

London Luton Airport Operations Limited

## Luton Airport Expansion - 19 mppa

Environmental Impact Assessment

[Update to](#) Volume 2 [Noise Chapter](#): Environmental Statement Addendum

[ENVIRONMENTAL STATEMENT REGULATION 25 AND CLARIFICATIONS](#)



## Report for

Alejo Pérez Monsalvo  
CAPEX Director  
London Luton Airport  
Navigation House  
Airport Way, Luton  
Bedfordshire LU2 9LY

## Main contributors

Mark Evans

## Issued by

Mark Evans

## Approved by

Jo Webb

## Wood

Floor 23  
25 Canada Square  
Canary Wharf  
London E14 5LQ  
United Kingdom  
Tel +44 (0)20 3215 1610

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## Document revisions

No.	Details	Date
1	Final	May 2021

## 8. Noise

**Note on Update:** *The updates within this chapter have been made in response to comments made by Luton Borough Council's Acoustic Consultant on the 25<sup>th</sup> February 2021 as presented in Appendix 8D. The updates here-in do not change the validity of other assessments within the ES submitted for the 19 mppa application (41431RR20V3 Environmental Statement, dated 11th January 2021). This updated chapter should be read in conjunction with the updated associated Appendices appended to this chapter (they continue to reference Volume 3 for consistency with the original chapter). The Figures within Volume 3: Figures and Appendices do not change.*

### 8.1 Introduction

8.1.1 This chapter of the ES assesses the likely significant effects of the Proposed Scheme with respect to noise. The chapter should be read in conjunction with the **Chapter 3: Description of the Proposed Scheme** and with respect to relevant parts of **Chapter 9: Human health** and **Chapter 10: Transport**, where common receptors have been considered and where there is an overlap or relationship. This chapter supplements the noise chapter in the 2014 Planning Permission 2012 ES.

8.1.2 This noise assessment has assessed the likely significant effects arising from the proposed change to Condition 8 to raise the passenger throughput cap to 19 mppa, and those arising from the proposed increases to the daytime and night-time noise contours, through the variation of Condition 10, which is:

The area enclosed by the 57dB(A)  $L_{eq16hr}$  (0700-2300) contour shall not exceed 21.6 sq km for daytime noise, and the area enclosed by the 48dB(A)  $L_{eq8hr}$  (2300-0700) contour shall not exceed 42.9 sq km for night-time noise, when calculated by the Federal Aviation Authority Integrated Noise Model version 7.0-d (or as may be updated and amended) for the period up to the end of 2027.

Post 2027 the area enclosed by the 57dB(A)  $L_{eq16hr}$  (0700-2300) contour shall not exceed 15.5 sq km for daytime noise, and the area enclosed by the 48dB(A)  $L_{eq8hr}$  (2300-0700) contour shall not exceed 35.5 sq km for night time noise.

Post 2030 the area enclosed by the 57dB(A)  $L_{eq16hr}$  (0700-2300) contour shall not exceed 15.1 sq km for daytime noise, and the area enclosed by the 48dB(A)  $L_{eq8hr}$  (2300-0700) contour shall not exceed 31.6 sq km for night time noise.

8.1.3 The first year where the daytime 57dB(A)  $L_{eq16hr}$  (0700-2300) contour and night-time 48dB(A)  $L_{eq8hr}$  (2300-0700) contour shall return to the existing long-term Condition 10 limits would therefore be 2031.

8.1.2 ~~, for the period to the end of 2027, and from 2028 onwards (see Section 3.2).~~

### 8.2 Limitations of this assessment

8.2.1 The proposed condition variations have been based upon forecasts for future aircraft operations and the resultant noise levels. There is an inherent uncertainty in forecasting aircraft movements which is based on multiple factors including fleet mix assumptions.

- 8.2.2 Aircraft operation forecasts for the Proposed Scheme's scenarios have been supplied by LLAOL<sup>126</sup> and are therefore assumed to be correct at the time of writing. It is understood that the assumed numbers of new generation aircraft are based on airline orders for the relevant aircraft between now and 2026, and this has been represented in LLAOL's fleet mix assumptions.

## 8.3 Relevant legislation, planning policy, and technical guidance

- 8.3.1 A full explanation of the relevant legislation, policy and guidance is presented in **Appendix 8A** in **Volume 3: Figures and Appendices**. The following provides a summary of key documents used within this assessment.

### Legislative context

- 8.3.2 The following legislation is relevant to the assessment of the effects on noise receptors:

- The *Civil Aviation Act*<sup>127</sup>;
- The *Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003*<sup>128</sup>
- *Directive 2002/30/EC*<sup>129</sup>;
- *European Union (EU) Regulation 598*<sup>130</sup>;
- *Environmental Noise Directive (2002/49/EC)*<sup>131</sup> (END); and
- *Environmental Noise (England) Regulations 2006* (as amended)<sup>132</sup>.

### Planning policy context

- 8.3.3 The main policy documents which are referred to within this assessment are further summarised in **Table 8.1**.

Table 8.1 Policy relevant to the noise assessment

Policy reference	Policy issue
<b>National planning policies</b>	
<b>Noise Policy Statement for</b>	<p>The NPSE sets out the long-term vision of the Government and within the context of policy on sustainable development aims to:</p> <ul style="list-style-type: none"> <li>• avoid significant adverse impacts on health and quality of life;</li> <li>• mitigate and minimise adverse impacts on health and quality of life; and</li> </ul>

<sup>126</sup> A discussion on how the forecasts are used within the noise modelling software is provided within Appendix 10B.

<sup>127</sup> Civil Aviation Act, 2006 [online]. Available at: <https://www.legislation.gov.uk/ukpga/2006/34/contents> [Accessed 10 November 2020].

<sup>128</sup> The Aerodromes (Noise Restrictions) (Rules and procedures) Regulations, 2003 [online]. Available at: <https://www.legislation.gov.uk/uksi/2003/1742/contents/made> [Accessed 10 November 2020].

<sup>129</sup> Directive 2002/30/EC. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0030&from=EN> [Accessed 10 November 2020].

<sup>130</sup> Regulation (EU) 598/2014, [online]. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0598&from=EN> [Accessed 10 November 2020].

<sup>131</sup> Directive 2002/49/EC, [online]. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0049&from=EN> [Accessed 10 November 2020].

<sup>132</sup> The Environmental Noise (England) Regulations, 2006 [online]. Available at: <http://www.legislation.gov.uk/uksi/2006/2238/contents/made> [Accessed 10 November 2020].



Policy reference	Policy issue
<b>England (NPSE) (Defra, 2010)</b> <sup>133</sup>	<ul style="list-style-type: none"> <li>where possible, contribute to the improvement of health and quality of life.</li> </ul> <p>It introduces three 'Effect Levels' relevant to the assessment of noise; the two of concern within this assessment are:</p> <ul style="list-style-type: none"> <li><b>LOAEL: Lowest Observed Adverse Effect Level</b> – this is the level above which adverse effects on health and quality of life can be detected; and</li> <li><b>SOAEL: Significant Observed Adverse Effect Level</b> – this is the level above which significant adverse effects on health and quality of life occur.</li> </ul> <p>The aim of the NPSE is to avoid all noise occurring at the SOAEL level and to minimise, as far as possible, all noise occurring between the LOAEL and SOAEL brackets.</p>
<b>The Planning Practice Guidance for Noise (PPG-N) (MCHLG, 2019)</b> <sup>134</sup>	<p>Published by the Ministry of Housing, Communities and Local Government introduces a fourth effect level not included in the NPSE:</p> <p><b>UAE – Unacceptable Adverse Effect Level</b> – this is the level above which extensive and regular changes in behaviour and/or an inability to mitigate the effect of noise leading to psychological stress or physical effects occurs.</p>
<b>Aviation Policy Framework (APF) (2013)</b> <sup>135</sup>	<p>By defining the Government's objectives and policies on the impacts of aviation, the APF sets out the framework within which decisions on aviation ought to be made to deliver a balanced approach to securing the benefits of aviation and to support economic growth.</p> <p>The APF states that the "Government wants to see the best use of existing airport capacity" and that in the short-term, a key priority for Government is to continue to work with the aviation industry and other stakeholders to make better use of existing runways at all UK airports to improve performance, resilience and the passenger experience.</p>
<b>Consultation Response on UK Airspace Policy: A Framework for Balanced Decisions on the Design and use of Airspace</b> <sup>136</sup>	<p>The Consultation Response confirms: "The government has issued revised Air Navigation Directions and Air Navigation Guidance to the CAA which will take effect from 1 January 2018". With regard to aircraft noise the Consultation Response sets out that:</p> <ul style="list-style-type: none"> <li>"The Government's current aviation policy is set out in the Aviation Policy Framework (APF). The policies set out within this document provide an update to some of the policies on aviation noise contained within the APF and should be viewed as the current government policy."</li> <li>"Consistent with the Noise Policy Statement for England, our objectives in implementing this [UK airspace] policy are to: ... limit and, where possible, reduce the number of people in the UK significantly affected by the adverse impacts from aircraft noise."</li> <li>"The specific daytime and night-time values proposed for the LOAEL: 51 dB <math>L_{Aeq\ 16hr}</math> and 45 dB <math>L_{night}</math> also received broad support" and therefore "We [the Government] will set a LOAEL at 51 dB <math>L_{Aeq\ 16hr}</math> for daytime noise .... and based on feedback and further discussion with CAA we are making one minor change to the LOAEL night metric to be 45 dB <math>L_{Aeq\ 8hr}</math> rather than <math>L_{night}</math> to be consistent with the daytime metric."</li> </ul>

<sup>133</sup> Department for Environment, Food and Rural Affairs (2010), Noise Policy Statement for England [online]. Available at [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69533/pb13750-noise-policy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf) [Accessed 12 November 2020].

<sup>134</sup> Ministry of Housing, Communities and Local Government (2019), The Planning Practice Guidance for Noise [online]. Available at: <https://www.gov.uk/guidance/noise--2> [Accessed 12 November 2020].

<sup>135</sup> Secretary of State for Transport (2013) Aviation Policy Framework [online]. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/153776/aviation-policy-framework.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/153776/aviation-policy-framework.pdf) [Accessed 12 November 2020].

<sup>136</sup> Department for Transport (2017) Consultation Response on UK Airspace Policy: a framework for balanced decisions on the design and use of airspace, [online]. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/653801/consultation-response-on-uk-airspace-policy-web-version.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/653801/consultation-response-on-uk-airspace-policy-web-version.pdf) [Checked July 2020].

Policy reference	Policy issue
	<ul style="list-style-type: none"> <li>“The Government acknowledges the evidence from recent research which shows that sensitivity to aircraft noise has increased, with the same percentage of people reporting to be highly annoyed at a level of 54 dB <math>L_{Aeq, 16hr}</math> as occurred at 57 dB <math>L_{Aeq, 16hr}</math> in the past.”</li> <li>the Government continues to expect airport operators to offer households exposed to levels of noise of 69 dB <math>L_{Aeq, 16h}</math> or more, assistance with the costs of moving;</li> <li>the Government also expects airport operators to offer acoustic insulation to noise-sensitive buildings, such as schools and hospitals, exposed to levels of noise of 63 dB <math>L_{Aeq, 16h}</math> or more; and</li> <li>“As a minimum, the Government would expect airport operators to offer financial assistance towards acoustic insulation to residential dwellings which experience an increase in noise of 3 dB or more which leaves them exposed to levels of noise of 63 dB <math>L_{Aeq, 16h}</math> or more.”</li> </ul>
<b>Development plan policies</b>	
<b>Luton local plan (2011-31), adopted 2017</b>	<p>Policy LLP6: London Luton Airport Strategic Allocation, states in relation to airport expansion that proposals for development will only be supported where:</p> <ul style="list-style-type: none"> <li>“iv. they fully assess the impacts of any increase in Air Transport Movements on surrounding occupiers and / or local environment (in terms of noise, disturbance, air quality and climate change impacts), and identify appropriate forms of mitigation in the event significant adverse effects are identified;</li> <li>v. achieve further noise reduction or no material increase in day or night time noise or otherwise cause excessive noise including ground noise at any time of the day or night and in accordance with the airport's most recent Airport Noise Action Plan;</li> <li>vi. include an effective noise control, monitoring and management scheme that ensures that current and future operations at the airport are fully in accordance with the policies of this Plan and any planning permission which has been granted;</li> <li>vii. include proposals that will, over time, result in a significant diminution and betterment of the effects of aircraft operations on the amenity of local residents, occupiers and users of sensitive premises in the area, through measures to be taken to secure fleet modernisation or otherwise”</li> </ul> <p>Policy LLP38: ‘Pollution and Contamination’ considers the effects of noise associated with new development and states that where adverse impacts are identified, appropriate mitigation will be required.</p>

## Technical guidance

8.3.4 The main guidance documents and standards which are referred to within this assessment are further summarised in **Table 8.2**.

**Table 8.2** Guidelines relevant to the noise assessment

Guidance	Relevance
<b>World Health Organization (WHO) Environmental Noise Guidelines for the</b>	The 2018 guidelines present health-based recommendations for environmental noise exposure, including for aircraft noise. The guidelines recommend reducing noise levels produced by aircraft below 45 dB $L_{den}$ to mitigate adverse health effects. For night-time, the guidelines recommend reduction in noise levels produced by aircraft to below 40 dB $L_{night}$ to help mitigate adverse effects on sleep.

## European Region (2018)<sup>137</sup>

### IEMA Guidelines for Environmental Noise Impact Assessment (2014)<sup>138</sup>

The guidelines describe how the assessment of noise effects should be presented within the EIA process. The IEMA guidelines cover aspects such as scoping assessments, baseline prediction and definitions for significance criteria.

## 8.4 Data gathering methodology

- 8.4.1 Historically airports in the UK use one of two noise models to calculate aircraft noise; the UK civil aircraft noise contour model (ANCON), developed and maintained by the CAA, or the Integrated Noise Model (INM), produced by the US Federal Aviation Administration (FAA).
- 8.4.2 In 2015 INM was replaced by the Aviation Environmental Design Tool (AEDT), which is also produced by FAA. INM is now considered by the FAA as legacy software. Due to the release of AEDT, the FAA stopped supporting INM and will therefore not update the model or its associated database with new aircraft technology.
- 8.4.3 For the 2014 Planning Permission 2012 ES, all modelling was undertaken using INM. For consistency with the modelling underpinning the 2014 Planning Permission 2012 ES, the INM model has been retained for use for the purposes of this assessment.
- 8.4.4 Air traffic movements presented in **Appendix 8C-8B** in **Volume 3: Figures and Appendices**, have been provided by LLAOL and consist of forecasts based on predicted passenger numbers and fleet mixes. The runway and departure route split for all scenarios (including an update of the original 12.5 mppa 2028 future baseline) is based on a five-year average over the years 2015 to 2019. Noise levels, for individual aircraft, have been validated against actual operation for the most frequently operating types. [The validation data has shown that noise levels for modernised aircraft are currently not as quiet as initially anticipated when the 2012 ES was written.](#)
- 8.4.5 Details of the modelling methodology are contained in **Appendix 8B-8C** in **Volume 3: Figures and Appendices**.
- 8.4.6 The assessment of aircraft noise is based on an 'average summer's day' period from 16<sup>th</sup> June to 15<sup>th</sup> September. This 92-day period is used to account for the increased aircraft traffic during the summer season seen at many UK airports and consistent with the  $L_{Aeq,16hr}$  and  $L_{Aeq,8hr}$  index.
- 8.4.7 For the purpose of the noise assessment, population growth calculations used to inform the assessment present a larger increase in population than those schemes granted planning permission since 2011 (i.e. the 2014 Planning Permission 2012 ES baseline assessment). The population growth calculations have been used in the assessment of cumulative effects. It should be noted that the population data utilised for the 2014 Planning Permission 2012 ES is now considered out of date and as such, the population and dwellings counts have been updated with more recent population data for 2018. The 2018 population data is supplied

<sup>137</sup> World Health Organization (2018) Environmental Noise Guidelines for the European Region [online]. Available at: [https://www.euro.who.int/\\_data/assets/pdf\\_file/0008/383921/noise-guidelines-eng.pdf](https://www.euro.who.int/_data/assets/pdf_file/0008/383921/noise-guidelines-eng.pdf) [Accessed 12 November 2020].

<sup>138</sup> Institute of Environmental Management and Assessment (2014) Guidelines for Environmental Noise Impact Assessment, London.

under licence for this Proposed Scheme by CACI and applies population forecasts to the latest UK population census of 2011.

8.4.8 [Evidence has been presented in \*\*Appendix 8H\*\* as to the 2031 19 mppa Forecast Summer Contour. The technical note within this appendix provides a brief methodology of the noise modelling, the data used within the models and the results in terms of the Condition 10 contour noise levels of 57 dB  \$L\_{Aeq,16h}\$  in the daytime and 48 dB  \$L\_{Aeq,8h}\$  in the night-time. The results show that by 2031, Luton airborne aviation noise would be below the existing long-term Condition 10 contours limits of 15.2 sq km for the daytime limit and 31.6 sq km for the night-time limit. No further assessment has been undertaken of the noise in 2031 as this year would not form part of the 'With Scheme' scenario, the existing Condition 10 limits having been met.](#)

## 8.5 Consultation

8.5.1 For the assessment of the 19 mppa scenario, an initial approach to the noise assessment methodology was sent to Luton Borough Council (LBC) on 28 January 2020, with comments received back from the Council and LBC's acoustic consultant. The responses are presented in **Table 8.3**, with notes on and how these have been considered within the assessment. **Table 8.3** also provides an overview of noise issues that were raised during the non-statutory consultation, identifies how the EIA has had regard to those issues, and where further information can be found in this chapter.

Table 8.3 LBC comments and considerations from pre-submission consultation

Comment	Consultee	Consideration within this assessment	Considered in section
If it [the application] is a s73 then it is varying conditions (8 and 10 possibly) on the application that was submitted in 2012 (12/01400/FUL) and varied in 2017 (15/00950/VARCON) and so you would need to be looking at the difference from then to now – there is a lot of data available as LLAOL provide their quarterly reports (and annual monitoring report). You would also need to consider the difference between the permission for 18 mppa (what is happening on the ground currently) and the additional 1 mppa.	LBC	There is limited data to undertake comparative assessments with the 2014 Planning Permission 2012 ES, which was based on a short-term assessment against the 2011 baseline and a future baseline in 2028. It is considered that 2028 is the key year of assessment and that the increased mppa should be assessed against both the change in Condition 10 as a result of the proposal and also the difference with the original future year assessment of the 2014 Planning Permission 2012 ES. As it is expected that the effect of the proposals will diminish over time, the worst-case year of airport noise above that allowed for in the existing Condition 10 has also been assessed.	<b>Section 8.8</b>

Comment	Consultee	Consideration within this assessment	Considered in section
For the avoidance of doubt, we do expect to see plotted noise contours. We also assume that the same schedule of non-residential receptors will be used.	LBC	Noise contours have been plotted and the same non-residential receptors have been used as in the previous S73 application in 2019 (19/00428/EIA or 19/01253/EIASCRC).	<a href="#">Appendix 9E</a> in <b>Volume 3: Figures and Appendices</b>
You refer to changes to the level and frequency of $L_{Amax}$ and then say a significant effect will be identified if the frequency or level increases substantially - have you a view as to what level is considered to be substantial and the level at which you will define a significant effect?	LBC	An $L_{Amax}$ 80 dB noise contour is considered to be the threshold of potential significant effects <a href="#">for residences</a> . We have undertaken an assessment of the changes in fleet mix and ATMs to identify if there would likely be an increase in $L_{Amax}$ events above 80 dB.  <a href="#">For the daytime effects of maximum noise events at education premises, a level of <math>L_{Amax}</math> 72 dB has been used.</a>	<b>Section 98.8</b>
In terms of N contours; whilst it may not be an 'official assessment process' it is another metric to consider in line with Govt advice (so not just $L_{Aeq}$ 16hr or $L_{Aeq}$ 8hr).	LBC	<a href="#">NN contours have been considered as a supplementary metric as part of our assessment however, as stated in the comment, they are not an 'official assessment process'. -Contours have been considered.</a>	<b>Appendix 9F-8G</b> in <b>Volume 3: Figures and Appendices</b>
Traffic noise needs to consider this in relation to sensitive receptors.	LBC	Consideration for traffic noise was added to the Screening assessment to scope that source of noise out from further assessment; it was deemed to result in negligible effects. No comment was received from LBC as to significant effects from traffic noise.	<a href="#">Appendix 1A</a> in <b>Volume 3: Figures and Appendices</b> <b>Section 9.6</b>
You make no mention of ground noise and would need to consider that and determine whether it can be scoped out (or not). If there is an overall increase in the number of ATMs (which may be the case with 19 mppa compared to 18 mppa), then there could be an increase in ground noise (and there are some residents in the area who complain about ground noise from the airport, though to date I am not sure	LBC	Ground noise has been considered within the Screening document to determine whether an EIA is required. Additional ATMs were assessed without taking into account any potential benefit of reduced noise from modernisation. Short-term and long-term effects of the 19 mppa scenario were considered negligible.	<a href="#">Appendix 1A</a> in <b>Volume 3: Figures and Appendices</b> <b>Section 9.6</b>



Comment	Consultee	Consideration within this assessment	Considered in section
that LLAOL have been able to pick it up in dealing with the residents).			
Your final point about no construction noise, etc, is accepted assuming that the application is purely for 19 mppa and has no operational development associated with it.	LBC	The growth to 19 mppa will be accommodated without any new on-airport infrastructure as described in <b>Chapter 3: Description of the Proposed Scheme</b> . There have been no changes to agreed approach.	<a href="#">Section 9.6</a> <a href="#">Chapter 3</a>
Comments were received that expressed concerns about the impact of the proposals on local noise level.	Various	The noise assessment has assessed likely significant effects arising from the Proposed Scheme. It explains the likely significant effects arising from the proposed change to Condition 8 to raise the passenger throughput cap to 19 mppa, and those arising from the proposed increases to the daytime and night-time noise contours through the variation of Condition 10 for the period to the end of 2027, and from 2028 <a href="#">onward to 2030, with 2031 being the first year of a return to the existing long-term limit for Condition 10</a> .	<b>Section 8.9.9-10</b>
Comments were received that requested noise monitoring be carried out, and that noise levels be continually reviewed and reported to local communities on a monthly basis.	Various	<p>Luton Airport has three fixed noise monitoring terminals that constantly monitor the noise from aircraft. They also have four portable noise monitoring terminals, which are used to measure noise levels in local communities. Live updates of the noise monitoring (with a 20 min delay) can be seen from the <a href="#">fixed</a> monitoring stations here: <a href="https://travisltn.topsonic.aero/">https://travisltn.topsonic.aero/</a>.</p> <p>The findings from the noise monitoring are reported in regular and publicly available reports, which can be found through the following links:</p> <ul style="list-style-type: none"> <li>Community noise reports: <a href="https://www.london-luton.co.uk/corporate/community/noise/community-noise-reports">https://www.london-luton.co.uk/corporate/community/noise/community-noise-reports</a></li> <li>Quarterly noise reports: <a href="https://www.london-luton.co.uk/corporate/community/noise/quarterly-monitoring-report">https://www.london-luton.co.uk/corporate/community/noise/quarterly-monitoring-report</a></li> <li>Annual noise reports: <a href="https://www.london-luton.co.uk/corporate/community/noise/annual-monitoring-reports">https://www.london-luton.co.uk/corporate/community/noise/annual-monitoring-reports</a></li> </ul>	
Some comments received provided recommendations for noise mitigation or management measures.	Various	Environmental measures embedded into the Proposed Scheme to manage and mitigate noise are presented in <b>Section 8.7</b> and in <b>Table 8.28</b> .	<b>Section 8.7; Table 8.28</b>

8.5.2

A formal request to LBC for a Screening Opinion under Regulation 5(2) of the *Town and Country Planning (Environmental Impact Assessment) Regulations 2017* was submitted (see **Appendix 1A** and **Appendix 1B** in **Volume 3: Appendices and Figures**). This included an initial assessment of noise from the proposed variation. The screening assessment concluded that the proposed variation would not have a significant effect on noise sensitive receptors. In particular, the screening assessment considered the following:

- increase in road traffic noise effects as a result of increased traffic from the rise in passengers;
- increase in aviation ground noise from aircraft taxiing; and
- increase in aviation 'in-air' noise.

- 8.5.3 Based on the increase in the number of dwellings that would be exposed to noise levels above the Significant Observed Adverse Effect Level (SOAEL) as a result of 'in-air' noise, LBC considered that the Proposed Scheme was likely to have a significant environmental effect and therefore required an EIA.
- 8.5.4 In conjunction with the screening request, a standalone Noise Impact Assessment report was submitted to LBC in July 2020 associated with the 19 mppa application. The report received comments from both the Council and the Council's third-party acoustic consultant. The comments were considered within the revision of the assessment as provided within this chapter. The key comments and how they have been addressed are presented in **Table 8.4**.

**Table 8.4** LBC comments and considerations from the Noise Impact Assessment

Comment	Consideration within this assessment	Considered in section
The assessment does not justify this extent of relaxation. Seeking a greater relaxation than is technically justified by the noise assessment purely to cover matters of forecasting uncertainty is not an appropriate approach.	The amendment to Condition 10 has been revised with new forecasting and noise predictions. The relaxation submitted is only that required by predicted noise levels based on forecasted flows.	<b>Section 1.2</b>
We do not accept that reference to an entirely separate application (which we understand will be withdrawn once the 19 mppa application is made) can in any way be used to justify the extent of relaxation being sought in this case.	References to the previous S73 (19/00428/EIA or 19/01253/EIASCRC) have been removed.	N/A
Given current uncertainties within the airline industry associated with Covid-19, how confident is LBC that 2021 will indeed be the worst-case operational year? Any further delay in the resurgence of the industry beyond what is currently foreseen might put pressure on 2024 as the year for re-normalisation of Condition 10.	Forecasts have been updated to take into account the latest understanding of how the airlines will operate.	<b>Section 2.2</b>
The assessment and appendices are confusing and appear contradictory, and the explanations provided were not totally understandable. A clear and coherent link between forecast numbers and noise model inputs is required.	A modelling report is presented in the Appendix to provide the necessary explanation in one place. Assessment scenarios and results have been updated.	<b>Appendix 8B-8C in Volume 3: Figures and Appendices</b>
Three separate years as providing baselines against which the 2028 19 mppa noise case is to be compared. There is no text justifying or explaining the merits of these comparisons. They do not include 2019, which by all reasonable standards could be considered the most recent year for which noise contours are available, i.e. the baseline year. BAP Appendix B contains summer's day, day time and night-time movement numbers for 2019 suggesting that this has been the subject of noise modelling.	Assessment scenarios have been updated. The reason for not using 2019 as a baseline was because the noise limits imposed by Condition 10 were already being exceeded during that year and therefore it was not considered an appropriate baseline.	<b>Section 8.8</b>

Comment	Consideration within this assessment	Considered in section
The acid test of noise effects for any application to vary aircraft operations is the 'with Proposed Scheme' vs. without Proposed Scheme' comparison for the year of full capacity (in this case 2028). By convention, comparison of the 'with Proposed Scheme' case against baseline is also undertaken. We think the basis of this analysis needs to be rationalised and justified	The assessment scenarios are the worst-case year for identification of <a href="#">Condition 10 noise limits, the worst-case year for identification of mitigation, the following years after worst-case year to show reduction in effect</a> , and 2028 both 'with' and 'without' Proposed Scheme mppa increase and baseline. <a href="#">Beyond 2028, the noise levels are reduced to meet with the existing long-term Condition 10 limits in 2031.</a>	<b>Section 8.8</b>
No reference is made in the NIA to the plotted contours contained as part of BAP Appendix D. Plots are provided for values of 57 dB daytime and 48 dB night-time in each of years 2021, 2024 and 2028 'with Proposed Scheme' (19 mppa) and 'without Proposed Scheme' (18 mppa). This would not be considered adequate for an ES noise chapter, as contours should as a minimum be plotted at LOAEL, SOAEL, and UAEL as well 54 dB LAeq,16h day as this is now considered to represent the onset for significant community annoyance. Good practice is to plot contours at 3 dB intervals from LOAEL up to UAEL, as was prepared for the S.73 application ( <b>19/00428/EIA or 19/01253/EIASCR</b> ). In this way, locations affected by noise at different average levels during the daytime and night-time can be identified.	Figures referenced in the chapter and include contour values.	<a href="#">Volume 3: Figures and Appendices Section 8.9 and Appendix 8E in Volume 3: Figures and Appendices</a>
We believe the method for assessing the magnitude of change to be an unnecessarily convoluted and not 100% reliable way of assessing the noise level difference between two scenarios given that the noise model is able to identify the actual range of differences across the entire assessment grid.	Method has been amended to use a matrix of noise level change and absolute noise levels at receptor points, so the convoluted calculation method is not required.	<b>Section 8.9</b>
A large amount of data is presented in tabular form in the appendices. It seems to be excessive given the additional information that can be gleaned from L <sub>Amax</sub> flyover effects.	The assessment within the chapter is considered to be sufficiently concise. The appendices provide all supporting information required for reviewing the application.	<b>Section 8.9 and Appendix 8E-8F in Volume 3: Figures and Appendices</b>
The commitment to funding of the SIGS appears to fall short to the tune of £1,300,000. There is no reference to any funding post 2021.	The mitigation <a href="#">approach</a> has been revised <del>and detailed</del> within the chapter.	<b>Section 8.714</b>

[8.5.5](#) [Luton Borough Council provided comments on the Environmental Statement submitted in January 2021. These were subsequently responded to by Wood with a meeting held on 13<sup>th</sup> April 2021 to discuss the comments with Wood, LBC, LLAOL and Vernon Cole in attendance. This was followed by further comments by Vernon Cole on the Wood response. The comments and responses are presented in \*\*Appendix 8D\*\*.](#)

## 8.6 Scope of the assessment

### Spatial scope

- 8.6.1 The spatial scope of the assessment of noise covers the area of the Proposed Scheme, together with an area extending to the worst-case noise attributed to aviation for the 51 dB  $L_{Aeq,16hr}$  daytime contour and 45 dB  $L_{Aeq,8hr}$  night-time contour<sup>139</sup>. Additional locations have been modelled outside of these noise contour areas to show the predicted noise levels at nearby communities.

