ANC Response to Davies Commission Discussion Paper on Airport Noise

5th September 2013

The Davies Commission 'Discussion Paper' has discussed a number issues related to the noise impact of aircraft on the population. It has simplified this discussion into a number of questions and has invited comment from the public and other bodies. The text below represents the response and comment on behalf of the Association of Noise Consultants to these questions.

The comments have been compiled on the basis of the consensus view of the ANC member companies involved in the ad hoc committee formed to prepare this response, any areas in which opinions differed are identified.

What is the most appropriate methodology to assess and compare different airport noise footprints? For example:

Q What metrics or assessment methods would an appropriate 'scorecard' be based on?

The discussion paper makes the links between the evidence base on the effects of noise and the methods to be used to assess effects on people. This is a positive and welcome step. However, the links are not always as strong as they need to be and we would submit that any methods used to assess noise effects on people should flow from and be underpinned by the best available scientific evidence on effects including, but not limited to: annoyance, cognitive impairment, sleep disturbance and cardiovascular diseases. It is recommended that specific effects be assessed using best available knowledge on Lowest Observed Adverse Effect Levels (LOAEL) and Significant Observed Adverse Effect Levels (SOAEL), consistent with the Government's noise policy (as defined in the NPSE). A strategic consideration of specific effects (especially sleep disturbance, cardiovascular effects and cognitive impairment) should ensure that a proper level of focus and emphasis is given to levels of exposure to aircraft noise which may be potentially harmful to health. It is also recommended that a precautionary approach be taken with respect to the assessment of such effects.

Even at a strategic level, it should be practical to assess effects on people using a combination of metrics. Given that exposure and human response to aircraft noise is complex, it is recommended that a combination of $L_{Aeq,T}$, L_{max}, SEL, time of day and in particular the number of events should be considered.

Separate assessments should be carried out for day and night. It may also be appropriate to consider other time periods, such as the evening period, the early morning period or weekends.

The key UK research studies performed to date have been highly contentious. For example, there has been significant controversy surrounding the ANASE study. This means that there is significant public mistrust in the assessment methods which are currently used to perform strategic assessment of different options and to inform policy decisions. We would suggest that the governance structures currently in place may be part of the problem. For example, the perceived lack of independence in the organisations responsible for conducting or managing research programmes is likely to

be a hindrance to the acceptance of the findings of such studies. It is therefore recommended that a review of current governance structures and mechanisms be undertaken by a panel of

independent experts with a view to making recommendations about possible improvements to the governance structures and systems currently employed.

Q To what extent is it appropriate to use multiple metrics, and would there be any issues of contradiction if this were to occur?

Multiple noise metrics would allow different effects of aircraft noise to be appraised.

Multiple non-acoustic metrics appear useful in communicating noise effects to the public. An Apparent contradiction might arise as the spatial dispersion of different noise metrics might be different e.g. the contours for $L_{Aeq,T}$ related to annoyance, may be a different size or shape to those for SEL or L_{Amax} for sleep disturbance.

Q Are there additional relevant metrics to those discussed in Chapter 3 which the Commission should be aware of?

It is recommended that a suite of supplementary metrics be considered to support the communication of findings of the potential effects of aircraft noise. These are set out in the table below [supplemental metrics]. However, it is recommended that the information provided in the discussion paper is not sufficient to make clear recommendations about communicating the effects of aircraft noise. It is recommended, therefore, that a work programme be undertaken to review current best practice on the communication of noise effects and that the results of this review be used to effectively road test any supplementary methods. This may include appropriate pilot studies.

Furthermore, recent innovations have been made in the communication of effects using auralisation (verified sound demonstrations). It is recommended that the potential of such techniques be explored.

Supplemental Metrics – Public Communication	TA	Time Above Noise Metric: The amount of time that noise levels are	Minutes/day	Daily
	NA	Number of Events Above Noise Metric: the number of noise events	Events/day	Daily
	Flight Paths	Indication of flight "corridors" i.e. where to expect aircraft over flight	Day	Show different airport modes
	Respite	Opposite of TA – time when aircraft noise less than a specified level	Minutes/day	Daily
	No of Movements	No of aircraft	Day	Show different airport modes of operation

Q What baseline should any noise assessment be based on? Should an assessment be based on absolute noise levels, or on changes relative to the existing noise environment?

It is recommended that use of both methods be considered. For example setting a lower absolute limit, below which effects are not expected to be significant and above which, use the changes relative to the existing noise environment. This also it depends on the effect being

considered e.g. Annoyance – changes relative to baseline; Sleep disturbance – Absolute noise levels.

Any such assessments should be underpinned by the best available scientific evidence and, where possible, scientific consensus. There is a growing body of evidence and consensus about the combined effects of noise and this evidence should be reviewed and considered. This includes the combined effects on sleep resulting from exposure to different sources of transportation noise. These combined effects were debated at some length at the Heathrow Terminal 5 Inquiry. It is recommended that the evidence submitted to and any lessons which were learned from that inquiry, be used to inform the current consideration of aircraft noise in mixed noise environments. In the absence of robust studies it is suggested that the possibility of additive effects cannot be ignored.

