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Civil Aviation Authority**

ERCD Report 0308

Revised Future Aircraft Noise Exposure Estimates for UK Airports

D P Rhodes

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December 2003*

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Summary

In 2002 the Department for Transport published estimates of future aircraft noise exposure at UK airports as part of its Consultation: The Future Development of Air Transport in the United Kingdom. Since then, the methodology and data used to estimate future noise exposure has been updated to reflect the latest available information. A detailed technical description of the changes made is available separately in ERCD Report 0307. This report presents revised noise exposure estimates using this updated methodology for Heathrow, Gatwick, Stansted, Luton, Birmingham and Manchester airports. Some of the previous scenarios have been updated, whilst noise exposure forecasts for a number of new scenarios are presented.

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1 Introduction

This document describes the results of revised aircraft noise exposure estimates for several UK airports. The work has been undertaken in support of the Department for Transport's (DfT) Consultation: The Future Development of Air Transport in the United Kingdom. These results helped to inform the policies set out in the Government's White Paper on *The Future of Air Transport* (Ref 1).

The methodology used to develop aircraft noise exposure estimates for this report is described in ERCD Report 0307 (Ref 2), which may be read in conjunction with this report.

Annual passenger air traffic movement (PATM) forecasts were provided for each scenario using the DfT's Air Passenger Forecasting Model (Ref 3). This model has been continuously updated and in some cases the forecast PATMs have been revised using the latest version of this model. These forecasts are referred to in this report as 'revised forecasts'. Where the original PATM forecast is unchanged, it is referred to as the original forecast. In some cases, 'low' and 'high' forecasts have been used in addition to the 'central' growth forecasts used previously.

Before noise exposure estimates can be calculated for each scenario, the supplied ATM forecast must be first converted into specific aircraft types or variants. This process is described in detail in Ref 2 and has been updated since results were published in the regional consultation documents.

Once the PATM forecast has been converted into specific aircraft types, information is required to describe the noise performance characteristics of each type. For existing aircraft types, radar data from around the relevant airport is used to generate aircraft performance information and noise measurements collected around the London airports are used to define each aircraft's noise performance characteristics. As with the aircraft type assignment process, the aircraft noise performance data *has* been updated since results were published for the regional consultations. For existing aircraft types, noise performance information is based on year 2002 measurements obtained from around the London airports, the latest available, compared with year 2000 data used previously. Noise performance estimates for future/projected aircraft types have been also been updated using the latest available information. The detailed changes are described in Ref 2.

Once the requisite aircraft type forecast and noise characteristics are defined, the amount of noise likely to be experienced by those living near a given airport may be calculated. The noise exposure measure is the Equivalent Continuous Sound Level, L_{eq} (16-hour) in dBA. The background to the use of this index is explained in DORA Report 9023 (Ref 4). The magnitude and extent of the aircraft noise around these airports are depicted on maps by contours of constant aircraft noise index (L_{eq}) values. The contours are determined by an empirically validated computer model, which calculates the emissions and propagation of noise from arriving and departing air traffic. The method by which noise maps, or contours of L_{eq} , are prepared using the ANCON Noise Model is described in more detail in Ref 5, 6 & 7. Application of the ANCON Noise Model for forecasting is covered in Ref 2.

Section 2 presents results for new and revised scenarios for Heathrow airport. Many of the scenarios were focused on air quality modelling.

Section 3 presents results for revised scenarios for Gatwick airport. All the forecasts remain unchanged.

Section 4 presents results for Stansted airport. First, corrected results are presented for the scenario considering one additional runway in 2015 and 2030. The noise results published in the south-east consultation document were not calculated using the most up-to-date set of forecasts for air transport movements available at the time, although the up-to-date ATM forecasts themselves were correctly quoted in the consultation document. The published noise results for 2015 were based on a lower number of ATMs than the figure quoted in the consultation document and the published noise results for 2030 were based on a higher number of ATMs than the figure quoted. This issue is discussed in detail in section 4.1. It should be noted, however, that the forecasts analysed in section 4.1 were 'seeded' forecasts, as described in the consultation document. DfT has asked for it to be noted in this report that the conclusions reached and set out in the Government's White Paper were informed by the revised forecasts described in section 4.4 of this report, rather than those described in section 4.1. The revised forecasts relied on by the Government assume an unseeded traffic mix, with a lower number of movements and generally smaller aircraft types. For both 2015 and 2030, the revised 'unseeded' forecasts result in smaller contour areas and population counts than the previously published results.

Section 5 presents revised results for Luton airport including one new scenario. Section 6 presents results for a new scenario at Birmingham airport. Section 7 presents results for new scenarios at Manchester airport. Finally, Section 8 presents the conclusions.

The population estimates shown in this report are based on 1991 Census data as updated by CACI Ltd in 1999.

This document contains small scale (A4) diagrams of the L_{eq} contours for scenarios updated since publication of the regional consultation documents.

2 London Heathrow

Several scenarios have been analysed for London Heathrow. These include scenarios with updated ATM forecasts, but also new scenarios not previously considered. The scenarios have been grouped as follows:

- Revised central/mid forecast;
- Low/high forecasts;
- Additional sensitivity scenarios primarily focused on air quality issues, but for which corresponding noise contours have been produced.

For each scenario the aircraft type or fleet mix and noise performance assumptions have been updated as described in section 1. A brief description is provided, along with tables containing estimates of the noise contour areas and the populations and households enclosed. Associated diagrams are included depicting the noise exposure contours. Where a scenario is the same as before, the updated results are compared against the previously published results.