### Temporal scope

- 8.6.2 The key assessment year is the future year of 2028, which corresponds to the future year identified within the 2014 Planning Permission 2012 ES. However, there are years prior to [this 2028](#) that also need assessment for three reasons:

———[2024 has also been assessed because this is the first year where 19 mppa is predicted to be reached.](#)

1) [As passenger demand returns to pre-Covid levels and increases to above higher than the Current Condition 8 limit of 18 mppa, it is predicted that the existing Condition 10 contours would be breached. Therefore, the years prior to 2024 to when the throughput of passengers reaches 19 mppa in 2024 also need to be assessed.](#)

1) — The variation to Condition 10 presents a new area limit for the daytime 57 dB  $L_{Aeq, 16 hr}$  and night-time 48 dB  $L_{Aeq, 8 hr}$  assessment, which is based on the [widest largest](#) area, predicted to be in 2021, [with 18 mppa](#).

2) —

3) [Whilst 2021 is the worst-case year in terms of Condition 10 noise contour expansion, this does not account for the worst-case significance of effect between 2021 and 2031. The worst-case year has been identified as 2022 for significance of effect. Additional years of 2023 and 2024 have been included as information to show how noise decreases as modernization reduces the noise effect from the airport operations, supporting the conclusion that 2022 is the worst-case year for significant effect.](#)

[As modernization reduces the noise effect from the airport operations, the 2028 year would not be the worst-case scenario. To ensure that environmental measures required to minimise significant noise effects encompass the worst-case effect from the Proposed Development, interim years between 2021 and 2028 also need to be assessed. The worst-case year has been identified as 2022. Additional years of 2023 and 2024 have been included as information to show how noise decreases, supporting the conclusion that 2022 is the worst-case year for significant effect.](#)

[2024 has also been assessed because this is the first year where 19 mppa is predicted to be reached.](#)

- 8.6.3 [It is not considered necessary to model 2025 – 2027 or 2029 and 2030 as these years would be subject to the proposed Condition 10 changes. Whilst noise levels would continue to fall after 2024 \(as is clear by the reduction in 2028\) and after 2028 \(as is clear from meeting existing Condition 10 in 2031\), they would neither show the worst-case year for significant effect, sound insulation eligibility, nor would they show a risk in exceeding the amended](#)

<sup>139</sup> These contours relate to the Lowest Observable Adverse Effect Level, which is discussed in **Section 8.8**.

Condition 10. It is however, expected that effects identified in preceding years which are assessed would continue into those years not assessed. For this assessment therefore, for example, the noise effects of 2024 are likely to be similar (though lower) for the years 2025, 2026 and 2027.

To undertake the assessment of the key year of 2028, the predicted noise contours for the Proposed Scheme are compared to the baseline condition. As the proposal is to vary a condition of the 2014 Planning Permission, it is considered relevant to use the baseline of 12.5 mppa in 2028, as was assumed for the 2012 ES (as updated with runway operation and population numbers). By undertaking this comparison, it is possible to analyse the effect as would have been identified in 2012 with this different condition (given necessary adjustments for the latest knowledge). For years prior to 2028 which encompass both the change to the Condition 10 and worst-case year for significant effect, it is more appropriate to compare with what it is permissible currently, i.e. what is the actual effect that could be experienced at residences, assuming what is permissible with the existing Condition 10 18 mppa contour area.

8.6.38.6.4 In summary, three non-variation scenarios are considered as a baseline for comparison:

- the extent of the existing 18 mppa Condition 10 for 2021 to 2027 inclusive, which provides a noise limit for airport 'in-air' operation;
- the extent of the existing 18 mppa Condition 10 for 2028 onwards, which provides a future noise limit for airport in-air operation; and
- the 'without Proposed Scheme' 2028 scenario of 12.5 mppa as assessed in the 2014 Planning Permission 2012 ES but updated to take into account the latest knowledge of fleet mix and runway split.

## Receptors

8.6.48.6.5 The closest residential areas to the airport are located to the west and south-west of Luton but there are more densely populated areas to the north. There are several small villages within relatively close proximity of LLA. Breachwood Green and Whitwell are located to the east and are affected by easterly departures and westerly arrivals. Residential areas to the west, such as Slip End, Caddington, Flamstead, and Markyate are affected by easterly arrivals or westerly departures. Due to the scale of the study areas the effect of aviation noise will be assessed in terms of dwellings in different noise contours rather than identifying noise at specific residential receptors.

8.6.58.6.6 The assessment considers the effect of the Proposed Scheme on the residents adversely affected, and significantly adversely affected, by the proposed variations, taking into account absolute levels of noise and the magnitude of change. Additional commentary is provided for other indicators, including N-contours and  $L_{Amax}$  levels.

8.6.68.6.7 Noise at non-residential receptors will be assessed; particularly education, healthcare, and religious centres are considered sensitive to increases in noise. Noise levels indicating thresholds for the onset of potentially significant effects for non-residential noise sensitive receptors are dependent on their use. The magnitude of change in noise is applied to assess significance on non-residential receptors.

8.6.78.6.8 The list of non-residential receptors presented in the 2014 Planning Permission 2012 ES have been reviewed and community locations which did not represent any non-residential noise sensitive receptors have been removed and the specific non-residential noise sensitive



receptors identified. The receptors identified in **Table 8.5** are not exhaustive but relate to the closest modelled point.

**Table 8.5** Non-residential noise sensitive receptors

Location	Receptors
<b>Old Knebworth</b>	Knebworth Country Park
<b>Caddington</b>	Caddington Village School, Heathfield Lower School
<b>Park Town, Luton</b>	The Linden Academy, Wonderland Day Care Nursery
<b>Whitwell</b>	St Paul's Walden Primary School, The Whitwell Surgery
<b>Breachwood Green</b>	Breachwood Green JMI School
<b>St Pauls Walden</b>	All Saints Church
<b>Farley Hill, Luton</b>	Stockwood Park Academy, St Margaret of Scotland Catholic Primary School
<b>Slip End</b>	Slip End Lower School
<b>Harpenden</b>	Roundwood Park School, King's School, Highfield's Pre-school, Manland Primary School, St George's School, Spire Harpenden Hospital
<b>Walkern</b>	Walkern Primary School
<b>Stevenage (Eastern Perimeter)</b>	Camps Hill Community School, Noble School, Lodge Farm Primary School
<b>Stevenage Station</b>	North Hertfordshire College
<b>Luton (Wandon End)</b>	Wigmore Park
<b>Kensworth</b>	Kensworth Primary School
<b>Hudnall Corner</b>	Hudnall Park
<b>Flamstead</b>	Flamstead School
<b>Markyate</b>	Markyate Village School & Nursery

### Likely significant effects

[8.6.88.6.9](#) The assessment considers the impact of the Proposed Scheme from the initial 2021 [‘with Scheme’](#) forecast [with 18 mppa](#), upon which the amendment to Condition 10 is based. The following [‘with Scheme’](#) years are also assessed until 2024, which is the first year of increased throughput to 19 mppa. Based on the changing fleet mix with increased modernisation, these chosen scenario years show both the worst-case years for noise effect and how the noise levels start to decrease thereafter. A future year of 2028 is also assessed to understand the long-term effects of the Proposed Scheme in line with the original methodology within the 2014 Planning Permission 2012 ES.

[8.6.98.6.10](#) This assessment is for airborne aircraft ‘in-air’ noise only, which is principally from aircraft arriving and landing and from aircraft taking-off and departing. ‘In-air’ aircraft noise that is considered in this assessment includes noise that occurs when, aircraft are on the runway:

- for start of take-off roll (SoR);

- after landing;
- when aircraft are rolling down the runway; and
- when aircraft are using reverse thrust for braking.

[8.6.108.6.11](#) Road traffic noise effects and aviation ground noise are not considered within this report as they have already been considered within the screening report (see **Appendix 1A** in **Volume 3: Figures and Appendices**) and have been shown not to have a significant effect. There are no construction works or operational building services plant to assess as there are no infrastructure requirements associated with the Proposed Scheme.

## 8.7 Environmental measures embedded into the Proposed Scheme

8.7.1 To ensure that noise levels decrease year on year the following commitments will be made as part of the Proposed Scheme:

- For Summer 2021 and all subsequent seasons, no night-time slots (22:00 to 05:59 GMT) will be allocated to aircraft with a quota count (QC) value greater than 1;
- No further daytime slots will be allocated to aircraft with a QC value greater than 1 (06:00 to 21:59 GMT) between 1 June and 30 September;
- No further night slots to be allocated to series flights (22:00-05:59 GMT) between 1 June and 30 September;
- No new slot applications with an aircraft QC value greater than 0.5 will be permitted between 22:00 and 05:59 GMT;
- Only scheduled arriving aircraft will be accepted between 04:45 and 06:00 GMT. All other arriving aircraft must land after 06:00 GMT, arrivals earlier than the scheduled arrival time will not be accepted; and
- No re-scheduling of existing allocated slots from the day time (06:00 to 21:59 GMT) into the night-time (22:00 to 05:59 GMT) 1 June – 30 September.

## 8.8 Assessment methodology

### Approach

8.8.1 The assessment of effects in this chapter differs from the generic project-wide approach to the assessment methodology as set out in **Chapter 4: Approach to preparing the Environmental Statement**. The generic approach of comparing the Proposed Scheme with a baseline has informed this noise assessment. However, the identification of receptor sensitivity and magnitude is unnecessary as there exists in NPSE the framework for identifying significant effects on health, albeit the level by which this occurs is a matter of professional judgment.

8.8.2 Aircraft noise effects have been assessed by calculating and comparing predicted aircraft noise levels for the airport operating to the extent of the proposed variations against a selection of baseline scenarios as described in **Section 8.6**. As described in **Section 2.1**, in seeking to increase the passenger numbers to 19 mppa, Condition 10 needs to be varied both in the area limits up to 2027 inclusive and the area limits set for 2028 and onwards [until](#)

[the existing Condition 10 long-term limits are met in 2031](#). The worst-case year for significant noise effects is not necessarily aligned with either the largest area contained within Condition 10 daytime or night-time contours 57 dB and 48 dB respectively or the years of maximum 19 mppa capacity. It is therefore necessary to analyse noise modelling results for a number of years between 2021 and 2028 to ascertain the years of highest impact in relation to significance and mitigation requirements.

- 8.8.3 The primary means of assessing aviation noise is by using the daytime (07:00 - 23:00)  $L_{Aeq, 16hr}$  and night-time (23:00 - 07:00)  $L_{Aeq, 8hr}$  metrics. The N65 and N60 contours and  $L_{Amax}$  contours have also been considered, but are only presented as additional information, so conclusions regarding significant effect have not been drawn from those results.

### Assessment scenarios

- 8.8.4 Aviation noise described using the  $L_{Aeq}$  metric has been assessed using the following scenarios as discussed in **Section 8.6**:
- comparison of the 'with Proposed Scheme' scenarios: 2021 (with the amended Condition 10 limits), 2022, and 2023 ~~18 mppa~~ scenarios with the existing [18 mppa](#) Condition 10 limits for 2021 - 2027 showing the short-term change in noise levels prior to the projected year that the 19 mppa would take effect.
  - comparison of the 'with Proposed Scheme' 19 mppa 2024 scenario with the existing [18 mppa](#) Condition 10 limits for 2021 - 2027 showing the short-term change in noise levels prior to the change in Condition 8.
  - comparison of the 2028 19 mppa scenario (with the amended Condition 10 limits) with the 2028 baseline ('without Proposed Scheme') 12.5 mppa scenario as would have been expected for the 2014 Planning Permission's ES (as assessed in the 2012 ES); and
  - comparison of the 2028 19 mppa scenario (with the amended Condition 10 limits) with the existing [18 mppa](#) Condition 10 limits for 2028 onwards for long-term effects.

### Assessment criteria

- 8.8.5 Following government policy terminology<sup>140</sup>, adverse effects can be detected from calculated noise at a residential receptor when between LOAEL and SOAEL, and significant adverse effects occur when above SOAEL. Reference to the NPSE criteria is made within this assessment and mitigation considered accordingly to minimise absolute levels of noise. However, determining whether, the difference between baseline scenarios and the Proposed Scheme, would be considered a significant effect is also dependent on the magnitude of change.

### Assessment criteria for residential receptors

- 8.8.6 The aircraft noise thresholds shown in **Table 8.6** have been used within this assessment for residential receptors.

<sup>140</sup> Department for Agriculture and Rural Affairs (2010). *Noise Policy Statement for England*. Available [online] at [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69533/pb13750-noise-policy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf) [Accessed 23 November 2020].

Table 8.6 Summary of aircraft noise thresholds for residential receptors

Period	Lowest Observed Adverse Effect Level (LOAEL)	Significant Observed Adverse Effect Level (SOAEL)	Unacceptable Adverse Effect Level (UAEL)
<b>Day time (07:00 to 23:00)</b>	51 dB $L_{Aeq,16hr}$	63 dB $L_{Aeq,16hr}$	71 dB $L_{Aeq,16hr}$
<b>Night-time (23:00 to 07:00)</b>	45 dB $L_{Aeq,8hr}$	55 dB $L_{Aeq,8hr}$	66 dB $L_{Aeq,8hr}$

### Daytime aircraft noise

- 8.8.7 The airborne noise assessment method prescribed in the 2014 Planning Permission 2012 ES was based on noise policy contained in the withdrawn *Future of Air Transport White Paper* (ATWP)<sup>141</sup>. The 2014 Planning Permission 2012 ES therefore assessed amenity noise effects when aircraft noise exceeded 57 dB, 63 dB, and 69 dB  $L_{Aeq,16hr}$  as endorsed in the White Paper.
- 8.8.8 For the purposes of this assessment, the daytime noise policy thresholds of 63 dB and 69 dB used for the 2014 Planning Permission 2012 ES have been retained; however consistent with updated airspace policy guidance, this assessment also considers noise above 51 dB  $L_{Aeq,16hr}$ .
- 8.8.9 The level of **71 dB  $L_{Aeq,16hr}$**  has been considered a suitable value for a daytime UAEL relating to 10 dB above BS 8233<sup>142</sup> internal noise target levels assuming a precautionary outdoor to indoor noise level difference of 26 dB with windows closed<sup>143</sup>.
- 8.8.10 The level of **63 dB  $L_{Aeq,16hr}$**  has been considered a suitable value for the SOAEL for the assessment of likely significant adverse effects and is based upon paragraphs 3.37-3.39 from the APF<sup>144</sup>, which indicates that above 63 dB  $L_{Aeq,16hr}$ , airports should provide financial assistance towards noise insulation at noise-sensitive buildings and residential dwellings.
- 8.8.11 The level of **51 dB  $L_{Aeq,16hr}$**  has been considered a suitable value for LOAEL based on the Air Navigation Guidance (ANG, 2017)<sup>145</sup> which states that “We [the Government] will set a LOAEL at 51 dB  $L_{Aeq,16hr}$  for daytime noise”.

<sup>141</sup> Department for Transport (2003). *The Future of Air Transport*. Available [online] at [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685595/6046.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685595/6046.pdf) [Accessed 23 November 2020].

<sup>142</sup> British Standards Institution (BSI, 2014) *British Standard BS 8223:2014 Guidance on sound insulation and noise reduction for buildings*. London, BSI.

<sup>143</sup> This is based on the UAEL identified within the Heathrow Preliminary Environmental Information Report (PEIR), Appendix 7.1 Annex F: Overview of LOAEL, SOAEL and UAEL values (Heathrow Airport Limited, 2019), available at <https://aec.heathrowconsultation.com/wp-content/uploads/sites/5/2019/06/23-Volume-3-PEIR-Chapter-17-Noise-and-vibration-Appendices.pdf> [Accessed 23 November 2020], which itself refers to Figure 2 within ProPG: Planning & Noise. Professional Planning Guidance on Planning and Noise. New Residential Development (May 2017) available at <https://www.ioa.org.uk/sites/default/files/14720%20ProPG%20Main%20Document.pdf> [Accessed 23 November 2020].

<sup>144</sup> Department for Transport (2013). *Aviation Policy Framework*. Available [online] at <https://www.gov.uk/government/publications/aviation-policy-framework> [Accessed 23 November 2020].

<sup>145</sup> Department for Transport (2017) *Air Navigation Guidance* [online]. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/918507/air-navigation-guidance-2017.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918507/air-navigation-guidance-2017.pdf) [Accessed on 12 November 2020].

### Night-time aircraft noise

- 8.8.12 With regards to night-time aircraft noise, this was assessed in the 2014 Planning Permission 2012 ES according to the area of the 90 dB Sound Exposure Level (SEL) footprint<sup>146</sup> for the most frequently operated aircraft and the area of the 55 dB and the 48 dB  $L_{Aeq,8hr}$  contour.
- 8.8.13 The level of **66 dB  $L_{Aeq,8hr}$**  has been considered a suitable value for a night-time UAEL relating to 10 dB above BS 8233<sup>147</sup> internal noise target levels assuming a precautionary outdoor to indoor noise level difference of 26 dB with windows closed<sup>148</sup>.
- 8.8.14 For the purposes of this assessment, it is considered that a suitable value for the night-time SOAEL is **55 dB  $L_{Aeq,8hr}$** . This is based on the WHO Night Noise Guidelines for Europe<sup>149</sup> 'interim target value' of 55 dB  $L_{Aeq,8hr}$ . The interim target is recommended by WHO for countries where the night noise guideline (NNG) of 40 dB cannot be achieved in the short-term for several reasons.
- 8.8.15 Consistent with updated policy and guidance this assessment considers **45 dB  $L_{Aeq,8hr}$**  as suitable value for LOAEL.

### Assessment criteria for non-residential noise sensitive buildings

- 8.8.16 The threshold criteria for assessing the effect of the Proposed Scheme upon non-residential noise-sensitive receptors are presented in **Table 8.7**. A significant effect is potentially identified where the aircraft noise exceeds the relevant threshold; identified exceedances are then assessed using magnitude of change criteria.

**Table 8.7** Threshold criteria for establishing potentially significant effects on noise-sensitive non-residential receptors

Receptor(s)	Threshold criteria	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
<b>Acoustical resources</b> i.e. Auditoria; concert halls; sound recording, broadcast studios and theatres	50 dB $L_{Aeq, 16h}$ <sup>1</sup>	50 dB $L_{Aeq, 8h}$
<b>Places of meeting for religious worship; courts; cinemas; lecture theatres; museums; small auditoria or halls</b>	50 dB $L_{Aeq, 16h}$ <sup>2</sup>	N/A
<b>Healthcare facilities</b> Including hospitals and out-patient clinics	50 dB $L_{Aeq, 16h}$	45 dB $L_{Aeq, 8h}$ <sup>3</sup>
<b>Hotels</b>	50 dB $L_{Aeq, 16h}$	45 dB $L_{Aeq, 8h}$ <sup>3</sup>
<b>Educational facilities</b> Including schools, colleges, and libraries	50 dB $L_{Aeq, 16h}$	N/A
<b>Offices</b>	55 dB $L_{Aeq, 16h}$ <sup>4</sup>	N/A

<sup>146</sup> Sound Exposure Level is the constant sound level that has the same amount of energy in one second as the original noise event.

<sup>147</sup> British Standards Institution (BSI, 2014), *Op. cit.*

<sup>148</sup> As per footnote 143, based on UAEL within Heathrow PEIR (2019) and ProPG (2017).

<sup>149</sup> The World Health Organisation, Night Noise Guidelines for Europe, 2009 [Available [online] at: [http://www.euro.who.int/\\_data/assets/pdf\\_file/0017/43316/E92845.pdf](http://www.euro.who.int/_data/assets/pdf_file/0017/43316/E92845.pdf)] [Accessed 23 November 2020].



Receptor(s)	Threshold criteria	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
External amenity spaces	55 dB $L_{Aeq, 16h}$ <sup>5</sup>	N/A

1. Based on an internal level of 25  $L_{Aeq,T}$  consistent with BS 8233. To require these criteria the internal sound levels due to existing sources (internal and external) must already be reduced to these criteria or lower. Given typical environments this would suggest any such receptor would have a level of sound insulation from the building shell (including windows and ventilation penetrations) that would reduce external levels by at least 25 to 30 dB.
2. Based on an internal level of 35 dB  $L_{Aeq,T}$  consistent with Building Bulletin 93 and BS 8233. Equivalent external level assuming 10-15 dB for a partially open window.
3. Based on an internal level of 30 dB  $L_{Aeq,T}$  consistent with BS 8233, WHO guidelines. Equivalent external level assuming 10-15 dB for a partially open window.
4. Based on an internal level of 40 dB  $L_{Aeq,T}$  consistent with BS 8233, BCO guidelines etc. Equivalent external level assuming 10-15 dB for a partially open window.
5. Based upon guidance from World Health Organization 'Guidelines for community noise'.

### Magnitude of noise change criteria for residential and non-residential receptors

- 8.8.17 Where predicted aviation noise levels at residences exceed the LOAEL or SOAEL there is the potential for adverse or significant adverse effects, respectively. A notable exceedance of criteria is deemed to occur if aviation noise exceeds the LOAEL by at least 3.0 dB and the SOAEL by at least 1.0 dB.
- 8.8.18 For non-residential receptors, any increase of at least 1 dB where the noise level is above the threshold criteria would be considered a significant effect.
- 8.8.19 The approach takes account of the increasing severity of the effect when the SOAEL is exceeded. PPG-N<sup>150</sup> states that where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring. It is therefore considered appropriate to assign a greater degree of importance to noise change above the SOAEL.
- 8.8.20 Where pertinent, additional factors are taken into account when determining adverse or significant adverse effects, such as the time over which the effect occurs and the context of the increases, and the increase or decrease in population (associated with dwellings) exposed at or above SOAEL.
- 8.8.21 Reductions in noise can provide a beneficial or significant beneficial effect.
- 8.8.22 Any increases or decreases less than the stated change above would result in a negligible effect.

### N-Contours

- 8.8.23 There was no evidence from the findings within CAP 1506<sup>151</sup> that suggested N65 or N70 contours correlated better with annoyance than  $L_{Aeq, 16hr}$  and there are no planning criteria available for the N65/N60 metrics.

<sup>150</sup> Ministry of Housing, Communities and Local Government, Planning Practice Guidance: Noise (2014) [Available online: <https://www.gov.uk/guidance/noise--2>] [Accessed 23 November 2020].

<sup>151</sup> Civil Aviation Authority, CAP 1506: Survey of noise attitudes 2014: Aircraft (2017) [Available online: <https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=7744>] [Accessed 23 November 2020].

- 8.8.24 The 'Number above' contours outline the extent of the area exposed to a certain  $L_{Amax}$  noise level a certain number of times per day. An 'N65, 200 contour' outlines the area exposed to at least 65 dB  $L_{Amax}$  at least 200 times per day. Due to the nature of these contours, they can be very sensitive to small changes in the movements used to produce them. For instance, if an airport had 190 movements per day it would have no N65, 200 contour, however this does not mean that the 190 movements do not have an impact. Equally if the airport had ten extra movements there would be an N65 200 contour, although any impact of the 10 extra movements is likely to be small.
- 8.8.25 Despite the potential issues, N-contours are considered to be informative indicators of the noise environment generated by aircraft in flight not fully expressed using the  $L_{Aeq,T}$ . As such, the N65 and N60 contours have been identified for both the current limit contours of the existing Condition 10 and the proposed Condition 10 limit contours, both short-term (as identified by 18 mppa 2021 forecasts) and long-term (19 mppa 2028 forecasts). The results of the N contours analysis is presented in **Appendix 8E-8G** in **Volume 3: Figures and Appendices**.

### $L_{Amax}$ Assessment

- 8.8.26 The assessment of effects from maximum noise levels of aircraft movements have focused on the following:
- daytime disturbance of educational establishments with a potential onset of adverse effects of above 80-72 dB  $L_{Amax, daytime}$ . This is based on the design requirement within *Acoustic design of schools: Performance standards*<sup>152</sup> for regular discrete noise events to not exceed 60 dB  $L_{A1, 30 minutes}$ . The external level is calculated by adding 15-12 dB for attenuation through a slightly open window and also assuming parity conservative estimation of the difference between the  $L_{A1, 30 mins}$  and  $L_{Amax}$  of 5 dB for one event in 30 minutes as a precautionary approach. (in fact the aviation  $L_{Amax}$  will actually be slightly higher than the  $L_{A1, 30mins}$ , making the limit criterion more likely to be exceeded in this assessment than it would in reality). Schools and colleges are the most common sensitive non-residential receptor within identified receptors locations (as per **Table 8.5**).
  - night-time disturbance of sleep within health care and residences with a potential onset of adverse effects of above 80 dB  $L_{Amax, night-time}$ . This is based on research described within CAP 725<sup>153</sup> that referred to research showing a statistical relationship between sleep arousal rates and aviation noise of approximately 80 dB upwards.
- 8.8.27 For non-residential receptors, computer noise modelling has been undertaken to predict noise from the loudest aircraft types at specific locations. For residences,  $L_{Amax}$  contours have been produced to provide an area (sq.km), number of dwellings and population included within various aircraft type noise contours. The data for the  $L_{Amax}$  predictions are presented in **Appendix 8E-8F** in **Volume 3: Figures and Appendices**.
- 8.8.28 An appreciation of how  $L_{Amax}$  could either decrease or increase has been gathered by examining the change in forecasted ATMs as a result of the 19 mppa proposed variation and the fleet mix between older, louder planes and the new, quieter planes. Adverse effects would potentially be identified where there is an overall increase in the louder planes causing exposure above  $L_{Amax}$  80 dB at noise sensitive receptors.

<sup>152</sup> Department for Education, *Acoustic design of schools: performance standards* (Building bulletin 93), 2015. UK Government. Available [online] at: <https://www.gov.uk/government/publications/bb93-acoustic-design-of-schools-performance-standards> [Accessed 23 November 2020].

<sup>153</sup> Civil Aviation Authority, CAP 725: *Airspace Change Process Guidance Document* (2017) [Available [online] at: <https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=395> [Accessed 23 November 2020].

8.8.29 Recent non-compliance with Condition 10 (based on the  $L_{Aeq, 16 \text{ hour}}$  and  $L_{Aeq, 8 \text{ hour}}$ ) does not involve the  $L_{Amax}$  metric. ~~Therefore, the  $L_{Amax}$  assessment is restricted to 19 mppa scenarios.~~ Instead of the use of the existing 18 mppa Condition 10 noise ~~levels/limits~~, the  $L_{Amax}$  assessment compares the 19 mppa scenario with the 18 mppa ~~forecasts/scenarios~~ for 2024 and 2028. Existing 18 mppa Condition 10 results are not based on forecasts and do not have the ~~necessary~~ detail of fleet mix ~~necessary~~ upon which to ~~carry out a comparative~~ ~~in an~~  $L_{Amax}$  assessment.

