



HEP WORTH
ACOUSTICS
Noise and Vibration Consultants

**SOUTHEND AIRPORT
JAAP**

**On behalf of:
Southend-on-Sea Borough Council**

**Report no: 30679.1v1
February 2010**

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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Limited was appointed to carry out a noise impact assessment by Southend-on-Sea Borough Council on behalf of Southend-on-Sea and Rochford District Councils, who are leading the Joint Area Action Plan which is considering the development of the airport. The appointment specified three particular areas to be considered:-
- i) A review of the noise assessment carried out by the airport owner's consultants for the proposed runway extension.
 - ii) The baseline position to be adopted for comparison with future development options.
 - iii) The impact of the proposed development to 2 million passengers per annum (2mppa) both with and without a runway extension.
- 1.2 The review by Hepworth Acoustics was required to consider the assumptions and data used in the assessment and to consider the appropriateness of noise mitigation measures suggested, and to consider additional measures if necessary.
- 1.3 The original work was carried out at the start of 2009. Hepworth Acoustics was provided with two reports from Bickerdike Allen Partners (BAP), the noise consultants working for the airport owners. The two reports were 'London Southend Airport Noise Implications of Runway Extension – A7937-R01A-DC-October 2008' and 'Southend Airport Strategic Noise Mapping Report 2006 – A7664-R01- June 2007'.
- 1.4 Subsequent to this initial work, a planning application was submitted to Southend-on-Sea Borough Council for an extension to the runway and associated works. The planning application was accompanied with an Environmental Statement.
- 1.5 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 BACKGROUND

- 2.1 Southend currently has a low level of passenger traffic, ranging from 30,000 to 50,000 passengers per annum over the last three years. Aircraft movements were just over 37,000 in 2008. The current development plans are for capacity to increase to around 2,000,000 passengers per annum by 2020. This level of passenger throughput is similar to that achieved currently at Cardiff and Southampton airports.
- 2.2 The noise section of the Environmental Statement, produced in 2009, was produced by BAP. This document provided information on noise levels associated with current operations, 2020 levels with approved developments but existing runway and 2020 levels with approved developments and extended runway. The information in the Environmental Statement provided the main source of data for this current review.
- 2.3 As a result of the implementation of the Environmental Noise (England) Regulations, Southend Airport is required to implement a Noise Action Plan. A draft Noise Action Plan was published by the airport in October 2009. This document has been referred to in the current review.
- 2.4 In addition to the documents detailed above, reference has been made to draft planning conditions and the draft Section 106 agreement for the proposed runway extension.

3.0 IDENTIFICATION OF ISSUES

3.1 There are a number of issues that need to be considered when reviewing the noise impact of the development proposals for the airport. The Environmental Statement dealt with noise issues in four categories:

- Airborne aircraft noise
- Aircraft ground noise
- Road traffic noise
- Construction noise

3.2 The issues identified in the original assessment in 2009 for consideration were as follows:-

- i) Baseline
- ii) Fleet mix assumptions
- iii) Assessment time periods
- iv) Freight
- v) Ground noise
- vi) Training flights
- vii) Mitigation.

3.3 No information was available at the start of 2009 on road traffic noise and construction noise. However, as information on these topics was included in the Environmental Statement, they are included in this review along with the other topics contained in 3.2.

4.0 ASSESSMENT OF ISSUES

Baseline

- 4.1 The Environmental Statement contains noise contour information for the 2020 situation with and without runway extension. The without runway extension scenario in 2020 includes the currently consented developments including the railway station and new terminal. The without runway scenario would lead to approximately 740,000 passengers using the airport in 2020. The runway extension scenario would lead to approximately 2,000,000 passengers using the airport in 2020.
- 4.2 It is considered that the 2020 without runway extension scenario provides a valid baseline for comparison of the future development proposals. The new terminal building and railway station which are included in the 2020 without runway extension scenario are already consented and therefore the airport can reach this level of operations without requiring any further planning consents.

Fleet mix assumptions

- 4.3 The accuracy of any noise prediction model is dependant upon the accuracy of the input data used in the model, as well as the ability of the model to adequately predict the transmission of noise from the source to the receiver. The accuracy of the 2020 noise contours (both with and without runway extension) will be dependent on the accuracy of the predicted movements and mix of aircraft that will use the airport in 2020. The actual fleet mix for either scenario may vary from that used in the Environmental Statement. The proposed runway extension will allow operators to use different aircraft to those that can currently be operated out of the airport. The main reason for the proposed runway extension is that it enables airlines to operate larger capacity jet aircraft, particularly those that are attractive to the Low Cost Carriers.