2.1 Central/mid forecasts

2.1.1 2015 480,000 PATMs: max use of existing runways (original ATM forecast)

This scenario and ATM forecast is unchanged from the one analysed previously. It assumes Heathrow will grow within current planning consents to 480,000 PATMs and 77mppa¹.

It is assumed that segregated-mode operation with alternation and the Cranford Agreement are retained.

Tables 2.1(a) and 2.1(b) show the contour area, population and household estimates, compared with the previously published results. The noise exposure contours are shown diagrammatically in **Figure 2.1**.

Table 2.1(a): London Heathrow Year 2015 — contour areas with maximum use of existing runway (original ATM forecast 480,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, original fleet mix/n.c. [†]	Original forecast, revised fleet mix/n.c.	Change
>54	194.7	168.1	-26.6
>57	110.2	95.8	-14.4
>60	63.9	54.5	-9.4
>63	39.2	33.7	-5.5
>66	24.5	19.9	-4.6
>69	13.3	9.8	-3.5
>72	6.8	5.0	-1.8

[†] Note: revised fleet mix/n.c. refers to the updated airport fleet mix and noise characteristics described in Ref 2.

Table 2.1(b): London Heathrow Year 2015 — population and household counts with maximum use of existing runway (original ATM forecast 480,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	498.6	436.9	-61.7	215.0	188.4	-26.6
>57	226.0	195.5	-30.5	94.8	81.9	-12.9
>60	103.1	88.2	-14.9	41.3	35.2	-6.1
>63	53.4	41.0	-12.4	21.2	16.2	-5.0
>66	19.3	15.4	-3.9	7.6	6.0	-1.6
>69	5.0	3.3	-1.7	2.0	1.3	-0.7
>72	1.6	0.2	-1.4	0.6	0.1	-0.5

The updated fleet mix and revised noise performance estimates result in the noise contour areas decreasing by around 13 per cent. This is mainly due to changing

¹ Para. 7.9 of the South-East consultation document on The Future Development of Air Transport in the UK, notes that the DfT's passenger forecast for maximum use in 2015 is lower than forecasts produced by BAA and CAA for the recent price-cap review of BAA's London airports. By 2020 DfT's passenger forecast is 86mppa.

assumptions with regard to very large aircraft, e.g. forecast numbers of Airbus A340, Boeing 747-400 and Boeing 777 aircraft types. The associated population and household counts decrease in line with the smaller estimated contour areas.

2.1.2 2015 655,000 PATMs: with a short third runway (original ATM forecast)

This scenario assumes the additional of a short (2,000m) runway to the north of the airport. This has been referred to as option E4 in previous supporting technical documentation. With the additional short runway, forecast throughput is 655,000 PATMs and 116mppa. As before it is assumed that segregated-mode operation with alternation and the Cranford agreement are retained for the two main runways. **Tables 2.2(a)** and **2.2(b)** show updated contour areas, populations and household counts. The noise exposure contours are shown in **Figure 2.2**.

The ATM forecast is unchanged from that used previously. Revising the aircraft type mix and noise performance assumptions reduces contour areas by approximately 9 per cent. The reduction is smaller for this scenario compared with the maximum use scenario because much of the additional growth is forecast in smaller aircraft types. The revised noise performance and aircraft fleet mix changes have a greater effect on larger aircraft and thus have a less significant effect in the scenario.

Table 2.2(a): London Heathrow Year 2015 — contour areas with short third runway (original ATM forecast 655,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	276.2	250.5	-25.7
>57	155.7	141.3	-14.4
>60	95.8	86.0	-9.8
>63	57.6	51.2	-6.4
>66	33.4	28.4	-5.0
>69	19.2	15.1	-4.1
>72	9.5	6.8	-2.7

Table 2.2(b): London Heathrow Year 2015 — population and household counts with short third runway (original ATM forecast 655,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	747.7	692.0	-55.7	324.6	299.8	-24.8
>57	333.3	295.1	-38.2	138.6	122.6	-16.0
>60	162.4	138.0	-24.4	66.2	55.5	-10.7
>63	75.7	64.4	-11.3	30.4	25.8	-4.6
>66	27.3	21.3	-6.0	11.0	8.5	-2.5
>69	8.6	5.5	-3.1	3.4	2.2	-1.2
>72	2.3	0.5	-1.8	0.9	0.2	-0.7

2.1.3 2015 655,000 PATMs: with a short third runway, revised ATM forecast

For this scenario, the ATM forecast from the DfT's Air Passenger Forecasting Model has been revised, in addition to updated aircraft fleet mix and noise performance data. As before it is assumed that segregated-mode operation with alternation and the Cranford agreement are retained for the two main runways.

Table 2.3(a) shows a slight increase in contour area across all contour levels for the revised ATM forecast. Although the total number of movements remains unchanged, there has been a small shift to larger aircraft, explaining the increase in contour areas. Associated passenger and household counts are shown in **Table 2.3(b)**. These also show small increases relative to the original ATM forecast. The contours are shown in **Figure 2.3**.