## 8.9 $L_{Aeq}$ Assessment of noise effects on residences

### Residential $L_{Aeq}$ noise contour assessment

- 8.9.1 This section presents a discussion of the results, presented in full in **Appendix 8D-8E** in **Volume 3: Figures and Appendices**, used to identify noise effects for the operation of LLA. The tables present the total area, dwellings and population encompassed by the contours pertaining to the relevant baseline and Proposed Scheme scenario. Tables are split into noise contours for the purposes of assessing effects on residences, and specific receptor locations in the community for the purposes of assessing effects on non-residential receptors. The tables identify the levels of interest; LOAEL, SOAEL, and existing Condition 10 limits.
- 8.9.2 Applying the change criteria in **Section 8.8**, the assessment is carried out in three steps by comparing the Proposed Scheme Scenarios with the baseline scenarios:
- identify whether there are changes of 3 dB or more between the LOAEL or SOAEL contour levels when comparing the 19 mppa and relevant baseline scenario;
  - identify whether there are changes of 1 dB or more within the SOAEL contour when comparing the 19 mppa and baseline scenario; and
  - identify any change in number of receptors exposed within the SOAEL contour in the 19 mppa scenarios.

### General Comments

- 8.9.3 **Table 8.8** summarises the results with the numbers of dwellings above LOAEL, the 54 dB  $L_{Aeq, 16hr}$  contour (the onset of significant annoyance) and SOAEL for the various baseline and Proposed Scheme scenarios. **Table 8.9** provides the difference between the key assessment years.
- 8.9.4 The results show more dwellings would be predicted to experience noise above the LOAEL, SOAEL, and level identified with the onset of significant annoyance for most scenarios from the Proposed Scheme. The exception to this is less dwellings are predicted to experience noise above SOAEL during the night-time when compared with the 12.5 mppa 2028 future baseline updated scenario.
- 8.9.5 The worst case-year for the number of dwellings above SOAEL is 2022, when 724 additional dwellings would be predicted to experience noise above SOAEL during the night-time with the Proposed Scheme in comparison with the existing Condition 10 limits. The number of additional dwellings above the night-time SOAEL remains constant until 2023 and then decreases thereafter.
- 8.9.6 No dwellings are predicted to be within the noise contour for UAEL for either daytime or night-time in any scenario.

Table 8.8 Number of dwellings within operational aviation noise contour levels in key assessment years ( $L_{Aeq,T}$  dB)

Contour level ( $L_{Aeq,T}$ )	Number of dwellings							
	Baseline Existing 18 mppa Condition 10 noise contour (2021 - 2027)	With Scheme 2021 18 mppa Noise contour	With Scheme 2022 18 mppa Noise contour	With Scheme 2023 18 mppa Noise contour	With Scheme 2024 19 mppa Noise contour	Baseline Existing future 18 mppa Condition 10 noise contour (2028 onwards)	Baseline 12.5 mppa future baseline 2028 Noise Contour	With Scheme 2028 19 mppa noise contour
<b>Daytime contour level (<math>L_{Aeq,16hr}</math>)</b>								
51	13,981	16,746	16,411	15,547	14,644	10,003	9,990	10,276
54	7,080	7,661	7,827	7,619	7,258	5,582	5,560	5,816
63	720	758	805	776	720	411	331	460
<b>Night-time contour level (<math>L_{Aeq,8hr}</math>)</b>								
45	19,490	25,426	24,906	24,815	22,328	15,597	16,706	19,637
55	1,184	1,790	1,908	1,908	1,742	1,012	1,406	1,385

Table 8.9 Comparisons of numbers of dwellings within operational aviation noise contour levels in key assessment years ( $L_{Aeq,T}$  dB)

Contour level ( $L_{Aeq,T}$ )	Change in number of dwellings					
	With Scheme 2021 18 mppa increase on existing 18 mppa Condition 10 noise contour	With Scheme 2022 18 mppa increase on existing 18 mppa Condition 10 noise contour	With Scheme 2023 18 mppa increase on existing 18 mppa Condition 10 noise contour	With Scheme 2024 19 mppa increase on existing 18 mppa Condition 10 noise contour	With Scheme 2028 19 mppa increase on existing future 18 mppa Condition 10 noise contour	With Scheme 2028 19 mppa increase on 12.5 mppa future baseline 2028
<b>Daytime contour level (<math>L_{Aeq,16hr}</math>)</b>						
51	2,765	2,430	1,566	663	273	286
54	581	747	539	178	234	256
63	38	85	56	0	49	129
<b>Night-time contour level (<math>L_{Aeq,8hr}</math>)</b>						
45	5,936	5,416	5,325	2,838	4,040	2,931
55	606	724	724	558	373	-21

## Comparison of noise change

**Table 8.10** to **Table 8.21** show how the difference in number of dwellings between the Proposed Scheme scenarios and baseline scenarios relate to different noise contours to enable an assessment.

The numbers will not correlate with the numbers in **Table 8.8** or **Table 8.9** as they are based on different change parameters. Numbers in **Table 8.8** and **Table 8.9** are a comparison between total absolute values between scenarios (e.g. comparing total numbers of dwellings experiencing noise of 55 dB and higher) and **Table 8.10** to **Table 8.21** are a comparison of changes in noise level between scenarios (e.g. comparing dwellings that would experience a change in noise levels of at least 1.0 to 1.9 dB within a noise contour range of 55.0 to 55.9 dB). It is therefore not possible to compare the 724 dwellings above SOAEL in the 2022 night-time in **Table 8.9** when looking at the dwellings within the 1-1.9 dB change bracket for noise contours of 55 dB and above in **Table 8.13**.

**Table 8.10** Number of dwellings by change of daytime noise level (dB), per noise contour ( $L_{Aeq,T}$  dB), as a result of comparing the 2021 **18 mppa** **With Scheme** scenario with the existing **18 mppa** Condition 10 noise limits for the period 2021 - 2027

Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq,16hr}$ dB), daytime						
	<=-3	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	>=3
51.0 to 51.9	0	0	0	4,178	0	0	0
52.0 to 52.9	0	0	0	2,989	0	0	0
53.0 to 53.9	0	0	0	1,916	2	0	0
54.0 to 54.9	0	0	0	822	0	0	0
55.0 to 55.9	0	0	0	1,267	0	0	0
56.0 to 56.9	0	0	0	842	0	0	0
57.0 to 57.9	0	0	0	781	0	0	0
58.0 to 58.9	0	0	0	692	0	0	0
59.0 to 59.9	0	0	0	1,117	0	0	0
60.0 to 60.9	0	0	0	539	0	0	0
61.0 to 61.9	0	0	0	595	0	0	0
62.0 to 62.9	0	0	0	248	0	0	0
63.0 to 63.9	0	0	0	199	0	0	0
64.0 to 64.9	0	0	0	161	0	0	0
65.0 to 65.9	0	0	0	387	0	0	0
66.0 to 66.9	0	0	0	2	0	0	0



Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq,16hr}$ dB), daytime						
	<=-3	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	>=3
67.0 to 67.9	0	0	0	7	0	0	0
68.0 to 68.9	0	0	0	2	0	0	0

8.9.88.9.9 When comparing the 2021 [With Scheme 18 mppa](#) daytime noise levels with the existing [18 mppa](#) Condition 10, the results show that there are no increases of more than 3 dB between the LOAEL (51 dB) and SOAEL (63 dB). Further, there are no increases of 1 dB or more for any residents experiencing noise above SOAEL. On this basis, **the effect of the Proposed Scheme during daytime of 2021 would not be significant.**

Table 8.11 -Number of dwellings by change of night-time noise level (dB), per noise contour ( $L_{Aeq,T}$  dB), as a result of comparing the 2021 [With Scheme 18 mppa](#) scenario with the existing [18 mppa](#) Condition 10 noise limits for [the period 2021 - 2027](#)

Night-time $L_{Aeq,8hr}$	Change in noise level ( $L_{Aeq,8hr}$ dB), night-time						
	<=-3	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	>=3
45.0 to 45.9	0	0	0	6,038	1,142	0	0
46.0 to 46.9	0	0	0	5,009	636	0	0
47.0 to 47.9	0	0	0	3,132	847	0	0
48.0 to 48.9	0	0	0	1,106	219	0	0
49.0 to 49.9	0	0	0	1,109	294	0	0
50.0 to 50.9	0	0	0	554	385	0	0
51.0 to 51.9	0	0	0	795	144	0	0
52.0 to 52.9	0	0	0	594	92	0	0
53.0 to 53.9	0	0	0	815	132	0	0
54.0 to 54.9	0	0	0	398	195	0	0
55.0 to 55.9	0	0	0	640	138	0	0
56.0 to 56.9	0	0	0	227	0	0	0
57.0 to 57.9	0	0	0	197	0	0	0
58.0 to 58.9	0	0	0	128	0	0	0
59.0 to 59.9	0	0	0	309	6	0	0
60.0 to 60.9	0	0	0	135	0	0	0
61.0 to 61.9	0	0	0	1	0	0	0
62.0 to 62.9	0	0	0	9	0	0	0

Night-time $L_{Aeq,8hr}$	Change in noise level ( $L_{Aeq, 8hr}$ dB), night-time						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
63.0 to 63.9	0	0	0	0	0	0	0
64.0 to 64.9	0	0	0	0	0	0	0
65.0 to 65.9	0	0	0	0	0	0	0

8.9.98.9.10 When comparing the 2021 [With Scheme 18 mppa](#) night-time noise levels with the existing [18 mppa](#) Condition 10, the results show that there are no increases of more than 3 dB between the LOAEL (45 dB) and SOAEL (55 dB). However, there are increases of 1 - 1.9 dB for residents in 144 dwellings experiencing noise above SOAEL. On this basis, **the effect of the Proposed Scheme during night-time of 2021 would be significant.**

Table 8.12 Number of dwellings by change of daytime noise level (dB), per noise contour ( $L_{Aeq, T}$  dB), as a result of comparing the 2022 [With Scheme 18 mppa](#) scenario with the existing [18 mppa](#) Condition 10 noise limits for [the period 2021 - 2027](#)

Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq, 16hr}$ dB), daytime						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
51.0 to 51.9	0	0	0	3,926	0	0	0
52.0 to 52.9	0	0	0	2,939	0	0	0
53.0 to 53.9	0	0	0	1,719	0	0	0
54.0 to 54.9	0	0	0	907	0	0	0
55.0 to 55.9	0	0	0	1,291	0	0	0
56.0 to 56.9	0	0	0	870	0	0	0
57.0 to 57.9	0	0	0	703	0	0	0
58.0 to 58.9	0	0	0	756	0	0	0
59.0 to 59.9	0	0	0	929	0	0	0
60.0 to 60.9	0	0	0	713	0	0	0
61.0 to 61.9	0	0	0	554	0	0	0
62.0 to 62.9	0	0	0	299	0	0	0
63.0 to 63.9	0	0	0	156	0	0	0
64.0 to 64.9	0	0	0	251	0	0	0
65.0 to 65.9	0	0	0	387	0	0	0
66.0 to 66.9	0	0	0	2	0	0	0

Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq,16hr}$ dB), daytime						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
67.0 to 67.9	0	0	0	5	0	0	0
68.0 to 68.9	0	0	0	4	0	0	0

8.9.108.9.11 When comparing the 2022 [With Scheme 18 mppa](#) daytime noise levels with the existing [18 mppa](#) Condition 10, the results show that there are no increases of more than 3 dB between the LOAEL (51 dB) and SOAEL (63 dB). Further, there are no increases of 1 dB or more for any residents experiencing noise above SOAEL. On this basis, **the effect of the Proposed Scheme during day time of 2022 would not be significant.**

Table 8.13 Number of dwellings by change of night-time noise level (dB), per noise contour ( $L_{Aeq,T}$  dB), as a result of comparing the 2022 [With Scheme 18 mppa](#) scenario with the existing [18 mppa](#) Condition 10 noise limits for [the period 2021 - 2027](#)

Night-time $L_{Aeq,8hr}$	Change in noise level ( $L_{Aeq,8hr}$ dB), night-time						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
45.0 to 45.9	0	0	0	4,315	1,957	0	0
46.0 to 46.9	0	0	0	3,841	1,985	0	0
47.0 to 47.9	0	0	0	1,880	1,641	0	0
48.0 to 48.9	0	0	0	587	1,122	0	0
49.0 to 49.9	0	0	0	417	705	0	0
50.0 to 50.9	0	0	0	275	860	0	0
51.0 to 51.9	0	0	0	177	629	0	0
52.0 to 52.9	0	0	0	147	627	0	0
53.0 to 53.9	0	0	0	180	695	0	0
54.0 to 54.9	0	0	0	251	707	0	0
55.0 to 55.9	0	0	0	6	522	0	0
56.0 to 56.9	0	0	0	0	494	0	0
57.0 to 57.9	0	0	0	0	164	0	0
58.0 to 58.9	0	0	0	2	191	0	0
59.0 to 59.9	0	0	0	6	198	0	0
60.0 to 60.9	0	0	0	16	299	0	0
61.0 to 61.9	0	0	0	1	0	0	0

Night-time $L_{Aeq,8hr}$	Change in noise level ( $L_{Aeq, 8hr}$ dB), night-time						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
62.0 to 62.9	0	0	0	0	9	0	0
63.0 to 63.9	0	0	0	0	0	0	0
64.0 to 64.9	0	0	0	0	0	0	0
65.0 to 65.9	0	0	0	0	0	0	0

8.9.118.9.12 When comparing the 2022 [With Scheme 18 mppa](#) night-time noise levels with the existing [18 mppa](#) Condition 10, the results show that there are no increases of more than 3 dB between the LOAEL (45 dB) and SOAEL (55 dB). However, there are increases of 1 - 1.9 dB for residents in 1,877 dwellings experiencing noise above SOAEL. On this basis, **the effect of the Proposed Scheme during night-time of 2022 would be significant.**

Table 8.14 Number of dwellings by change of daytime noise level (dB), per noise contour ( $L_{Aeq, T}$  dB), as a result of comparing the 2023 [With Scheme 18 mppa](#) scenario with the existing [18 mppa](#) Condition 10 noise limits for [the period 2021 - 2027](#)

Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq, 16hr}$ dB), daytime						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
51.0 to 51.9	0	0	0	3,712	0	0	0
52.0 to 52.9	0	0	0	2,533	0	0	0
53.0 to 53.9	0	0	0	1,683	0	0	0
54.0 to 54.9	0	0	0	883	0	0	0
55.0 to 55.9	0	0	0	1,348	0	0	0
56.0 to 56.9	0	0	0	666	0	0	0
57.0 to 57.9	0	0	0	781	0	0	0
58.0 to 58.9	0	0	0	711	0	0	0
59.0 to 59.9	0	0	0	1,020	0	0	0
60.0 to 60.9	0	0	0	629	0	0	0
61.0 to 61.9	0	0	0	528	0	0	0
62.0 to 62.9	0	0	0	277	0	0	0
63.0 to 63.9	0	0	0	217	0	0	0
64.0 to 64.9	0	0	0	163	0	0	0
65.0 to 65.9	0	0	0	385	0	0	0

Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq,16hr}$ dB), daytime						
	<=-3	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	>=3
66.0 to 66.9	0	0	0	2	0	0	0
67.0 to 67.9	0	0	0	5	0	0	0
68.0 to 68.9	0	0	0	4	0	0	0

8.9-128.9.13 When comparing the 2023 [With Scheme 18 mppa](#) day-time noise levels with the existing [18 mppa](#) Condition 10, the results show that there are no increases of more than 3 dB between the LOAEL (51 dB) and SOAEL (63 dB). Further, there are no increases of 1 dB or more for any residents experiencing noise above SOAEL. On this basis, **the effect of the Proposed Scheme during daytime of 2023 would not be significant.**

Table 8.15 Number of dwellings by change of night-time noise level (dB), per noise contour ( $L_{Aeq,T}$  dB), as a result of comparing the 2023 [With Scheme 18 mppa](#) scenario with the existing [18 mppa](#) Condition 10 noise limits for [the period 2021 - 2027](#)

Night-time $L_{Aeq,8hr}$	Change in noise level ( $L_{Aeq,8hr}$ dB), night-time						
	<=-3	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	>=3
45.0 to 45.9	0	0	0	4,376	1,957	0	0
46.0 to 46.9	0	0	0	3,812	1,878	0	0
47.0 to 47.9	0	0	0	1,917	1,641	0	0
48.0 to 48.9	0	0	0	596	1,089	0	0
49.0 to 49.9	0	0	0	415	870	0	0
50.0 to 50.9	0	0	0	266	677	0	0
51.0 to 51.9	0	0	0	177	629	0	0
52.0 to 52.9	0	0	0	147	627	0	0
53.0 to 53.9	0	0	0	228	695	0	0
54.0 to 54.9	0	0	0	203	707	0	0
55.0 to 55.9	0	0	0	6	522	0	0
56.0 to 56.9	0	0	0	0	494	0	0
57.0 to 57.9	0	0	0	0	164	0	0
58.0 to 58.9	0	0	0	2	191	0	0
59.0 to 59.9	0	0	0	19	198	0	0
60.0 to 60.9	0	0	0	3	299	0	0

Night-time $L_{Aeq,8hr}$	Change in noise level ( $L_{Aeq, 8hr}$ dB), night-time						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
61.0 to 61.9	0	0	0	1	0	0	0
62.0 to 62.9	0	0	0	0	9	0	0
63.0 to 63.9	0	0	0	0	0	0	0
64.0 to 64.9	0	0	0	0	0	0	0
65.0 to 65.9	0	0	0	0	0	0	0

8.9.138.9.14 When comparing the 2023 [With Scheme 18 mppa](#) night-time noise levels with the existing [18 mppa](#) Condition 10, the results show that there are no increases of more than 3 dB between the LOAEL (45 dB) and SOAEL (55 dB). However, there are increases of 1 - 1.9 dB for residents in 1,877 dwellings experiencing noise above SOAEL. On this basis, **the effect of the Proposed Scheme during night-time of 2023 would be significant.**

Table 8.16 Number of dwellings by change of day-time noise level (dB), per noise contour ( $L_{Aeq, T}$  dB), as a result of comparing the 2024 [With Scheme 19 mppa](#) scenario with the existing [18 mppa](#) Condition 10 noise limits for [the period 2021 - 2027](#)

Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq, 16hr}$ dB), daytime						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
51.0 to 51.9	0	0	0	3,587	0	0	0
52.0 to 52.9	0	0	0	2,453	0	0	0
53.0 to 53.9	0	0	0	1,346	0	0	0
54.0 to 54.9	0	0	0	806	0	0	0
55.0 to 55.9	0	0	0	1,265	0	0	0
56.0 to 56.9	0	0	0	620	0	0	0
57.0 to 57.9	0	0	0	836	0	0	0
58.0 to 58.9	0	0	0	883	0	0	0
59.0 to 59.9	0	0	0	882	0	0	0
60.0 to 60.9	0	0	0	440	0	0	0
61.0 to 61.9	0	0	0	644	0	0	0
62.0 to 62.9	0	0	0	162	0	0	0
63.0 to 63.9	0	0	0	198	0	0	0
64.0 to 64.9	0	0	0	206	0	0	0



Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq,16hr}$ dB), daytime						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
65.0 to 65.9	0	0	0	307	0	0	0
66.0 to 66.9	0	0	0	0	0	0	0
67.0 to 67.9	0	0	0	9	0	0	0
68.0 to 68.9	0	0	0	0	0	0	0

8.9.148.9.15 When comparing the 2024 [With Scheme](#) 19 mppa day time noise levels with the existing [18 mppa](#) Condition 10, the results show that there are no increases of more than 3 dB between the LOAEL (51 dB) and SOAEL (63 dB). Further, there are no increases of 1 dB or more for any residents experiencing noise above SOAEL. On this basis, **the effect of the Proposed Scheme during daytime of 2024 would not be significant.**

Table 8.17 Number of dwellings by change of night-time noise level (dB), per noise contour ( $L_{Aeq,T}$  dB), as a result of comparing the 2024 [With Scheme](#) 19 mppa scenario with the existing [18 mppa](#) Condition 10 noise limits for [the period 2021 - 2027](#)

Night-time $L_{Aeq,8hr}$	Change in noise level ( $L_{Aeq,8hr}$ dB), night-time						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
45.0 to 45.9	0	0	0	4,739	1,195	0	0
46.0 to 46.9	0	0	0	4,254	1,084	0	0
47.0 to 47.9	0	0	0	1,864	761	0	0
48.0 to 48.9	0	0	0	522	634	0	0
49.0 to 49.9	0	0	0	611	748	0	0
50.0 to 50.9	0	0	0	380	562	0	0
51.0 to 51.9	0	0	0	287	599	0	0
52.0 to 52.9	0	0	0	112	581	0	0
53.0 to 53.9	0	0	0	262	603	0	0
54.0 to 54.9	0	0	0	224	564	0	0
55.0 to 55.9	0	0	0	81	403	0	0
56.0 to 56.9	0	0	0	6	441	0	0
57.0 to 57.9	0	0	0	27	64	0	0
58.0 to 58.9	0	0	0	8	243	0	0
59.0 to 59.9	0	0	0	68	256	0	0

Night-time $L_{Aeq,8hr}$	Change in noise level ( $L_{Aeq,8hr}$ dB), night-time						
	<=-3	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	>=3
60.0 to 60.9	0	0	0	74	61	0	0
61.0 to 61.9	0	0	0	6	0	0	0
62.0 to 62.9	0	0	0	2	2	0	0
63.0 to 63.9	0	0	0	0	0	0	0
64.0 to 64.9	0	0	0	0	0	0	0
65.0 to 65.9	0	0	0	0	0	0	0

8.9.158.9.16 When comparing the 2024 [With Scheme](#) 19 mppa night-time noise levels with the existing [18 mppa](#) Condition 10, the results show that there are no increases of more than 3 dB between the LOAEL (45 dB) and SOAEL (55 dB). However, there are increases of 1 - 1.9 dB for residents in 1,470 dwellings experiencing noise above SOAEL. On this basis, **the effect of the Proposed Scheme during night-time of 2024 would be significant.**

Table 8.18 Number of dwellings by change of daytime noise level (dB), per noise contour ( $L_{Aeq,T}$  dB), as a result of comparing the 2028 [With Scheme](#) 19 mppa scenario with the existing future [18 mppa](#) Condition 10 noise limits for 2028

Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq,16hr}$ dB), daytime						
	<=-3	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	>=3
51.0 to 51.9	0	0	0	2,065	0	0	0
52.0 to 52.9	0	0	0	1,075	0	0	0
53.0 to 53.9	0	0	0	1,320	0	0	0
54.0 to 54.9	0	0	0	931	0	0	0
55.0 to 55.9	0	0	0	756	0	0	0
56.0 to 56.9	0	0	0	789	0	0	0
57.0 to 57.9	0	0	0	834	0	0	0
58.0 to 58.9	0	0	0	790	0	0	0
59.0 to 59.9	0	0	0	547	0	0	0
60.0 to 60.9	0	0	0	362	0	0	0
61.0 to 61.9	0	0	0	87	0	0	0
62.0 to 62.9	0	0	0	260	0	0	0
63.0 to 63.9	0	0	0	317	0	0	0

Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq,16hr}$ dB), daytime						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
64.0 to 64.9	0	0	0	133	0	0	0
65.0 to 65.9	0	0	0	6	0	0	0
66.0 to 66.9	0	0	0	4	0	0	0
67.0 to 67.9	0	0	0	0	0	0	0
68.0 to 68.9	0	0	0	0	0	0	0

8.9.168.9.17 When comparing the 2028 [With Scheme](#) 19 mppa daytime noise levels with the existing future [18 mppa](#) Condition 10, the results show that there are no increases of more than 3 dB between the LOAEL (51 dB) and SOAEL (63 dB). In addition, there are no increases of 1 dB or more for any residents experiencing noise above SOAEL. **On this basis, the effect of the Proposed Scheme during daytime of 2028 would not be significant.**

Table 8.19 Number of dwellings by change of night-time noise level (dB), per noise contour ( $L_{Aeq,T}$  dB), as a result of comparing the 2028 [With Scheme](#) 19 mppa scenario with the existing future [18 mppa](#) Condition 10 noise limits in 2028

Night-time $L_{Aeq,8hr}$	Change in noise level ( $L_{Aeq,8hr}$ dB), night-time						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
45.0 to 45.9	0	0	0	5,876	0	0	0
46.0 to 46.9	0	0	0	4,253	0	0	0
47.0 to 47.9	0	0	0	1,884	0	0	0
48.0 to 48.9	0	0	0	1,479	0	0	0
49.0 to 49.9	0	0	0	924	0	0	0
50.0 to 50.9	0	0	0	719	0	0	0
51.0 to 51.9	0	0	0	958	0	0	0
52.0 to 52.9	0	0	0	759	0	0	0
53.0 to 53.9	0	0	0	894	0	0	0
54.0 to 54.9	0	0	0	506	0	0	0
55.0 to 55.9	0	0	0	499	0	0	0
56.0 to 56.9	0	0	0	164	0	0	0
57.0 to 57.9	0	0	0	212	0	0	0
58.0 to 58.9	0	0	0	246	0	0	0

Night-time $L_{Aeq,8hr}$	Change in noise level ( $L_{Aeq, 8hr}$ dB), night-time						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
59.0 to 59.9	0	0	0	252	0	0	0
60.0 to 60.9	0	0	0	2	0	0	0
61.0 to 61.9	0	0	0	10	0	0	0
62.0 to 62.9	0	0	0	0	0	0	0
63.0 to 63.9	0	0	0	0	0	0	0
64.0 to 64.9	0	0	0	0	0	0	0
65.0 to 65.9	0	0	0	0	0	0	0

8.9.178.9.18 When comparing the 2028 [With Scheme](#) 19 mppa night-time noise levels with the existing future [18 mppa](#) Condition 10, the results show that there are no increases of more than 3 dB between the LOAEL (45 dB) and SOAEL (55 dB). In addition, there are no increases of 1 dB or more for any residents experiencing noise above SOAEL. **On this basis, the effect of the Proposed Scheme during night-time of 2028 would not be significant.**

Table 8.20 Number of dwellings by change of daytime noise level (dB), per noise contour ( $L_{Aeq, T}$  dB), as a result of comparing the 2028 [With Scheme](#) 19 mppa scenario with the 12.5 mppa updated 2028 future baseline

Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq, 16hr}$ dB), daytime						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
51.0 to 51.9	0	0	0	2,065	0	0	0
52.0 to 52.9	0	0	0	1,075	0	0	0
53.0 to 53.9	0	0	0	1,320	0	0	0
54.0 to 54.9	0	0	0	931	0	0	0
55.0 to 55.9	0	0	0	756	0	0	0
56.0 to 56.9	0	0	0	789	0	0	0
57.0 to 57.9	0	0	0	834	0	0	0
58.0 to 58.9	0	0	0	790	0	0	0
59.0 to 59.9	0	0	0	547	0	0	0
60.0 to 60.9	0	0	0	362	0	0	0
61.0 to 61.9	0	0	0	87	0	0	0
62.0 to 62.9	0	0	0	260	0	0	0

Daytime $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq,16hr}$ dB), daytime						
	<=-3	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	>=3
63.0 to 63.9	0	0	0	317	0	0	0
64.0 to 64.9	0	0	0	133	0	0	0
65.0 to 65.9	0	0	0	6	0	0	0
66.0 to 66.9	0	0	0	4	0	0	0
67.0 to 67.9	0	0	0	0	0	0	0
68.0 to 68.9	0	0	0	0	0	0	0

8.9.188.9.19 When comparing the 2028 [With Scheme](#) 19 mppa daytime noise levels with the 12.5 mppa future baseline for 2028, the results show that there are no increases of more than 3 dB between the LOAEL (51 dB) and SOAEL (63 dB). Further, there are no increases of 1 dB or more for any residents experiencing noise above SOAEL. **On this basis, the effect of the Proposed Scheme during daytime of 2028 would not be significant.**

Table 8.21 Number of dwellings by change of night-time noise level (dB), per noise contour ( $L_{Aeq,T}$  dB), as a result of comparing the 2028 [With Scheme](#) 19 mppa scenario with the 12.5mppa updated 2028 future baseline

Night-time $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq,8hr}$ dB), night-time						
	<=-3	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	>=3
45.0 to 45.9	0	0	0	3,666	2,210	0	0
46.0 to 46.9	0	0	0	2,657	1,596	0	0
47.0 to 47.9	0	0	0	1,796	88	0	0
48.0 to 48.9	0	0	0	1,479	0	0	0
49.0 to 49.9	0	0	0	924	0	0	0
50.0 to 50.9	0	0	0	719	0	0	0
51.0 to 51.9	0	0	89	869	0	0	0
52.0 to 52.9	0	0	247	512	0	0	0
53.0 to 53.9	0	0	78	816	0	0	0
54.0 to 54.9	0	0	0	506	0	0	0
55.0 to 55.9	0	0	0	499	0	0	0