For aircraft noise is it suggested that single source assessment of aircraft noise, supplemented by consideration of evidence on combined effects, would be a robust approach.

Q How should we characterise a noise environment currently unaffected by aircraft noise?

First, it would be necessary to establish why a noise environment currently unaffected by aircraft noise requires characterisation. This may relate to the potential introduction of aircraft noise to an area first the first time (eg the construction of a new airport, or large scale re-routing), in which case it will be important to capture all data which could be relevant in comparison with the potential metrics described above. Particularly relevant to the TA and respite concepts would be the statistical distribution of ambient noise levels over extended time periods, including seasonal variations.

To facilitate an informed multi-metric approach, the character of the noise environment should be described using as wide a range of noise indices e.g. $L_{Amax,T}$, $L_{A10,T}$., $L_{Aeq,T}$ and $L_{A90,T}$ for day, evening and night, as possible.

Q How could the assessment methods described in Chapter 4 be improved to better reflect noise impacts and effects?

Consider a wider range of effects than at present e.g. annoyance, speech interference (indoors and outdoors), sleep disturbance, impacts on children's cognitive development and direct health effects.

As well as modelling airport operations averaged over a range of modes, also show the predicted noise propagation under the specific modes of operation.

Use supplementary indices such as:-

- Flight Paths
- Aircraft movement numbers
- Respite between aircraft movements
- The number of aircraft above a specified noise level
- The total amount of time above a specified noise level

It is recommended that risk assessments be carried out for sleep disturbance using best available exposure response relationships including dose-response relationships for noise induced awakenings. This should include consideration of the work reported by Basner et al.

Q Is monetising noise impacts and effects a sensible approach? If so, which monetisation methods described here hold the most credibility, or are most pertinent to noise and its various effects?

Monetising noise impacts could be useful for comparison of different options for managing the noise from an airport and for the evaluation of the cost benefit or cost effectiveness of the proposal. i.e. rating the noise impacts against socio-economic benefits and health impacts. Doing so allows the benefits and dis-benefits of decision making to have a value related to society's willingness to pay for these effects. This provides "standardisation" of different effects and brings more rigour to the balancing of adverse with beneficial effects in the decision making process which can be particularly helpful where resources are limited, and where choices must be made across different policies i.e. economic, health and environmental policies. Providing a stated preference approach to valuing noise is preferred as the concept as it appears more credible and easier to articulate than hedonic pricing.

Experience with Land Compensation claims, has, however, shown what a difficult concept monetising is, when valuing an inanimate object such as property affected by increases in individual's sensitivities to noise is complex.

Q Are there any specific thresholds that significantly alter the nature of any noise assessment, e.g. a level or intermittency of noise beyond which the impact or effect significantly changes in nature?

The NPSE clearly states that Significant Observed Adverse Effect Levels -SOAELs should be avoided as far as possible within the context of Sustainable Development. It is likely, therefore, that the effects on people will be unacceptable if a SOAEL is significantly exceeded. Consequently, in line with NPSE, LOAELs, SOAELs, thresholds of significant harm in terms of human health and quality of life should be established to inform the strategic assessment of different airport expansion options. In addition, the number of aircraft movements over a specific period especially at night is considered to have a significant bearing on effects.

Q To what extent does introducing noise at a previously unaffected area represent more or less of an impact than increasing noise in already affected areas?

This will obviously depend upon the circumstances and the degree to which areas are already exposed to aircraft noise, especially at levels above SOAELs and thresholds where significant harm in terms of human health and quality of life might be expected. Health Impact Assessment techniques should be used to assess the extent to which noise, at in a previously unaffected areas, represents more or less of an impact than increasing the noise in already affected areas.

In broad terms, policy in the NPPF and NPSE suggests that avoiding or minimising adverse health effects in already noisy locations would normally outweigh avoiding or minimising impacts on the amenity or ecological value of relatively quiet areas, where the choice is between introducing noise to a previously unaffected area, or increasing noise in already affected areas.

Q To what extent is the use of a noise envelope approach appropriate, and which metrics could be used effectively in this regard?

Noise envelope approaches may be useful depending upon the circumstances. However, it is likely that sole reliance on $L_{Aeq,T}$ contours will be limited. Because the link between exposure and the response to aircraft noise has been questioned by the ANASE findings, it may be necessary to define the envelope using a combination of LAeq,T, Lmax, SEL, number of events and time of day. Controls that include the maximum permitted number of persons in each noise contour between 50 and 75 dB $L_{Aeq,T,16h}$ are also considered to be appropriate

As noted above auralisation (verified sound demonstrations) could play a valuable role in facilitating stakeholder input to defining and accepting any envelope set. It is recommended that the potential of such techniques be explored

Q To what extent should noise concentration and noise dispersal be used in the UK? Where and how could these techniques be deployed most effectively?

