

Expansion of Bristol Airport to 12mppa

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Proof of Evidence for PCCA

Laurence Vaughn

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1. Introduction

My name is Laurence Vaughn and I am a director of Quiet Places Ltd, an environmental noise mapping company and I am also a Principal Engineer with Norton Straw Consultants. I am a practicing engineering consultant with over 20 years experience in providing engineering advice and assessments across a wide range of industries. I have a BEng (Hons) degree in Mechanical Engineering and a PhD in adhesives, both from the University of Bristol. I am a Chartered Engineer and a Fellow of the Institute of Mechanical Engineers as well as a Member of the Institute of Materials, Minerals and Mining. I have a certificate in Environmental Noise Measurement from the Institute of Acoustics and I am a member of the UK Acoustics Network. I am also a Parish Councillor in the village of Wrington in North Somerset.

My experience in environmental noise includes:

- A certificate in Environmental Noise Measurement following a week-long course and formal assessment (including both an exam and a written report), by the Institute of Acoustics;
- Noise calculations at residential properties arising from activities on industrial sites;
- Providing environmental noise calculations at a residential property for people concerned about noise when moving home. This takes account of the noise arising from road, rail and air traffic as well as geographical information (GIS) in a region around a property. At Quiet Places we have developed our own noise calculation software based on open source data and algorithms which uses as inputs Ordnance Survey data, road traffic information, rail movements and aircraft flight data.

2. Glossary

For terms relating to the acoustic and noise aspects of this proof, I refer you to the glossary contained in Appendix 7A of BAL's original environmental statement (CD2.5.17).

3. Scope of Evidence

In this proof I look at the main causes for concern regarding BAL's noise assessment.

4. Concerns with the Noise assessment

My evidence is that BAL's noise assessment cannot be relied on due to a great deal of uncertainty regarding the methodology used and the conclusions reached. Given how badly noise from the airport affects local residents, it is essential that there is certainty in relation to these effects so that the inspectors can determine whether the effects are acceptable. Additionally, the approach taken by BAL does not recognise the Aviation Policy Framework objective to reduce the number of people significantly affected by aircraft noise.

My concerns with BAL's assessment of noise include:

Forecast Air Traffic Movements

- The growth scenarios are used to estimate the future aircraft movements, and the assumptions embedded in these lead to considerable uncertainty in respect of the conclusions that are drawn. Current expectations are that flying for leisure travel will recover much faster than for business travel (McKinsey [How air travel is evolving post pandemic](#) (CD10.30)). Similarly, aircraft that have been parked up and pilots that have been furloughed can't be simply switched back on overnight and, from a commercial point of view, the relatively cheap seat prices for leisure travel are unlikely to persist, providing a further drag on the recovery of the industry. Simply put, if the aircraft movements are wrong the data calculated for noise are also incorrect.
- More flights will produce more noise. The updated forecasts show that there will be growth from 61,382 atm (all flights) in 2019 to around 75,500 atm (commercial flights) at 12 mppa in 2030. If the predicted 10,000 'other' movements are added, the total would be 85,500 movements annually, an increase of approximately 40%.
- The only way that it can be shown that overall noise is to decrease with an increase in the number of flights is through a fleet of aircraft that are significantly quieter. BAL have made an assumption that new aircraft will be quieter without certainty or the basis of any engineering technology to back this up. They have also assumed that these new, quieter, aircraft will be adopted by the operators as soon as they are available. Both of these assumptions are unrealistic at best and harmful at worst, since if either assumption is wrong then noise will be higher, not lower.
- More aircraft movements and passengers also means more road traffic, again creating more noise in both the vicinity of the airport and the road network.

Main Report EIA Table 6.6 (CD2.20.1)

- Table 6.6. is used throughout to provide the association between a noise level change and whether the impact is classified as Negligible through to Very Substantial. Note that the only metric used in this assessment is the change in

noise level (dB) (e.g. Table 6.7). The Government Aviation Policy Framework (CD6.1) recognises that not only is there no consensus on the way to measure the noise impacts of aviation (paragraph 3.18), but also noise contours should not be the only measure used (paragraph 3.19).