Table 2.3(a): London Heathrow Year 2015 — contour areas with short third runway (revised ATM forecast 655,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, revised fleet mix/n.c.	Revised forecast, revised fleet mix/n.c.	Change
>54	250.5	254.0	+3.5
>57	141.3	143.3	+2.0
>60	86.0	86.3	+0.3
>63	51.2	52.6	+1.4
>66	28.4	29.0	+0.6
>69	15.1	15.2	+0.1
>72	6.8	7.3	+0.5

Table 2.3(b): London Heathrow Year 2015 — populations and household counts with short third runway (revised ATM forecast 655,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, revised fleet mix/n.c.	Revised forecast, revised fleet mix/n.c.	Change	Original forecast, revised fleet mix/n.c.	Revised forecast, revised fleet mix/n.c.	Change
>54	692.0	710.6	+18.6	299.8	308.8	+9.0
>57	295.1	304.9	+9.8	122.6	126.6	+4.0
>60	138.0	141.7	+3.7	55.5	57.0	+1.5
>63	64.4	66.9	+2.5	25.8	26.8	+1.0
>66	21.3	22.0	+0.7	8.5	8.7	+0.2
>69	5.5	5.7	+0.2	2.2	2.2	-
>72	0.5	0.6	+0.1	0.2	0.3	+0.1

2.2 Low/high forecasts

Some consultation responses raised concerns over aircraft crossing the present north runway (09L-27R) in order to reach a possible third runway. Allowance had been made in previous ATM forecast for the loss of movements and hence capacity due to crossings, but that number of lost movements may have been underestimated.

To address these concerns, a lower ATM forecast has been considered and the associated noise exposure estimated. As a further sensitivity test a higher ATM forecast, assuming no crossings, i.e. assuming the provision of stands north of runway 09L-27R has also been analysed. As before, for both scenarios it has been assumed that segregated-mode operation with alternation is retained for the two main runways.

2.2.1 2015 600,000 PATMs: with a short third runway (revised low ATM forecast)

Under this scenario ATMs for the two main runways have been reduced, while assuming the same number of movements on the short third runway (approx. 220,000 PATMs). As before it is assumed that segregated-mode operation with alternation and the Cranford agreement are retained for the two main runways.

Reducing the total number of ATMs predictably reduces overall noise impact and contour areas reduce at all contour levels (Table 2.4(a)). The 57dBA L_{eq} contour decreases by 13.4km² or 9 per cent, the corresponding population reduction (Table 2.4(b)) is just under 47,000 (15 per cent). The contours are shown in Figure 2.4.

Table 2.4(a): London Heathrow Year 2015 — contour areas with short third runway (low ATM forecast 600,000 PATMs)

L_{eq} (dBA)	Area (km ²)		
	Revised forecast, 655,000 PATMs, revised fleet mix/n.c.	Revised forecast, 600,000 PATMs, revised fleet mix/n.c.	Change
>54	254.0	225.4	-28.6
>57	143.3	129.9	-13.4
>60	86.3	79.1	-7.2
>63	52.6	47.1	-5.5
>66	29.0	25.8	-3.2
>69	15.2	13.2	-2.0
>72	7.3	6.4	-0.9

Table 2.4(b): London Heathrow Year 2015 — population and household counts with short third runway (low ATM forecast 600,000 PATMs)

L_{eq} (dBA)	Population (000s)			Household (000s)		
	Revised forecast, 655,000 PATMs, revised fleet mix/n.c.	Revised forecast, 600,000 PATMs, revised fleet mix/n.c.	Change	Revised forecast, 655,000 PATMs, revised fleet mix/n.c.	Revised forecast, 600,000 PATMs, revised fleet mix/n.c.	Change
>54	710.6	610.9	-99.7	308.8	263.1	-45.7
>57	304.9	258.1	-46.8	126.6	107.0	-19.6
>60	141.7	123.8	-17.9	57.0	49.6	-7.4
>63	66.9	55.8	-11.1	26.8	22.3	-4.5
>66	22.0	17.8	-4.2	8.7	7.0	-1.7
>69	5.7	4.3	-1.4	2.2	1.7	-0.5
>72	0.6	0.4	-0.2	0.3	0.2	-0.1

2.2.2 2015 700,000 PATMs: with a short third runway, no crossings, stands north of runway 09L-27R

A higher ATM forecast was also considered that assumes no crossing of the existing north runway (09L-27R). This would require the provision of stands north of runway 09L-27R. Movements off the short third runway remain unchanged at approx. 220,000 PATMs. As before, it is assumed that segregated-mode operation with alternation is retained for the two main runways. Noise contour areas are shown in **Table 2.5(a)** and population/household counts in **Table 2.5(b)**. The contours are shown diagrammatically in **Figure 2.5**.

Predictably, both contour areas and associated population counts increase. The 57dBA L_{eq} contour area increases by 12.4km² or 9 per cent, the population within this contour increasing by 29,200 or 10 per cent.

Table 2.5(a): London Heathrow Year 2015 — contour areas with short third runway (high ATM forecast 700,000 PATMs)

L_{eq} (dBA)	Area (km ²)		
	Revised forecast, 655,000 PATMs, revised fleet mix/n.c.	Revised forecast, 700,000 PATMs, revised fleet mix/n.c.	Change
>54	254.0	280.8	+26.8
>57	143.3	155.7	+12.4
>60	86.3	95.1	+8.8
>63	52.6	56.8	+4.2
>66	29.0	31.8	+2.8
>69	15.2	17.4	+2.2
>72	7.3	8.6	+1.3

Table 2.5(b): London Heathrow Year 2015 — population and household counts with short third runway (high ATM forecast 700,000 PATMs)

L_{eq} (dBA)	Population (000s)			Household (000s)		
	Revised forecast, 655,000 PATMs, revised fleet mix/n.c.	Revised forecast, 700,000 PATMs, revised fleet mix/n.c.	Change	Revised forecast, 655,000 PATMs, revised fleet mix/n.c.	Revised forecast, 700,000 PATMs, revised fleet mix/n.c.	Change
>54	710.6	811.2	+100.6	308.8	354.3	+45.5
>57	304.9	334.1	+29.2	126.6	138.6	+12.0
>60	141.7	163.5	+21.8	57.0	66.7	+9.7
>63	66.9	74.3	+7.4	26.8	29.7	+2.9
>66	22.0	26.2	+4.2	8.7	10.5	+1.8
>69	5.7	7.3	+1.6	2.2	2.9	+0.7
>72	0.6	1.4	+0.8	0.3	0.6	+0.3

2.3 Additional scenarios

Some additional scenarios have been considered. Many of the scenarios were focused on mitigating emissions impacts. However, to maintain consistent analysis across noise and emissions work, corresponding noise exposure estimates have been produced. In many cases the noise impacts are very similar.