Night-time $L_{Aeq,16hr}$	Change in noise level ( $L_{Aeq,8hr}$ dB), night-time						
	$\leq -3$	-2.9 to -2.0	-1.9 to -1.0	-0.9 to 0.9	1.0 to 1.9	2 to 2.9.0	$\geq 3$
56.0 to 56.9	0	0	0	164	0	0	0
57.0 to 57.9	0	0	0	212	0	0	0
58.0 to 58.9	0	0	0	246	0	0	0
59.0 to 59.9	0	0	0	252	0	0	0
60.0 to 60.9	0	0	0	2	0	0	0
61.0 to 61.9	0	0	0	10	0	0	0
62.0 to 62.9	0	0	0	0	0	0	0
63.0 to 63.9	0	0	0	0	0	0	0
64.0 to 64.9	0	0	0	0	0	0	0
65.0 to 65.9	0	0	0	0	0	0	0

8.9.198.9.20 When comparing the 2028 [With Scheme](#) 19 mppa night-time noise levels with the 12.5 mppa future baseline for 2028, the results show that there are no increases of more than 3 dB between the LOAEL (45 dB) and SOAEL (55 dB). Further, there are no increases of 1 dB or more for any residents experiencing noise above SOAEL. **On this basis, the effect of the Proposed Scheme during night-time of 2028 would not be significant.**

8.9.208.9.21 **Table 8.22** provides a summary of the findings of the above tables, showing the peak of effect from the Proposed Scheme in 2022 and 2023, with this effect reducing thereafter. By 2028, the Proposed Scheme would have **no significant adverse effect on residences.**

Table 8.22 [Threshold criteria for establishing potentially significant effects on noise-sensitive residential receptors](#) Population number significantly affected by Proposed Scheme (based on magnitude increase and noise level above effect level) for different scenario assessments

Adverse Effect Level	2021 <a href="#">With Scheme 18</a> mppa increase on existing <a href="#">18 mppa</a> Condition 10 noise contour	2022 <a href="#">With Scheme 18</a> mppa increase on existing <a href="#">18 mppa</a> Condition 10 noise contour	2023 <a href="#">With Scheme 18</a> mppa increase on existing <a href="#">18 mppa</a> Condition 10 noise contour	2024 <a href="#">With Scheme 19</a> mppa increase on existing <a href="#">18 mppa</a> Condition 10 noise contour	2028 <a href="#">With Scheme 19</a> mppa increase on existing <a href="#">18 mppa</a> Condition 10 noise contour	2028 <a href="#">With Scheme 19</a> mppa increase on 12.5 mppa future baseline 2028
Day time						
LOAEL	0	0	0	0	0	0
SOAEL	0	0	0	0	0	0



<u>Adverse Effect Level</u>	2021 <u>With Scheme 18</u> mppa-increase on existing <u>18 mppa</u> Condition 10 noise contour	2022 <u>With Scheme 18-mppa</u> increase on existing <u>18 mppa</u> Condition 10 noise contour	2023 <u>With Scheme 18 mppa</u> increase on existing <u>18 mppa</u> Condition 10 noise contour	2024 <u>With Scheme 19</u> mppa increase on existing <u>18 mppa</u> Condition 10 noise contour	2028 <u>With Scheme 19</u> mppa increase on existing future <u>18 mppa</u> Condition 10 noise contour	2028 <u>With Scheme 19</u> mppa increase on 12.5 mppa future baseline 2028
<b>Night-time</b>						
LOAEL	0	0	0	0	0	0
SOAEL	144	1,877	1,877	1,470	0	0

## 8.10 Non-residential receptors $L_{Aeq}$ assessment

8.10.1

**Table 8.23** shows the predicted noise levels for the various Proposed Scheme and baseline scenarios and **Table 8.24** shows the differences within the identified comparisons of interest. The results show that there would be changes of 1 dB or more above the threshold criteria (i.e., changes of 1 dB or more below the threshold criteria are not considered significant) at Caddington (schools), Park Town (academy, nursery), Breachwood Green (school), St Pauls Walden (church), Slip End (school) and at Stevenage Station (college), (highlighted red in **Table 8.24** where relevant, e.g. night-time levels are not pertinent for schools). These significant effects are mainly predicted in 2022, except for ongoing significant effects in Park Town, Luton to 2024 and at Slip End to 2023. **On this basis, the effect of the Proposed Scheme would be significant at these locations.** For the avoidance of doubt, **Table 8.24** identifies where significant effects have been identified.

Table 8.23 Noise levels ( $L_{Aeq,T}$  dB) predicted for Proposed Scheme and baseline scenarios for non-residential receptors

Location	Noise levels ( $L_{Aeq,T}$ dB) predicted at non-residential receptors															
	Existing <a href="#">18 mppa</a> Condition 10 years 2021-2027		2021 <a href="#">With Scheme</a> <a href="#">18 mppa</a>		2022 <a href="#">With Scheme</a> <a href="#">18 mppa</a>		2023 <a href="#">With Scheme</a> <a href="#">18 mppa</a>		2024 <a href="#">With Scheme</a> 19 mppa		Existing <a href="#">18 mppa</a> Condition 10 years 2028+		2028 12.5 mppa revised future baseline		2028 <a href="#">With Scheme</a> 19 mppa	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Old Knebworth Lodge Farm	44	38	45	39	44	39	44	39	44	39	42	37	43	38	42	38
Caddington	54	50	55	51	55	51	54	50	54	50	54	49	54	49	54	50
Park Town, Luton	60	54	61	55	61	56	61	56	61	55	59	54	59	55	59	55
Whitwell	47	42	48	43	48	43	47	43	47	42	46	41	46	42	46	42
Breachwood Green	54	49	55	50	55	50	54	50	54	50	53	49	53	49	53	49
St Pauls Walden	53	49	54	49	54	49	54	49	53	49	52	48	53	48	53	48
Farley Hill School Luton	49	43	50	44	50	44	49	44	49	44	48	43	48	43	48	43
Slip End	60	54	61	55	61	55	60	55	60	55	59	53	59	55	59	54
Harpenden Children's Home	39	34	40	35	40	34	40	34	39	34	38	33	38	33	38	33
Walkern	46	42	47	43	46	43	46	42	46	42	46	41	46	41	46	42

Location	Noise levels (L <sub>Aeq, T</sub> dB) predicted at non-residential receptors															
	Existing <u>18 mppa</u> Condition 10 years 2021-2027		2021 <u>With Scheme</u> <u>18 mppa</u>		2022 <u>With</u> <u>Scheme18 mppa</u>		2023 <u>With</u> <u>Scheme18 mppa</u>		2024 <u>With Scheme</u> <u>19 mppa</u>		Existing <u>18 mppa</u> Condition 10 years 2028+		2028 12.5 mppa revised future baseline		2028 <u>With Scheme</u> <u>19 mppa</u>	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Stevenage (Eastern Perimeter)	49	45	49	45	49	45	49	45	49	45	48	44	48	43	48	44
Stevenage Station	52	48	53	49	53	49	52	49	52	48	52	47	52	47	52	48
Luton (Wandon End)	54	48	54	49	54	49	54	49	54	48	52	47	52	48	52	48
Kensworth	50	46	50	46	50	46	50	46	50	46	49	45	49	45	49	46
Hudnall Corner	46	41	48	43	48	42	47	42	47	42	46	40	46	41	46	41
Flamstead	51	45	51	46	51	45	51	45	50	45	49	43	49	45	49	44
Markyate	53	47	53	48	53	48	53	48	53	47	51	46	52	47	51	46

Table 8.24 Differences in noise level ( $L_{Aeq,T}$  dB) predicted between Proposed Scheme and baseline scenarios for non-residential receptors

Location	2021 <u>With Scheme 18</u> mppa minus existing <u>18 mppa</u> Condition 10		2022 <u>With Scheme 18</u> mppa minus existing <u>18 mppa</u> Condition 10		2023 <u>With Scheme 18</u> mppa minus existing <u>18 mppa</u> Condition 10		2024 19 mppa minus existing <u>18 mppa</u> Condition 10		2028 19 mppa minus existing future <u>18 mppa</u> Condition 10		2028 19 mppa minus 12.5 mppa future baseline		Significant
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	
Old Knebworth Lodge Farm	0.3	0.9	0.0	1.0	0	1.0	0.0	1.0	0.1	0.7	-0.2	-0.4	No
Caddington	0.5	0.7	1.0	1.0	0.0	0.0	0.0	0.0	0.1	0.7	-0.1	0.6	Yes
Park Town, Luton	0.7	0.8	1.0	2.0	1.0	2.0	1.0	1.0	0.1	0.7	0.6	-0.1	Yes
Whitwell	0.5	0.9	1.0	1.0	0.0	1.0	0.0	0.0	0.1	0.7	-0.2	0.2	No
Breachwood Green	0.5	0.8	1.0	1.0	0.0	1.0	0.0	1.0	0.1	0.6	-0.1	0.4	Yes
St Pauls Walden	0.5	0.8	1.0	0.0	1.0	0.0	0.0	0.0	0.1	0.7	-0.1	0.5	Yes
Farley Hill School Luton	0.6	0.8	1.0	1.0	0.0	1.0	0.0	1.0	0.1	0.6	0.2	0.0	No
Slip End	0.7	1.0	1.0	1.0	0.0	1.0	0.0	1.0	0.1	0.7	-0.2	-1.1	Yes
Harpenden Children's Home	0.9	1.1	1.0	0.0	1.0	0.0	0.0	0.0	0.1	0.6	0.1	-0.2	No
Walkern	0.5	0.7	0.0	1.0	0.0	0.0	0.0	0.0	0.1	0.6	0.1	1.2	No
Stevenage (Eastern Perimeter)	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.1	1.1	No

Location	2021 <a href="#">With Scheme 18 mppa</a> minus existing <a href="#">18 mppa</a> Condition 10		2022 <a href="#">With Scheme 18 mppa</a> minus existing <a href="#">18 mppa</a> Condition 10		2023 <a href="#">With Scheme 18 mppa</a> minus existing <a href="#">18 mppa</a> Condition 10		2024 19 mppa minus existing <a href="#">18 mppa</a> Condition 10		2028 19 mppa minus existing future <a href="#">18 mppa</a> Condition 10		2028 19 mppa minus 12.5 mppa future baseline		Significant
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	
Stevenage Station	0.4	0.7	1.0	1.0	0.0	1.0	0.0	0.0	0.1	0.7	0.0	0.8	Yes
Luton (Wandon End)	0.7	1.0	0.0	1.0	0.0	1.0	0.0	0.0	0.1	0.7	0.0	-0.1	No
Kensworth	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.0	0.9	No
Hudnall Corner	1.5	1.4	2.0	1.0	1.0	1.0	1.0	1.0	0.1	0.7	-0.1	-0.5	No
Flamstead	0.5	1.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.1	0.7	-0.3	-0.4	No
Markyate	0.6	1.0	0.0	1.0	0.0	1.0	0.0	0.0	0.1	0.6	-0.3	-0.5	No

## 8.11 L<sub>Amax</sub> assessment

### Residential Receptors

8.11.1 The data in **Appendix 9E-8F** in **Volume 3: Figures and Appendices** shows the number of dwellings within noise contours above L<sub>Amax</sub> 80 dB for a variety of aircraft. The data shows that the older A320ceo, B737-800, and A321ceo are notably louder than the more recent aircraft; A320neo, A321neo, and B737Max. The ATM figures during the night-time (the period of interest for sleep disturbance within residences) for these two different sets of aircraft age and loudness are presented in **Table 8.25**, with a comparison between the Proposed Scheme and existing operation in **Table 8.26**. The figures in the tables have been extracted from spreadsheets and have been subjected to rounding. The figures are therefore within one digit of the correct number. They have not been updated in the tables so as to remain consistent with the source information.

Table 8.25 Night-time ATMs for most common aircraft types

Aircraft	2024 18 mppa	2028 18 mppa	2024 19 mppa	2028 19 mppa
<b>A320ceo</b>	1,681	644	1,292	438
<b>A321ceo</b>	229	11	303	0
<b>B737-800</b>	487	301	132	49
<b>Total 'old' aircraft</b>	2,396	957	1,727	487
<b>A320neo</b>	1,194	2,061	829	2,040
<b>A321neo</b>	339	605	926	1,210
<b>B737-Max</b>	330	771	675	758
<b>Total 'new' aircraft</b>	1,863	3,436	2,430	4,008
<b>Total of the above aircraft</b>	4,259	4,394	4,157	4,495

Table 8.26 Comparison of ATMs during the night-time

Aircraft sets	2024 19 mppa minus 2024 18 mppa	2028 19 mppa minus 2028 18 mppa
<b>Old aircraft: A320ceo, A321ceo, B737-800</b>	-669	-470
<b>New aircraft: A320neo, A321neo, B737-Max</b>	+556	571
<b>Total of the above</b>	-103	101

8.11.2 The results show that the proportion of the loudest aircraft is predicted to decrease in comparison with the new quieter aircraft. It should also be noted that in 2024 the total ATMs (i.e. also including other aircraft not included in the above table, see forecasts in **Appendix 3A-8B** in **Volume 3: Figures and Appendices**) would decrease and in 2028 the total increase is very small, equating to an average of two additional flights during the night-time in the 92-day summer period. The absolute L<sub>Amax</sub> level will reduce for a significant number of ATMs.

## Non-residential noise sensitive receptors

8.11.3 **Appendix 9E-89F** in **Volume 3: Figures and Appendices** presents the predicted  $L_{Amax}$  levels at non-residential receptors for the most common and loudest aircraft. The results show that the **80 72** dB level is **only** exceeded during the daytime at **two locations many locations; Park Town (Luton), and Slip End. In both cases, the exceedance is a result of the A321ceo departing and there is not this same exceedance for the A321neo. However, the results show a reduction in the locations affected by an  $L_{Amax}$  of over 72 dB with modernised aircraft.**

8.11.38, 11.4 The effect of reduced  $L_{Amax}$  levels from modernised aircraft has to be balanced with the increase in number of flights as a result of the development. Whilst the noise modelling is based on a summer time it is assumed that the increase in flights 'With Scheme' is representative of the year. **On this basis, the aviation movements In 2024, there is an increase in daytime A321ceo ATMs for the 19 mppa scenario (see forecasteds in Appendix 3A-8B in Volume 3: Figures and Appendices show that there would be an average increase of 10 movements a day during the daytime in 2024 with 19 mppa and 3 additional movements per day in 2028 with 19 mppa. This accounts for an average increase for each 30 minute 30-minute period upon which the  $L_{Amax}$  is assessed within schools of underless than 1 additional flight. ), but by 2028, the A321ceo is in reduced use in the 19 mppa scenarios. Therefore, despite a general increase in flights the effect of these occurrences of  $L_{Amax}$  events over 80-72 dB(A) would decrease in the long term. The effects on non-residential receptors areis considered negligible.**

## 8.12 Assessment Summary

8.12.1 A summary of the results of the assessment of the noise is provided in **Table 8.27**.

Table 8.27 Summary of significance of adverse effects

Receptor and summary of predicted effects	Significance	Summary rationale
Residences	<b>Significant Adverse</b>	With the Proposed Scheme, residents in 1,877 dwellings would experience a night-time noise level above SOAEL (55 dB LAeq, 8 hour) 1 - 1.9 dB higher than existing Condition 10 limits allow.
Non-residential receptors at Caddington, Park Town in Luton, Breachwood Green, St Pauls Walden, Slip End and Stevenage.	<b>Significant Adverse</b>	Increases in noise level of at least 1 dB <b>and</b> above threshold of effect criteria.

## 8.13 Assessment of cumulative effects

8.13.1 As outlined in **Section 4.98**, consideration has been given to whether any of the noise receptors that have been taken forward for assessment in this chapter are likely to be subject to cumulative noise effects due to noise effects generated by 'other developments'. However, no 'other developments' have been identified within the study area of this assessment that would contribute to a cumulative noise impact. **No likely significant inter-project effects** are predicted to occur from the Proposed Scheme together with 'other developments'.

8.13.2 The potential for inter-related effects has been identified at receptors that could experience noise and health effects, and these are reported in **Chapter 9: Health**. This is because the Health



assessment is by its nature cumulative, as it assesses the effects on a variety of determinants of health, one of which is exposure to noise.

- 8.13.3 The air quality, climate, and transport assessments have identified that no likely significant effects are predicted to occur. **No likely significant intra-project effects** involving cumulative noise interactions with these aspects are therefore predicted to occur from the Proposed Scheme.

## 8.14 Consideration of optional additional mitigation

- 8.14.1 The assessment of noise effects identified the [18 mppa With Scheme -2022](#) scenario as the worst-case year in terms of significance of effect based on additional dwellings affected by noise above SOAEL. The resulting area and number of dwellings related to the LOAEL and SOAEL are presented in **Table 8.28**.

Table 8.28: LOAEL and SOAEL for various noise model scenarios

	Area of SOAEL (sq.km)	No. Dwellings in SOAEL	Area of LOAEL (sq.km)	No. Dwellings in LOAEL
<b>Daytime</b>				
<b>Current <a href="#">18 mppa</a> Condition 10 contour</b>	6.3	720	54.1	13,981
<b>Forecast <a href="#">18 mppa With Scheme -2022</a></b>	7.1	805	57.6	16,411
<b>Night-time</b>				
<b>Current <a href="#">18 mppa</a> Condition 10 contour</b>	9.6	1,184	60.9	19,490
<b>Forecast <a href="#">With Scheme 18 mppa 2022</a></b>	11.5	1,908	68.5	24,906

### Mitigation for properties exposed to noise higher than SOAEL

- 8.14.2 ~~The Independent Commission on Civil Aviation Noise (ICCAN) is working towards forming best practice for noise mitigation, but this information is not yet available. Based on current guidance LLAOL have defined two options for mitigation for properties greater than SOAEL; either insulation.~~

- 8.14.38.14.2 Taking the daytime situation, a total of 805 dwellings are forecast to be exposed to noise levels above 63 dB  $L_{Aeq16hr}$  (SOAEL) in the [18 mppa With Scheme -2022](#) scenario (day-time worst-case year). Based on the current [18 mppa](#) condition, 720 of these properties would already be exposed to these noise levels. Therefore, 85 new properties would be exposed to an increased level of noise due to the forecasted increase in air traffic in [the With Scheme 2022 scenario](#).

- 8.14.48.14.3 For the night-time, a total of 1,908 dwellings were predicted to be exposed to noise levels above 55 dB  $L_{Aeq8hr}$  (SOAEL) in the [With Scheme 18 mppa-2022](#) scenario (worst-case year) and therefore eligible for insulation. There are currently 1,184 properties within the SOAEL based on the current [18 mppa](#) Condition 10. Therefore in [the With Scheme 2022 scenario](#) an increase of 724 new properties would be exposed to an increased level of noise due to the forecasted increase in air traffic.

8.14.58,14.4 It is forecast that the maximum increase of 85 properties in the daytime SOAEL will be fully contained in the [With Scheme](#) 2022 night-time SOAEL contour and therefore mitigation has been defined based on dwellings within the 2022 night-time SOAEL.

8.14.68,14.5 Additional measures will be needed to minimise the significant effects identified in **Table 8.9**; namely the 724 additional dwellings above SOAEL during the night-time as a result of the Proposed Scheme.

8.14.78,14.6 As 2022 is forecast to be the worst-case year in terms of noise insulation provision, the 2022 noise insulation eligibility contour would be fixed for 6 years. Therefore, the scheme would not change each year, but would always be based on 2022 data, allowing everyone affected by the worst-case year to be eligible for insulation in future years.

8.14.88,14.7 In accordance with the Noise Action Plan for the Airport, noise insulation ~~is~~[will be](#) provided to residential receptors exposed to noise above SOAEL as required by the first aim of the NPSE. ~~As part of the proposals, LLAOL will increase contributions to the Noise Insulation Fund as shown in Table 8.29 which compares this increase with existing funding.~~ LLAOL would continue spending up to approximately £3,000 per property to enhance noise insulation. ~~For reference, Table 8.29 also shows the funding in 2016 to 2020.~~

Table 8.29: Increased noise insulation funding

Year	Existing funding		Proposed in this version of Section 73 application	
	Proposed funding	Number of properties	Proposed funding	Number of properties
2016	£100,000	33	£100,000	33
2017	£100,000	33	£100,000	33
2018	£100,000	33	£100,000	33
2019	£100,000	33	£100,000	33
2020	£100,000	33	£100,000	33
2021	£100,000	33	£400,000	133
2022	£100,000	33	£900,000	300
2023	£100,000	33	£700,000	233
2024	£100,000	33	£100,000	33
2025	£100,000	33	£100,000	33
2026	£100,000	33	£100,000	33
2027	£100,000	33	£100,000	33
2028	£100,000	33	£100,000	33
<b>Total</b>	<b>£1,300,000</b>	<b>429</b>	<b>£3,000,000</b>	<b>996</b>

8.14.98,14.8 Eligible properties are assessed in accordance with the Noise Insulation Scheme Policy v4 ~~(see Appendix 8F in Volume 3: Figures and appendices)~~. The order in which properties are contacted for insulation is determined by the independent London Luton Airport Consultative committee. The

scheme would continue to give insulation to those dwellings with the highest noise levels as a priority.

8.14.10 The additional budget of £1,700,000 (further to the £1,300,000 funding existing) would be sufficient to noise insulate properties in areas above SOAEL as a result of proposed variation to Condition 10 assuming no more than 78% (567 properties) take-up (i.e. the pick-up of residents offered noise insulation in the past). The current take-up of insulation is approximately 50%, therefore the contribution is considered sufficient. Based on the current acceptance rate, the enhanced Noise Insulation Fund would cover additional dwellings above SOAEL by the end of 2022.

## 8.15 Conclusions of significance evaluation

8.15.1 It is considered that existing mitigation and enhanced mitigation are sufficient to meet the Government's policy aim to mitigate and minimise adverse impacts on health and quality of life as stated in the NPSE.

8.15.2 The significant effect [on residences](#) described in **Section 8.9 8** will be temporary and will not persist past 2027, beyond which the difference between the noise from the variation to the conditions and the existing conditions would not be significant.

## 8.16 Implementation of environmental measures

8.16.1 **Section 8.7** describes the environmental measures within the Proposed Scheme. **Table 8.28** summarises the key compensatory measures and the means by which they will be implemented.

Table 8.30 Summary of environmental measures to be implemented relating to noise

Environmental measure	Responsibility for implementation	ES section reference
LLAOL will contribute to the Noise Insulation Fund with an initial budget of £400,000 in 2021, <del>£900,000 in 2022, £700,000 in 2023 and £100,000</del> each year afterwards to 2028 inclusive	LLAOL	<b>Section 8.7</b>

## Appendix 8A

# Noise - Legislation, policy, and guidance

Noise from airports is considered in several planning policy documents and is subject to legislative control and regulation. At an international level, standards governing aircraft noise emissions are set by the International Civil Aviation Organization (ICAO). In the UK, the DfT and Defra are responsible for regulating the various environmental aspects of the aviation industry. At a local level, the local planning authority also has some control over the development of an airport through planning policy.

### Legislative context

*The Civil Aviation Act*<sup>1</sup> is the principal legislation for the regulation of aircraft operations. It was updated in 2006 when additional powers to avoid, limit or mitigate the effects of noise connected with departures or arrivals of aircraft at an aerodrome were introduced.

*The Airports (Noise-related Operating Restrictions) (England and Wales) Regulations 2018*<sup>2</sup> implements into UK law the provisions of *European Union (EU) Regulation 598*<sup>3</sup>, aimed at enabling authorities to deal with aircraft noise within the international framework of the Balanced Approach. The Balanced Approach to noise management involves consideration of noise in the context of environmental benefit and economic incentives, but without imposing control measures that would be overly restrictive. *EU Regulation 598* makes it clear that for airports where a noise problem has been identified, additional noise abatement measures should be identified in accordance with the Balanced Approach method and should restrictions be required these should be cost-effective and be introduced only when other Balanced Approach measures are not sufficient to attain the specific noise abatement objectives.

*The Environmental Noise Directive* (2002/49/EC)<sup>4</sup> (END) requires all Member States within the EU to produce Noise Maps and Action Plans for the main sources of environmental noise, including major airports. The requirements of the *Environmental Noise Directive* are transposed into the *Environmental Noise (England) Regulations 2006* (as amended)<sup>5</sup>. These regulations require major airports (such as LLA) to prepare Noise Maps and Action Plans.

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<sup>1</sup> Civil Aviation Act, 2006 [online]. Available at: <https://www.legislation.gov.uk/ukpga/2006/34/contents> [Checked November 2020].

<sup>2</sup> The Airports (Noise-related Operating Restrictions) (England and Wales) Regulations, 2018 [online]. Available at: [https://www.legislation.gov.uk/uksi/2018/785#:~:text=The%20Airports%20\(Noise-related%20Operating%20Restrictions\)%20\(England%20and%20Wales\),in%20the%20content%20and%20are%20referenced%20with%20anotations](https://www.legislation.gov.uk/uksi/2018/785#:~:text=The%20Airports%20(Noise-related%20Operating%20Restrictions)%20(England%20and%20Wales),in%20the%20content%20and%20are%20referenced%20with%20anotations) [Checked December 2020].

<sup>3</sup> Regulation (EU) 598/2014, [online]. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0598&from=EN> [Checked November 2020].

<sup>4</sup> Directive 2002/49/EC, [online]. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0049&from=EN> [Checked November 2020].

<sup>5</sup> The Environmental Noise (England) Regulations, 2006 [online]. Available at: <http://www.legislation.gov.uk/uksi/2006/2238/contents/made> [Checked November 2020].

## Planning policy context

### National planning policy framework

Noise is considered by the *National Planning Policy Framework* (MHCLG, 2019). The NPPF advises that significant adverse impacts on health and the quality of life as a result of noise from new development should be avoided. It also advises that other adverse impacts on health and quality of life arising from noise from new development should be reduced to a minimum.

The NPPF states in Paragraph 180 that "Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- "mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."

Paragraph 182 advises that *"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."* This should be taken into account when considering whether proposed development is an acceptable use of land.

The NPPF document does not refer to any other documents regarding noise other than the *Noise Policy Statement for England* (NPSE, 2010).

### Noise Policy Statement for England (2010)

The *Noise Policy Statement for England* (NPSE) (Defra, 2010) forms the overarching statement of noise policy for England (and hence is of direct relevance to the assessment of planning applications under the NPPF for developments in England only). It sets out the long-term vision of the Government, as follows:

*"[to] Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."*

This vision is supported by the following aims, which are reflected in the provisions of the NPPF:

*"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life."*

The Explanatory Note to the NPSE (paragraph 2.14) acknowledges that noise contributing to annoyance and / or sleep disturbance in human populations can have long-term consequences for health and wellbeing. It introduces three 'Effect Levels' relevant to the assessment of noise. These are:

- **NOEL: No Observed Effect Level** – this is the level below which no effect can be detected. In simple terms, below this level there is no detectable effect on health and quality of life due to the noise;
- **LOAEL: Lowest Observed Adverse Effect Level** – this is the level above which adverse effects on health and quality of life can be detected; and
- **SOAEL: Significant Observed Adverse Effect Level** – this is the level above which significant adverse effects on health and quality of life occur.

The aim of the NPSE is to avoid all noise occurring at the SOAEL level and to minimise, as far as possible, all noise occurring between the LOAEL and SOAEL brackets.

The NPSE states that it is not possible to have a single, numerical definition of the SOAEL that is applicable to all sources of noise in all situations, since the SOAEL is likely to be different for different noise sources, for different receptors at different times. Further research is required to increase understanding of what constitutes a significant adverse impact on health and quality of life due to noise, and the NPSE states that not stating specific SOAEL levels provides a suitable degree of policy flexibility until such evidence is available.

### Planning Practice Guidance, 2019

The *Planning Practice Guidance-Noise*<sup>6</sup> (PPG-N) (MCHLG, 2019), published by the Ministry of Housing, Communities and Local Government, was revised in July 2019. The PPG-N introduces a fourth effect level not included in the NPSE:

- **UAEL – Unacceptable Adverse Effect Level** – this is the level above which extensive and regular changes in behaviour and / or an inability to mitigate the effect of noise leading to psychological stress or physical effects occurs.

In cases where existing noise sensitive locations already experience high noise levels, PPG-N suggests that a development that is expected to cause even a small increase in noise may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur.

PPG-N advises that the noise impact may be partially offset if the residents of those dwellings have access to:

- a relatively quiet façade (containing windows to habitable rooms) as part of their dwelling;
- a relatively quiet external amenity space for their sole use (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur;
- a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and
- a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within 5 minutes walking distance).

