

Memorandum

Project: Luton Airport 19mppa ES
Subject: Noise Review
Reference: VC 20-07/M1-0
Date: 25 February 2021

Summary

In order to handle 19mppa, London Luton Airport Operations Limited (LLAOL) seeks to vary existing Condition 8 which limits the number of passengers to a maximum 18mppa. Associated with an uplift in the maximum number of passengers is a requirement to vary existing Condition 10 which sets limits on the areas covered by the daytime 57dB $L_{Aeq,16h}$ and night-time 48dB $L_{Aeq,8h}$ noise contours. The scale of the variations is directly associated with the noise impacts expected to arise and these therefore need to be properly and comprehensively quantified.

Noise Chapter 8 of the ES focuses only on air noise, claiming that changes in ground and road traffic noise have been scoped out on the basis that no changes of significance are expected to arise. I do not take issue with this. Chapter 8 therefore contains technical information on the expected changes in air noise levels only, providing data on the extent of the noise contours at various values, the dwellings/population contained within them and the difference in air noise level arising for various assessment cases. Additional information is provided by way of flyover L_{Amax} values and Nx (number above) contours for daytime (N65) and night-time (N60).

Following my review of Noise Chapter 8 and the associated Appendices, the following are the key findings that require further information and/or careful consideration in determining whether noise is a reason for refusing the application.

- The requested variation for Condition 10 is no longer temporary. The application seeks to increase not only the limits for the period up to 2028 (referred to in the ES as the short term (ST) limits) but also the more restrictive limits applicable post 2028 (referred to in the ES as the long term (LT) limits).
- This, in my view, changes the complexion of the application and calls into question whether the proposals are strictly in line with current government policy which seeks to minimise and where possible reduce the number of people significantly affected by aircraft noise. It also requires operators to share the benefits of noise reducing technology with affected communities.
- If permitted, the application is forecast to give rise to significant adverse noise effects at 1,877 dwellings by virtue of night-time noise level increases of more than 1dB arising in locations exposed to average noise above the SOAEL (55dB $L_{Aeq,8h}$).

- Mitigation in the form of enhanced sound insulation is proposed as a response to these significant adverse effects, and the funding of the noise insulation scheme is to be increased substantially (more than doubled). However, there will be insufficient funding to cover the cost of mitigation for all dwellings experiencing significant adverse effects, and in the year in which the worst effects are forecast to arise (2022) funding will have been made available for not more than 600 properties, leaving more than 1,300 properties exposed to significant effects with no opportunity for mitigating them.
- Some clarification on the measures incorporated into the noise model would be helpful in order to ensure that it fully reflects actual movements at Luton Airport as accurately as possible. It would be useful to get further information on matters such as aircraft tracks and operational procedures, noise data used for new generation aircraft and the extent of validation exercise that have been carried out.
- The structure of Noise Chapter 8 is difficult to follow and the content is not sufficient to enable the claimed outcomes to be clearly understood. Some further information and/or clarification is therefore required in order to ensure that the full technical noise case is properly put.

The following sections provide more detail on these and other aspects of the noise case.

1 Condition 10

1.1 Policy Considerations

- 1.1.1 On 20th October 2017, the government published a Consultation Response on UK Airspace Policy¹. In paragraph 2.69 of the 20th October Consultation Response it states:

The government's overall policy on aviation noise is to limit and, where possible reduce the number of people in the UK significantly affected by aircraft noise, as part of a policy of sharing benefits of noise reduction with industry in support of sustainable development

- 1.1.2 The policies set out within the Consultation Response document should be viewed as current government policy.
- 1.1.3 *Aviation 2050, The future of UK aviation*², is a consultation document published by the Government in December 2018.
- 1.1.4 The consultation period ended on 30 June 2019 and a consultation response document was published in October 2019³. The government has decided to proceed with its policy proposals with some changes to the manner in which it will legislate for powers to direct individual

¹ Consultation Response on UK Airspace Policy: A framework for balanced decisions on the design and use of airspace: Cm 9520, DfT, October 2017.