2.3.1 2010 515,000 PATMs: mixed-mode with existing runways

This scenario assumes mixed-mode has been implemented, with the consequential loss of runway alternation and of the Cranford Agreement. The supplied ATM forecast assumes that two-thirds of departures would operate from the southern runway (09R-27L) and a third from the northern runway (09L-27R). For arrivals, two-thirds operate to the northern runway and one-third to the southern runway. This analysis assumes that the current arrangement of noise preferential routes remains unchanged.

Table 2.6 shows the contour area, population and household counts. The contours are also depicted diagrammatically in **Figure 2.6**.

Table 2.6: London Heathrow Year 2010 — contour areas and population/household counts: mixed-mode with existing runways (revised ATM forecast 515,000 PATMs)

L_{eq} (dBA)	Area (km ²)	Population (000s)	Households (000s)
>54	200.3	560.9	245.2
>57	111.7	226.0	94.9
>60	63.3	107.0	43.3
>63	38.6	54.3	21.6
>66	23.2	20.3	7.9
>69	12.1	7.0	2.6
>72	6.2	1.8	0.7

2.3.2 2015 550,000 PATMs: with a short third runway, existing southern runway used for departures only, existing northern runway used for arrivals only

This scenario is similar to that presented in section 2.1.3, but the total number of movements has decreased by reducing the number of movements on the two main runways. Movements off the short third runway remain unchanged at approx. 220,000 PATMs. As before the analysis assumes that segregated mode operation is retained on the two main runways, but there is a loss of alternation with departures off the southern runway only and arrivals only to the existing northern runway.

Tables 2.7(a) and 2.7(b) show the contour areas and population/household counts respectively. The contours are also show diagrammatically in **Figure 2.7**.

Table 2.7(a): London Heathrow Year 2015 — contour areas with a short third runway, existing southern runway used for departures only, existing northern runway used for arrivals only (revised ATM forecast 550,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Revised forecast, 655,000 PATMs, revised fleet mix/n.c.	Revised forecast, 550,000 PATMs, revised fleet mix/n.c.	Change
>54	254.0	212.5	-41.5
>57	143.3	124.2	-19.1
>60	86.3	73.3	-13.0
>63	52.6	39.8	-12.8
>66	29.0	22.0	-7.0
>69	15.2	11.7	-3.5
>72	7.3	6.1	-1.2

Table 2.7(b): London Heathrow Year 2015 — population and household counts with a short third runway, existing southern runway used for departures only, existing northern runway used for arrivals only (revised ATM forecast 550,000 PATMs)

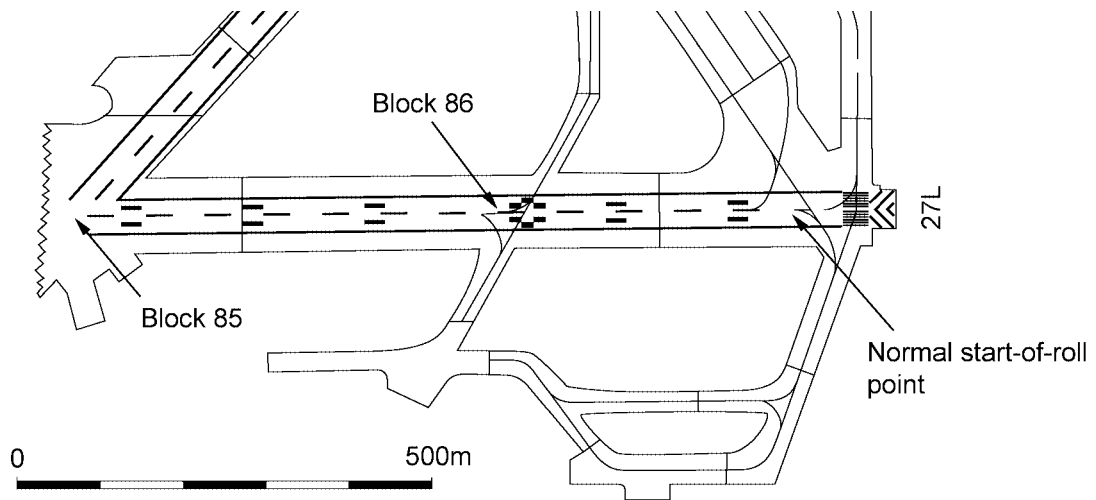
L _{eq} (dBA)	Population (000s)			Household (000s)		
	Revised forecast, 655,000 PATMs, revised fleet mix/n.c.	Revised forecast, 550,000 PATMs, revised fleet mix/n.c.	Change	Revised forecast, 655,000 PATMs, revised fleet mix/n.c.	Revised forecast, 550,000 PATMs, revised fleet mix/n.c.	Change
>54	710.6	571.2	-139.4	308.8	247.9	-60.9
>57	304.9	220.2	-84.7	126.6	90.6	-36.0
>60	141.7	104.0	-37.7	57.0	41.9	-15.1
>63	66.9	44.7	-22.2	26.8	17.8	-9.0
>66	22.0	17.5	-4.5	8.7	6.8	-1.9
>69	5.7	7.1	+1.4	2.2	2.6	+0.4
>72	0.6	1.9	+1.3	0.3	0.7	+0.4

