IMPLEMENTING THE MAYOR OF LONDON'S AMBIENT NOISE STRATEGY

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1 INTRODUCTION

The former Greater London Council was abolished in 1986. The Greater London Authority (GLA) Act of 1999 established the GLA from 2000 as a new regional policy-making body for the UK's capital, consisting of a directly elected executive Mayor, and a 25-member scrutinising Assembly. The Act requires the Mayor to produce a 'London Ambient Noise Strategy' (LANS), published, after extensive consultation, in March 2004[1]. It was the first such city-wide strategy in the UK. It preceded both the Government's own proposed National Ambient Noise Strategy (not due until 2007) and comprehensive noise mapping of the capital – although a few of the 33 local authority areas (boroughs) which make up the capital have undertaken mapping for their own purposes. Even the National Noise Incidence (single, 24 hour, measurements at dwellings) and Attitudes surveys of 1999-2001 had only sampled some outer London boroughs. The LANS therefore had not only to set the pace for other cities and act as pilot for the national strategy; it had to do so under conditions of a lack of comprehensive data on the existing noise situation in London. The difficulties are compounded by a lack of new powers or funding for noise reduction, and a legacy of many years of under-investment in roads, railways, open spaces, housing and other city infrastructure.

At the European level, the other major context is, of course, the EU Environmental Noise Directive (END) that requires noise mapping (by 2007) and action planning (by 2008) for major roads, railways and airports throughout Member States and for all significant sources of transportation and industrial noise in major agglomerations. In the GLA Act, these sources are referred to as 'ambient' noise.

2 LONDON AMBIENT NOISE STRATEGY

2.1 LANS approach

LANS promotes a comprehensive set of policies and proposals which the various local, regional and national actors will need to incorporate in their action planning, operational management and other mechanisms. The initial aim is to convince those responsible for sources of noise and for the design of buildings and open spaces, that there are techniques that can be adopted at reasonable cost that will result in improvements. Many of those in responsible organisations who are in a position to take action, are not experienced in environmental noise control. Some are, indeed, sceptical of its value and practicability. Key tasks for LANS at this early stage in UK noise action planning thus include 'consciousness-raising' and capacity-building, including updating and extending design and management skills.

A key step is setting up effective and motivated 'Noise Action Partnerships'. The first proposal is to create a forum of the GLA and the London boroughs, under the joint leadership of the GLA, the Association of London Government, which represents the boroughs, and the Government Office for London. In future, other organisations may join, or formal partnerships may need to be established

for specific areas of work. An early aim is to identify and secure support for pilot projects to demonstrate effective noise reduction, and quantify costs and implications.

A vital organisation in this process is Transport for London (TfL), which is responsible for the largest of London's roads, most buses, the Underground railway network, the growing network of light rail and trams and increasing involvement in surface railways. TfL is a separate organisation from the GLA, but the appointment of its board and its budget are under the control of the Mayor of London. So, while LANS cannot directly commit TfL to any particular action, TfL is required to adopt the principles of the LANS (and other Mayoral strategies) as far as resources, and its other duties allow. TfL also provides some funding for local transport projects via Borough Spending Plans. The 33 are able to bid for funding noise projects, though at present the available environment budget is small.

2.2 Key Priorities of LANS

The aim of LANS is a practical one – 'to minimise the adverse impacts of noise on people living and working in, and visiting London using the best available practices and technology within a sustainable development framework'. The challenge is to seek further noise reductions at source, while using development layout, building design, traffic management and other means to minimise noise exposure, and achieve progressively better soundscapes.

Three key issues were highlighted:

- Securing good, noise reducing surfaces on Transport for London's roads.
- Securing a night aircraft ban across London.
- Reducing noise through better planning and design of new housing.

Aircraft noise is a significant concern for many Londoners, and the strategy sets out many measures to reduce these problems. However, the key noise controls for Heathrow Airport are the responsibility of national Government. The Mayor has more direct influence on the other two issues, through Transport for London, as outlined above, and through town planning powers. Major planning applications must be referred to the Mayor, who may direct refusal. Local development plans must also be 'in general conformity' with the Mayor's Spatial Development Strategy – 'The London Plan'. These help the Mayor to influence urban design.