² Aviation 2050, The future of UK aviation, A consultation. C9714, HM Government December 2018

³ Consultation Response on Legislation for Enforcing the development of Airspace Change Proposals. HM Government October 2019

Airspace Change Proposals. Those policy proposals contain various provisions relating to noise including:

- Set a new objective to limit, and where possible, reduce total adverse effects on health and quality of life from aviation noise;
- Develop a new national indicator to track the long term performance of the sector in reducing noise. They could be defined as either a national noise quota or a total contour area based on the largest airports.
- Routinely set noise caps and part of planning approvals (for increase in passenger numbers or flights. This effectively means that all commercial airports of suitable size will have to sign up to a noise envelope which can be periodically reviewed and, if necessary, updated.
- Require all major airports to set out a plan which commits to future noise reduction, and to review this periodically.

1.1.5 What is clear from the above is that the government expects airports, especially major airports like Luton, to commit to lower community noise levels over time even as the number of operations increases. The current wording of Condition 10 encapsulates this imperative by committing LLAOL to a reduction in the area of the 57dB $L_{Aeq,16h}$ contour by the time the current permitted capacity of 18mppa is reached (originally forecast to be 2028).

1.1.6 Furthermore, Condition 10 in its current form sets the benchmark against which noise impacts arising from any subsequent changes in operation, for which planning consent may be required, shall be assessed. In order to comply with current government policy, those applications should be accompanied by a commitment to a further reduction in the permitted noise contour limit.

1.1.7 The current application fails this test as it is seeking noise contour limits for 19mppa which are larger, in perpetuity, than those currently in place for 18mppa.

1.2 Timing

1.2.1 The application retains 2028 as the last year for which forecast aircraft operations and noise levels are provided. I believe the application would benefit from extending the analysis beyond 2028.

1.2.2 It is indicated that the new limit of 19mppa will be reached by 2024 and that the year in which noise levels are highest (i.e., noise contours their most extensive) will be 2021. From 2021 to 2024 and beyond, noise levels are expected to reduce as can be seen by considering the day and night noise contour areas set out in Appendix 8C. Focussing on 57dBA daytime and 48dBA night-time, the trend is as follows:

Contour	Contour Area (km ²) in year				
	2021	2022	2023	2024	2028
57dBA (day)	21.6	21.1	20.4	19.4	15.5
48dBA (night)	42.9	42.1	41.9	39.8	35.5

T1 Noise contour areas for Development Case (19mppa): changes over time

1.2.3 These figures are used to justify the change to the limits set out in Condition 10 as follows:

Short Term (2020 to 2027)

- 57dB L_{Aeq,16h} increases from 19.4 to 21.6km²;
- 48dB L_{Aeq,8h} increases from 37.2 to 42.9km².

Long Term (2028 and beyond)

- 57dB L_{Aeq,16h} increases from 15.2 to 15.5km²;
- 48dB L_{Aeq,8h} increases from 31.6 to 35.5km².

1.2.4 Given the clear trend to lower noise levels year on year, the question arises; in which year post 2028 are the original Condition 10 LT contour limits expected to be achieved?

1.2.5 In my view, the ES noise analysis needs to be extended in order to establish that this application can ultimately be permitted on the basis that a commitment is made to future noise contour limits that are at least equal to and preferably lower, in all respects, than the LT values currently set out in Condition 10. On this basis, the application could be considered to be consistent with policy requirements.

1.2.6 Under the current circumstances of Covid 19 and its effects on the airline industry, growth plans at many airports are being re-evaluated. At Stansted, for example, the 35+ application first made in February 2018 has been amended to factor in Covid 19 effects, one of which is a 4 year delay to the year in which the sought increased passenger throughput will be reached. It has changed from 2028 to 2032, with operating forecasts and noise levels/contours amended accordingly.