2.3.3 *2015 550,000 PATMs: with a short third runway, existing southern runway used for departures only including a displaced start of takeoff roll on 27L for smaller aircraft types, existing northern runway used for arrivals only*

This scenario is the same as in section 2.3.2, except that for some departures the start of takeoff roll for some departures is displaced inwards from the current nominal start of roll. Aircraft up to and including Class 3² were assumed to begin their takeoff roll 1,000m (3,300ft) (Block 85) from the nominal end of 27L. Larger aircraft including the Airbus A330, A340, Boeing 767-400 and medium range Boeing 777 variants were assumed to begin their takeoff roll 440m (1,440ft) (Block 86) from the nominal end of 27L. For aircraft such as the Airbus A340-500/600, A380, stretched/long-range Boeing 777 variants and the Boeing 747-400 it was assumed

² Passenger ATM forecasts were defined in terms of aircraft seat size classes. Classes 1 to 3 included aircraft up to 250 seats. Class 4 aircraft were defined as having 251-350 seats, and Classes 5 and 6 include aircraft with more than 350 seats. Details of specific aircraft variants as function of seat class are given in Ref 2.

they continued to start their takeoff roll at the normal start-of-roll point on runway 27L, *i.e.* no displacement.



Although, displacing the start of takeoff roll point inward will reduce noise in regions just to the east of the 27L threshold, aircraft will either lift off further down the runway or use increased thrust to maintain a similar rotate point. Since this scenario was primarily aimed at reducing NO_x emissions, aircraft thrust levels were assumed to be unchanged and thus aircraft would lift off further down the runway and thus aircraft noise would increase slightly to the west of the southern runway (noting the normal dominance of westerly operations). This is seen in the contour area results (**Table 2.8(a)**), which show a small increase in contour areas at lower contour levels.

Population and household counts are shown in **Table 2.8(b)**. Compared to the scenario without start of takeoff roll displacement the changes are small, and vary from either positive or negative depending on contour level due to the specific population distributions around the airport. Contours are shown diagrammatically in **Figure 2.8**.

Table 2.8(a): London Heathrow Year 2015 — contour areas with a short third runway, existing southern runway used for departures only, including a displaced start of roll on 27L for smaller types, existing northern runway used for arrivals only (revised ATM forecast 550,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	No displacement	With displacement	Change
>54	212.5	214.6	+2.1
>57	124.2	125.2	+1.0
>60	73.3	73.7	+0.4
>63	39.8	39.9	+0.1
>66	22.0	22.0	-
>69	11.7	11.7	-
>72	6.1	6.2	+0.1

Table 2.8(b): London Heathrow Year 2015 — population and household counts with a short third runway, existing southern runway used for departures only, including a displaced start of roll on 27L for smaller types, existing northern runway used for arrivals only (revised ATM forecast 550,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	No displacement	With displacement	Change	No displacement	With displacement	Change
>54	571.2	572.2	+1.0	247.9	248.4	+0.5
>57	220.2	219.7	-0.5	90.6	90.4	-0.2
>60	104.0	102.8	-1.2	41.9	41.4	-0.5
>63	44.7	44.9	+0.2	17.8	17.9	+0.1
>66	17.5	17.2	-0.3	6.8	6.6	-0.2
>69	7.1	7.1	-	2.6	2.6	-
>72	1.9	2.0	+0.1	0.7	0.8	+0.1

2.3.4 *2020 550,000 PATMs: with a short third runway, existing southern runway used for departures only, existing northern runway used for arrivals only*

This scenario is the same as that for section 2.3.2, except that the assessment is based on the year 2020 instead of 2015. Small changes to the fleet mix have been made to reflect the continual progression to more modern, quieter aircraft types. **Table 2.9(a)** shows small reductions in contour area across all contour levels. **Table 2.9(b)** shows corresponding small reductions in population and household counts. The contours are shown diagrammatically in **Figure 2.9**.

Table 2.9(a): London Heathrow Year 2020 — contour areas with a short third runway, existing southern runway used for departures only, existing northern runway used for arrivals only (revised ATM forecast 550,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Revised forecast, 550,000 PATMs, 2015, revised fleet mix/n.c.	Revised forecast, 550,000 PATMs, 2020, revised fleet mix/n.c.	Change
>54	212.5	207.6	-4.9
>57	124.2	121.8	-2.4
>60	73.3	71.8	-1.5
>63	39.8	38.8	-1.0
>66	22.0	21.5	-0.5
>69	11.7	11.4	-0.3
>72	6.1	6.0	-0.1

Table 2.9(b): London Heathrow Year 2020 — population and household counts with a short third, existing southern runway used for departures only, existing northern runway used for arrivals only (revised ATM forecast 550,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Revised forecast, 550,000 PATMs, 2015, revised fleet mix/n.c.	Revised forecast, 550,000 PATMs, 2020, revised fleet mix/n.c.	Change	Revised forecast, 550,000 PATMs, 2015, revised fleet mix/n.c.	Revised forecast, 550,000 PATMs, 2020, revised fleet mix/n.c.	Change
>54	571.2	552.8	-18.4	247.9	239.4	-8.5
>57	220.2	213.2	-7.0	90.6	87.6	-3.0
>60	104.0	100.4	-3.6	41.9	40.5	-1.4
>63	44.7	43.2	-1.5	17.8	17.2	-0.6
>66	17.5	17.2	-0.3	6.8	6.6	-0.2
>69	7.1	7.0	-0.1	2.6	2.6	-
>72	1.9	1.9	-	0.7	0.7	-

2.3.5 *2020 600,000 PATMs: with a short third runway, existing southern runway used for departures only, existing northern runway used for arrivals only*

This scenario is the same as that in section 2.3.2, except that the forecast is for 600,000 PATMs. The contour areas are shown in **Table 2.10(a)** and population/household counts in **Table 2.10(b)**. Comparisons are shown relative to the year 2020 550,000 PATMs assessment. As expected the forecast contour areas and population/household counts increase due to the increased number of movements. The 57dBA L_{eq} contour areas increases by 12.9km² or 11 per cent. The contours are shown diagrammatically in **Figure 2.10**.