3. PROGRAMME TO IMPLEMENT THE LANS

3.1 London Noise Action Forum

The aim is for this "partnership" to have a broad remit. In addition to identifying pilot projects to demonstrate feasibility, it will offer a forum for sharing and developing good practice. During consultation on the draft LANS, some boroughs suggested that London-wide guidance on noise control standards would be useful. Such guidance used to be issued by the Scientific Branch of the former Greater London Council (abolished in 1986). Any new guidelines will need to respect the wide diversity of contexts across London. Thorny issues include 'worst mode', e.g. should homes be designed in relation to the levels of aircraft noise experienced for the worst 25% of the time, or only for an average condition? The aim is to build consensus, and to concentrate initially on areas where guidelines are lacking (e.g. noise from 'party boats').

Borough support is being built by undertaking pan-London research to fill gaps in evidence, where it can be more cost-effective than work by boroughs acting individually. Examples are:

- A London Noise Survey has begun with noise measurements in three inner London boroughs, to quantify differences between inner and outer areas. Due to the sampling approach (selecting authority areas by probability proportional to population) used in a 2001

national survey, only some of the more populous outer London Boroughs had been surveyed. We also hope to be able to add the results of a similar survey commissioned separately by Westminster City Council and publish results for all four inner London boroughs shortly.

- Another study recognises that much of London's housing is relatively poorly insulated both internally and externally, and that, even if new funding or legislation can be introduced, it will take a long time to improve the whole stock. A 'Quiet Homes' study thus reviews the scope for more targeted initiatives, including raising the profile of noise in housing allocation and design.

- A 'Sound-conscious urban design' study has identified examples of development projects, building layouts and design features which address noise in ways which contribute to, rather than detract from, visual quality. LANS recognises that sound quality can define space. It aims to encourage urban designers to work consciously with sound as a positive element of good design, from the outset rather than as an add-on to mitigate adverse effects after fundamental design parameters have been established. Illustrated examples are provided in stand-alone format. The aim is to extend the range.

Through such projects, the GLA and its partners can begin to re-build the sense of London as a coherent whole, with important *strategic* needs for noise planning and action. This can lead to a greater willingness on the part of boroughs to participate in pilot noise action projects. The major challenge will be to obtain new funding. Better understanding of cost/benefit trade-offs will be vital in making the case for new funding. Limited evidence on house price differentials is unlikely to reflect the full potential value of noise reduction. More work is needed, e.g. deriving implied values from analysis of spending in different countries on noise reduction; sleep quality[2]; and any effects of sleep quality on worker productivity.

3.2 Transport for London – planned noise actions

Transport for London (see 2.1 above) is legally required, in exercising its functions, to 'have regard to' the Mayor's strategies, including LANS. Through discounts on the Central London Congestion Charge, TfL promotes electric vehicles and those using certain alternatively fuels, recognising that these are often quieter – although it was not expected that significant changes in overall noise levels would result from the Congestion Charge. TfL aims to set an example in its managed fleets and contracts. London Underground and TfL are developing a predictive monitoring tool to assess the deterioration of rail and to enable them better to predict noise. Docklands Light Railway (DLR) has developed a Noise and Vibration Policy that specifies targets, noise monitoring and maintenance procedures for the network. Noise mitigation measures will be used in extensions to the DLR. London is one of 10 European cities taking part in the CUTE trial of hydrogen fuel cell buses. Three of these Citaro buses are currently in service, and noise is to be assessed. Even in current form – which simply takes a conventional bus and replaces the diesel engine with an electric one – these are quieter. Purpose-designed fuel cell buses hold the promise of being even quieter. TfL also plans to test hybrid diesel-electric buses, which again have the potential to be quieter.

TfL will use the road traffic noise maps recently completed for The Department for Environment, Food and Rural Affairs (Defra) to identify a Traffic Noise Action Programme on the Transport for London Road Network (TLRN). TfL has a limited noise monitoring programme, and more comprehensive work is being considered. TfL has already committed to using quieter road surfaces on the roads for which it is responsible, wherever appropriate, when resurfacing is required. TfL is responsible for about 5% of London's roads by length (580 kilometres), carrying over a quarter of the total traffic. The boroughs are responsible for most of the rest, including about 1,200 kilometres of 'principal roads', many of which are not much quieter.