Where practicable, noise concentration over less sensitive localities should be promoted that is to maximise use of noise preferential routes. Where this isn't practicable we should still aim for noise concentration affecting the least number of persons practicable; and put in place local mitigation schemes e.g. noise insulation, and compensate existing noise sensitive land occupiers for loss of amenity as appropriate. The control of development to prevent creep of noise sensitive land use into areas affected by high levels of aviation noise e.g. > 69 dB LAeq, 0700 to 2300 hours should be avoided.

Q What constitutes best practice for noise compensation schemes abroad? and how do these compare to current UK practice? What noise assessments could be effectively utilised when constructing compensation arrangements?

There are airport noise insulation schemes in place at all of the principal airports in England, including Heathrow, Gatwick, Stansted, Birmingham and Manchester. Many regional airports also operate such schemes. The majority of the schemes are daytime only with the qualifying criteria ranging from 55 dB LAeq 16h at East Midlands airport to 69 dB LAeq 16h for Heathrow. At the three airports which operate night-time insulation schemes (all are SEL based), Heathrow and Gatwick have set a qualifying level of 90 dB(A) SEL, whereas Bristol is 82 dB(A) SEL. The table below provides a snapshot of International airport noise insulation schemes NB: this is a sample of schemes accessible via the internet in 2009.

International Airport Noise Insulation Schemes (2009)

Airport	Qualifying Criteria
North America	
JFK, La Guardia, Newark	Schools that are in or had been in the 65 dB(A) or higher L_{DN} contour
Oakland Intl	65 dB(A) CNEL for residential properties
New Orleans	65 dB(A) L_{DN} for residential properties
San Diego	65 dB(A) L_{DN} for residential properties
San Francisco	65 dB(A) CNEL
Los Angeles	65 db(A) CNEL
Seattle/Tacoma	Sound Insulation Program, information on criteria not available
Anchorage Intl	65-69 dB(A) L_{DN} for residential properties
Vancouver	L_{dn} dB(A) 60 for continuous noise and SEL 75 for sporadic noise
Calgary	None. Noise issues tackled through land use control
Montreal	None
Ottawa International	According to information provided by Transport Canada, building code requirements due to the cold climate have been in place since the early 1970s and include solid core doors, weather stripping, double glazed windows and a high rating of attic and wall insulation, so there is no need for airport to have sound insulation programs.
Toronto	No information available
Europe	
Schipol	58 dB(A) (L_{den}), 49 dB(A) (L_{night})
Amsterdam	63.71 dB(A) L_{den} 54.44 dB(A) L_{night}
Charles de Gaulle	L_{den} 55 dB(A)
Frankfurt	Noise insulation contours of the insulation programme are defined by a combination of L_{Aeq} 55 dB and a max noise level of 6 x 75 dB(A). The target is to avoid noise events that regularly exceed 6 x 52 dB(A) "at the ear of a sleeping person".
Dortmund	Eligibility based on a L_{eq} > 62 dB(A) 24 hour noise contour
Hamburg	Exceedence of L_{eq} 65 dB(A), 55 dB(A) for indoor areas
Madrid	65 dB(A) L_d, (L_{eq} 0700-2300), 55 dB(A) L_N (L_{eq} 2300-0700)
Prague	65 dB(A) L_d, (L_{eq} 0700-2300), 55 dB(A) L_N (L_{eq} 2300-0700)
Oslo	L_{DEN} >60dB outdoor and L_{Amax} > 60dB indoor
Australasia	
Auckland	Existing Buildings subject to noise from aircraft operations: AIAL is required to offer acoustic treatment based on Annual Aircraft Noise Contours once Existing Buildings are within the L_{dn} 60 dBA contour and L_{dn} 65 dBA contour. This includes educational facilities, registered preschools, household units, child centres, hospitals, and rest homes. Offers in the L_{dn} 60 dBA contour are 75% funded by AIAL and in the L_{dn} 65 dBA contour are 100% funded by AIAL.
Sydney	ANEF 30 dB(A) for residences (Australian Noise Exposure Forecast)
Cairns International	None
Thailand	Higher than NEF 40 dB(A) triggers offer of compensation
Macau International	None
Changi International	None. Noise issues tackled through land use control

The majority of airports listed above use derivatives of the L_{eq}, which makes direct comparison to the UK difficult. The three German airports, however, all employ L_{eq} based schemes, with the criteria ranging from 55 to 65 dB(A).

It should be noted that in the USA, FAA Sound Insulation Guidelines recommend a criterion of 65 dB(A) L_{DN}, which is regarded as being interchangeable with 65 dB(A) CNEL. An approximate L_{eq} can be derived from L_{DN} by the subtraction of 10 dB. Therefore, it can be seen that the qualification level for most U.S schemes is at the lower i.e. "more generous" end of the range found in the UK i.e. approximately $L_{eq,24\ hr}$ 55 dB(A).

Direct comparison of the UK range of criteria with International standards is difficult because of the difference in noise indices and time periods use. In broad terms, however, the UK can be regarded as about in the middle of range of the standards used internationally; with the bottom of the range found in the UK comparing favourably with the most generous schemes worldwide, and the top of the range found in the UK approximating to the least generous schemes found internationally.

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