Table 2.10(a): London Heathrow Year 2020 — contour areas with a short third runway, existing southern runway used for departures only, existing northern runway used for arrivals only (revised ATM forecast 600,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Revised forecast, 550,000 PATMs, 2020, revised fleet mix/n.c.	Revised forecast, 600,000 PATMs, 2020, revised fleet mix/n.c.	Change
>54	207.6	233.9	+26.3
>57	121.8	134.7	+12.9
>60	71.8	79.7	+7.9
>63	38.8	44.1	+5.3
>66	21.5	23.7	+2.2
>69	11.4	12.4	+1.0
>72	6.0	6.6	+0.6

Table 2.10(b): London Heathrow Year 2020 — population and household counts with a short third runway, existing southern runway used for departures only, existing northern runway used for arrivals only (revised ATM forecast 600,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Revised forecast, 550,000 PATMs, 2020, revised fleet mix/n.c.	Revised forecast, 600,000 PATMs, 2020, revised fleet mix/n.c.	Change	Revised forecast, 550,000 PATMs, 2020, revised fleet mix/n.c.	Revised forecast, 600,000 PATMs, 2020, revised fleet mix/n.c.	Change
>54	552.8	655.8	+103.0	239.4	286.9	+47.5
>57	213.2	261.3	+48.1	87.6	109.1	+21.5
>60	100.4	119.2	+18.8	40.5	48.4	+7.9
>63	43.2	51.8	+8.6	17.2	20.6	+3.4
>66	17.2	20.4	+3.2	6.6	7.9	+1.3
>69	7.0	8.3	+1.3	2.6	3.1	+0.5
>72	1.9	2.7	+0.8	0.7	1.0	+0.3

2.4 Sensitivity scenario

2.4.1 2015 655,000 PATMs: one additional short runway, revised ATM forecast assuming Chapter 3 -10dB operating standard

The previously published noise exposure estimates were produced for two different possible future noise standards. At the time the past assessments were evaluated, the International Civil Aviation Organisation (ICAO) was reviewing possible future noise certification standards. The options being considered were expressed relative to the current Chapter 3 standard and included Chapter 3 -8dB, Chapter 3 -11dB and Chapter 3 -14dB³.

The previous analysis was based on the Chapter 3 -8dB and Chapter 3 -14dB proposals, since these bounded the likely standard that ICAO might adopt. Although results were presented in terms of both proposed noise standards, additional sensitivity testing meant that there were considerable fleet differences between the two assessments⁴. For this reason, the differences in the estimated noise exposures should *not* be attributed entirely to the different noise standards assumed.

A decision on a new international noise certification standard was taken in early 2001, when CAEP recommended that ICAO member states adopt a Chapter 3 -10dB standard for the certification of new aircraft designs submitted after 1 January 2006. This recommendation was subsequently ratified by the ICAO Assembly. Trade-offs between points are not permitted and the minimum margin relative to the present Chapter 3 standard that would be permitted at any two measurement points would be 2dB. Chapter 3 -10dB was adopted as it was

³ 8, 11 and 14dB refer to the additional margin required beyond the current Chapter 3 standards, aggregated across the three certification measurement points. In the interests of brevity, a detailed explanation is provided in ERCD Report 0307 (Ref 2).

⁴ Section 6.1, p.78 of the SERAS Stage 3 report describes in more detail the fleet changes made between the 'Chapter 3-8dB' and 'Chapter 3-14dB' noise assessments, over and above the effect of assuming different aircraft noise certification standards.

considered by the Assembly to produce an appropriately balanced outcome in terms of the expected costs and benefits to be accrued from the new standard. No agreement was reached in CAEP on the subject of phaseout of marginal Chapter 3 aircraft.

A detailed discussion, describing which aircraft variants would not meet the Chapter 4 standard without modification, is described in Ref 2.

The Chapter 3 -10dB criterion becomes a standard for new designs from 2006. By 2015 it is anticipated that the majority of production aircraft will go far beyond this standard. Some aircraft in production today have margins relative to Chapter 3 in excess of 20dB. Thus, for the main analysis, the effects of a more stringent standard, Chapter 3 -14dB (no trades), has been applied as before to *all* aircraft operating in 2015. In other words, it has been assumed that any aircraft not meeting the Chapter 3 -14dB criterion have been modified to meet the criterion exactly or have been replaced with a new type that just meets the criterion. This has been accomplished by applying noise adjustments to any aircraft models that do not meet the Chapter 3 -14dB criterion. Where noise certification margins vary significantly for a given type, these have been subdivided into specific aircraft/engine variants, the noise adjustment then being determined from the sub-variant average.