The London Boroughs can bid for funds from TfL for transport projects, including environmental ones, via Borough Spending Plans (BSP). GLA officers advise on setting criteria and assessing bids. In principle, this provides a valuable mechanism by which LANS can be implemented. However, noise will be in competition with many other issues for a budget that is very limited in relation to needs, including large maintenance backlogs. BSP's will not meet the scale of action needed to make significant improvements. The aim will be to secure pilot projects, which can demonstrate scope for wider action, and build local skills and confidence.

4 NOISE MAPPING AND ASSESSMENT

Noise mapping is a useful tool for identifying 'hotspots', and for designing mitigation where receptors are affected by more than one road, for example. However, it must not be allowed to dominate policy to the exclusion of matters which may reduce annoyance more, but not show up on the map (e.g. replacing road humps with other means of achieving lower link speed).

The Defra maps will allow a strategic overview in terms of the number of residents exposed to particular levels of ambient noise. They can help to focus action where the benefits appear greatest (in terms of 'people–decibels', or 'standardised long term annoyance'). With access to the underlying databases and the ability to add greater precision and detail, it will become possible to run 'what-if' scenarios to help create more detailed local action plans.

However, it is important to bear in mind the limitations of such high level strategic maps. The London road traffic noise map, for example, has a number of characteristics that may limit its utility for assessing some potential types of noise actions. Many of the limitations of END type mapping, such as the 4 metre receptor height, limitations in building height data, shortcomings in the Calculation of Road Traffic methodology and the use of L_{den} as the main indicator, have been widely discussed elsewhere and need not be repeated here.

However, one important issue that does not seem to have received the same level of attention is how to ensure that over-reliance on such mapping does not cause small incremental noise reductions to be under-valued. Noise assessment has tended to focus on whether individual projects cause changes that can be readily perceived. Proactive city noise management, on the other hand, will often mean revisiting the same network periodically with measures which can be cumulatively significant. For example, some types of noise reducing road surface may only reduce noise by 1 or 2 decibels – often regarded as 'imperceptible' and so disregarded in scheme-specific assessments. Yet, when coupled with other small improvements over time, the result may be noticeable improvements. Convincing traffic engineers that these are worthwhile can be difficult if they are in the habit of considering each proposal in isolation, using simple 'minimum perceptible change' criteria. Mapping, by concentrating on changes in the 5 dB contour bands may further hide the effect of such changes and so add to the difficulty.

Apart from assessing the overall numbers of people exposed to different levels of noise, the GLA also needs to consider how noise impacts different sectors of its very diverse population. Noise mapping data can be overlaid with demographic data, using GIS. Although simple in principle, intellectual property right issues and how mapping data is layered can be significant constraints.

5 NOISE ACTION PLANS

In 2008, Agglomerations such as London will be required by the END to have drawn up noise action plans to be submitted to the European Commission. Those responsible for major roads, railways airports and industrial sites will also be required to draw up such plans. Although at the time of writing (September 2004), the Government has not yet indicated the precise boundaries to be used to delineate London (and other agglomerations) nor the authorities to be designated as "competent"

for these purposes – and neither has it or the European Commission yet given any guidance on the form of such plans - in London, the GLA and TfL appear likely to have significant roles to play in this process. While LANS – and in particular its formal Proposals - provides a substantial foundation for potential GLA and TfL action plans, further development will be needed to provide the "rules of engagement" to turn these proposals into effective and practical detailed action plans. It is worth considering how that development process might affect some common existing practices in UK noise assessment. In particular, there is a link between the need to develop noise action plans and the issue of small incremental changes, when considering new sources.

There are, of course, two general types of situation in which noise impact assessment is required – new sources affecting existing noise sensitive buildings and new noise sensitive developments which will be exposed to existing noise. As discussed in (4) above, in the first case, many decisions on individual projects have been made on the basis that changes of less than 1dB are not significant. But if a noise action plan has identified the area as being already exposed to noise above a desirable level, then decision-makers may wish to adopt more stringent approaches to any additional impact. How these issues are approached is likely to depend heavily on any new limits Government may set in response to the END process. In practice, action plans may involve challenging choices for decision-makers. For example, a proposal might raise the exposure of some people by only a fraction of a decibel - but in an area already above the action plan limit - whilst the wider population gains substantial noise reductions. But the potential must exist for action plans to require action which would not be triggered by consideration of the project in isolation, otherwise the action plan is not achieving the objective, clearly intended by the END, of considering the wider environmental context and controlling the overall noise exposure of the population.