- No reference is provided for Table 6.6. It also appears as Table 7B.7 in the original submission (Env Stmt Chp 07 App 7A-G (CD2.5.17)), and a reference is given as '*Institute of Environmental Management and Assessment (2014). Guidelines on Environmental Noise Impact Assessment. London: IEMA*' (CD10.5). 7B.6.22 states that Table 7B.7 'has been used successfully in various airport Public Inquiries' but no reference is provided for this. Hence it is concluded that this table is not based on any peer reviewed guidance.
- The IEMA document (CD10.5) is exactly what it describes itself as, a guidelines document and hence does not offer any impact assessment tables that can be used as-is. Paragraph 7.77 of this document explicitly addresses this: '*Following the publication of the draft guidelines in 2002, there was evidence of some confusion over their application. At no time did these guidelines confirm that a certain noise level change equated to a certain semantic description of the magnitude of the noise impact. As indicated above, the assessor must form a view about the appropriate descriptor, taking account of the objective evidence of the expected noise change, and making a professional judgement regarding the effect of the noise impact.*' Some discussion is introduced in the IEMA guideline document to illustrate how the impact assessment is not simply an evaluation of the change in noise level (paragraphs 7.75 and 7.76), in a way that seems particularly relevant to the operation of an airport. i.e. Table 6.6 makes no account for the number of events (flights) and their timings (e.g. early morning) in the impact assessment and whether the change is therefore significant or not. Hence the approach taken with Tables 6.6 and 6.7 is not consistent with the IEMA guidelines and does not capture all expected factors, such as the time of day, or the number and frequency of aircraft movements.
- This aspect is underlined in the Government policy on aviation noise (CD6.1) which recognises that people do not experience noise in an averaged manner (paragraph 3.19). Hence the approach for noise assessment used by BAL is inherently flawed as it does not account for the number, frequency, nor the time of day, of aircraft movements.
- It is also the case that this approach also makes a tacit assumption that the noise that residents are currently exposed to is acceptable. The noise assessment is predicated on only considering change as a result of the increase in number of aircraft movements. Hence there is an inherent bias that any local residents are accepting and content with the noise currently produced by aircraft movements at BAL.

- The approach at Bristol Airport is in line with the latest NATS aircraft noise restrictions notice for London Heathrow, London Gatwick and London Stansted. However this approach has two in-built biases and assumptions:
 - 1) that the noise from aircraft has no impact below a level of 81EPNdB;
 - 2) that the noise from any aircraft movements outside of these hours has no impact.

It is also of note that the approach adopted, with a nominal points-per-movement counting towards an overall point quota, and a limit to the number of flights, is somewhat at odds with the approach taken for non-nighttime aircraft movements, clearly underlining the deficiencies in this part of the noise assessment by BAL.

- Clearly all aircraft make noise on both takeoff and landing and, as discussed earlier in this document, their impact is not simply a measurement of the noise produced, but also needs to consider the number of events and the time at which it occurs. However, to make an assumption that there is a threshold at which the noise impact of an aircraft movement is zero is clearly nonsense. To make this assertion especially during nighttime, when local residents are likely to be asleep and most sensitive to aircraft movements, seems doubly so. The Government Aviation Policy Framework (CD6.1) recognises 'that the costs on local communities are higher from aircraft noise during the night, particularly the health costs associated with sleep disturbance' (paragraph 3.34).
- Similarly the requested change from a seasonal split between the permitted number of night flights from 3,000 in the summer and 1,000 in winter, to an overall annual limit of 4,000, is clearly going to be used to increase the number of summer night flights (e.g. Table 6A.8 in the EIA appendices (CD2.20.4) where medium jets will increase nighttime summer movements from 3090 with 10 mppa in 2030 to 3820 with 12 mppa in 2030, a 23% increase). By ignoring the number and frequency of aircraft movements in evaluating the impact of noise, the consequences of this significant increase has been conveniently neglected.
- In an interesting parallel, the church in the village of Wrington (the same parish that the airport is located in) was the subject of a noise abatement notice after one complaint regarding the church clock chiming every 15 minutes during the night. North Somerset Council officials instructed the vicar to silence the bell between 23:00 and 07:00. (<https://www.bbc.co.uk/news/uk-england-somerset-17838390> (CD10.31))
- The NATS noise classification of aircraft is intermittently updated to reflect the introduction of new aircraft types, however it is not clear that it has been recognised by BAL that aircraft have different EPNdB ratings depending on whether they are taking off or landing, which needs to be taken account of when calculating the impact of an aircraft movement on the quota count.
- It is disingenuous to provide a means to control and limit nighttime aircraft movements when this does not cover the full night period, defined as 2300hrs to 0700hrs by BAL throughout their discussion on noise. The BAL approach is only for the period from 2330hrs to 0600hrs. That means that the shoulder periods of 2300-2330hrs and 0600-0700hrs are not regulated by the night-time restrictions

and would also be outside the agreed daytime noise contour restriction (0700-2300hrs). This arrangement permits a significant number of shoulder period flights to occur during the nighttime period, but not be counted towards the limit on number of nighttime movements nor the quota.