It is readily acknowledged that the assumption, that all aircraft operating in 2015 would meet or exceed Chapter 3 -14dB, may not be satisfied in practice. Therefore, as a sensitivity test on the Chapter 3 -14dB criterion, one scenario has been analysed assuming general performance at or better than Chapter 3 -10dB, *i.e.* the forthcoming Chapter 4 noise standard. As for the Chapter 3 -14dB analysis it has been assumed that *all* aircraft operating in either 2015 or 2030 would at least meet the Chapter 3 -10dB. (The only aircraft models forecast to not meet the Chapter 3 -10dB criteria are some Airbus A320 family variants⁵.)

Table 2.11 compares the contour areas for London Heathrow operating at 655,000 PATMs with a possible short third runway for both Chapter 3 -14dB and Chapter 3 -10dB. In contrast to the past Chapter 3 -8dB and -14dB, *no other fleet changes have been made*. The effect of the less stringent operating 'standard' is to increase the 57dBA L_{eq} contour area by 3.2km² or 2.2 per cent. This small change highlights the fact that in practice most aircraft operating in 2015 and beyond are expected to meet or exceed the Chapter 3 -14dB criterion, even though this is not actually required, even for new types from 2006 under the Chapter 4 standard.

⁵ The ANCON 2002 databases introduced separate aircraft noise and performance characteristics for the A319, A320 and A321 variants, with either CFM56 or IAE V2500 engines. Certification noise levels still vary within these six variants, due to different specific engine models and different certificated weights. Average Chapter 3 margins were derived by matching specific certification data by aircraft tail-number to types operating at the London airports in 2002. Adjustments were then made as necessary to the six variants.

Table 2.11: London Heathrow Year 2015 — contour areas with short third runway and assuming an operational noise restriction of Chapter 3 -10dB (revised ATM forecast 655,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Revised forecast, revised fleet mix/n.c. Ch3-14dB	Revised forecast, revised fleet mix/n.c. Ch3-10dB	Change
>54	254.0	261.1	+7.1
>57	143.3	146.5	+3.2
>60	86.3	89.7	+3.4
>63	52.6	54.0	+1.4
>66	29.0	29.7	+0.7
>69	15.2	15.9	+0.7
>72	7.3	7.7	+0.4

3 London Gatwick

3.1 Central/mid forecasts

3.1.1 2015 260,000 PATMs: maximum use of existing runway

This scenario reflects the agreement and memorandum signed in 2001 by the airport and surrounding local authorities under section 106 of the Town and Country Planning Act 1990, and allows Gatwick to move over time towards a terminal capacity of 40mppa based on a single runway, two terminal airport with development remaining within the current boundaries. The DfT-supplied corresponding ATM forecast is for 260,000 PATMs and 36mppa.

Noise contour areas are shown in **Table 3.1(a)** and compared to the previously published results. At the 54 and 57dBA L_{eq} contours there are small increases in area (+1% for 57dBA L_{eq} contour). The fleet mix forecast for Gatwick in the year 2015 is not dominated by large aircraft to the same extent as Heathrow. Thus the changes in fleet mix and noise performance assumptions, which mainly affect large aircraft have very little overall effect on this scenario. The small increase in noise contour area at lower contour levels may be due to measured noise levels for existing types increasing very slightly between the year 2000 and 2002 measurements, although it is difficult to attribute such small differences to one particular change.

Population and household counts are shown in **Table 3.1(b)** and show little change from the previous assessment. This is consistent with the contour area changes. The associated noise contours are shown diagrammatically in **Figure 3.1**.

Table 3.1(a): London Gatwick Year 2015 — contour areas for maximum use of existing runway (original forecast 260,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	87.0	90.3	+3.3
>57	51.6	52.2	+0.6
>60	30.5	30.2	-0.3
>63	17.7	17.5	-0.2
>66	10.0	9.7	-0.3
>69	5.4	5.3	-0.1
>72	2.9	2.8	-0.1

Table 3.1(b): London Gatwick Year 2015 — population and household counts for maximum use of existing runway (original forecast 260,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	9.1	10.3	+1.2	3.6	4.1	+0.5
>57	4.0	4.3	+0.3	1.6	1.7	+0.1
>60	1.5	1.5	-	0.6	0.6	-
>63	0.7	0.7	-	0.3	0.3	-
>66	0.3	0.3	-	0.1	0.1	-
>69	0.1	0.1	-	<0.1	<0.1	-
>72	<0.1	<0.1	-	<0.1	<0.1	-

3.1.2 2015 486,000 PATMs: one additional wide-spaced runway

This scenario assumes the addition of a wide-spaced runway to the south of the airport, which would provide for 486,000 PATMs and 68mppa in 2015. The ATM forecast is unchanged. The runways are assumed to operate in mixed-mode with an equal split of operations between the two runways.

Table 3.2(a) shows the contour areas compared against the previously published assessment. As for the maximum use scenario at Gatwick, only small reductions in contour area are apparent. This is not unexpected, since a comparison of the ATMs and passenger throughputs shows that the average aircraft size remains virtually the same as for a single runway. Thus the same aircraft types are present in the same proportions and hence the effect of the revised methodology and data is similar to that for the single runway scenario.

Table 3.2(b) shows the associated population and household counts. Small reductions in both are evident and consistent with contour area reductions. The noise exposure contours are shown diagrammatically in **Figure 3.2**.