The potential effect of an existing business on a new residential development being located close to it should be carefully considered as the existing noise levels from the business may be regarded as unacceptable by the new residents and subject to enforcement action. In the case of an established business, the policy set out in Paragraph 182 of the NPPF should be followed.

<sup>6</sup> Gov.uk (2019) Planning Practice Guidance – Noise, [online]. Available at <https://www.gov.uk/guidance/noise--2> [Checked May 2020]

PPG-N links the increasing effect levels to an effect, perception by receptor and associated action, as summarised in **Table 8A.1**.

Table 8A.1 PPG-N – Summary of noise exposure hierarchy

Increasing effect level	Effect	Perception	Action
<b>Less than NOEL (No Observed Effect)</b>	No effect	Not noticeable	No specific measures
<b>Greater than LOAEL (Lowest Observed Adverse Effect Level)</b>	Adverse effect	Noticeable and intrusive	Mitigate and reduce to a minimum
<b>Greater than SOAEL (Significant Observed Adverse Effect Level)</b>	Significant adverse effect	Noticeable and disruptive	Avoid
<b>Greater than UAEL (Unacceptable Adverse Effect Level)</b>	Unacceptable adverse effect	Noticeable and very disruptive	Prevent

Source: Planning Practice Guidance – Noise, 2019

## Aviation policy and guidance

### Aviation 2050

The Government announced that the Department for Transport (DfT) is currently progressing work to develop a new strategy for UK aviation<sup>7</sup> that will set out the long-term direction for aviation policy to 2050 and beyond.

In December 2018, the Government published *Aviation 2050: The Future of UK Aviation* – A consultation document seeking views until April 2019. Recognising the strong and continuing growth in demand for air services, the strategy will look to address what should constitute a framework for future sustainable growth and consider how the UK can balance environmental costs with the economic benefits of aviation.

The *Aviation 2050* notes on page 8 that it aims “To achieve a safe, secure and sustainable aviation sector that meets the needs of consumers and of a global, outward-looking Britain”. This aim is underpinned by the following six objectives:

- *Help the aviation industry work for its customers;*
- *Ensure a safe and secure way to travel;*
- *Build a global and connected Britain;*
- *Encourage competitive markets;*
- *Support growth while tackling environmental impacts; and*
- *Develop innovation, technology and skills.*

The “increasing demand” section (i.e. Paragraphs 1.17~1.21) clearly acknowledges the significantly increasing demand for flying in terms of transporting both passengers and freight. The need for further aviation capacity is highlighted and the Government is supportive of a new runway at London Heathrow Airport as well as other airports throughout the UK making best use of their existing runways.

<sup>7</sup> Written Statement to Parliament on Airport Capacity and Airspace Policy – 2nd February 2017.



The Government essentially encourages making best use of existing runways throughout the UK and acknowledges the important role of airports beyond London Heathrow Airport. In particular, the Government recognises the economic benefits that airports can have on the local area to act as catalysts to encourage economic growth and development in the region. However, it also recognises the importance of appropriately managing the environmental impacts that airports could cause on surroundings particularly with respect to noise implications.

There is currently an ongoing consultation process regarding the 'Aviation 2050 – the future of UK aviation' document with initial results available for 'Legislation for enforcing the development of airspace change proposals'<sup>8</sup> section, annex A of the consultation document. On the basis of the consultation, the government intends to:

- "to take forward new powers for the Secretary of State (delegable to the CAA) to direct that airspace change proposals are taken forward by airports or other relevant bodies;
- take forward its sanctions and penalties regime proposal; and
- give the CAA the responsibility for enforcing the sanctions and penalties regime."<sup>9</sup>

Further responses are to be published, leading to a final strategy for aviation growth.

### Aviation policy framework

The *Aviation Policy Framework*<sup>10</sup> (APF) was published in March 2013 and fully replaces the *2003 Air Transport White Paper*<sup>11</sup> as Government policy on aviation. The framework outlines objectives and principles to guide plans and decisions on airport developments, bringing together many related and discreet policies. By defining the Government's objectives and policies on the impacts of aviation, the APF sets out the framework within which decisions on aviation ought to be made to deliver a balanced approach to securing the benefits of aviation and to support economic growth.

The APF states that the "Government wants to see the best use of existing airport capacity" and that in the short-term, a key priority for Government is to continue to work with the aviation industry and other stakeholders to make better use of existing runways at all UK airports to improve performance, resilience and the passenger experience.

There has been no update to the *Aviation Policy Framework* (APF) 2013<sup>12</sup> which underpinned the noise assessment for the Original Permission, and hence the APF 2013 continues to act as the primary policy framework for this assessment. However, to ensure consistency with recent aviation policy guidance contained in the Consultation Response on *UK Airspace Policy: A Framework for balanced decisions on the design and use of airspace*<sup>13</sup>, noise levels have been reported down to 51 dB  $L_{Aeq,16hr}$  and 45 dB  $L_{Aeq,8hr}$  and these values are considered as the lowest-observed adverse-effect level (LOAEL) for daytime and night-time respectively.

<sup>8</sup> Department for Transport (2019). Consultation Response on Legislation for Enforcing the Development of Airspace Change [online]. Proposals Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/841247/consultation-response-on-legislation-for-enforcing-the-development-of-airspace-change-proposals.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/841247/consultation-response-on-legislation-for-enforcing-the-development-of-airspace-change-proposals.pdf) [Checked December 2020].

<sup>9</sup> Department for Transport <https://www.gov.uk/government/consultations/aviation-2050-the-future-of-uk-aviation>

<sup>10</sup> Department for Transport (2013). *Aviation Policy Framework*, [online]. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/153776/aviation-policy-framework.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/153776/aviation-policy-framework.pdf) [Checked November 2018].

<sup>11</sup> Department for Transport (2003). *The Future of Air Transport*, [online]. Available at: <https://www.gov.uk/government/publications/the-future-of-air-transport> [Checked November 2018].

<sup>12</sup> Department for Transport (2013) *Aviation Policy Framework*, [online]. Available at <https://www.gov.uk/government/publications/aviation-policy-framework> [Checked March 2019].

<sup>13</sup> Department for Transport and Civil Aviation Authority (2017) *Consultation Response on UK Airspace Policy: A framework for balanced decisions on the design and use of airspace* [online] Available at [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/653801/consultation-response-on-uk-airspace-policy-web-version.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/653801/consultation-response-on-uk-airspace-policy-web-version.pdf) [Checked October 2018].

Several guidance documents have also been updated since the Original Permission, including the *Air Navigation Guidance (ANG) 2017*<sup>14</sup>, which, took effect from 2018 and provides guidance to the CAA on the implementation of the changes to airspace policy. Furthermore, the CAA published CAP1616<sup>15</sup> in response to the ANG, and this provides guidance for the assessment of noise required for an airspace change. Although the ANG 2017 and CAP1616 are considered best practice for the assessment of noise resulting from an airspace change, the guidance is not considered primary policy for this assessment on the basis that this is not an airspace change assessment, nor does it seek to alter established flight paths.

Alongside the updated airspace guidance, the Government published its *Consultation Response on UK Airspace Policy 2017*, which provides the reasoning behind policy changes and reaffirms that the Government's objective for aviation noise management as being, to:

*"Limit and, where possible, reduce the number of people in the UK significantly affected by the adverse impacts of aircraft noise"*<sup>16</sup>.

**Table 8A.2** presents a summary of aviation policy and guidance that has been updated between the Original Permission and this report.

**Table 8A.2** Aviation policy and guidance relevant to the noise assessment

Policy reference	Policy information relevant to noise
<b>Air Navigation Guidance, 2017</b> <sup>17</sup>	<p>Section 70(2) of the <i>Transport Act 2000</i><sup>18</sup> requires the CAA to take account of any guidance on environmental objectives given to it by the Secretary of State (SoS) when carrying out its air navigation function. Following extensive review by the CAA, the <i>Air Navigation Guidance 2017</i> was introduced. The guidance is considered statutory guidance to the CAA on environmental objectives in respect of its air navigation functions. The Guidance defines the Government's key environmental objective in respect to noise as:</p> <p><i>"Limit and, where possible, reduce the number of people in the UK significantly affected by adverse impacts from aircraft noise"</i>.</p> <p>The Guidance goes on to define a daytime LOAEL of 51 dB <math>L_{Aeq,16hr}</math> and 45 dB <math>L_{Aeq,8hr}</math> for night-time. The Guidance also highlights altitude-based priorities and identifies that noise is the priority objective for aircraft below 4,000 ft., between 4,000 and 7,000 ft noise should be balanced with other environmental objectives and above 7,000 ft noise is no longer priority.</p>
<b>CAP 1129: Noise Envelopes</b> <sup>19</sup>	<p>CAP 1129 introduces and defines the concept of a noise envelope and provides example of use at other airports. The guidance defines three approaches to setting an envelope including restricting inputs; restricting noise exposure and restricting noise impact. A noise envelope should also be clearly defined, be agreed by stakeholders, be legally binding, take account</p>

<sup>14</sup> Department for Transport and Civil Aviation Authority (2017) *Air Navigation Guidance 2017*, [online]. Available at <https://www.gov.uk/government/publications/uk-air-navigation-guidance-2017> [Checked March 2019]

<sup>15</sup> Civil Aviation Authority (2017) CAP1616 Airspace Design: Guidance on the regulatory process for changing airspace design including community engagement requirements, [online]. Available at <http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=8127> [Checked March 2019]

<sup>16</sup> Department for Transport (2017) *Consultation Response on UK Airspace Policy: A framework for balanced decisions on the design and use of airspace* [online] Available at [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/653801/consultation-response-on-uk-airspace-policy-web-version.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/653801/consultation-response-on-uk-airspace-policy-web-version.pdf) [Checked February 2018].

<sup>17</sup> Department for Transport and Civil Aviation Authority (2017) *UK Air Navigation Guidance 2017*, [online]. Available at: <https://www.gov.uk/government/publications/uk-air-navigation-guidance-2017> [Checked March 2019].

<sup>18</sup> Transport Act, 2000, [online]. Available at: <https://www.legislation.gov.uk/ukpga/2000/38/contents> [Checked March 2019]

<sup>19</sup> Civil Aviation Authority (2013). *Noise Envelopes, CAP 1129*, [online]. Available at: <https://publicapps.caa.co.uk/docs/33/CAP%201129%20Noise%20Envelopes.pdf> [Checked March 2019].

Policy reference	Policy information relevant to noise
	of noise and annoyance, consider modern technology and have aims proportionate to the airport.
<b>CAP 1278: Aircraft Noise and Health Effects: Recent Findings<sup>20</sup></b>	Published by the CAA, this report is an update to the previous <i>ERCD Report 0907</i> and highlights key research that has been published in aircraft noise and health effects since 2007, including sleep disturbance, cardiovascular disease, children's learning, and other health effects.
<b>CAP 1506: Survey of Noise Attitudes 2014: Aircraft<sup>21</sup></b>	Latest UK-based evidence on the effects of aircraft noise exposure on social attitudes and annoyance. The results of this survey have been used to aid the setting of noise exposure thresholds in the <i>Air Navigation Guidance 2017</i> .
<b>CAP 1616: Airspace Design Guidance<sup>22</sup></b>	<p>CAP 1616 presents guidance to support the new process of assessing airspace change and outlines the process and metrics for environmental assessments, including noise and states that:</p> <p><i>"In the airspace from the ground to 4,000 ft, the Government's environmental priority is to minimise the noise impact of aircraft and the number of people on the ground affected by it".</i></p> <p>Furthermore, for airspace between 4,000 ft and 7,000 ft the focus is to continue minimising the noise impact on populated areas as well as balancing other requirements.</p> <p>CAP 1616a<sup>23</sup> provides technical guidance in support of CAP 1616. The guidance defines noise metrics and provides a method for calculating aircraft noise using a recognised and validated model.</p>
<b>Consultation Response on UK Airspace Policy: A Framework for Balanced Decisions on the Design and use of Airspace<sup>24</sup></b>	<p>The Consultation Response confirms: <i>"The government has issued revised Air Navigation Directions and Air Navigation Guidance to the CAA which will take effect from 1 January 2018".</i> With regard to aircraft noise the Consultation Response sets out that:</p> <ul style="list-style-type: none"> <li><i>"The Government's current aviation policy is set out in the Aviation Policy Framework (APF). The policies set out within this document provide an update to some of the policies on aviation noise contained within the APF and should be viewed as the current government policy."</i></li> <li><i>"Consistent with the Noise Policy Statement for England, our objectives in implementing this [UK airspace] policy are to: ... limit and, where possible, reduce the number of people in the UK significantly affected by the adverse impacts from aircraft noise."</i></li> </ul>

<sup>20</sup> Civil Aviation Authority (2016). Aircraft noise and health effects: recent findings, CAP 1278, [online]. Available at: <https://publicapps.caa.co.uk/docs/33/CAP%201278%20MAR16.pdf> [Checked March 2019].

<sup>21</sup> Civil Aviation Authority (2017). Survey of noise attitudes 2014: aircraft, CAP 1506, [online]. Available at: <https://publicapps.caa.co.uk/docs/33/CAP%201506%20FEB17.pdf> [Checked March 2019].

<sup>22</sup> Civil Aviation Authority (2017) Airspace Design: guidance on the regulatory process for changing airspace design including community engagement requirements, CAP 1616, [online]. Available at: <https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=8127> [Checked March 2019].

<sup>23</sup> Civil Aviation Authority (2017) Airspace Design: Environmental requirements technical annex, CAP 1616a, [online]. Available at: <https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=8128> [Checked March 2019].

<sup>24</sup> Department for Transport (2017) Consultation Response on UK Airspace Policy: a framework for balanced decisions on the design and use of airspace, [online]. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/653801/consultation-response-on-uk-airspace-policy-web-version.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/653801/consultation-response-on-uk-airspace-policy-web-version.pdf) [Checked March 2019].

## Policy reference

## Policy information relevant to noise

- *"The specific daytime and night-time values proposed for the LOAEL: 51 dB LAeq 16hr and 45 dB Lnight also received broad support" and therefore "We [the Government] will set a LOAEL at 51 dB LAeq 16hr for daytime noise .... and based on feedback and further discussion with CAA we are making one minor change to the LOAEL night metric to be 45 dB LAeq 8hr rather than Lnight to be consistent with the daytime metric."*
- *"The Government acknowledges the evidence from recent research which shows that sensitivity to aircraft noise has increased, with the same percentage of people reporting to be highly annoyed at a level of 54 dB LAeq 16hr as occurred at 57 dB LAeq 16hr in the past."*

Similar to the APF, 2012 The Consultation Response also confirms:

- The Government continues to expect airport operators to offer households exposed to levels of noise of 69 dB LAeq,16h or more, assistance with the costs of moving;
- The Government also expects airport operators to offer acoustic insulation to noise-sensitive buildings, such as schools and hospitals, exposed to levels of noise of 63 dB LAeq,16h or more; and
- *"As a minimum, the Government would expect airport operators to offer financial assistance towards acoustic insulation to residential dwellings which experience an increase in noise of 3 dB or more which leaves them exposed to levels of noise of 63 dB LAeq,16h or more."*

## Appendix 8B

# Noise - Air Traffic Movements

Table 8B.1      Forecast flows for 92 summer day period

	With Scheme 2021		With Scheme 2022		With Scheme 2023		2024 18 mppa		2028 18mppa		With Scheme 2021 19mppa		With Scheme 2024 19mppa		With Scheme 2028 19mppa	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
A300	229	148	225	146	225	146	229	148	287	168	229	148	226	146	226	146
A318ceo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A318 neo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A319ceo	3257	455	2560	360	1760	289	2083	377	55	1	3264	456	2010	347	49	n/a
A319 neo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A320ceo	11106	2254	7440	1296	6807	1290	7087	1681	5024	644	10417	2230	6542	1292	1888	438
A320 neo	2625	542	4473	742	5914	819	7817	1194	12162	2061	2634	546	6203	829	14088	2040
A321ceo	4532	556	4415	499	4019	451	1402	229	389	11	5294	386	3661	303	0	0
A321 neo	1046	12	3225	793	3616	842	4175	339	4027	605	1008	209	3733	926	5638	1210
A330	12	0	11	0	11	0	12	0	0	0	12	0	11	0	11	0
B737- Max	637	142	1033	254	1787	277	1533	330	2735	771	639	142	3804	675	4108	758
B737-300 / 73C	0	0	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0	0	n/a	n/a	0	n/a
B737-400	12	104	12	103	12	103	12	104	0	112	12	105	13	103	13	103
B737-500	17	0	20	0	20	0	17	0	0	0	17	0	21	0	21	0
B737-600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B737-700	32	0	36	0	37	0	32	0	0	0	32	0	39	0	39	0
B737-800 / 73H	4054	675	3588	551	2835	529	3158	487	1897	301	4063	677	824	132	541	49
B737-900	191	41	189	40	189	40	191	41	0	0	192	41	190	40	190	40
B757	n/a	130	n/a	128	n/a	128	n/a	130	0	112	n/a	131	n/a	129	n/a	129
B767-200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B767-300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B787-800 / 900	17	0	17	0	17	0	17	0	0	0	17	0	17	0	29	0
Dash 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DO328	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E135/145	406	0	340	0	353	0	406	n/a	0	0	407	0	366	0	366	0

	With Scheme 2021		With Scheme 2022		With Scheme 2023		2024 18 mppa		2028 18mppa		With Scheme 2021 19mppa		With Scheme 2024 19mppa		With Scheme 2028 19mppa	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
E175/195	0	0	n/a	n/a	10	n/a	n/a	n/a	0	0	0	0	11	n/a	11	n/a
F10062	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	6218	72	7120	81	7389	84	6218	72	7998	76	6232	73	7660	87	7631	90
Total	34391	5131	34706	4994	35003	4997	34391	5131	34574	4863	34469	5143	35331	5007	34849	5002



## Appendix 8C

# Noise - Modelling report

## **LONDON LUTON AIRPORT**

A11060-N57-DR

21 December 2020

### **SECTION 73 – NOISE CONTOURING METHODOLOGY**

#### **1.0 INTRODUCTION**

London Luton Airport Operations Limited (LLAOL) are making a Section 73 application to Luton Borough Council (LBC) to increase their annual passenger limit to 19 million passengers per annum (mppa), and for an increase in the limits on the area of the 57 dB daytime and 48 dB night time noise contours. For both contours there is a short term limit that applies until the end of 2027 and a lower long term limit that applies from 2028 onwards.

Chapter 7 of the Environmental Statement accompanying the application contains aircraft noise contours for a number of scenarios. This appendix details the methodology for the production of these noise contours. It follows the same format as the corresponding appendix in the 2012 ES, specifically *Appendix H Appendix N03 Detailed Noise Input Data, Methodology and Airport Noise Contours*.

The latest contours and those in the 2012 ES, have been prepared by Bickerdike Allen Partners LLP (BAP) based on actual and forecast future movements provided by London Luton Airport Operations Limited (LLAOL). These include the actual and expected number of movements by the individual aircraft types.

Chapter 7 contains contours for the following scenarios:

- Existing Short Term Limit
- 2021 18mppa (Proposed Short Term Contour Area Limit)
- 2022 18mppa (Worst Intermediate Year)
- 2023 18mppa
- 2024 19mppa
- Existing Long Term Limit
- 2028 19mppa (Proposed Long Term Contour Area Limit)
- 2028 12.5mppa (Future Baseline)

Details of the noise contour methodology for these scenarios are given below. The 2028 12.5mppa scenario is based on the forecast movements from the 2012 ES, but using the latest methodology.

## **2.0 SOFTWARE**

The overall  $L_{Aeq,T}$  contours were produced using the version 7.0d of the Federal Aviation Administration (FAA) Integrated Noise Model (INM). This is relatively minor update of version 7.0c which was used to produce the contours presented in the 2012 ES.

To produce the number above contours (N65 and N60) the INM software was used in conjunction with the Transport Noise Information Package (TNIP Expert v2.3b) from the Australian Government Department of Transport and Regional Services.

## **3.0 GEOGRAPHICAL INFORMATION**

Geographical information about the location and height of the runway have been taken from the UK Aeronautical Information Package (AIP) for London Luton Airport. This is unchanged from the information used in the 2012 ES.

As before the INM study includes the effect of local topography. The data is based on the Ordnance Survey Landform Panorama product and then processed for input into the INM model.

## **4.0 AIRCRAFT OPERATIONS**

The basis for the summer noise contours are the aircraft movements during a 92 day summer period. Specifically, the movements from the 16<sup>th</sup> June to the 15<sup>th</sup> September inclusive were used. This is the standard summer period used when producing noise contours in the U.K. This period represents a worst case as it includes the peak period at the airport due to holidays. For annual contours, the movements across the whole year are considered.

### **4.1 Traffic Distribution by Aircraft Type**

The forecast of future aircraft operations used within this assessment are presented in Appendix 3A of the ES.

### **4.2 Flight Tracks and Dispersion**

Arrivals at London Luton Airport (LLA) use Standard Arrival Routes (STARs), which involve straight final approaches with the aircraft typically joining the extended centreline of the runway around 8 nautical miles from the thresholds. Arrivals are therefore modelled as straight approaches, along the runway centreline.

Departures use the published Standard Instrument Departures (SIDs) given in the UK Aeronautical Information Publication (AIP). The use of the departure flight tracks is monitored by the Airport's track keeping system. The tracks flown are also available to view via the Airport's web site using the TraVis system.

A number of the SIDs are initially similar close to the airport. Therefore, a set of six modelled representative departure tracks, three from each runway end, for use in the INM model were generated based on actual tracks flown. The traffic has then been dispersed from these representative tracks as described below.

The dispersion model has the assumption that there are three "dispersed" tracks associated with each departure route; these comprise the representative track of each route and one sub-track either side. The allocation of departure movements to each track is as follows:

- 68.26 % along the representative track;
- 15.87 % along each of the two sub-tracks either side of the representative track.

This dispersion model is that assumed by the INM software when it generates the sub-tracks from the actual tracks. These assumptions are identical to those used for the previous contours.

The same set of modelled flight tracks were used to produce all of the noise contours. These are the same as those used to produce the contours for the *2011 Current Aircraft Noise Baseline* scenario with the exception of the departure routes to the west. These have been revised since the 2012 ES to reflect an airspace change and also the adjustments to an on route bearing to counter the natural drift in magnetic north.

#### **4.3 Flight Profiles**

For the departure movements the INM model offers a number of standard flight profiles for most aircraft types, particularly for the larger aircraft types. These relate to different departure weights which are greatly affected by the length of the flight, and consequently the fuel load.

In the INM the weight is referred to as the stage length. Stage lengths occur in increments of 500 up to 1500 nmi and then in increments of 1000 nmi. The INM model assumes all aircraft take off with a full load irrespective of stage length. As the stage length increases the aircraft has to depart with greater fuel and so its flight profile is slightly lower than when a shorter stage length is flown.

Following long term measurement of aircraft departures in southern Luton and discussion with airlines the standard flight profiles were supplemented with custom profiles for the Airbus A319 and A320 and the Boeing 737-800. These better reflected the operational procedures flown and also improved the correlation between measured and predicted noise levels, when considering both the results from southern Luton and the fixed monitors of the airport's noise and track keeping system. This change occurred after the 2012 ES, so the earlier contours used standard flight profiles.

For the departure movements the appropriate stage lengths were determined from the destinations, which were provided in the forecasts. For the 2012 ES contours the stage length was similarly set for each departing aircraft based on its destination. In some cases, particularly for smaller aircraft, profiles do not exist in the INM model for the stage lengths flown. In these cases the closest available stage length was used.

#### 4.4 Traffic Distribution by Route

For all scenarios, the modelled route usage is the average of the summer activity in the last five years (2015-2019). This five year average split of departures by route is summarised in Table 1.

Runway	Modelled Departure Route	Percentage of Runway Departures
08	E1	11%
	E2	52%
	E3	38%
26	CPT_260	38%
	DVR_9Y	51%
	OLY_260	11%

**Table 1: Modelled departure route usage (2015-2019 average)**

#### 4.5 Traffic Distribution by Runway

For all of the scenarios, the modelled runway usage is the average of the summer activity in the last five years (2015 to 2019). This five year average split by runway is given in Table 2.

Runway	Percentage of Movements
08	22%
26	78%

**Table 2: Modelled runway usage (2015-2019 average)**

#### 4.6 Future Aircraft Types

For all the scenarios, the modelled performance of the modernised aircraft types has been based on current aircraft types available in the INM, but with an allowance for their expected lower noise levels.

For all of the scenarios the modelled change in noise for the A320neo compared with the A320ceo has been derived from measured noise levels.

When the *Current Short Term Limit* contours were produced measured results were not available for the A321neo. The modelled change in noise for the A321neo compared to the A321ceo was therefore based on a comparison of certification values. For the other scenarios, which were produced later, the modelled change in noise levels for the A321neo are based on measured results in 2018.

For all of the scenarios the modelled change in noise for the Boeing 737 MAX compared with the 737-800 are based on a comparison of certification noise levels. The modelled changes in noise levels for the modernised aircraft are detailed in Table 3.

Scenario	Modernised Aircraft Type	Current Aircraft Type	Change in Modernised Aircraft Noise	
			Arrivals	Departures
All	Airbus A320neo	Airbus A320ceo	-1 dB	-3.8 dB
Current Short Term Limit	Airbus A321neo	Airbus A321ceo	-1.8 dB	-6.3 dB
All Other	Airbus A321neo	Airbus A321ceo	0 dB	-1.9 dB
All	Boeing 737 MAX	Boeing 737-800	-2.2 dB	-3 dB

**Table 3: Latest modelled change in noise produced by modernised aircraft types**

At the time of the 2012 ES none of the modernised aircraft types had flown, let alone been certificated or entered service. Consequently, assumptions were made on their expected performance, and these are detailed in Table 4.

Modernised Aircraft Type	Current Aircraft Type	Change in Modernised Aircraft Noise	
		Arrivals	Departures
Airbus A319neo	Airbus A319	-3 dB	-3 dB
Airbus A320neo	Airbus A320	-3 dB	-3 dB
Airbus A321neo	Airbus A321	-3 dB	-3 dB
Boeing 737 MAX	Boeing 737-800	-3 dB	-3 dB

**Table 4: 2012 ES modelled change in noise produced by modernised aircraft types**

Comparing Tables A3 and A4 shows a similar overall modelled improvement from departures, but a decrease in the modelled improvement from arrivals. The Airbus A319neo has only sold in very limited numbers and does not feature in the latest forecast so is not included in Table 3.

## 5.0 VALIDATION OF INM MODEL

To provide a check of the methodology used for producing the regular noise contours for London Luton Airport (LLA) a validation exercise has been conducted annually for several years. This involves the comparison of predicted noise levels for individual operations by key aircraft types with the measured noise levels obtained from the Noise and Track Keeping (NTK) system.

For all the scenarios the results of the validation exercise used to produce the actual contours for 2019 at the airport were used and are summarised below.

The validation exercise for the 2019 actual contours was based on the then most recent set of annual measured results from the airport's NTK system, the data for 2018. The exercise considered the most common and loudest aircraft types. The measured sound exposure levels (SELs) obtained for the three main aircraft types operating at Luton Airport, the Airbus A319ceo, Airbus A320ceo, and the Boeing 737-800, from the fixed Noise Monitoring Terminals (NMTs) in 2018 are shown in Table 5. These are the averages of thousands of results in 2018 for each operation. Table 5 also includes the noise levels from the Validated INM Prediction. These are generally very similar to the measured noise levels, being less than 1 dB different.

Aircraft Type	Operation	Movement-Weighted NMT Noise Level, SEL dB(A)	
		2018 Average <sup>[1]</sup>	Validated INM Prediction
Airbus A319ceo	Arrival	84.7	84.5
	Departure	83.6	84.2
Airbus A320ceo	Arrival	84.4	84.2
	Departure	83.9	84.5
Boeing 737-800	Arrival	85.7	86.5
	Departure	86.2	86.0

**Table 5: Comparison of Measured Sound Exposure Levels – Fixed NMTs**

<sup>[1]</sup> Average based on results from specific NMTs exposed by each operation.

Measured noise levels for each aircraft type vary to some degree year on year. BAP have reviewed the average measured arrival and departure noise levels for the A320ceo, the most common type, over the period 2014-2018. The highest arrival noise levels occurred in 2018, the highest departure noise levels occurred in 2014.

To allow for this variation in noise level, for all the future scenarios except the *Current Short Term Limit* the modelled noise level for the A320ceo on departure has been increased to the 2014 level, which is 0.7 dB higher than that in 2018. The arrival noise levels have not been altered. For the *Current Short Term Limit* scenario the A320ceo noise levels are based on the measured results in 2018 as described above.