Main Report EIA - Noise Monitoring Terminals (CD2.20.1)

- BAL operates three Noise Monitoring Terminals (NMTs), however no precise information is provided on their location, nor on their calibration or the training provided to their staff to operate them.
- Equally, even though there is many years worth of data that has been measured, the use of this data is limited to a statement in the annual monitoring report that '*no movements exceed the threshold for a noise penalty*' (CD14.7). There is a minor mention of using the measured noise data to validate the noise modelling (6A-9 Updated Aircraft Information (CD2.20.4)), but only to check the noise produced by the Airbus A320neo and A321neo aircraft operating from the airport. No attempt has been made to offer a comparison against the calculated noise contours (which is also a process known as validation). With such a rich amount of data at their disposal, this omission is a huge oversight, and also implies that the measured data does not support the modelling conclusions.

Appendix 6B Noise Figures (CD2.20.4)

- Many of the noise contours presented in this appendix have artefacts that question the validity of what has been presented. e.g. Figure 6A.1 and 6A.2 both have small ring contours that are disassociated from the other contours, located to the East of Winford. Small 'islands' of increased or decreased noise are nonsensical given the methods used. Equally Figures 6A.11 and 6A.12 present difference contours, yet both have odd regions of 'differences' that are unexplained.
- The noise contours provided are typically dual mode, as in they combine results for two runway directions together. Hence they do not represent the noise associated with the actual operation of the airport, where a single runway direction is used at any one time (depending on wind direction), usually decided on a daily basis.
- The use of single mode contours would therefore be a better representation of the real world situation and that experienced by local residents.

Road traffic noise (CD2.20.1)

- Table 6.6 is used for the assessment of road traffic noise, and the comments raised earlier apply equally for road noise.
- The data provided in Table 6A.9 (provided by Stantec, but no reference given (CD2.20.4)) suggests that an increase of 25% in passenger numbers from 10 mppa to 12 mppa only results in a modest 10% increase in traffic on the roads around the airport, although this is the only means of access for these additional passengers. This does not seem rational, and could be underestimating the

increase in road traffic by a factor of 2. It is also not clear if this data accounts for two-way traffic where passengers are arriving or departing by taxi, or being taken by family or friends. If the road traffic increase has been underestimated, then consequently the noise calculations and the impact on the local community and residents will equally be underestimated.

Assessment of effects (CD2.20.1)

- BAL have assessed the effects of air noise, ground noise and road traffic noise for a range of scenarios, in all cases using the impact table 6.7, which considers only a change in noise level. As previously discussed, this approach makes no recognition of the change in frequency of noise events, as directed by the IEMA in their Guidelines on Environmental Noise Impact Assessment (used by BAL (CD10.5)), who state that '*the noise impact and the consequential effect can only rarely be properly determined solely by the simple numerical difference in the value of a particular noise indicator*' (paragraph 7.11). There is no doubt that if the frequency of noise event were taken into account, then the impact assessment would be significantly more onerous than currently suggested by BAL. Equally the approach taken by BAL makes the assumption that it is only the change that is of consequence, and that the current situation endured by local residents is acceptable as-is.

5. Conclusions

In my proof of evidence I consider that the documentation provided by BAL in respect of environmental noise have the following issues:

- Forecast air traffic movements - Any claims of a reduction in overall aircraft noise are only possible through unfounded assumptions on aircraft producing less noise, which will be adopted by operators as soon as they are available. The reality is that more flights will produce more noise.
- Noise impact ratings - the approach taken by BAL makes no recognition of the change in frequency of noise events, as directed by the IEMA. There is no doubt that if the frequency of noise event were taken into account, then the impact assessment would be significantly more onerous than currently suggested by BAL. Equally the approach taken by BAL makes the assumption that it is only the change that is of consequence, and that the current situation endured by local residents is acceptable as-is.
- Night flying - the proposed approach, with a nominal points-per-movement counting towards an overall point quota, and a limit to the number of flights, is somewhat at odds with the approach taken for non-nighttime aircraft movements, clearly underlining the deficiencies in this part of the noise assessment by BAL. This arrangement also permits a significant number of shoulder period flights to occur during the nighttime period, but not be counted towards the limit on number of nighttime movements nor the quota

- Noise monitoring terminals - With such a rich amount of data at their disposal, the omission of data gathered by their own noise monitoring terminals is a huge oversight by BAL. It also implies that the measured data does not support the modelling conclusions
- Noise figures - these contain unexplained artefacts that call into question both the analysis and the experience of the originators.
- Road traffic noise - the estimated traffic increase seems contradictory to the increase in passengers expected.

6. Proposed Conditions on Air Noise

Conditions will need to be imposed that are robust from a noise perspective.

Currently the noise conditions on the 10mppa consent are not fit for purpose and lead to significant adverse residential amenity effects.

We have suggested an improvement to the current conditions plus new conditions to restrict night flights. Our reasoning for these new conditions is set out in the PCAA conditions submission. This is a changing working document and I will refer to it when I give evidence if required.