2 Significant Adverse Effects

2.1 Scale of Effects

2.1.1 Table 8.22 on p. 174 of Noise Chapter 8 summarises the finding set out in preceding Tables 8.10 to 8.21 which each identify the change in noise level in 1dB noise exposure bands. For the night period, years 2021, 2022, 2023 and 2024 are identified as giving rise to a significant adverse effect due a number of dwellings experiencing a change of more 1dB while exposed to noise levels above the SOAEL (55dB L_{Aeq,8h}). The highest number (1,877) occurs in years 2021 and 2022. (Table 8.22 is actually wrongly titled and incorrectly identifies the numbers as pertaining to population, but I take the sense from the preceding tables.)

- 2.1.2 By 2028, no significant adverse effects are forecast to occur at night, but we can make no judgment as to the situation in 2025, 2026 or 2027 as no data are provided. It is reasonable to assume that such affects are likely to occur in at least one of these years, in which case the full extent of significant adverse effects cannot be determined from the ES.
- 2.1.3 It should be noted that by 2028, although no significant adverse effects are forecast to arise, this is by virtue of the fact that noise level differences compared to what is permitted by existing Condition 10 (using the LT contour limit) are less than 1dB. There will still be 1,385 dwelling exposed to noise levels above the SOAEL, an increase of 373 over what would arise should existing Condition 10 be retained. This increase ties in with the application to extend the LT night 48dB contour limit from 31.6 to 35.5km².

2.2 Cause of Effects

- 2.2.1 In trying to determine the underlying reason for the significant adverse night noise effects I have referred to the BAP Appendix B to the Scoping Opinion and Appendix 8B to the ES.
- 2.2.2 Turning first to Appendix B, Table 2 identifies that the number of night movements for the 19mppa case in 2028 is 5,002 while the number pertaining the currently permitted Long Term noise contour limit is 4,863. This amounts to an increase of just less than 3%. Table 3 goes on to point out that when the original modelling was undertaken to derive the existing 2028 Long Term noise contour limit, the % of forecast movements by modernised aircraft was 71%, but this increases to 80% for the most recent modelling for 19mppa.
- 2.2.3 This increase in the modernisation % effectively compensates for the slight increase in the number of movements as Table 4 establishes that Appendix B does not support a request for an increase in the night-time noise contour limit. The current LT limit is retained.
- 2.2.4 Turning now to Noise Chapter 8 Appendix 8.B, it provides no contradictory information on the number of night-time movement nor the modernisation % for the 2028 cases of 19mppa vs. the existing LT noise limit. What it does do, however, is establish in Tables 3 and 4 that the most recent modelling uses alternative noise corrections for modernised aircraft compared to the original modelling. Departure noise levels are on aggregate not likely to be materially lower than previously assumed, but it seems clear that arrival noise levels will be slightly higher.
- 2.2.5 This may be the underlying reason for the higher night noise levels and more extensive noise contour associated with 19mppa compared to the existing LT condition, but this is not made explicitly clear anywhere in the ES. I recommend that further information and clarification be provided on this matter, as it goes to the heart of the significant adverse effects being predicted and the seeming need to increase the LT night contour limit by more than 12%. The precise nature of the cause should be clearly understood.

3 Mitigation

3.1 Policy

3.1.1 The Noise Policy Statement for England⁴ contains, in para. 1.7, the following policy aims:

1. *Avoid significant adverse effects on health and quality of life;*
2. *Mitigate and minimise adverse impacts on health and quality of life;*
3. *Where possible, contribute to the improvements of health and quality of life.*

3.1.2 The Planning Practice Guidance (PPG)⁵, updated in July 2019, considers noise in the context of planning decisions. It refers to the aims and exposure levels of the NPSE and notes that as noise exposure increases above the LOAEL it starts to cause small changes in behaviour an attitude, and that above the SOAEL noise causes (ID: 30-005):

A material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when noise is present. If the exposure is predicted to be above this level, the planning process should be used to avoid this effect occurring.