## Appendix 8D

# Noise - Comments and responses to the ES submission



## 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 20<sup>th</sup> October 2017, the government published a Consultation Response on UK Airspace Policy<sup>1</sup>. In paragraph 2.69 of the 20<sup>th</sup> 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*<sup>2</sup>, 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 2019<sup>3</sup>. 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

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

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

<sup>3</sup> 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 <sup>2</sup> ) 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<sub>Aeq,16h</sub> increases from 19.4 to 21.6km<sup>2</sup>;
- 48dB L<sub>Aeq,8h</sub> increases from 37.2 to 42.9km<sup>2</sup>.

*Long Term (2028 and beyond)*

- 57dB L<sub>Aeq,16h</sub> increases from 15.2 to 15.5km<sup>2</sup>;
- 48dB L<sub>Aeq,8h</sub> increases from 31.6 to 35.5km<sup>2</sup>.

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<sub>Aeq,8h</sub>). 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 35.5km<sup>2</sup>.

## 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 England<sup>4</sup> 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)<sup>5</sup>, 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.

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<sup>4</sup> Noise Policy Statement for England, March 2010

<sup>5</sup> 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 BB93<sup>6</sup> 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 725<sup>7</sup> 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 1616<sup>8</sup> (with CAP 1616a<sup>9</sup> 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 1992<sup>10</sup> 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.

<sup>6</sup> Building Bulletin 93:

<sup>7</sup>CAA Guidance on the Application of the Airspace Change Process: CAP 725

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

<sup>9</sup> Airspace Design: Environmental requirements technical annex. CAP1616a

<sup>10</sup> 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

# Noise Response to Vernon Cole's Letter

Table 4.1 Noise Responses

Issue	Wood response and Vernon's main comment on the response further to a meeting held on the 13 <sup>th</sup> April 2021 to discuss the below.
<p><b>The proposals are not in line with government policy which seeks to minimise and where possible reduce the number of people significantly affected by aircraft noise.</b></p>	<p>The overall objective of the UK Aviation Noise Policy [ANP] [<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/153776/aviation-policy-framework.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/153776/aviation-policy-framework.pdf</a>], confirmed by the Consultation Response on Legislation for Enforcing the Development of Airspace Change Proposals [<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/841247/consultation-response-on-legislation-for-enforcing-the-development-of-airspace-change-proposals.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/841247/consultation-response-on-legislation-for-enforcing-the-development-of-airspace-change-proposals.pdf</a>] is to limit noise and where possible reduce the number of people in the UK significantly affected by aircraft noise. This policy objective is integrated into Luton Local Plan Policy LLP 6, where it states that Proposals for development will only be supported where [...] proposals: v) achieve further noise reduction or no material increase in day or night-time noise.</p> <p>There appears to be a conflict between this and the requirement for growth in the aviation industry which is noted in the National Planning Policy Framework [<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>], the ANP, Consultation Response document and General Aviation Strategy [<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/417334/General_Aviation_Strategy.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/417334/General_Aviation_Strategy.pdf</a>]. However, this conflict only arises via an implication from the above policy text. In the context of sustainable development, and growth of airports, the overall approach to limit and reduce the number significantly affected does not mean that no additional significant effect can be permitted, where that is a necessary result in support of sustainable development. It is noted in LLP6 that the criteria should be applied "where applicable / appropriate having regard to the nature and scale of such proposals". At least by 2028, the 19 mppa Development Proposal does not materially increase noise above the 18 mppa scenario [this is assumed to be &lt;1 dB difference]. In addition, the 19 mppa scenario for 2024 is quieter than the 2021 18 mppa scenario. On this basis, the scale of the development would not be considered sufficient to enact the criteria requirements in LLP6.</p> <p>Also, whilst not policy yet, the fluidity of noise caps is discussed in the Government documentation Aviation 2050: The future of UK aviation: A consultation (<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/841247/consultation-response-on-legislation-for-enforcing-the-development-of-airspace-change-proposals.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/841247/consultation-response-on-legislation-for-enforcing-the-development-of-airspace-change-proposals.pdf</a>). It states that a new measure will be to routinely set "noise caps as part of planning approvals (for increase in passengers or flights). The aim is to balance noise and growth and to provide future certainty over noise levels to communities. It is important that caps are subject to periodic review to ensure they remain relevant and continue to strike a fair balance by taking account of actual growth and the introduction of new aircraft technology."</p> <p><b>Vernon Cole Response (13<sup>th</sup> April 2021):</b></p> <p><i>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 calls into question whether the proposals are strictly in line with current government policy which requires major airports to commit to lower noise levels even as operations grow. It also requires operators to share the benefits of noise reducing technology with affected communities.</i></p> <p><i>The application retains 2028 as the last year for which forecast aircraft operations and noise levels are provided, but it would benefit from extending the analysis beyond 2028. 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. In my view, the ES noise analysis needs to be extended in order to establish that this application can demonstrate 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.</i></p> <p><b>Wood approach to updating the ES noise chapter:</b></p>

Issue	Wood response and Vernon's main comment on the response further to a meeting held on the 13 <sup>th</sup> April 2021 to discuss the below.
<p><b>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.</b></p>	<p>The noise chapter has been updated based on noise modelling undertaken showing that the 19 mppa With Scheme would return to the existing long-term Condition 10 limits in 2031.</p> <p>The noise assessment presented in Chapter 8 of the ES considers mitigation to cover properties predicted to newly experience noise above the Significant Observed Adverse Effect Level (SOAEL). The noise insulation would be secured via a Section 106 agreement with Luton Council. For the night-time noise contour this is predicted to be 724 additional properties. To date, the take-up of noise insulation offers is approximately 50 %. Applying this take-up rate to the 724 newly exposed properties identified, it is expected that 362 properties would take up the offer in 2021/2022.</p> <p>In 2021 and 2022, LLAOL's noise insulation fund includes sufficient budget for an additional 367 properties to receive noise insulation. This is over half of the newly significantly affected properties and within the expectations based on experience of those that would take up noise insulation offered. This is considered a reasonable approach to mitigation which has been far extended beyond existing provisions. Noise insulation will continue to be provided to eligible properties beyond 2022, currently planned up to 2028, using an enhanced budget in comparison to the existing noise insulation fund. The total number that could be insulated with the enhanced fund on top of the existing budget would be an additional 567 properties, 78% of the maximum number of properties newly experiencing noise levels above SOAEL.</p>
<p><b>Why does the total funding available only provide sound insulation mitigation to 996 dwellings, which is only approximately 50% of the total number eligible under the scheme?</b></p>	<p><b>Vernon Cole Response (13<sup>th</sup> April 2021):</b>  <i>The objective of a suitable mitigation scheme is to avoid people being exposed to noise levels above SOAEL. There will be 1,908 dwellings exposed to night noise levels above SOAEL in the year of worst noise effects (2022). 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.</i></p>
<p><b>Why is only £1.8M (out of a total of £3M up to 2028) available for the Noise Insulation Fund in the worst year of 2022? More should be made available earlier.</b></p>	<p><i>The scheme as described in the ES explicitly identifies that it will not provide sufficient funding to treat all eligible properties. 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 budgets are set on the basis that LLAOL expect only 50% of eligible properties to take up the SIGS. While that may be a reasonable expectation, it should not be built into the scheme as described in the ES or S. 106, as it then declares itself to be inadequate. It would be more appropriate for LLAOL to commit to provide sufficient funding for all eligible properties for which the owner/occupier wishes to take up the scheme. The expected 50% take up rate is built into this commitment without it being an explicit limitation of the scheme.</i></p> <p><b>Wood approach to updating the ES noise chapter:</b>          LLAOL commit to provide sufficient funding for all eligible properties for which the owner/occupier wishes to take up the scheme.</p>
<p><b>The application would benefit from analysis of the noise effects beyond 2028.</b></p>	<p>The noise assessment presented in <b>chapter 8 of the ES Doc Ref. 41431RR20V3</b> which accompanies the 19 mppa application considers the effects of the proposed modifications on noise in the period until 2028. The consideration of noise effects beyond 2028 is not part of the scope of the assessment as this was not part of the original package of conditions from the 2012 ES that this submission seeks to revise. Assessment results for noise beyond 2028 would not be different from that in 2028 as an assessment would assume full use of the Condition limit, even with, as expected, continued modernisation reducing noise levels.</p>
<p><b>What is the reason for the higher night noise levels and more extensive noise contour associated with the 19mppa compared to the existing LT conditions, as this is not made clear in the ES?</b></p>	<p>As suggested in Para 2.2.4 of the Noise Review (VC 20-07/M1-0), the main reason for the more extensive noise contours is the amendment to corrections to modernised aircraft based on measured levels. These changes in corrections which have resulted in higher noise levels for modernised aircraft is presented in Table 3 of <b>Appendix 8B Doc Ref. 41431RR21V2 of the ES</b>.</p>
<p><b>What additional steps can the Airport take to</b></p>	<p>The eligibility for sound insulation detailed in <b>Chapter 8 of the ES, Doc Ref. 41431RR20V3</b> is based the requirements set by the LPA as part of the previous planning consent. The condition requires the</p>

Issue	Wood response and Vernon's main comment on the response further to a meeting held on the 13 <sup>th</sup> April 2021 to discuss the below.				
<b>encourage people to be more willing to accept the mitigation provided through the Noise Insulation Fund?</b>	airport to review it effectiveness and update as necessary which is done periodically but at least during every contractor renewal period where the airport reviews noise insulating mediums available and includes or removes as necessary to ensure that a comprehensive list of options for insulating properties that encourage property owners to take up the scheme. During the latest contractor renewal process additional mediums such as sound attenuated trickle vents and loft insulation were added to the list of options. The most common reason for property owners to refuse the scheme is the requirement for passive or mechanical ventilation units to be installed to maintain the necessary airflow to meet building regulations.				
<b>Dispersion: as identified in para. 4.2, the model uses the standard INM software assumptions. Why has actual flight track dispersions as recorded at Luton Airport by the radar enabled track keeping system not been used?</b>	The modelled departure track centrelines and dispersed sub tracks are based on an analysis of radar data and information provided by the airport. The standard INM assumptions are only used to split the aircraft movements between the centreline and sub tracks. The standard INM assumptions are based on the aircraft being dispersed in a pattern approximating a normal distribution, which is commonly the case.				
<b>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?</b>	Custom departure profiles were created for the Airbus A319, the Airbus A320 and the Boeing 737-800, using information provided by the airlines who operate them at Luton. A separate profile was created for each of these aircraft types, reflecting the differences between the aircraft types and the specific procedures used by the airlines who operate them.				
<b>Modernised Aircraft: further details of the data that have been used to derive noise levels associated with a new generation aircraft would be welcomed. 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?</b>	As measured noise levels for the Airbus A320neo and A321neo are now available, they have been validated in the same way as all of the other validated aircraft. For the validation only the results from the fixed NMTs were used, as these give a consistent basis for comparison year on year, are well located relative to the flight paths and provide a larger dataset of noise measurements compared to the mobile NMTs. In the case of the A321neo, as it only started operating recently, it has been modelled based on measured noise levels from 2019, the first full year for which data was available. For the other aircraft including the A320ceo, the 2018 measured noise levels have been used.				
<b>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</b>	<p>The measured noise levels for all aircraft types show a small variance year on year. This can occur for a variety of reasons including load factors and weather conditions. The annual measured arrival and departure noise levels for the A320ceo are shown below. Although departure noise levels were higher overall in 2014 than they were in 2018, there has not been a consistent steady reduction in noise level over time.</p> <table border="1" data-bbox="451 1986 1026 2045"> <thead> <tr> <th data-bbox="451 1986 564 2045">Year</th><th data-bbox="569 1986 1026 2045">Average Measured Noise Level A320ceo, dB(A) SEL</th></tr> </thead> <tbody> <tr> <td> </td><td> </td></tr> </tbody> </table>	Year	Average Measured Noise Level A320ceo, dB(A) SEL		
Year	Average Measured Noise Level A320ceo, dB(A) SEL				

## Issue

**Wood response and Vernon's main comment on the response further to a meeting held on the 13<sup>th</sup> April 2021 to discuss the below.**

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.

	Arrival	Departure		
	NMT1	NMT1	NMT2	NMT3
2011	84.8	84.7	83.2	84.8
2012	84.7	84.6	83.9	84.5
2013	84.7	84.5	84.2	84.7
2014	84.1	84.3	84.8	84.4
2015	84.1	84.7	84.5	84.4
2016	83.8	84.0	84.1	84.8
2017	84.4	84.2	83.9	84.7
2018	84.4	83.7	83.9	84.5

In the ES only in 2024 is 19mppa referred to for the Development Case which is the correct nomenclature. Please can the applicant confirm this is correct?

In 2021, 2022 and 2023 the airport is forecast to operate within the 18mppa cap, but it is predicted that the noise contour limits detailed in Condition 10 to planning permission 15/00950/VARCON (which is the Do Minimum) would be exceeded. As such these years form part of the Development Proposal. 2024 is the first year that the increase in passenger numbers to 19mppa is predicted to occur and as such is used as a Development Case.

Appendix D of the ES 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). The application should have been fully updated to provide the relevant information and added as a stand alone Appendix to Noise Chapter 8.

**Appendix D Doc Ref. 41431RR21V2 of the ES** presents the EIA screening assessment that was presented to Luton Council. This is presented for information only and the assessment presented in the Noise Chapter of the ES **Chapter 8** contains the up-to-date assessment of operational aviation noise.

Appendix 3A appears out of date and incomplete, when considering the number and type of aircraft movements, for the following reasons:  
- are movement numbers for the 92 day summer period?  
- why is data given for 2011 and 2018 which are not assessed in the Noise Chapter;

The Aviation Movements within Appendix 3A are from the 92 day summer period from 16 June to 15 September as per assessment metrics defined within ERCD Report 0904 Metric for Aircraft Noise [Civil Aviation Authority, 2009] [<http://publicapps.caa.co.uk/docs/33/ERCD0904.pdf>] and CAP 1616a: Airspace Change: Environmental requirements technical annex [<https://publicapps.caa.co.uk/docs/33/CAP1616A%20Environmental%20requirements%20technical%20annex%20second%20edition.pdf>].

Data for 2011 to 2018 was provided in the ES for the 2014 Planning Permission (reference 12/01400/FUL) which was resubmitted as part of the current application.

Unfortunately, Appendix 3A was not updated to take into account updates within the assessment. Whilst the data presented is correct, the years 2022, 2023 and 2024 were not added and the years 2011 and 2018 were not removed. The night-time for 2028 Development Case was omitted by accident. An up-to-date Appendix 3A will be provided with the missing data.



Issue	Wood response and Vernon's main comment on the response further to a meeting held on the 13 <sup>th</sup> April 2021 to discuss the below.
<p>- why is data not provided for years 2022, 2023 and 2024; and</p> <p>- why is data not provided for the night period of 2028 Development Case (19mppa)?</p>	<p>The primary noise metrics for the assessment of noise from aviation is the <math>L_{Aeq, 16 \text{ hour}}</math> and <math>L_{Aeq, 8 \text{ hour}}</math> as per the Aviation Policy Framework [<a href="https://www.gov.uk/government/publications/aviation-policy-framework">https://www.gov.uk/government/publications/aviation-policy-framework</a>], and confirmed in the Consultation Response on UK Airspace Policy: A framework for balanced decisions on the design and use of airspace [<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918784/consultation-response-on-uk-airspace-policy-web.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918784/consultation-response-on-uk-airspace-policy-web.pdf</a>].</p> <p>However, the Aviation Policy Framework states that "we recommend that average noise contours should not be the only measure used when airports seek to explain how locations under flight paths are affected by aircraft noise. Instead, the Government encourages airport operators to use alternative measures which better reflect how aircraft noise is experienced in different localities" (APF, 2013). Based on this recommendation, N-Contours (provided as a report in <b>Appendix 8E, Doc Ref. 41431RR21V2</b>) and an <math>L_{Amax}</math> assessment have been provided (<b>Chapter 8, Doc Ref. 41431RR20V3</b>). The use of 80 dB as the point at which a significant effect might occur comes from reference within CAP725: Guidance on the Application of the Airspace Change Process to research that states: "below 90 dBA SEL (approximately 80 dBA <math>L_{max}</math>), aircraft noise events are unlikely to cause any measurable increase in overall rates of sleep disturbance". It is acknowledged that CAP 725 has been superseded by CAP 1616: Airspace Change, which does not have this reference to <math>L_{Amax}</math> and sleep disturbance. However, the CAP 725 text still provides a useful guide for considering <math>L_{Amax}</math> based assessment. As the Noise Review states (VC 20-07/M1-0) based on CAP 725 references to research, there are alternative levels that could be used to assess sleep disturbance, however the research used for the 80 dB <math>L_{Amax}</math> level was specifically based on aviation and therefore considered the most appropriate.</p> <p>Whichever noise level is used for the <math>L_{Amax}</math>, the key point of the assessment is that modernised aircraft result in lower maximum events generally. Therefore, as more modernised aircraft are used, as is the case with the 19mppa application, the number of the highest <math>L_{Amax}</math> events experienced will be reduced overtime. There are less aircraft movements at night in the 2024 19mppa scenario (5007) than the 18mppa 2024 scenario (5131); meaning fewer <math>L_{Amax}</math> events potentially disturbing sleep. There are 140 more aircraft movements in the 2028 19mppa scenario than there are in the 18mppa scenario, but this is equivalent to 2 additional flights per night, a 3% increase in night-time flights: therefore a minor increase.</p>



## Appendix 8E

### Noise - Assessment results

Table 8E.1 Comparisons of operational noise levels ( $L_{Aeq,T}$  dB) for existing 18 mppa condition 10 2021 – 2027 and for Proposed Development years 2021 to 2024

Contour Level, $L_{Aeq,T}$	Area (sq.km)					No. of Dwellings					No. of Population				
	18 mppa Existing Condition 10 2021-2027	With Scheme 2021	With Scheme 2022	With Scheme 2023	With Scheme 2024	18 mppa Existing Condition 10 2021-2027	With Scheme 2021	With Scheme 2022	With Scheme 2023	With Scheme 2024	18 mppa Existing Condition 10 2021-2027	With Scheme 2021	With Scheme 2022	With Scheme 2023	With Scheme 2024
Daytime contour level, $L_{Aeq,16hr}$															
51	54.1	59.0	57.6	56.1	53.5	13981	16746	16411	15547	14644	32966	39386	38687	36681	34550
52	46.4	50.4	49.4	48.1	46.1	10624	12568	12485	11835	11057	25386	29947	29744	28290	26477
53	39.6	43.2	42.3	41.2	39.4	8385	9579	9546	9302	8604	19917	22589	22523	22017	20364
54	33.5	36.8	36.0	35.0	33.3	7080	7661	7827	7619	7258	16752	18348	18610	18080	17194
55	28.1	31.0	30.2	29.4	28.0	5988	6839	6920	6736	6452	14185	16224	16335	15959	15228
56	23.4	26.1	25.4	24.5	23.3	4900	5572	5629	5388	5187	11511	13156	13423	12740	12275
57	19.4	21.6	21.1	20.4	19.4	4170	4730	4759	4722	4567	9577	11076	11202	11060	10682
58	15.9	17.9	17.4	16.8	16.0	3441	3949	4056	3941	3731	8033	9088	9298	8981	8579
59	13.0	14.6	14.3	13.9	13.2	2639	3257	3300	3230	2848	6405	7592	7663	7533	6745
60	10.8	12.0	11.9	11.6	11.0	1742	2140	2371	2210	1966	4530	5409	5808	5509	5070

Contour Level, <i>L</i> <sub>Aeq, T</sub>	Area (sq.km)					No. of Dwellings					No. of Population				
	18 mppa Existing Condition 10 2021-2027	With Scheme 2021	With Scheme 2022	With Scheme 2023	With Scheme 2024	18 mppa Existing Condition 10 2021-2027	With Scheme 2021	With Scheme 2022	With Scheme 2023	With Scheme 2024	18 mppa Existing Condition 10 2021-2027	With Scheme 2021	With Scheme 2022	With Scheme 2023	With Scheme 2024
61	9.0	10.0	10.0	9.7	9.3	1210	1601	1658	1581	1526	3222	4187	4336	4136	3985
62	7.6	8.4	8.5	8.3	7.9	807	1006	1104	1053	882	2196	2720	2976	2848	2372
63	6.3	7.1	7.1	6.9	6.6	720	758	805	776	720	1935	2036	2187	2077	1935
64	5.1	5.9	5.9	5.7	5.4	407	559	649	559	522	1091	1473	1736	1473	1380
65	4.1	4.8	4.8	4.7	4.4	149	398	398	396	316	419	1066	1066	1055	829
66	3.2	3.8	3.9	3.7	3.5	9	11	11	11	9	22	27	27	27	22
67	2.5	3.0	3.0	2.9	2.7	9	9	9	9	9	22	22	22	22	22
68	2.1	2.3	2.4	2.3	2.2	0	2	4	4	0	0	4	12	12	0
69	1.7	1.9	1.9	1.9	1.8	0	0	0	0	0	0	0	0	0	0
Night-time contour level, <i>L</i> <sub>Aeq,8hr</sub>															
45	60.9	70.5	68.5	68.2	64.5	19490	25426	24906	24815	22328	45579	59686	58666	58491	52238
46	51.5	59.6	58.1	57.9	54.8	13750	18246	18634	18482	16394	32080	42749	43669	43308	38404
47	43.8	50.3	49.3	49.1	46.6	9114	12601	12808	12792	11056	21472	29394	30246	30202	25703
48	37.2	42.9	42.1	41.9	39.8	7423	8622	9287	9234	8431	17654	20438	21890	21796	20166
49	31.2	36.4	35.6	35.4	33.5	6156	7297	7578	7549	7275	14531	17327	17957	17884	17195
50	25.9	30.5	29.8	29.7	28.0	4982	5894	6456	6264	5916	11614	13864	15235	14837	14040

Contour Level, <i>L<sub>Aeq, T</sub></i>	Area (sq.km)					No. of Dwellings					No. of Population				
	18 mppa Existing Condition 10 2021-2027	With Scheme 2021	With Scheme 2022	With Scheme 2023	With Scheme 2024	18 mppa Existing Condition 10 2021-2027	With Scheme 2021	With Scheme 2022	With Scheme 2023	With Scheme 2024	18 mppa Existing Condition 10 2021-2027	With Scheme 2021	With Scheme 2022	With Scheme 2023	With Scheme 2024
51	21.5	25.4	24.6	24.5	23.1	4204	4955	5321	5321	4974	9631	11497	12481	12481	11575
52	17.7	21.0	20.5	20.4	19.2	3418	4016	4515	4515	4088	7995	9258	10528	10528	9367
53	14.6	17.2	17.0	16.9	16.0	2604	3330	3741	3741	3395	6447	7796	8624	8624	7908
54	11.8	14.1	14.1	14.0	13.2	1839	2383	2866	2818	2530	4727	6062	6835	6721	6205
55	9.6	11.4	11.5	11.5	10.8	1184	1790	1908	1908	1742	3166	4616	4909	4909	4539
56	8.0	9.3	9.6	9.6	9.1	811	1012	1380	1380	1258	2206	2734	3644	3644	3334
57	6.6	7.7	8.1	8.1	7.7	695	785	886	886	811	1856	2155	2382	2382	2206
58	5.4	6.4	6.8	6.8	6.4	470	588	722	722	720	1231	1559	1944	1944	1935
59	4.4	5.2	5.6	5.6	5.2	158	460	529	529	469	444	1201	1397	1397	1226
60	3.5	4.2	4.5	4.5	4.2	10	145	325	312	145	26	408	854	818	408
61	2.7	3.4	3.6	3.6	3.4	10	10	10	10	10	26	26	26	26	26
62	2.2	2.6	2.8	2.8	2.6	0	9	9	9	4	0	22	22	22	12

\*Current Condition 10 daytime limit is 19.4 sq.km

\*\*Current Condition 10 night-time limit is 37.2 sq.km

Table 8E.2 Comparisons of operational noise levels ( $L_{Aeq, T}$  dB) for 2028 Scenarios

Area (sq.km)				No. of Dwellings			No. of Population		
Contour Level, $L_{Aeq, T}$	Existing 18 mppa Future Condition 2028+	12.5 mppa Future Baseline 2028	With Scheme 19 mppa 2028	Existing 18 mppa Future Condition 2028+	12.5 mppa Future Baseline 2028	With Scheme 19 mppa 2028	Existing 18 mppa Future Condition 2028+	12.5 mppa Future Baseline 2028	With Scheme 19 mppa 2028
Daytime contour level, $L_{Aeq, 16hr}$									
51	44.5	45.6	45.3	10003	9990	10276	23512	23437	24195
52	37.9	39.0	38.7	8003	7857	8211	19006	18772	19584
53	31.9	32.8	32.6	6946	6872	7136	16455	16330	16877
54	26.5	27.4	27.1	5582	5560	5816	13130	13036	13840
55	22.1	22.8	22.6	4748	4682	4885	11185	10926	11445
56	18.3	18.9	18.7	4110	3888	4129	9440	8991	9477
57	15.2	15.5	15.5	3267	3045	3340	7629	7247	7786
58	12.5	12.7	12.8	2333	2045	2506	5765	5200	6139
59	10.4	10.4	10.6	1663	1386	1716	4348	3655	4471
60	8.7	8.5	8.9	1059	886	1169	2862	2382	3128
61	7.3	7.1	7.5	807	722	807	2196	1944	2196
62	6.1	5.9	6.2	643	511	720	1713	1348	1935
63	5.0	4.8	5.1	411	331	460	1102	869	1201
64	4.0	3.8	4.1	143	17	143	404	39	404
65	3.2	3.0	3.2	10	10	10	26	26	26

Area (sq.km)				No. of Dwellings			No. of Population		
Contour Level, LAeq, T	Existing 18 mppa Future Condition 2028+	12.5 mppa Future Baseline 2028	With Scheme 19 mppa 2028	Existing 18 mppa Future Condition 2028+	12.5 mppa Future Baseline 2028	With Scheme 19 mppa 2028	Existing 18 mppa Future Condition 2028+	12.5 mppa Future Baseline 2028	With Scheme 19 mppa 2028
66	2.4	2.4	2.5	4	2	4	12	4	12
67	2.0	2.0	2.0	0	0	0	0	0	0
68	1.7	1.7	1.7	0	0	0	0	0	0
69	1.4	1.4	1.4	0	0	0	0	0	0
Night-time contour level, LAeq,8hr									
45	52.5	57.0	58.4	15597	16706	19637	36403	39151	45912
46	44.4	48.8	49.5	10475	11824	13761	24377	28124	32067
47	37.7	41.9	42.0	7989	9131	9508	18915	21674	22374
48	31.6	35.6	35.5	6860	7574	7624	16252	17968	18083
49	26.1	29.9	29.6	5391	6503	6145	12647	15335	14637
50	21.6	24.9	24.5	4747	5412	5221	11072	12703	12216
51	18.1	20.8	20.3	3805	4582	4502	8733	10715	10358
52	15.0	17.2	17.0	3077	3879	3544	7186	8948	8264
53	12.4	14.3	14.1	2053	3025	2785	5348	7188	6645
54	10.2	11.8	11.6	1625	2099	1891	4247	5311	4912
55	8.6	9.9	9.6	1012	1406	1385	2734	3709	3656
56	7.2	8.2	8.1	781	886	886	2143	2382	2382

Contour Level, <i>L<sub>Aeq, T</sub></i>	Area (sq.km)			No. of Dwellings			No. of Population		
	Existing 18 mppa Future Condition 2028+	12.5 mppa Future Baseline 2028	With Scheme 19 mppa 2028	Existing 18 mppa Future Condition 2028+	12.5 mppa Future Baseline 2028	With Scheme 19 mppa 2028	Existing 18 mppa Future Condition 2028+	12.5 mppa Future Baseline 2028	With Scheme 19 mppa 2028
57	6.0	6.9	6.8	530	722	722	1399	1944	1944
58	4.9	5.7	5.6	396	529	510	1054	1397	1343
59	3.9	4.6	4.5	144	318	264	407	833	679
60	3.1	3.7	3.6	10	10	12	26	26	30
61	2.4	2.9	2.8	2	9	10	8	22	26
62	1.9	2.2	2.2	0	0	0	0	0	0

## Appendix 8F

### Noise - L<sub>Amax</sub> Assessment data

Table 8F.1 Old aircraft, dB L<sub>Amax</sub> (non-residential)

