the information that would be needed for mapping. It is also clear that the project has the opportunity of working with Network Rail so that as they upgrade and develop their data management systems, the information needed for mapping can form part of this process so that when needed it can be obtained relatively easily.

A slightly more difficult problem exists over the question of railhead roughness. CRN was written with new railways in mind and it is inherently assumed within the model that the railhead is relatively smooth. However, there is evidence to suggest that this is not generally the case across the network. Consequently, the average noise from railways may be higher than the levels derived from CRN. Furthermore, an Action Plan for railways might be to increase the frequency of railhead grinding so that the average surface roughness is reduced compared with the current situation, and hence the average noise levels reduced. However, the current modelling protocol within CRN would mean that these benefits would not be reflected in the mapping. Research is about to commence to explore how this issue might be tackled.

For aircraft noise, there is a slightly esoteric question of whether we have a “national method” as referred to in the END. On the one hand there is the Civil Aviation Authority’s ANCON2 model, but it is not clear that this qualifies in terms of the END as a “national method” and in addition, there are difficulties caused by the fact that ANCON2 can only be used by the CAA. Furthermore, the noise impact at some airports is currently assessed using the US Federal Aviation Administration’s INM system. Thus, arguably, we do not have a national method. But, if this is the case, then for the purposes of the Directive we are left with the difficulty that the interim method which as described in END is not a complete package and is, in any case, under revision.

At present, discussions are being held with the Department for Transport and the Airport Operators Association over these issues. In the immediate future, it is likely that the ANCON2 model will be used to generate the Lden contours for one of the designated airports and that work will commence identifying what differences exist between ANCON2, INM and in due course the revised method identified in the END.

The inclusion of industry presents another set of issues. The END indicates that the industries to be mapped are major ones (within agglomerations only) – “such as” those regulated under the IPPC regulations. However, confining the scope to just those industries could exclude potentially significant sources. It may well be that the selection of industries to be mapped can only be made on a case by case basis drawing on local knowledge.

A further issue is how industry should be modelled. At its most simplistic, a site could be characterised by a single point source in the middle. This might give a result that is good enough for a strategic noise map. At the other extreme, every source within a complex site could be separately identified. For a strategic noise map, this might be too detailed. So perhaps the optimum solution is some where between these two extremes – but where? It is intended to let a research contract to explore these and related issues and to try to identify an appropriate way forward. Liaison is occurring with the Environment Agency in connection with the mapping of industry.

8. ADDITIONAL BENEFITS OF NOISE MAPPING

Apart from the broad aims of preparing to meet the requirements of the END and any Ambient Noise Strategy, there are a number of additional benefits to noise mapping of this type. The maps will generate an additional high-level layer of noise information, but this can also be built on for local detailed planning purposes if desired. The existence of the underlying data on the topology, buildings, transport infrastructures and attributes - such as traffic flows - within the strategic model, can greatly simplify the process of building such detailed local assessments. Unlike measurements – even large projects such as the National Noise Incidence Survey – these maps can be used interactively to assess the relative contributions of different sources (including “what-if” scenarios) and in a more geographically comprehensive manner. It does not, of course, make measurement unnecessary – rather strategic mapping complements measurement.

Finally, the benefits of being able to to inform those who are not noise specialists in a manner which is readily understandable should not be underestimated. The use of coloured contours enables anyone to get a basic appreciation of the severity of the noise impact. This is not just a matter of making information available to the public and politicians, it also means that developers and planners can be alerted at an early stage to potential noise problems – through acoustic zoning, for example. Mitigation of noise impacts can be built into developments from an early stage, rather than being almost an afterthought as all too often at present. As a result, it has the potential to move noise “up the agenda”, which should be welcomed.

9. CONCLUSIONS

This paper has presented an update of the Defra research project on noise mapping. It has set out the main aims of the project and described the current progress on the wide range of issues that are having to be tackled.