- 4.4 The use of larger capacity jet aircraft does not automatically mean higher noise levels. Modern aircraft can be quieter than smaller older aircraft. This review has assessed the assumptions that have been made in the fleet mixes used for the Airborne Noise assessments.
- 4.5 The assessment assumes that with the current runway, the vast majority of passenger movements in 2020 would be made using BAe 146/RJ100 jet and ATR72/Dash 8 Q400 propeller aircraft. The assumption is made that if the runway is extended, the above passenger flights would be added to by Airbus A319 or similar aircraft operations. One of the issues addressed was that aircraft similar to the Airbus A319 can be noisier for some operations e.g. Boeing 737-300.
- 4.6 The airport operator considers that the Airbus A319 is the most likely new jet aircraft type to be operated by Low Cost Carriers as a result of the runway extension. In order to ensure that this aircraft type rather than the Boeing 737-300 operates the majority of the new jet operations allowed by the runway extension, it is proposed that there will be a numerical limit on Boeing 737-300 operations included in the Section 106 Agreement.
- 4.7 The Environmental Statement also considers the noise impact of individual aircraft movements in terms of the 90 dB(A) SEL footprint of the BAe 146, Airbus A319 and typical turboprop aircraft. The point is made that there are fewer people affected as a result of some Airbus A319 movements compared with some BAe 146 and turboprop movements. However, as the same number of BAe 146 and turboprop operations is predicted, irrespective of whether the runway is extended, these noise events will still occur. However, generally the individual operations of the Airbus A319 will be no noisier than individual operations occurring with the baseline scenario.
- 4.8 It is considered that the fleet mixes considered for both 2020 scenarios are realistic.

Assessment time periods

- 4.9 In the original 2008 BAP report, predictions were only carried out for the 16 hour daytime period 07:00 – 23:00. No predictions were carried out for the night period and as there were few controls on night-time movements, it was considered that night-time noise was not effectively controlled. This issue has been addressed within the Environmental Statement for the current application by proposing strict limits on night-time operations and noise generated by these operations. This represents a significant improvement on the potential for night-time noise compared with the baseline scenario.

Freight

- 4.10 It is noted that the airport has recently been acquired by Stobart Group, who wish to integrate air freight services in to their overall freight transport network. In order to ensure that noise from freight operations does not create a significant noise impact, it has been agreed with the airport operator that freight air transport movements will not exceed 10% of the total number of air transport movements in any one year. There is also a general restriction (with limited exemptions) that no aircraft with a Quota Count of more than 1 shall be allowed to operate during the night-time period, and no aircraft with a Quota Count of more than 2 shall be allowed to operate at any time from the airport.

Ground Noise

- 4.11 The Environmental Statement highlights the main sources of ground noise to be taxiing and manoeuvring aircraft, aircraft auxiliary power units, ground power units and engine testing. Predictions have been provided in the Environmental Statement for 2020 Ground Noise Levels both with and without the runway extension, as well as predictions for 2008. These predictions were subsequently amended slightly by BAP following a review of the Environmental Statement. There will be some increases in ground noise from 2008 to 2020 baseline situation as a result of the increased level of passenger aircraft movements. With the proposed runway extension, there will be further increases at some properties, but these are

those properties with the lowest absolute Ground Noise levels. There is no increase in Ground Noise levels as a result of the runway extension at those properties that receive 55 dB $L_{Aeq,16h}$ or more for the 2020 baseline scenario.

- 4.12 There is a requirement in the Section 106 agreement for the airport to submit a scheme to promote quiet ground operations prior to commencing the runway extension. In addition, engine testing at the airport will be restricted, beyond what is currently allowed, so that it will not occur between 2000 hours and 0800 hours on Monday to Saturday and between 1800 hours and 0900 hours on Sunday. It is considered that these proposals will adequately control Ground Noise.

Training flights

- 4.13 The current predictions assume that as commercial operations at the airport increase as a result of the proposed runway extension, there will be some reduction in the number of General Aviation movements at the airport. Most training flights are operated by single and twin piston engine and are included in the category of General Aviation. Therefore, the proposed runway extension would lead to a small reduction in the number of training flights from the airport.