Similarly, it has been common practice – at least in busy urban areas – to accept proposals for new dwellings exposed to noise in Noise Exposure Category (NEC) C (and even, occasionally, D) of PPG 24, provided sound insulation is provided to achieve "acceptable" internal noise levels. But the END, like PPG 24 itself, places the emphasis on external noise levels. In part, this is based on studies that indicate that access to (relatively) quiet areas outside the home (including, but not only, "quiet facades") has important benefits. However, it is also a consequence of the thrust of the END and recent EU policy in general - to try to protect and improve the whole environment and to ensure that, as far as possible, people are not forced to spend their lives sheltering in "acoustic prisons" from the noise outside their homes. In this regard, the principles of PPG 24 are in line with EU policy, even if in practice its advice to "not normally" grant planning permission (in NEC C) has been interpreted as being far from prescriptive. When noise action plans are drawn up there is a strong argument for linking them to a planning process that actively seeks to improve the noise exposure profiles of the population. This could lead to a tightening of planning policy for new noise sensitive developments.

In practice, the general approaches described above, for both new sources and new receptors, will need to be balanced against the wider social needs for new development – especially the pressing requirement for new housing - without expanding cities into ever larger, unsustainable suburbs and (potentially) quiet areas. This will mean, as the London Plan[3] indicates, higher density development and extensive use of "brownfield" sites. While achieving such a balance will be challenging, LANS recognises (paragraph 4F.2) that compact cities can enable more people to gain access to more facilities while generating less noise, notably from mechanised transport. Such benefits could be lost in the long run if planning policies were to preclude development in all currently noisy areas. Therefore, noise action plans need to be integrated with wider action on making cities more sustainable. Increments of noise action need to be cost-effective in their own terms, and competitive bidding for specific noise reduction projects can have early advantages in encouraging innovation, and realising the aspirations of those most keen and ready to act. However, there is also a powerful argument for focusing on those areas where noise levels show the greatest excess over relevant values. A factor to be considered is that the short-term costs of a given dB improvement may be higher in urban, rather than suburban, areas and higher for the worst affected areas.

The EU Green Paper of 1996 stated that an estimated 20% of Europe's population was exposed to undesirably high external noise levels and this was the main argument for developing the END and

revising the whole EU approach to environmental noise management. In such a situation, action plans need to be able to demonstrate - for both new sources and new receptors – that they provide a framework for overall control or reduction of environmental noise, accompanied by appropriate powers and resources. While the content of action plans must be a matter for wide-ranging discussion and consultation (a requirement of the END in any case), it seems certain that any future END 'limit values' will be based on external noise levels (the END indicators, L_{den} and L_{night} are explicitly defined as external noise levels, for example) and will probably fall somewhere within the range of PPG 24 Noise Exposure Category C.

6 THE FUTURE

6.1 New approaches

From the national noise survey work completed in 2001, it appeared that outer London was noisier on average than the UK as a whole, not because its noisiest areas experienced higher levels, but rather because the quieter areas were less quiet. Recent London Noise Survey measurements in inner boroughs support this. It indicates the importance of protecting, enhancing and increasing such areas where possible. LANS promotes exploration of the value of designating 'areas of Relative Tranquillity or Special Soundscape Interest.' As with the evolution of urban ecology policy in the 1980s, the aim is not just to preserve areas which meet an absolute criterion, as in the END definition, but to consider the value of local access to places which may not meet such a criterion, but can provide valued local respite from noisy surroundings. Policy also needs to consider sounds which can offer relief through their distinctive character, eg. active water.

The Mayor has been able to push through the improvement of Trafalgar Square in central London. The north side of the square has been pedestrianised and people can now hear the central fountains from the steps of the National Gallery, where before they were separated by a wall of traffic. The aim is to improve public spaces across the city. Conflicting pressures will need to be balanced. For example, noise from people in the street could become more noticeable as traffic noise is reduced. Design and management of open spaces – and partially pedestrianised streets - needs to provide both for quiet areas and children's play. Much of London's extensive network of canals and rivers is relatively quiet. Traditionally, parts of this network have been noisy round the clock. Many wharves are statutorily protected, and will be important for handling aggregates, wastes and other bulk loads. However, demand for waterside housing is also increasing and new residents are likely to expect these areas to be (relatively) quiet.

