LONDON LUTON AIRPORT

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Effect of Modelling Methodology on 2012 ES with Development Contours

1.0 INTRODUCTION

The 2012 Environmental Statement (ES), prepared to accompany the application by London Luton Airport Operations Limited (LLAOL) for up to 18 million passenger per annum (mppa), included noise contours for a number of scenarios. The methodology used to produce noise contours for Luton Airport has changed in the years since they were produced to reflect developing information. To quantify the effect of the changes Bickerdike Allen Partners LLP (BAP) have reproduced a set of contours from the ES using the latest methodology.

This note summarises the key differences between the methodology used to produce the 2012 ES contours and the latest methodology, and reports the resulting contour areas under each for the summer with development 18 mppa partial modernisation scenario.

2.0 CONTOUR PRODUCTION

The following sections summarise the key differences between the methodology used to produce the 2012 ES contours and the latest methodology.

2.1 INM

The 2012 ES contours were produced using the Integrated Noise Model (INM) version 7.0c. The latest methodology uses an updated version of the INM software, version 7.0d. The updated version includes some new aircraft types and minor tweaks to certain types, but no changes have been made to any of the key types at Luton. Any effect on contour area from the new software version is expected to be minimal.

2.2 Validation

The 2012 ES contours were produced using a validation which was based on results from the airports noise monitoring terminals (NMTs) in 2011. The latest methodology uses a validation which is based on results from the airport's NMTs in 2018. In general year on year changes in the validation have been small, however most years they have resulted in small reductions in contour area. These reductions in contour area are generally due to gradual reductions in the measured levels of key aircraft types over the years. The average measured arrival and departure noise levels for the two most common aircraft types, the Airbus A319 and the Airbus A320 were all lower in 2018 than in 2011.

2.3 Departure Profiles

The 2012 ES contours used the standard departure profiles in INM for all aircraft types. Since 2015 custom departure profiles have been used for the 3 key aircraft types at Luton airport, the Airbus A319, Airbus A320 and Boeing 737-800. These custom profiles model aircraft as reducing from takeoff to climb thrust earlier. This was based on measurements in south Luton indicating the INM standard profiles resulted in significant over-predictions of the noise in this area, and information on departure procedures received from airlines.

The custom profiles result in contours that are slightly longer, but narrower as the aircraft climb slower, but are producing lower noise levels for some of their climb out. The combined effect of these custom profiles and the other small validation changes in the year they were introduced was a reduction in the area of the 48 dB night time contour of around 6%. The areas of the 51, 54 and 57 dB contours reduced by between 12% and 15% and the area of the 60 and higher value contours reduced by less than 6%.

2.4 Modernisation

At the time of the 2012 ES very little information was available regarding the noise performance of the modernised aircraft types, the Airbus A320neo family and the Boeing 737Max family. A general assumption of -3 dB on both arrival and departure compared to the equivalent current types was therefore used.

The A320neo now operates regularly at Luton airport and therefore measured results from the airport's NMTs are available. These indicate that the A320neo is around 1 dB quieter than the A320ceo on arrival and around 4 dB quieter on departure.

The other modernised aircraft types in the forecast, the Airbus A319neo, the Airbus A321neo and the Boeing 737 MAX 8 have not yet operated in significant numbers at Luton. The modelled noise levels for these aircraft have therefore been based on a comparison of published certification noise levels for the modernised and existing aircraft types. The resulting arrival and departure noise level adjustments compared to the existing types are shown in Table 1. Overall the changes to the modernisation assumptions are expected to result in slightly smaller noise contours.

Replacement Aircraft Type	Current Aircraft Type	Noise Level Adjustment (dB)	
		Arrival	Departure
Airbus A319neo	Airbus A319	-2.6	-5.2
Airbus A321neo	Airbus A321	-1.8	-6.3
Boeing 737 MAX8	Boeing 737-800	-2.2	-3.0

Table 1: Modelled Noise Level Adjustments for Modernised Aircraft Types

2.5 Runway and Departure Route Split

The latest forecast contours use runway and departure route splits based on the average of what occurred in the 5 most recent summer periods 2015-2019. These averages differ slightly from those used to produce the 2012 ES contours. However runway and departure route split generally don't significantly effect contour area, just the distribution of the noise and not the overall amount. The 5 year average runway and departure route usage are shown below in Table 2 and Table 3 respectively, and are compared with those used to produce the contours for the 2012 ES.

Runway	Modelled Runway Usage	
	2012 ES	5 Year Average (2015-2019)
080	18%	22%
260	82%	78%

Table 2: Modelled Runway Usage

Runway	Modelled Departure Route	Modelled Departure Route Usage by Runway	
		2012 ES	5 Year Average (2015-2019)
080	E1	33%	11%
	E2	33%	52%
	E3	33%	38%
260	CPT	33%	38%
	OLY	33%	11%
	DVR	33%	51%

Table 3: Modelled Departure Route Usage

3.0 NOISE CONTOURS

The areas of the summer with development 18 mppa partial modernisation scenario daytime and night time contours produced using the latest methodology are given below in Table 4 and Table 5 respectively, and compared with the equivalent contours from the 2012 ES.

Contour Value (dB $L_{Aeq,16h}$)	Summer 18 mppa partial modernisation Daytime Contour Area (km^2)	
	Latest Methodology	ES Methodology
51	53.4	56.8
54	32.6	34.7
57	18.6	19.5
60	10.0	11.3
63	5.5	6.8
66	2.9	3.7
69	1.6	1.8

Table 4: Summer daytime contour areas

Contour Value (dB $L_{Aeq,8h}$)	Summer 18 mppa partial modernisation Night Time Contour Area (km^2)	
	Latest Methodology	ES Methodology
45	62.1	66.1
48	38.1	40.4
51	22.2	23.1
54	12.5	13.5
57	6.8	8.0
60	3.7	4.6
63	1.9	2.2
66	1.1	1.2

Table 5: Summer night time contour areas

The contours produced using the latest methodology are smaller than those presented in the 2012 ES. This reduction in contour area is largely due to the gradual changes in validation in the intervening years and the inclusion of the custom departure profiles.

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