3.1.3 and that:

While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.

3.1.4 Government policy and guidance is clear that significant adverse effects shall be avoided as they are undesirable, and that the planning process should be used to achieve this goal. For this application, therefore, it would be wholly reasonable for the planning process to require mitigation that avoids significant adverse effects from occurring at all in order to prevent it from being a reason for denying consent.

3.2 Proposed Scheme

3.2.1 The terms of the mitigation scheme proposed to address the issue of exposure to noise above SOAEL are set out in ES Chapter 8, para 8.14 and Appendix 8F. Matters of fact that I do not dispute include:

- There will be 1,908 dwellings exposed to night noise levels above SOAEL in the year of worst noise effects (2022);
- The 1,184 dwellings so exposed to daytime noise are wholly contained within the night-time figure;
- There are an additional 724 dwellings exposed to night noise levels above SOAEL resulting from the 19mppa condition as compared to the existing ST noise contour limit condition.

⁴ Noise Policy Statement for England, March 2010

⁵ National Planning Practice Guidance, 2019

3.2.2 Bearing in mind that the objective of a suitable mitigation scheme is to avoid people being exposed to noise levels above SOAEL, then there are a number of matters on which the current scheme fails to deliver:

- The total funding available is sufficient to provide sound insulation mitigation to 996 dwellings, barely over 50% of the total number eligible under the scheme;
- The funding is to be released in yearly instalments and the total budget of £3M would only apply over the period up to 2028, in spite of the fact that the year of worst noise effects occurs some 6 years earlier in 2022;
- By 2022, the full available budget is only £1.8M which is sufficient to provide sound insulation for up to 598 properties, barely over 30% of the total number eligible under the scheme;
- The scheme is therefore predicated on the proposition that less than one third of all properties exposed to significant adverse night noise effects will benefit from mitigation in time to help avoid those effects from occurring;
- Furthermore, it appears also to be predicated on the proposition that only around one half of all properties exposed to significant adverse night noise effects will never benefit from mitigation.

3.2.3 I am aware that there are various practical matters to consider including the likely rate of uptake of offers of mitigation being less than 100%, the rate at which additional mitigation can be installed at affected dwellings and the fact that some eligible dwellings may already have benefitted from funds toward enhanced sound insulation. However, unless the last consideration applies to around 1,310 dwellings all located within the 19mppa SOAEL night noise contour, then the scheme in principle fails to meet the policy objectives.

3.2.4 The justification for the scheme as proposed appears to rely entirely on the proposition that occupants of only 50% of eligible dwellings would take up the offer of enhanced sound insulation. While that may be historically accurate, it begs the question as to why it is so low and what can be done to encourage people to be more willing to accept mitigation that can avoid effects above the SOAEL and the health consequences attached to them.

3.2.5 It should also be noted that the claim of funding being available to treat 78% of the dwellings exposed to significant adverse effects, as narrowly defined in the ES, is beside the point. While it may be relevant to prioritise dwellings exposed to noise above the SOAEL and experiencing a noise change of more than 1dB, it is not relevant to consider them as the only dwellings eligible for sound insulation under the scheme.

4 Noise Modelling

4.1 The noise modelling undertaken by BAP is described in Append 8B. For Noise Chapter 8 findings to be considered valid the noise modelling should reflect the actual conditions at Luton Airport as accurately as possible. Therefore, there are a number of matters on which further information or clarification would be beneficial:

- *Dispersion*: as identified in para. 4.2, the model uses the standard INM software assumptions. Better would be to use the actual flight track dispersions as recorded at Luton Airport by the radar enabled track keeping system.
- *Flight profiles*: para. 4.2 identifies that standard INM flight profiles are used for all aircraft apart from the Airbus A-319 and A-320 as well as the Boeing 737-800. Are the profiles identical for each of these aircraft types or do they differ? Do they reflect the specific procedures adopted by different operators at Luton Airport?
- *Modernised aircraft*: the noise levels associated with new generation aircraft are derived from measurements of operations at Luton Airport in the case of the Airbus A320 and A-321, while for the 737-MAX, assumed corrections to 737-800 noise levels are applied as no 737-MAXs have yet operated at the airport. This is summarised in Table 3, but it would be helpful to obtain further details of the data that have been used to derive these values. In particular, we should know whether and how all relevant and up to date data from all monitor terminals, both fixed and mobile, have been used in the analysis.
- *Validation*: variable alterations to the A320ceo (current generation) departure noise levels are justified by reference to the fact these vary year on year. The way the corrections have been applied suggest a systematic reduction in noise between 2014 and 2018, and it would therefore be useful to see the underlying data and explore reasons why this might have occurred, be they technical or operational.

5 Content of the Noise Chapter

5.1 Assessment Cases

- 5.1.1 It is normal to determine the noise effects of an application by comparing the expected conditions with the development in place (i.e., Development Case – DC) to those that would arise without the development going ahead (i.e., Do Minimum case – DM). This should be done at the year of maximum forecast capacity and other interim years as relevant to the application. A comparison of the future DC (and if appropriate DM) cases is usually, by convention, made against relevant baseline conditions.
- 5.1.2 I believe that Noise Chapter 8 takes a reasonable position in terms of assessment cases and the approach of effectively swapping the DM case for the existing Condition 10 case in any given year is appropriate. The objective of the noise case is essentially to justify a variation to that condition, so this is a reasonable approach on the basis that existing Condition 10 represents a lower noise case than the relevant DM case it replaces.
- 5.1.3 The assessment cases reported can be summarised as:
 - 2021DC vs Existing Condition 10-ST (replacing 2021DM);
 - 2022DC vs Existing Condition 10-ST (replacing 2022DM);
 - 2023DC vs Existing Condition 10-ST (replacing 2023DM);
 - 2024DC vs Existing Condition 10-ST (replacing 2024DM);
 - 2028DC vs. 2028DM (12.5mppa updated);
 - 2028DC vs Existing Condition 10-LT .

- 5.1.4 What I did find confusing was the reference in the text and various tables to 18mppa when identifying the DC cases for years 2021, 2022 and 2023 as there is effectively both a 19mppa (DC) and 18mppa (DM) case in each of these years, but the 18mppa (DM) case has been replaced by Existing Condition 10-ST. Only in 2024 is 19mppa referred to for the DC which is, in my view, the correct nomenclature. It would be helpful if the applicant could confirm that my interpretation is correct.

5.2 Tabulated Information

- 5.2.1 There is a large amount of technical information tabulated in Noise Chapter 8 and the associated Appendices. It is important to be able to inspect and understand the data in these tables in order to follow the thread of the analysis. Unfortunately, this was far from easy and I would make the following criticisms:

Referencing

- 5.2.2 Text in Noise Chapter 8 incorrectly references the various Appendices and within the Appendices themselves, there is mis-referencing to each other and back to the text in Noise Chapter 8.

Titling

- 5.2.3 Tables are in some instances mis-titled or contain header descriptions which do not match the data presented. The example of Table 8.22 has already been identified above (see para. 2.1.1), but this also occurs in several other instances.

Content

- 5.2.4 Tables 8.10 to 8.21 aim to set out the detail of how the significance of noise effects is evaluated. I have two specific comments on these tables:
- It is curious that the information provided does not enable a clear distinction between noise effects that are positive or adverse. There is one column covering noise changes between -0.9 and +0.9 dB, and while it is accepted that this covers a range that might be considered a negligible change, it would be more conventional to clearly distinguish between changes that are -ve, thereby indicating a betterment, and those which are +ve and thereby indicating a worsening.
 - In order to get a sense of the data underlying the findings set out in these tables, reference was made to Appendix D of Appendix 1B, the Screening Opinion. This is the only location within the ES where noise level differences between the various cases are quantified. Unfortunately, Appendix D appears to be out of date in that it still refers to 2011 noise contours, which are not assessed in Noise Chapter 8. Furthermore, it provides data for only two of the assessment years, 2019 and 2028, leaving a void in the understanding of the noise changes in 2022, 2023, 2024 and 2028DM (12.5mpps). In my view, this should have been fully updated to provide the relevant information and added as a stand alone Appendix to Noise Chapter 8.
- 5.2.5 In considering the noise levels attributed to each assessment case, it ought to be possible to clearly reference the number and type of aircraft movements. Appendix 3A claims to provide this information but again it appears out of date and incomplete:

- I assume the movement numbers are for to the 92 summer day period, but it is not stated;
- Data are given for 2011 and 2018 which are not years assessed in Noise Chapter 8;
- No data are provided for assessment years 2022, 2023 and 2024;
- No data are provided for the night period of 2028DC (19mppa).

5.3 L_{Amax} Analysis

- 5.3.1 I would challenge the use of 80 dB L_{Amax} as the sole relevant aircraft flyover noise disturbance criterion.

Schools

- 5.3.2 It is correct that BB93⁶ sets an internal design standard of 60 dB $L_{A1,30min}$ for teaching spaces, but the process by which this is equated to an external noise level of 80 dB L_{Amax} is not accepted. At both Stansted Airport (35+ application) and Leeds Bradford Airport (Terminal Extension application), L_{Amax} was taken to be a direct surrogate for $L_{A1,30min}$ with no correction. Noise Chapter 8 para. 8.8.26 suggests that it is conservative to allow for an aircraft flyover L_{Amax} to 5dB higher than the corresponding $L_{A1,30min}$ value. However, no justification or reference for this value is provided.

- 5.3.3 Furthermore, at Stansted Airport an outside to inside noise correction of 12dB was taken as a conservative estimate of the typical value that would apply across all windows in a school. This gave rise to an external L_{Amax} assessment value of 72 dB, a number that was agreed with Bickerdike Allen Partners as being appropriate for the analysis of effects at schools.

Sleep Disturbance

- 5.3.4 Reference is made to CAP 725⁷ to justify the selection of 80 dB L_{Amax} as representing the onset of sleep disturbance. It should be noted that CAP725 has now been replaced by CAP 1616⁸ (with CAP 1616a⁹ providing guidance on noise metrics). Neither of these current documents reference L_{Amax} as the essential metric for assessing sleep disturbance.
- 5.3.5 Which is not to say that an assessment of flyover L_{Amax} values is irrelevant, as it provides additional information on aircraft noise effects at night providing suitable thresholds are considered. However, it should be noted that CAP 725 references a study carried out in 1990 and reported in 1992¹⁰ to and this is taken by Noise Chapter 8 to justify the sole use of 80dB L_{Amax} for assessing sleep disturbance.
- 5.3.6 In fact, para. B.230 of CAP 725 also identifies that the effects of awakenings would be small for indoor noise levels below 45dB L_{Amax} and awakenings would be infrequent below 55dB L_{Amax} . It allows an indoor to outdoor correction of 15dB for an open window, giving two other external L_{Amax} values as being pertinent to the investigation of sleep disturbance, 60 and 70 dB L_{Amax} . The former value, 60 dB L_{Amax} carries through to the night-time 'number above' contours that are applicable to night time operations, namely N60.

⁶ Building Bulletin 93:

⁷CAA Guidance on the Application of the Airspace Change Process: CAP 725

⁸ Airspace Design: Guidance on the regulatory process for changing airspace design including community engagement requirements. CAP1616

⁹ Airspace Design: Environmental requirements technical annex. CAP1616a

¹⁰ DoT (1992), Report of a Field Study of Aircraft Noise and Sleep Disturbance, Department of Transport, 1992

- 5.3.7 Noise Chapter 8 would have more comprehensively assessed how sleep is affected by flyover L_{Amax} values if it has referred to these values also.

■ End of Section