Additional Mitigation measures

- 4.14 Southend Airport has operated to date with some noise mitigation measures incorporated in to previous planning consents and airport operating procedures. However, the current noise controls do not provide a high level of control over noise generation from the airport that could arise from the baseline scenario. The proposals for the development of the airport have provided the opportunity to completely revisit noise control measures and consider a wide range of mitigation measures. In addition to the measures described above, the following measures are proposed.
- 4.15 A Quiet Operations Policy will be developed by the airport covering both Air and Ground Noise. This will include the appointment of a Noise Manager who will be responsible for

implementing the Quiet Operations Policy. The policy includes the requirement to establish and maintain a noise complaints handling service.

- 4.16 A noise monitoring system is required to be set up by the airport. This will consist of two fixed monitoring terminals and one mobile terminal. The results of the noise monitoring are to be provided to the two councils.
- 4.17 A sound insulation scheme will be set up for properties exposed to a specific level of aircraft noise. The scheme would apply to residential, education and hospital properties. The scheme would be applied to eligible properties within the 63 dB $L_{Aeq,16h}$ noise contour.
- 4.18 Currently, there is no restriction on the total number of air transport movements that can take place from the airport. There would be a limit imposed of 53,500 air transport movements per year (with limited exemptions) as a result of the runway extension.
- 4.19 A revised restriction on night flights would be imposed as a result of the runway extension. This would limit night flights to 120 per month (with limited exemptions). Current controls limit night-time movements to 915 per month.
- 4.20 The Environmental Statement has assessed the road traffic noise impact of the proposals. The change in road traffic noise levels on existing unaltered roads is negligible. There will be some changes in road traffic noise exposure as a result of the diversion of Eastwoodbury Lane. However, no properties will meet the noise requirements for eligibility for noise insulation under the Noise Insulation Regulations 1975 (as amended).
- 4.21 Construction noise has also been considered within the Environmental Statement. Detailed construction programmes are not known at this stage but it is considered that acceptable noise levels can be achieved through a Construction Management Plan.

5.0 SUMMARY AND CONCLUSIONS

- 5.1 The proposals to develop Southend Airport create potential issues with increased activity at the airport generating increased noise, but the proposals also present an opportunity to update noise control measures and implement a comprehensive noise mitigation strategy.
- 5.2 The proximity of residential properties to the airport confirms the need to provide an appropriate noise mitigation strategy, and an inspection of the existing controls confirms that they do not meet current best practice. There is also potential for a significant intensification of use of the current airport without the need for additional planning consent.
- 5.3 The current proposal for the extension of the runway has been assessed against the 2020 baseline without runway extension. It is considered that this is an appropriate comparison. As part of the planning application for the runway extension, a comprehensive noise mitigation scheme has been negotiated with the airport operator. This has included numerical limits on total flights per year; Quota Count limits on aircraft operations; limits on number of cargo flights; limits on night-time operations; time limits on engine testing; appointment of a Noise Manager; implementation of a Quiet Operations Policy; installation of noise monitoring terminals; and the operation of a sound insulation policy.
- 5.4 It is considered that the noise mitigation scheme that is now proposed provides a suitable strategy to control existing and future noise from the operation of the airport. It provides certainty to local residents in relation to noise exposure and numbers of flights and is therefore considered to provide adequate noise control for the proposed development of the airport.

Appendix I – Noise Units and Indices

a) Sound Pressure Level and the decibel (dB)

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

b) Frequency and hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20,000 Hz. However, the upper frequency limit gradually reduces as a person gets older.

c) Glossary of Terms

When a noise level is constant and does not fluctuate over time, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise

where the level is continuously varying, a number of other indices, are used. The indices used in this report are described below.

L_{Aeq} This is the A-weighted ‘equivalent continuous noise level’ which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

SEL Referred to as the Sound Exposure Level (dB) this is the total A-weighted sound energy produced by an event and is effectively the L_{Aeq} of an event normalised to a duration of 1 second in length. SEL’s can be scaled according to the number of events and can be further manipulated to provide an average noise level $L_{Aeq,T}$.

EPNdB Referred to as the Effective Perceived Noise Level. This is a measure of the noise from an aircraft movement, weighted to reflect subjective responses to aircraft noisiness.