A critical factor in balancing these demands will be to encourage more imaginative design and management of buildings and open space, to take greater account of acoustic issues than is normally the case. The 'soundscape' needs as much care as townscape or landscape. Sound quality needs addressing as an integral part of noise control. Sounds can be a positive element of city character and the use of water features such as fountains, to help mask unwanted noise, is well established. Recognising the value of other distinctive sounds, either natural or anthropogenic, can be more controversial. For example, birdsong can disturb sleep as well as evoke tranquillity.

However, we need to acknowledge the sheer enormity of the task of improving sound environments if we rely only on removing acoustic energy[4]. Should we pay more attention to changing some of the characteristics of unwanted noise, such as from vehicles or industry, as well as reducing overall acoustic energy? Concepts from vehicle noise control engineering (e.g. harshness) could suggest ways forward. The car industry does not simply make vehicle interiors quieter, but considers the attractiveness of the actual sounds heard. We would need to develop environmental noise modelling and mitigation measures that can predict and modify a mix of environmental sounds – a bigger problem than on a car, with more uncertainty, but worth serious investigation. This will clearly take considerable further research, although some recent progress has been made by researchers such as Bergitta Berglund and her colleagues[5], towards the objective classification of urban soundscape quality.

We also need more integrated pan-European research, in a sample of environments from central city to rural, to quantify some of the maximum feasible benefits obtainable from 'global' changes, such as the replacement of internal combustion engines with hybrid-electric drive.

Developing a Mayor's award to encourage innovative acoustic design is one way London could, in a modest way, encourage new thinking. European-level co-operation is really needed, at a large scale, to develop practical ways to include qualitative considerations.

6.2 Possible "soundscape" projects

Until such innovative approaches are practicable, soundscape projects will need to involve well established, but often overlooked, principles. A number of high profile developments have been proposed for London that offer scope for the imaginative use of both noise mitigation and soundscape work. These include the re-development of the Lower Lea Valley in east London. This area includes much underutilised land, a disused sports arena and ageing industrial facilities, as well as the River Lea, other water channels, and open land used for recreation. The area is proposed to be redeveloped for mainly residential and recreational use, with the relocation of some industry. It offers opportunities for working with sound as a positive feature of a new environment. Even greater opportunities will arise if London is chosen to host the 2012 Olympic games, as the Olympic village and the main sporting venues will be located in this area. London's Olympic vision includes extensive landscape improvements to take best advantage of the considerable potential of the Lower Lea Valley's natural assets. Environmental issues will be central to the bid. This provides an ideal opportunity to develop sound-conscious urban design concepts in practical ways.

London's population is growing. From 7.3 million in 2003, it is expected to reach 8.1 million by 2016. The London Plan calls for a sizeable expansion of new housing, much on former industrial land and in many cases at higher densities than formerly. This poses challenges in noise control, but major new, high profile, developments also offer opportunities to create their own environment. Such large-scale projects can often use innovative design approaches that would not be realistic for smaller ones, where innovation is most likely to be at the scale of individual building. The GLA noise team is seeking to encourage new thinking in acoustic design for these developments.

7 CONCLUSION

This paper has outlined some of the issues and interactions inherent in implementing a citywide noise strategy such as LANS. It raises some issues related to implementing the EU Environmental Noise Directive. LANS looks to partnerships between representatives from key sectors as a mechanism to identify new ways of both reducing noise and improving soundscape quality, for the growing population living and working in, and visiting, London. The requirement to produce the UK's first citywide ambient noise strategy has given London a key role in helping to develop UK policy in response to the EU initiatives. LANS also offers a basis for developing the first round of detailed London noise action plans. It is suggested that such plans will necessarily require changes to some existing planning practices for both new noise sources and noise sensitive developments. By looking beyond source reduction and protection of receptors (important though these are) towards a broader approach, including urban planning, working positively with sound, and the protection and extension of quiet areas, it is hoped that the LANS can engage the interests and resources of many outside the acoustics community as well as those routinely involved with environmental noise issues.

8 DISCLAIMER

The views expressed in this paper are those of the authors and not necessarily those of the Mayor or The Greater London Authority.

9 REFERENCES

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