Location	A320 ceo Arr 26	A320ceo Arr 08	A320ceo Dep SL2 26	A320ceo Dep SL2 08	737-800 Arr 26	737-800 Dep SL2 26	737-800 Dep SL3 26	A321ceo Dep SL3 26
Old Knebworth Lodge Farm	37	14	30	63	41	37	37	33
Caddington	24	75	56	39	32	61	61	63
Park Town, Luton	37	63	73	56	44	77	77	82
Whitwell	53	25	40	62	57	48	48	46
Breachwood Green	65	25	39	73	68	47	47	45
St Pauls Walden	64	22	36	69	67	44	44	42
Farley Hill School Luton	28	60	58	43	35	64	64	67
Slip End	28	54	76	44	35	78	79	82
Harpenden Children's Home	28	28	44	39	35	50	49	47
Walkern	61	6	20	37	60	29	29	25
Stevenage (Eastern Perimeter)	63	8	22	44	66	31	31	27
Stevenage Station	65	13	26	61	69	36	36	32
Luton (Wandon End)	52	44	63	68	57	68	68	68
Kensworth	16	70	42	29	25	47	48	45
Hudnall Corner	11	36	43	23	20	48	47	44
Flamstead	21	30	63	35	29	67	67	66
Markyate	20	42	67	35	28	70	71	69

Table 8F.2 New aircraft, dB L<sub>Amax</sub> (non-residential)

Location	A320 neo Arr 26	A320neo Arr 08	A320neo Dep SL2 26	A320neo Dep SL2 08	737 MAX 8 Arr 26	737 MAX 8 Dep SL2 26	737 MAX 8 Dep SL3 26	A321neo Dep SL3 26
Old Knebworth Lodge Farm	36	13	26	36	39	34	34	27
Caddington	23	74	52	35	30	58	58	56
Park Town, Luton	37	62	69	52	42	74	74	75
Whitwell	52	24	36	59	54	45	45	39
Breachwood Green	64	24	35	68	66	44	44	39
St Pauls Walden	63	21	32	65	65	41	41	35
Farley Hill School Luton	27	59	55	40	33	61	61	60
Slip End	27	53	73	40	33	75	76	75
Harpenden Children's Home	27	27	41	36	33	47	46	40
Walkern	60	5	16	26	58	26	26	18
Stevenage (Eastern Perimeter)	62	7	18	31	64	28	28	21
Stevenage Station	64	12	22	44	67	33	33	26
Luton (Wandon End)	51	43	59	64	55	65	65	61
Kensworth	15	69	39	26	22	44	45	39
Hudnall Corner	10	35	39	19	18	45	44	38
Flamstead	20	29	59	32	27	64	64	59
Markyate	19	41	63	31	26	67	68	63



Table 8F.3 Residential, dwellings, old aircraft

dB L <sub>Amax</sub>	A320 ceo Arr 26	A320ceo Arr 08	A320ceo Dep SL2 26	A320ceo Dep SL2 08	737-800 Arr 26	737-800 Dep SL2 26	737-800 Dep SL3 26	A321ceo Dep SL3 26
80	3	190	81	9	18	700	734	2541
81	1	190	11	6	16	407	554	1887
82	1	129	2	6	16	244	389	1558
83	1	43	2	6	3	16	10	1140
84	0	0	0	5	3	5	4	835
85	0	0	0	0	1	2	2	685
86	0	0	0	0	1	2	2	450
87	0	0	0	0	0	0	2	392
88	0	0	0	0	0	0	0	74
89	0	0	0	0	0	0	0	2
90	0	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
<b>Total</b>	6	552	96	32	58	1376	1697	9564

Table 8F.4 Residential, dwellings, new aircraft

dB L <sub>Amax</sub>	A320 neo Arr 26	A320neo Arr 08	A320neo Dep SL2 26	A320neo Dep SL2 08	737 MAX 8 Arr 26	737 MAX 8 Dep SL2 26	737 MAX 8 Dep SL3 26	A321neo Dep SL3 26
80	1	190	0	5	16	16	10	395
81	1	129	0	0	3	5	4	346
82	1	43	0	0	1	2	2	74
83	0	0	0	0	1	2	2	2
84	0	0	0	0	1	0	2	0
85	0	0	0	0	0	0	0	0
86	0	0	0	0	0	0	0	0
87	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
<b>Total</b>	3	362	0	5	22	25	20	817

## Appendix 8G

# Noise - N-Contours report

## **LONDON LUTON AIRPORT**

A11060-N59-DR

17 December 2020

### **N65 & N60 Contours**

#### **1.0 INTRODUCTION**

London Luton Airport Operations Limited (LLAOL) are making a Section 73 application to Luton Borough Council (LBC) to increase their annual passenger limit to 19 million passengers per annum (mppa), and for an increase in the limits on the area of the 57 dB daytime and 48 dB night time noise contours. For both contours there is a short term limit that applies until the end of 2027 and a lower long term limit that applies from 2028 onwards.

Bickerdike Allen Partners LLP (BAP) have produced N65 and N60 number above contours as supplementary metrics for the Environmental Statement (ES) prepared to accompany the application. These contours were produced for two scenarios, one representing the current limits under Condition 10 and the other representing the proposed limits being applied for.

Number above contours outline the extent of the area exposed to at least a certain  $L_{Amax}$  noise level at least a certain number of times. An N65, 200 contour outlines the area exposed to at least 65 dB  $L_{Amax}$  at least 200 times in the period it is for, typically the day (07:00 – 22:59). Due to the nature of these contours they can be very sensitive to small changes in the movements used to produce them. For instance, if an airport had 190 movements per day it would have no N65, 200 contour, however this doesn't mean that the 190 movements are not significant. Equally if the airport had ten extra movements there would be an N65 200 contour, although any impact of the 10 extra movements is likely to be small.

Number above contours are often formed by the common area exposed by the combination of  $L_{Amax}$  footprints for various operations. If there were 15 arrivals and 10 departures neither operation on its own would be sufficient to generate an N65 25 contour. However, in combination they do reach the threshold of 25 movements and therefore the N65 25 contour would be the outline of the area where the 65 dB  $L_{Amax}$  footprints of the arrivals and departures overlap.

There are a number of examples of small changes in the number of aircraft movements having a relatively large impact of the size of the number above contours prepared as part of the ES. This note reports the areas and the number of people and dwellings within the contours and provides context for understanding the differences between those representing the current and proposed limits.

## 2.0 NUMBER ABOVE CONTOURS

### 2.1 Daytime N65 Contours

#### 2.1.1 Short Term Limits

N65 contours were produced at values of 25, 50, 100 and 200 for the daytime period (07:00-22:59) based on average summer day movements for scenarios representing the current and proposed short term limits. These are shown in the attached Figures A11060-N59-01 and A11060-N59-02 respectively. The areas of these contours and the number of people and dwellings within them are shown in Table 1 below. Table 2 shows a summary of the average summer day movements in terms of arrivals and departures by runway direction for the current and proposed short term limit scenarios.

Contour Value (N65)	Contour Area (km <sup>2</sup> )		Dwellings		Population	
	Current Short Term	Proposed Short Term	Current Short Term	Proposed Short Term	Current Short Term	Proposed Short Term
25	76.5	81.7	22,275	23,404	52,801	55,497
50	48.9	51.7	11,042	13,024	26,014	30,735
100	32.5	35.3	6,269	7,148	14,856	17,001
200	2.9	3.6	14	15	31	35

**Table 1: Summer daytime N65 contour areas, and dwelling and population counts**

Operation (Runway)	Average Summer Day Representative Movements	
	Current Short Term	Proposed Short Term
Westerly Arrivals (Rwy 26)	129	143
Easterly Arrivals (Rwy 08)	37	40
Westerly Departures (Rwy 26)	136	148
Easterly Departures (Rwy 08)	38	42

**Table 2: Average summer day movements<sup>1</sup>**

#### 2.1.2 N65 25 Contour

In both cases the N65 25 contour is based on the combination of footprints for each of the four basis operations as they all have over 25 movements a day. The contour based on the proposed limits scenario is larger. This is due to the increased movements resulting in the footprints of some noisier types contributing.

<sup>1</sup> Movements are rounded to the nearest whole number

### 2.1.3 N65 50 Contour

The N65 50 contours for the current and proposed limits are based on the combination of footprints for westerly operations. The N65 contour for the proposed limits scenario is larger. This is due to the increased movements resulting in the footprints of some noisier types contributing.

### 2.1.4 N65 100 Contour

The N65 100 contours for the current and proposed limits are based on the combination of footprints for westerly operations as they have over 100 movements a day. The contour based on the proposed limits scenario is larger. This is due to the increased movements resulting in the footprints of some noisier types contributing.

### 2.1.5 N65 200 Contour

The N65 200 contours for the current and proposed limits are similar in shape. The contour based on the proposed limits scenario is larger.

In both cases to the east of the airport the contours are based on the overlap of the footprints for the westerly arrivals and those for the westerly departures to reach the threshold of 200 movements. As the contour is based on the start of roll noise from westerly departures it does not extend far beyond the east end of the runway.

To the west of the airport the contours are formed by the overlap of footprints for the westerly departures, easterly arrivals and the easterly departures. As the contour is based on start of roll noise from easterly departures it doesn't extend far beyond the west end of the runway.

### 2.1.6 Long Term Limits

N65 contours were produced at values of 25, 50, 100 and 200 for the daytime period (07:00-22:59) based on average summer day movements for scenarios representing the current and proposed long term limits. These are shown in the attached Figures A11060-N59-03 and A11060-N59-04 respectively. The areas of these contours and the number of people and dwellings within them are shown in Table 3 below. Table 4 shows a summary of the average summer day movements in terms of arrivals and departures by runway direction for the current and proposed long term limit scenarios.

Contour Value (N65)	Contour Area (km <sup>2</sup> )		Dwellings		Population	
	Current Long Term	Proposed Long Term	Current Long Term	Proposed Long Term	Current Long Term	Proposed Long Term
25	54.0	54.6	13,815	14,038	32,321	32,997
50	37.0	37.5	8,088	8,171	19,025	19,265
100	25.8	26.3	4,920	5,015	11,375	11,645
200	3.1	3.2	15	15	35	35

**Table 3: Summer daytime N65 contour areas, and dwelling and population counts**

Operation (Runway)	Average Summer Day Representative Movements	
	Current Long Term	Proposed Long Term
Westerly Arrivals (Rwy 26)	141	145
Easterly Arrivals (Rwy 08)	40	41
Westerly Departures (Rwy 26)	147	150
Easterly Departures (Rwy 08)	42	43

**Table 4: Average summer day movements<sup>2</sup>**

#### 2.1.7 N65 25 Contour

In both cases the N65 25 contour is based on the combination of footprints for each of the operations as they all have over 25 movements a day. The contour based on the proposed limits scenario is slightly larger than that based on the current limits scenario.

#### 2.1.8 N65 50 Contour

The N65 50 contours for the current and proposed limits are based on the combination of footprints for westerly operations. The N65 contour for the proposed limits scenario is slightly larger than that based on the current limits scenario.

#### 2.1.9 N65 100 Contour

The N65 100 contours for the current and proposed limits are based on the combination of footprints for westerly operations as they all have over 100 movements a day. The contour based on the proposed limits scenario is slightly larger than that based on the current limits scenario.

---

<sup>2</sup> Movements are rounded to the nearest whole number

### 2.1.10 N65 200 Contour

The N65 200 contours for the current and proposed limits are similar in shape. The contour based on the proposed limits scenario is larger than that based on the current limits scenario.

In both cases to the east of the airport the contours are based on the overlap of the footprints for the westerly arrivals and those for the westerly departures to reach the threshold of 200 movements. As the contour is based on the start of roll noise from westerly departures it does not extend far beyond the east end of the runway.

To the west of the airport the contours are formed by the overlap of footprints for the westerly departures, easterly arrivals and the easterly departures. As the contour is based on start of roll noise from easterly departures it doesn't extend far beyond the west end of the runway.

## 2.2 Night Time N60 Contours

### 2.2.1 Short Term Limits

N60 contours were produced at values of 25 and 50<sup>3</sup> for the night time period (23:00-06:59) based on average summer night movements representing the current and proposed short term limits scenarios. These are shown in the attached Figures A11060-N59-05 and A11060-N59-06 respectively. The areas of these contours and the number of people and dwellings within them are shown in Table 5 below. Table 6 shows a summary of the average summer night movements in terms of arrivals and departures by runway direction for the current and proposed short term limit scenarios.

Contour Value (N60)	Contour Area (km <sup>2</sup> )		Dwellings		Population	
	Current Short Term	Proposed Short Term	Current Short Term	Proposed Short Term	Current Short Term	Proposed Short Term
25	13.0	24.8	273	3,959	744	9,264
50	-	1.1	-	0	-	0
100	-	-	-	-	-	-
200	-	-	-	-	-	-

**Table 5: Summer night time N60 contour areas, and dwelling and population counts**

<sup>3</sup> There are insufficient night time movements to generate an N60 100 or 200 contour under either the current or proposed limits scenarios, or to generate an N60 50 contour under the current limits scenario.



Operation (Runway)	Average Summer Night Representative Movements	
	Current Short Term	Proposed Short Term
Westerly Arrivals (Rwy 26)	21	25
Easterly Arrivals (Rwy 08)	6	7
Westerly Departures (Rwy 26)	15	19
Easterly Departures (Rwy 08)	4	5

**Table 6: Average summer night movements<sup>1</sup>**

### 2.2.2 N60 25 Contour

The night time N60 25 contour shows increases in both area and the number of dwellings and population from the current to the proposed limits scenario. This is due to the proposed limits contour extending further east, over Stevenage, and further west, over portion of south Luton.

The current limits contour to the east of the airport is based on the overlap of the footprints for the 21 westerly arrivals and 4 easterly departures, to just reach the threshold of 25 movements. This ends before Stevenage where some of the departures turn off the extended runway centreline. The proposed limits scenario has more movements, and the 4 additional westerly arrivals are sufficient for the number of arrivals to reach the threshold of 25 on their own. This causes an extension of the contour over Stevenage as it no longer ends after the departures turn.

To the west of the airport the proposed limits contour is formed by the overlap of the footprints for the 19 westerly departures and 7 easterly arrivals. It ends where the arrival and departure routes diverge. The combination of westerly departures and easterly arrivals is only 21 movements under the current limits scenario and therefore is insufficient to generate a 25 contour to the west of the airport.

### 2.2.3 N60 50 Contour

There are insufficient movements in the current limits scenario to generate an N60 50 contour. The proposed limits N60 50 contour is formed by the overlap of the footprints for the 19 westerly departures, the 25 westerly arrivals, the 5 easterly departures and the 7 easterly arrivals, which between them are sufficient to reach the contour threshold.

#### 2.2.4 Long Term Limits

N60 contours were produced at values of 25 and 50<sup>4</sup> for the night time period (23:00-06:59) based on average summer night movements representing the current and proposed long term limits scenarios. These are shown in the attached Figures A11060-N59-07 and A11060-N59-08 respectively, and the areas of these contours and the number of people and dwellings within them are shown in Table 7 below. Table 8 shows a summary of the average summer night movements in terms of arrivals and departures and runway direction for the current and proposed long term limit scenarios.

Contour Value (N60)	Contour Area (km <sup>2</sup> )		Dwellings		Population	
	Current Long Term	Proposed Long Term	Current Long Term	Proposed Long Term	Current Long Term	Proposed Long Term
25	11.6	20.0	251	1,936	692	5,097
50	-	1.0	-	0	-	0
100	-	-	-	-	-	-
200	-	-	-	-	-	-

**Table 7: Summer night time N60 contour areas, and dwelling and population counts**

Operation (Runway)	Average Summer Night Representative Movements	
	Current Long Term	Proposed Long Term
Westerly Arrivals (Rwy 26)	21	24
Easterly Arrivals (Rwy 08)	6	7
Westerly Departures (Rwy 26)	16	18
Easterly Departures (Rwy 08)	4	5

**Table 8: Average summer night movements<sup>1</sup>**

#### 2.2.5 N60 25 Contour

The night time N60 25 contour shows increases in both area and the number of dwellings and population from the current to the proposed limits scenario. This is due to the proposed limits contour extending further east, over Stevenage, and further west, over portion of south Luton.

---

<sup>4</sup> There are insufficient night time movements to generate an N60 100 or 200 contour under either the current or proposed limits scenarios, or to generate an N60 50 contour under the current limits scenario.

The current limits contour to the east of the airport is based on the overlap of the footprints for the 21 westerly arrivals and 4 easterly departures, to just reach the threshold of 25 movements. This ends before Stevenage where some of the departures turn off the extended runway centreline. The proposed limits scenario has more movements, and the 3 additional westerly arrivals combined with the approximately 50% of easterly departures that turn off the extended runway centreline around 2.5km later are sufficient to exceed the threshold of 25. This causes an extension of the contour towards Stevenage, as the contour only ends when all of the departures have turned off the extended runway centreline.

To the west of the airport the proposed limits contour is formed by the overlap of the footprints for the 18 westerly departures and 7 easterly arrivals. It ends where the arrival and departure routes begin to diverge. The combination of westerly departures and easterly arrivals is only 21 movements under the current limits scenario and therefore is insufficient to generate a 25 contour to the west of the airport.

#### **2.2.6 N60 50 Contour**

There are insufficient movements in the current limits scenario to generate an N60 50 contour. The proposed limits N60 50 contour is formed by the overlap of the footprints for the 18 westerly departures, the 24 westerly arrivals, the 5 easterly departures and the 7 easterly arrivals, which between them are sufficient to reach the contour threshold.

### **3.0 SUMMARY**

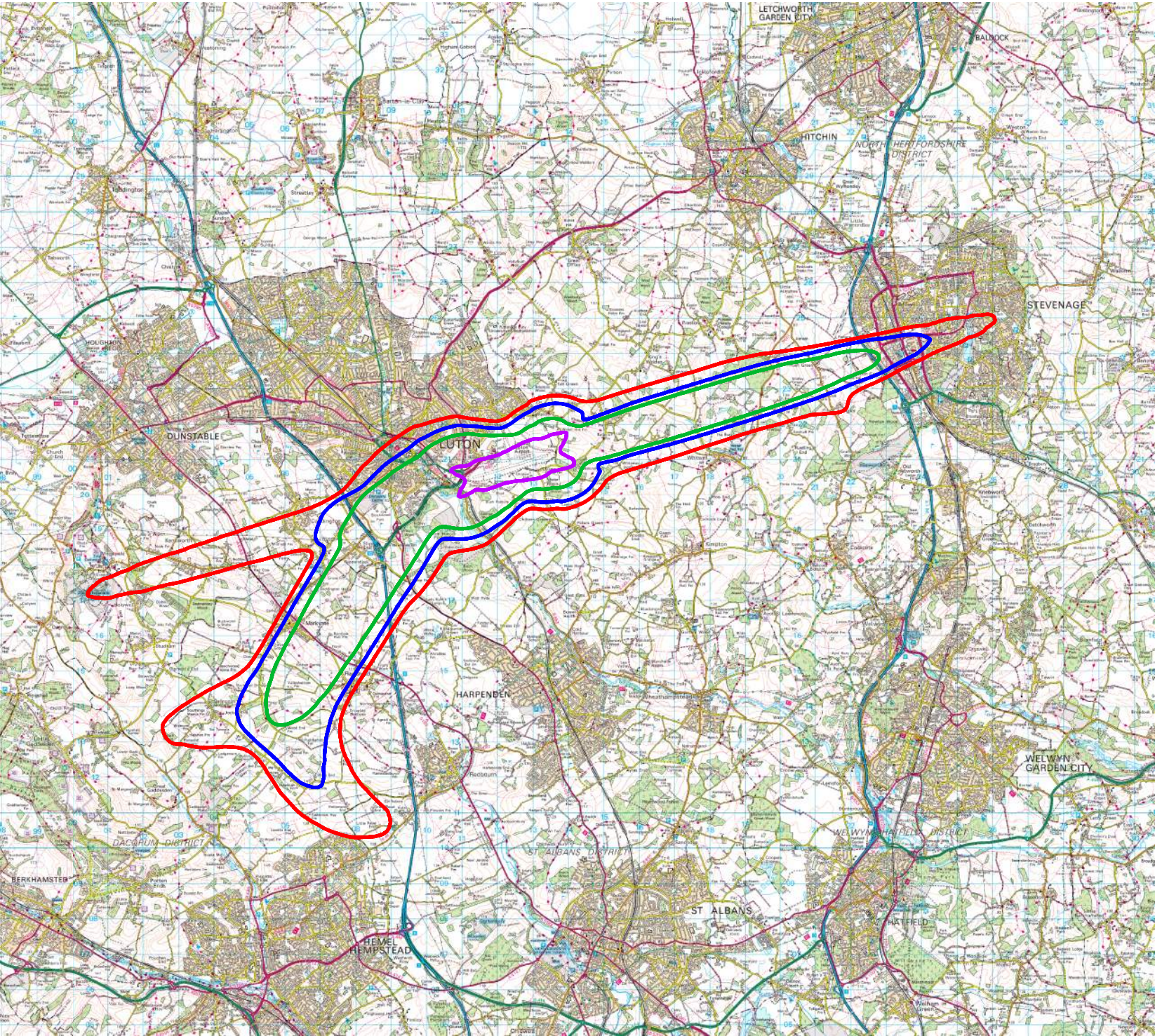
BAP have produced number above contours as supplementary metrics for an environmental statement prepared to accompany an application to vary Luton airport's planning conditions. The contours have been produced for four scenarios, based on the airport's existing short term and long term limits, and the proposed short term and long term limits being applied for. The areas and the number of dwellings and population within the contours have been presented.

Some of the contours based on the proposed limits scenario are noticeably larger than those based on the current limits, despite relatively small increases in the numbers of movements used to produce them. The individual contributions of easterly and westerly arrivals and departures to the contours have been discussed to provide context regarding these increases in contour size.

**Duncan Rogers**  
for Bickerdike Allen Partners

**David Charles**  
Partner





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LEGEND:

- N65, 25
- N65, 50
- N65, 100
- N65, 200


REVISIONS

**Bickerdike  
Allen  
Partners**  
Architecture  
Acoustics  
Technology

121 Salusbury Road, London, NW6 6RG  
Email: mail@bickerdikeallen.com T: 0207 625 4411  
www.bickerdikeallen.com F: 0207 625 0250

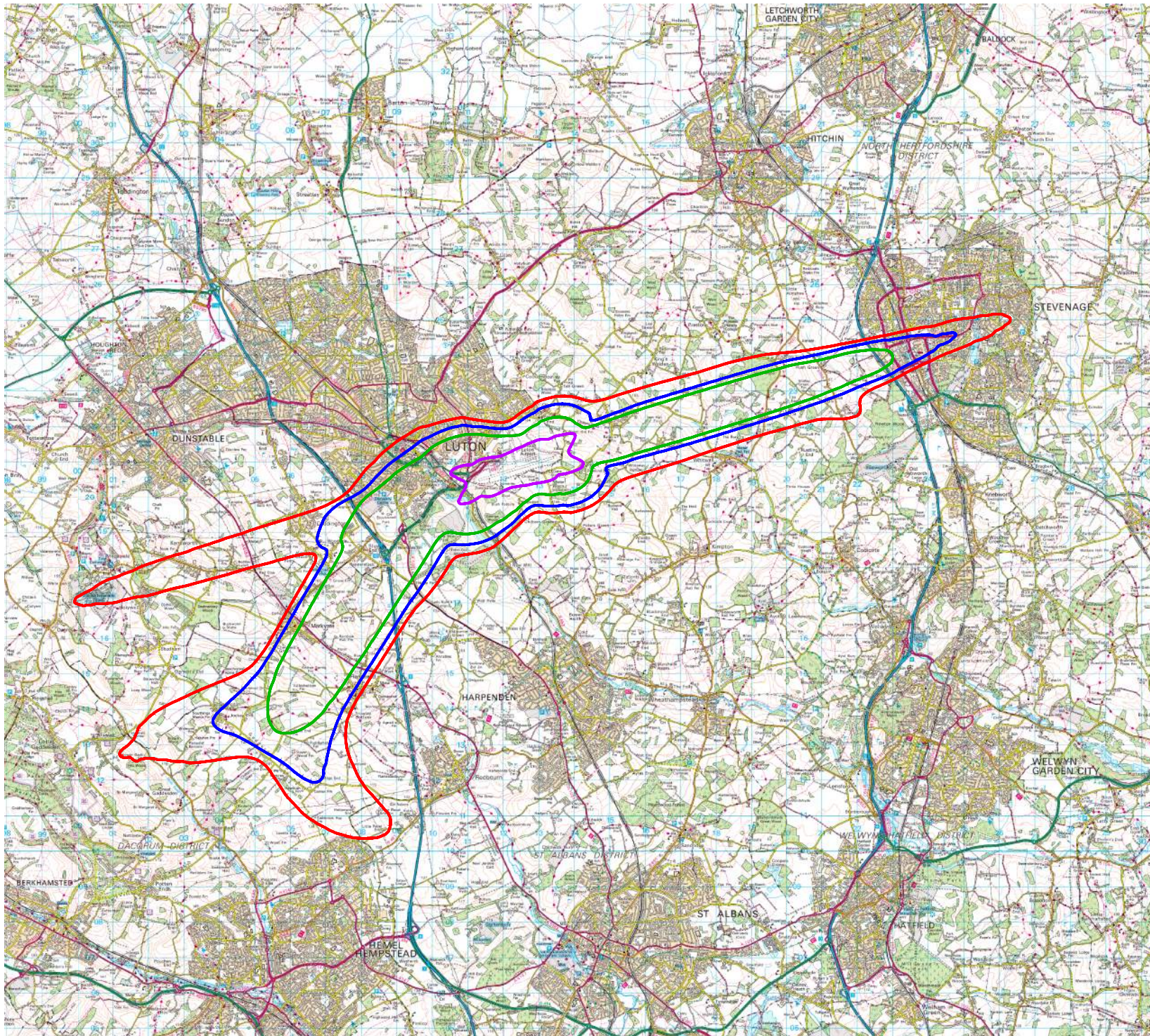


Summer Daytime N65 Noise Contours  
Existing Short Term Contour Area Limit

DRAWN: DR	CHECKED: DC
DATE: December 2020	SCALE: 1:150000@A4

FIGURE No:  
**A11060-N59-01-1.0**





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**LEGEND:**

- N65, 25
- N65, 50
- N65, 100
- N65, 200


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Architecture  
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Technology

121 Salusbury Road, London, NW6 6RG  
Email: [mail@bickerdikeallen.com](mailto:mail@bickerdikeallen.com)  
[www.bickerdikeallen.com](http://www.bickerdikeallen.com)

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F: 0207 625 0250



Summer Daytime N65 Noise Contours  
Proposed Short Term Contour Area Limit

DRAWN: MP

CHECKED: DR

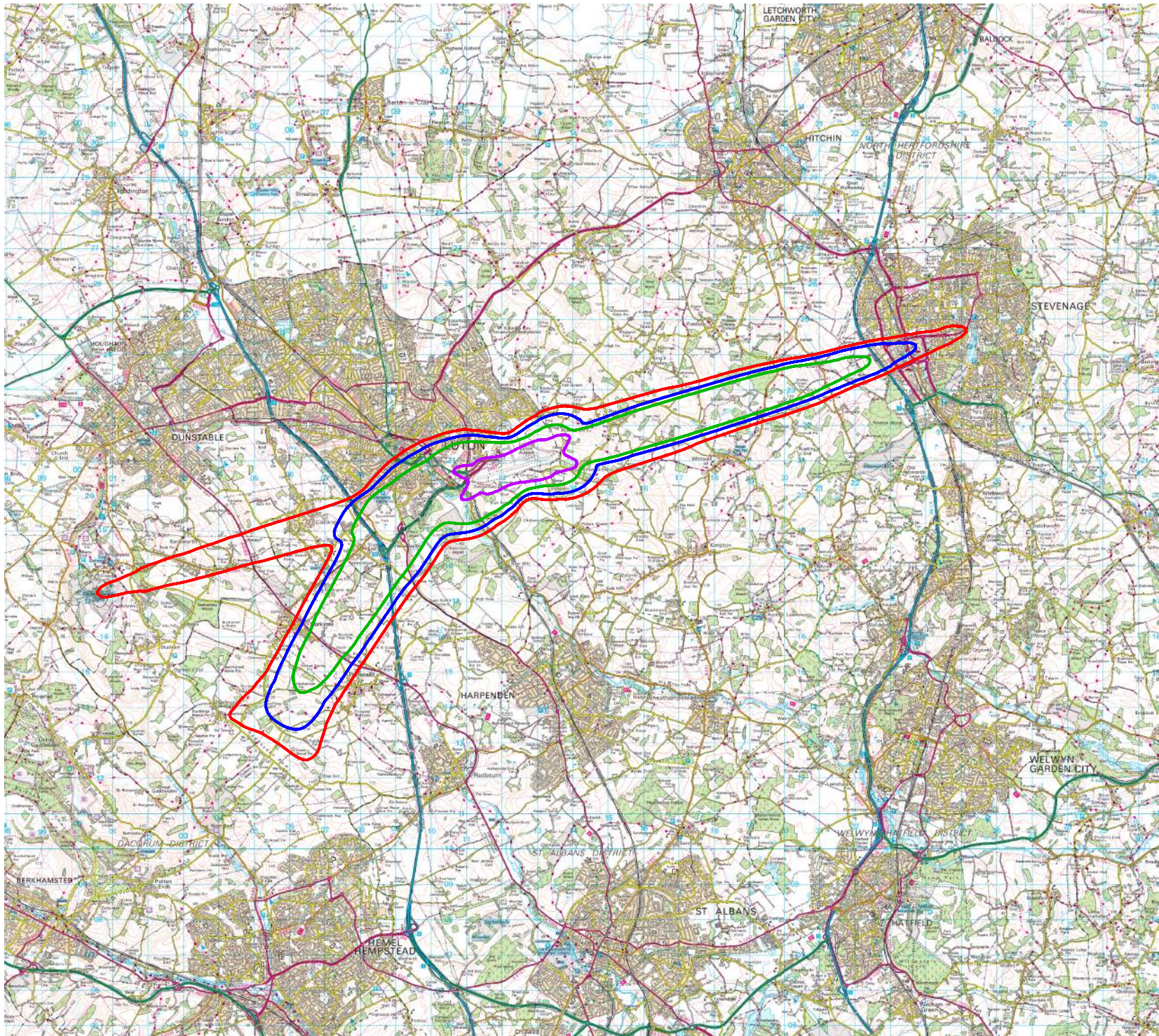
DATE: December 2020

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FIGURE No:

**A11060-N59-02-1.0**





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LEGEND:

- N65, 25
- N65, 50
- N65, 100
- N65, 200


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121 Salusbury Road, London, NW6 6RG  
Email: [mail@bickerdikeallen.com](mailto:mail@bickerdikeallen.com) T: 0207 625 4411  
[www.bickerdikeallen.com](http://www.bickerdikeallen.com) F: 0207 625 0250

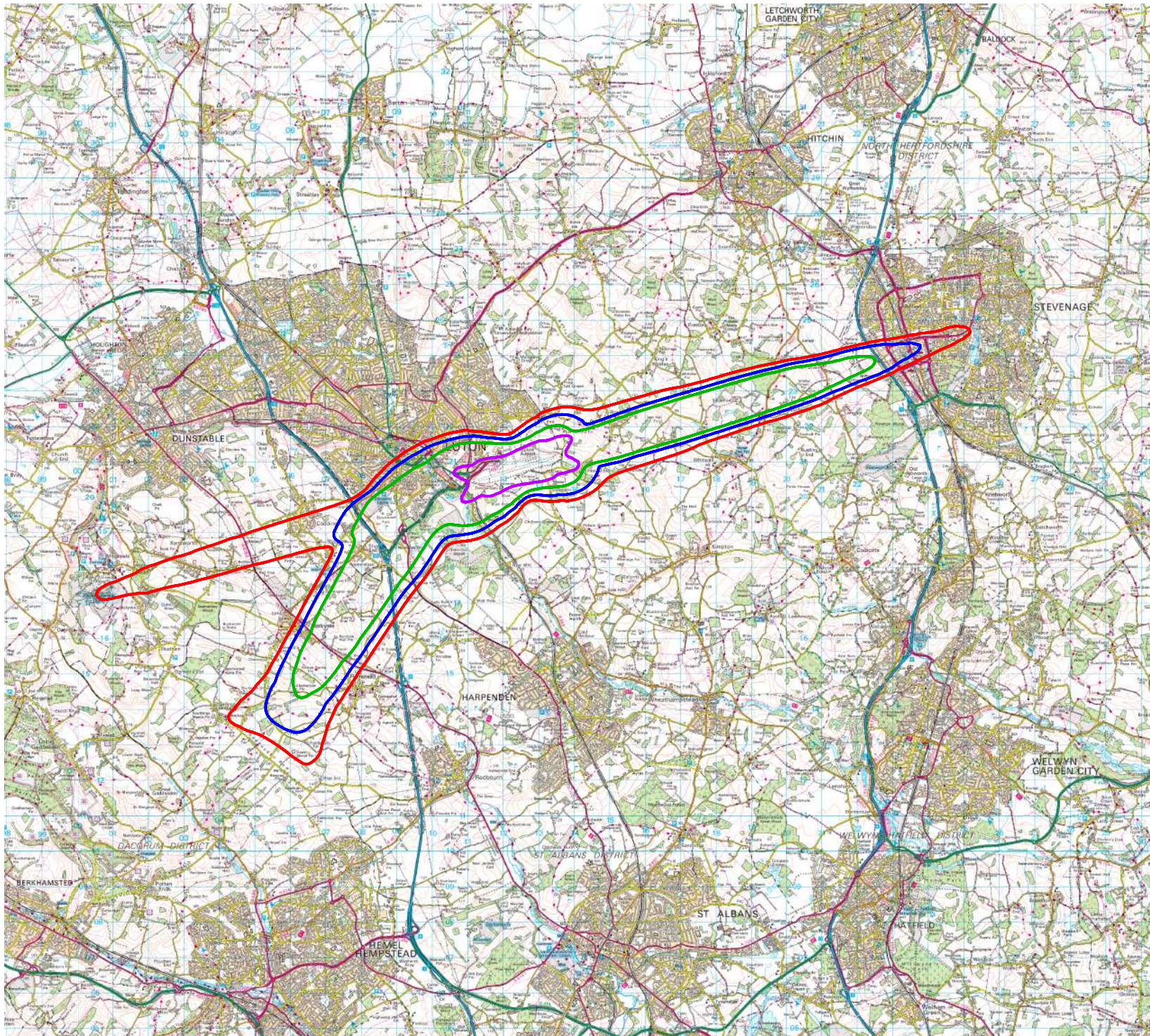


Summer Daytime N65 Noise Contours  
Existing Long Term Contour Area Limit

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DATE: December 2020	SCALE: 1:150000@A4

FIGURE No:  
**A11060-N59-03-1.0**





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**LEGEND:**

- N65, 25
- N65, 50
- N65, 100
- N65, 200


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121 Salusbury Road, London, NW6 6RG  
Email: [mail@bickerdikeallen.com](mailto:mail@bickerdikeallen.com)  
[www.bickerdikeallen.com](http://www.bickerdikeallen.com)

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F: 0207 625 0250



Summer Daytime N65 Noise Contours  
Proposed Long Term Contour Area Limit

DRAWN: MP

CHECKED: DR

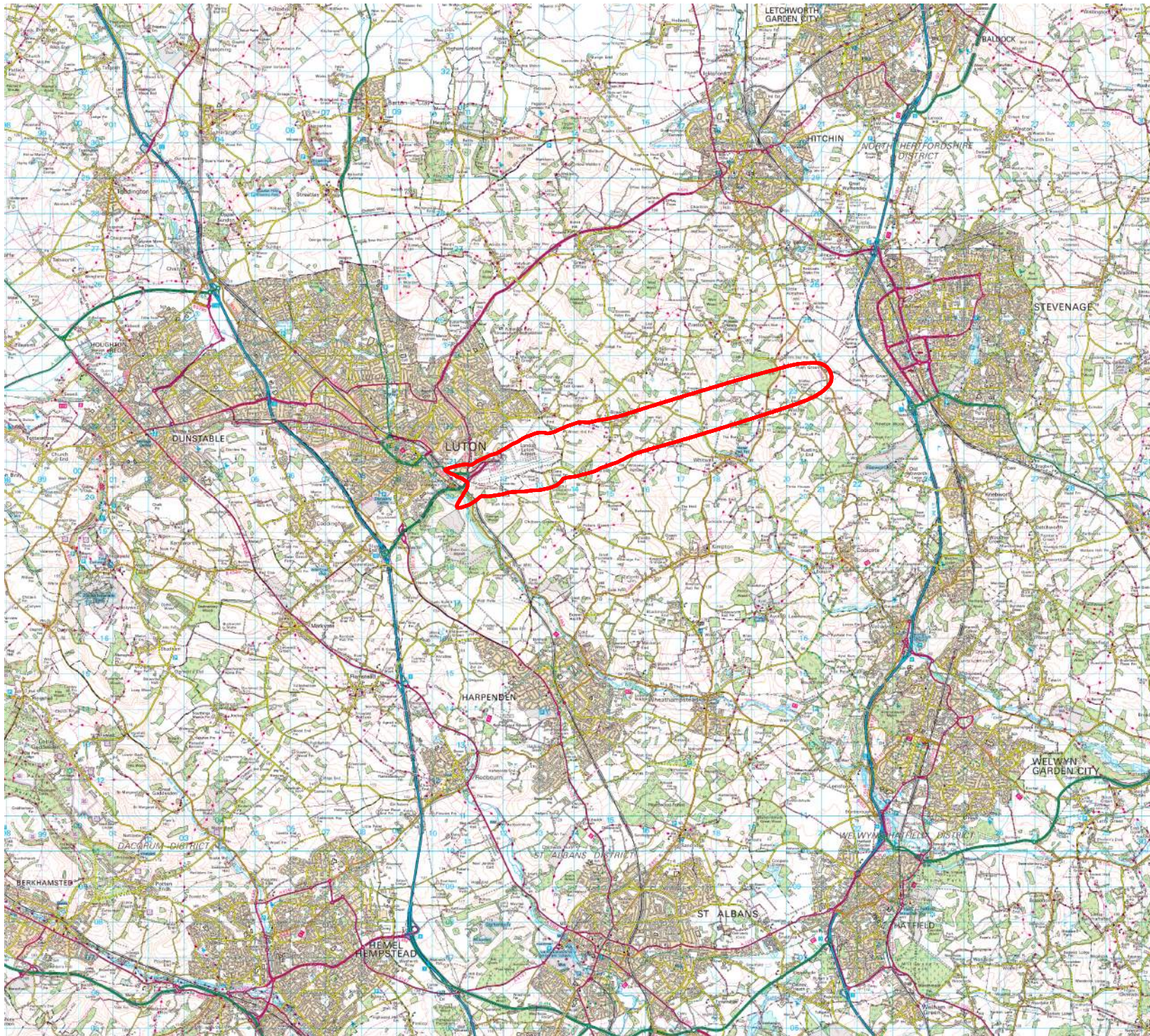
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FIGURE No:

**A11060-N59-04-1.0**





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#### LEGEND:

— N60, 25


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121 Salusbury Road, London, NW6 6RG  
Email: [mail@bickerdikeallen.com](mailto:mail@bickerdikeallen.com)  
[www.bickerdikeallen.com](http://www.bickerdikeallen.com)

T: 0207 625 4411  
F: 0207 625 0250



Summer Night Time N60 Noise Contours  
Existing Short Term Contour Area Limit

DRAWN: DR

CHECKED: DC

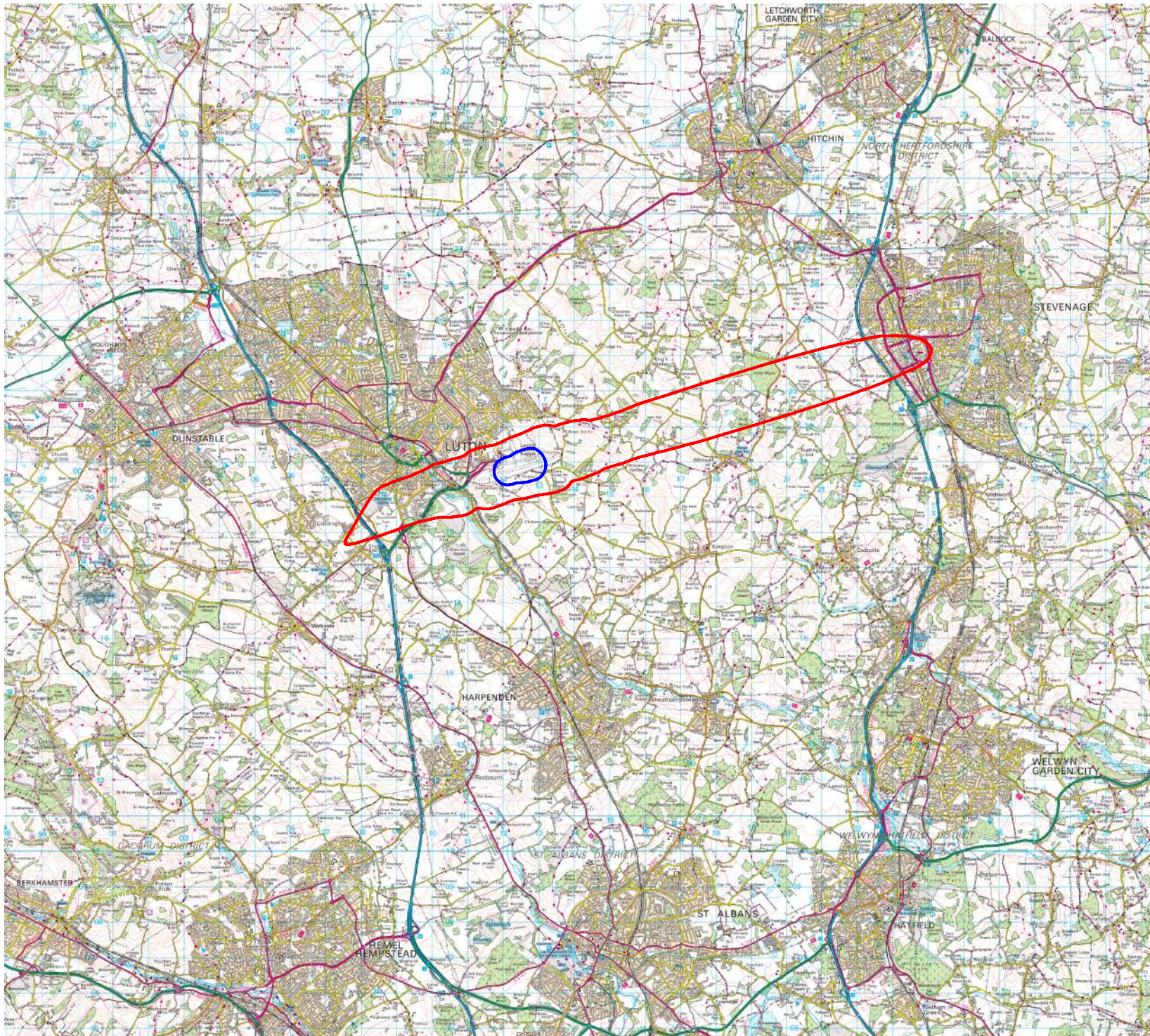
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FIGURE No:

**A11060-N59-05-1.0**





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**LEGEND:**

- N60, 25
- N60, 50


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121 Salusbury Road, London, NW6 6RG  
Email: [mail@bickerdikeallen.com](mailto:mail@bickerdikeallen.com)  
[www.bickerdikeallen.com](http://www.bickerdikeallen.com)

T: 0207 625 4411  
F: 0207 625 0250



Summer Night Time N60 Noise Contours  
Proposed Short Term Contour Area Limit

DRAWN: MP

CHECKED: DR

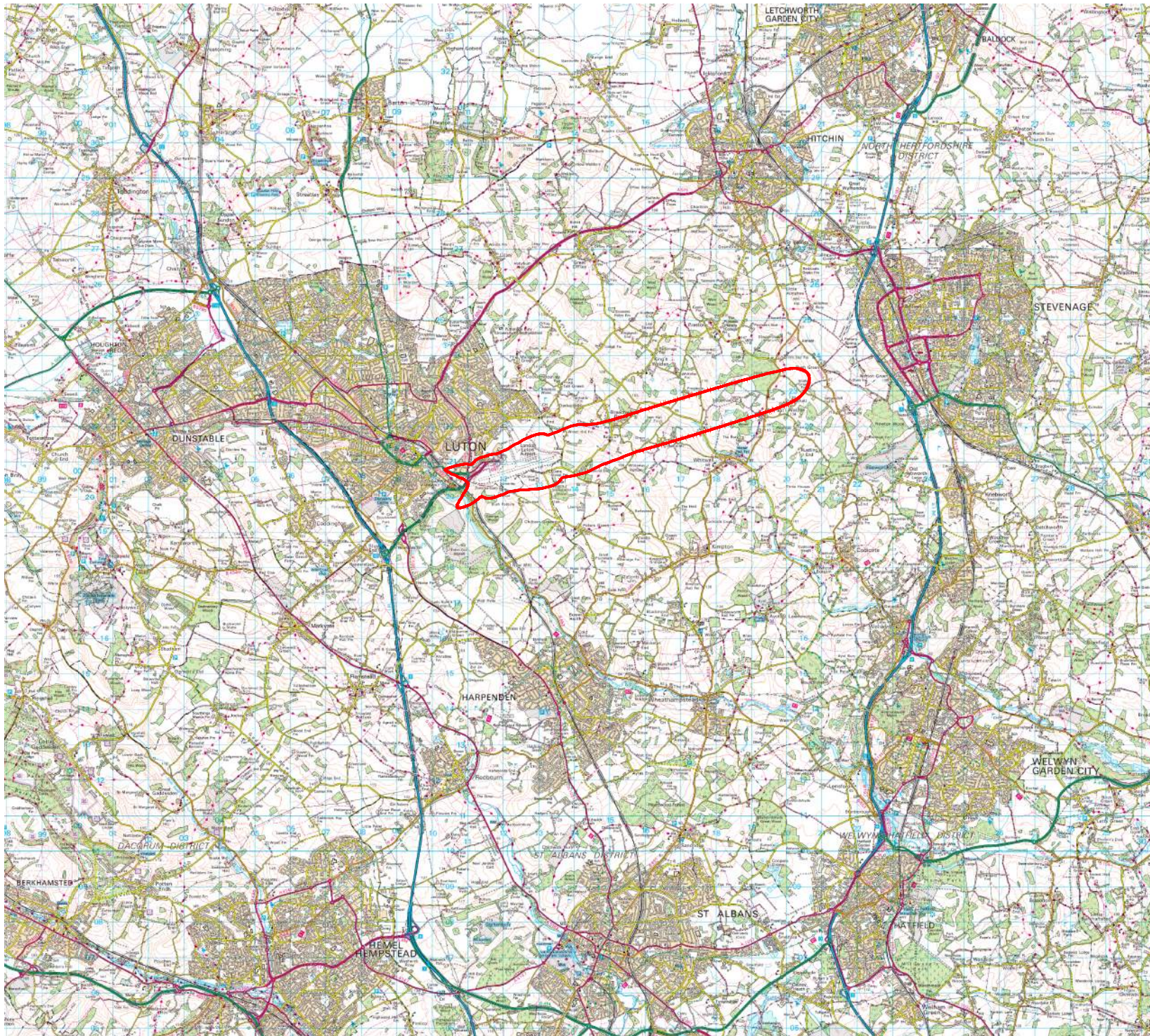
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SCALE: 1:150000@A4

FIGURE No:

**A11060-N59-06-1.0**





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**LEGEND:**

— N60, 25


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Technology

121 Salusbury Road, London, NW6 6RG  
Email: [mail@bickerdikeallen.com](mailto:mail@bickerdikeallen.com)  
[www.bickerdikeallen.com](http://www.bickerdikeallen.com)

T: 0207 625 4411  
F: 0207 625 0250



Summer Night Time N60 Noise Contours  
Existing Long Term Contour Area Limit

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CHECKED: DR

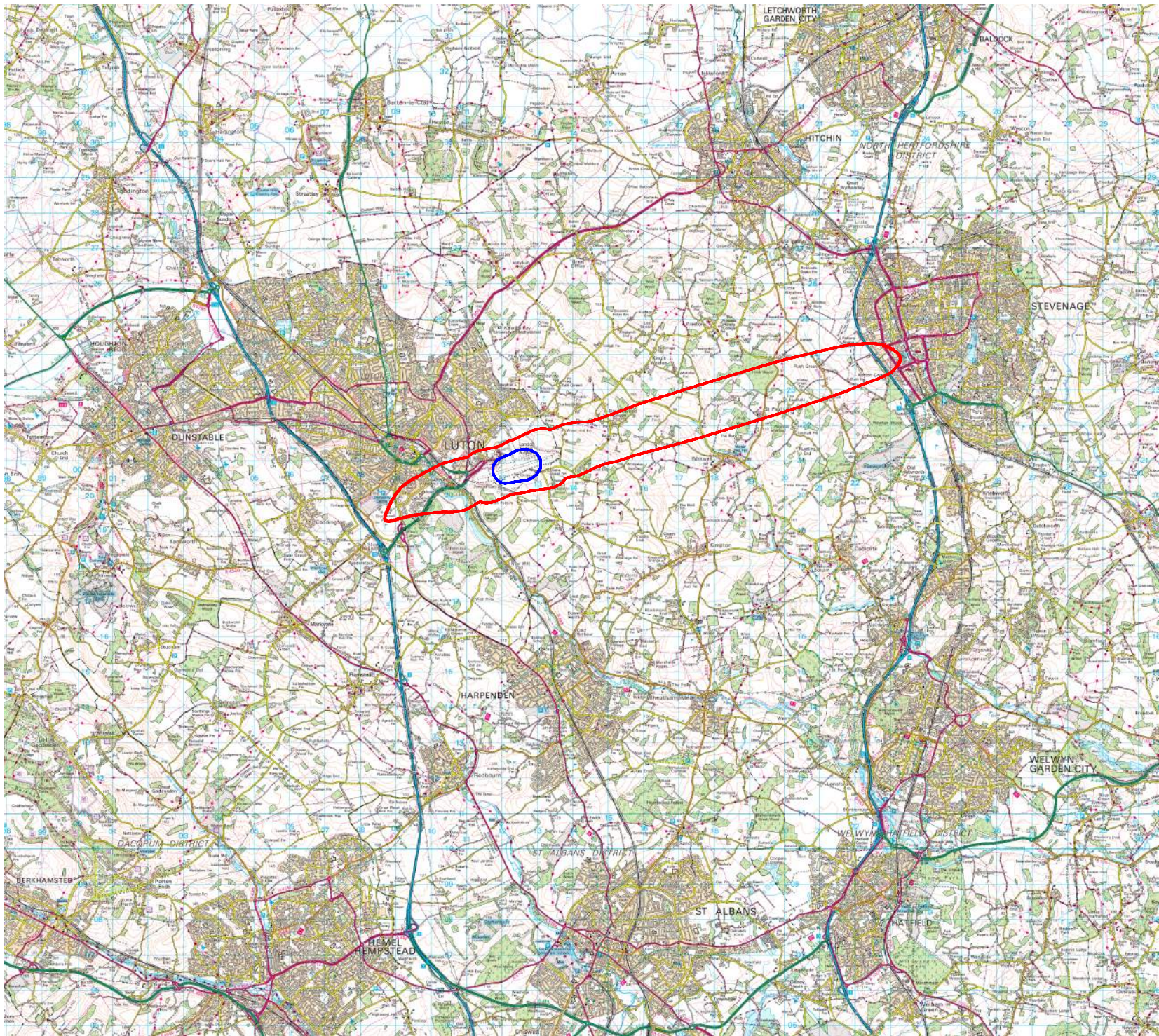
DATE: December 2020

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FIGURE No:

**A11060-N59-07-1.0**





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**LEGEND:**

- N60, 25
- N60, 50


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Partners**  
Architecture  
Acoustics  
Technology

121 Salusbury Road, London, NW6 6RG  
Email: [mail@bickerdikeallen.com](mailto:mail@bickerdikeallen.com) T: 0207 625 4411  
[www.bickerdikeallen.com](http://www.bickerdikeallen.com) F: 0207 625 0250



Summer Night Time N60 Noise Contours  
Proposed Long Term Contour Area Limit

DRAWN: MP CHECKED: DR

DATE: December 2020 SCALE: 1:150000@A4

FIGURE No:  
**A11060-N59-08-1.0**



## Appendix 8H

# Noise - 2031 19mppa Forecast Summer Contour Result

## **LONDON LUTON AIRPORT**

A11060-N61-DR

22 April 2021

### **2031 19mppa Forecast Summer Contours**

#### **1.0 INTRODUCTION**

London Luton Airport Operations Limited (LLAOL) are making a Section 73 application to Luton Borough Council (LBC) to increase their annual passenger limit to 19 million passengers per annum (mppa), and for a temporary increase in their current short-term 57 dB daytime and 48 dB night time noise contour area limits. Bickerdike Allen Partners LLP (BAP) previously produced summer daytime and night time noise contours for 2021, 2024, 2028 and 2032 based on a throughput of 19mppa. The contours were produced using forecasts provided by LLAOL.

LLAOL have requested that BAP produce contours for 2031 based on a throughput of 19mppa, in order to compare the forecast areas of the 57 dB  $L_{Aeq,16h}$  daytime contour and the 48 dB  $L_{Aeq,8h}$  night contour against the current long term limits of 15.2 km<sup>2</sup> and 31.6 km<sup>2</sup> respectively.

This note summarises the methodology used in the production of these noise contours and the resulting contour areas, which are compared with long term contour area limits.

#### **2.0 CONTOUR PRODUCTION**

The 2031 contours have been produced using the same methodology that was used to produce the previous contours prepared for the 19mppa application, which is detailed in note A11060-N57-DR. That is using the INM software (Version 7.0d) to produce the contours with terrain data allowed for and with user-defined profiles for the most common aircraft. The validation is based on measured results in 2018 at the fixed noise monitors. The runway and departure route usage is based on the long term average (2015-2019). The modelled noise levels for the A321neo are based on measured results. The modelled noise levels for the A320ceo are based on the highest measured levels in the previous 5 years (2014-2018).

A forecast of summer movements in 2031 based on 19mppa has been provided by LLAOL. This is based on the earlier forecast for 2032 but with 5% of the night time movements by the key passenger types in the 2032 forecast moved into the daytime. A summary of the resulting movements is shown in Table 1 below.

Aircraft Type	2031 19mppa Summer Movements			
	Daytime		Night Time	
	Arrival	Departure	Arrival	Departure
A300	72	146	112	34
A318	0	0	0	0
A318 NEO	0	0	0	0
A319	0	0	0	0
A319 NEO	0	0	0	0
A320	0	0	0	0
A320 NEO	7,858	8,242	1,380	974
A321	0	0	0	0
A321 NEO	2,774	2,924	647	503
A330	6	6	0	0
B737 MAX	2,408	2,546	465	340
B737-300 / 73C	0	0	0	0
B737-400	0	0	49	54
B737-500	0	0	0	0
B737-600	0	0	0	0
B737-700**	0	0	0	0
B737-800 / 73H**	0	0	0	0
B737-900**	0	0	0	0
B757	0	0	66	63
B767-200	0	0	0	0
B767-300	0	0	0	0
B787-800 / 900	15	15	0	0
Dash 8	0	0	0	0
DO328	0	0	0	0
E135/145	183	183	0	0
E175/195	7	4	0	0
F10062	0	0	0	0
OTHER	3,807	3,793	43	35
<b>Total<sup>[1]</sup></b>	<b>17,129</b>	<b>17,858</b>	<b>2,760</b>	<b>2,004</b>

<sup>[1]</sup> Totals may not match due to rounding

**Table 1: 2031 Summer Movements by Aircraft Type**

### 3.0 NOISE CONTOURS

The areas of the 2031 19mppa night time noise contours are given below in Table 2, and compared with the current and proposed long term contour area limits.

Scenario	Contour Area (km <sup>2</sup> )	
	57 dB L <sub>Aeq,16h</sub> Daytime	48 dB L <sub>Aeq,8h</sub> Night Time
2031 19mppa	14.7	31.5
Current Long Term Limit	15.2	31.6

**Table 2: 2031 19mppa Noise Contour Areas**

The area of the 57 dB daytime contour is 14.7 km<sup>2</sup>, which is less than the current long term limit of 15.2 km<sup>2</sup>. The 48 dB night time contour area is 31.5 km<sup>2</sup>, which is less than the current long term limit of 31.6 km<sup>2</sup>.

Detailed noise results have been provided separately in A11060\_06\_CA001\_12.0 Luton 18&19mppa Data Tables 210422.xlsx.

### 4.0 SUMMARY

BAP have produced 2031 summer noise contours. The areas of the 57 dB daytime contour and the 48 dB night time contour are less than their respective current long term limits.

**Duncan Rogers**  
for Bickerdike Allen Partners

**David Charles**  
Partner