Table 3.2(a): London Gatwick Year 2015 — contour areas with wide-spaced parallel runway (original forecast 486,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	132.8	132.0	-0.8
>57	80.5	79.3	-1.2
>60	50.9	49.2	-1.7
>63	32.1	30.7	-1.4
>66	18.9	17.4	-1.5
>69	10.0	8.8	-1.2
>72	4.9	4.4	-0.5

Table 3.2(b): London Gatwick Year 2015 — population and household counts with wide-spaced parallel runway (original forecast 486,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	29.3	28.5	-0.8	11.7	11.4	-0.3
>57	13.0	11.9	-1.1	5.0	4.7	-0.3
>60	4.5	4.1	-0.4	1.7	1.5	-0.2
>63	1.8	1.4	-0.4	0.6	0.5	-0.1
>66	0.5	0.4	-0.1	0.2	0.2	-
>69	0.2	<0.1	-0.1	<0.1	<0.1	-
>72	<0.1	<0.1	-	<0.1	<0.1	-

3.1.3 2030 378,000 PATMs: one additional close-parallel runway

This scenario considered an additional close-spaced parallel runway, south of the existing runway. This arrangement would be expected to increase throughput to 378,000 PATMs and 62mppa by 2030.

The revised contour areas and population/household counts are shown in **Tables 3.3(a) and 3.3(b)** respectively. The contours are shown diagrammatically in **Figure 3.3**.

The revised 57dBA L_{eq} contour has reduced in size by 14.1km² or 17 per cent. This is in contrast with the preceding scenarios, which remain relatively unchanged. However, the preceding scenarios were set in the year 2015. For this scenario in 2030 much of the additional passenger growth has been achieved through increasing average aircraft size and the use of more large aircraft. The updated fleet mix and noise performance assumptions have the greatest effect on the larger aircraft and this therefore explains the reduction in contour areas seen for this scenario.

Table 3.3(a): London Gatwick Year 2030 — contour areas with close-spaced parallel runway (original forecast 378,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	145.3	118.4	-26.9
>57	81.6	67.5	-14.1
>60	47.9	39.5	-8.4
>63	28.6	23.5	-5.1
>66	17.1	13.8	-3.3
>69	9.9	7.8	-0.1
>72	5.7	4.4	-0.1

Table 3.3(b): London Gatwick Year 2030 — population and household counts with close-spaced parallel runway (original forecast 378,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	22.9	14.8	-8.1	9.3	6.0	-3.3
>57	8.7	5.5	-3.2	3.5	2.2	-1.3
>60	2.9	2.1	-0.8	1.1	0.8	-0.3
>63	1.3	1.0	-0.3	0.5	0.4	-0.1
>66	0.5	0.4	-0.1	0.2	0.2	-
>69	0.3	0.2	-0.1	0.1	0.1	-0.1
>72	0.1	<0.1	-0.1	0.1	<0.1	-0.1

3.1.4 2030 486,000 ATMs: one additional wide-spaced runway

This scenario is the same as that in section 3.1.2, except it is evaluated for the year 2030. Movements are unchanged at 486,000, but the passenger throughput has increased to 76mppa (from 68mppa in 2015).

Contour areas and population/household counts are shown in **Tables 3.4(a) and 3.4(b)**. The contours are shown diagrammatically in **Figure 3.4**.

The revised contours are smaller than before due to the updated fleet mix and noise performance assumptions. The 57dBA L_{eq} contours has reduced in size by 18.2km² or 18 per cent, and population by 7,700 or 37 per cent. As with the additional close-parallel runway scenario this option is set in the year 2030 and much of the growth is expected from increasing average aircraft size and particularly the use of more large aircraft.

Table 3.4(a): London Gatwick Year 2030 — contour areas with wide-spaced parallel runway (original forecast 486,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, revised fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	171.9	138.6	-33.3
>57	102.2	84.0	-18.2
>60	64.1	52.5	-11.6
>63	40.9	33.1	-7.8
>66	24.9	19.3	-5.6
>69	14.1	9.9	-0.1
>72	6.9	4.8	-0.1

Table 3.4(b): London Gatwick Year 2030 — population and household count with wide-spaced parallel runway (original forecast 486,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, revised fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change	Original forecast, revised fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	39.8	29.6	-10.2	16.0	11.9	-4.1
>57	20.9	13.2	-7.7	8.4	5.2	-3.2
>60	7.8	4.6	-3.2	3.0	1.7	-1.3
>63	2.9	1.8	-1.1	1.1	0.7	-0.4
>66	1.1	0.5	-0.6	0.4	0.2	-0.2
>69	0.2	0.1	-0.1	0.1	<0.1	-
>72	<0.1	<0.1	-	<0.1	<0.1	-

4 London Stansted

4.1 Introduction

Section 4.2 presents corrected results for the two scenarios:

- Stansted 2015 one additional runway
- Stansted 2030 one additional runway

The south-east consultation document described these scenarios as providing capacity for 492,000 PATMs and 64mppa in 2015 and 74mppa in 2030. However, noise modelling analysis for 2015 used an earlier version of the supplied ATM forecast, which actually represented 447,000 PATMs and generally smaller aircraft. For 2030 the forecast used actually represented 513,000 PATMs — a higher number than quoted in the south-east consultation document. Thus earlier published results under estimated noise exposure in 2015, but overestimated it in 2030.

It is noted however, that these forecasts (2015: 492,000/64mppa and 2030: 492,000/74mppa) represented 'seeded' scenarios, where it had been assumed that operators would move additional long-haul services to the airport from the opening of a new runway. Following the consultation, the option of a seeded scenario was

ruled out as noted in footnote 4 of Chapter 11 of the Government's White Paper. These seeded scenarios were revised with unseeded ones, which assume slightly lower numbers of movements, but significantly smaller aircraft types. These 'unseeded' scenarios are reported in section 4.4 and for both 2015 and 2030 the noise contour areas and population counts are *lower* than previous published.

The Government's White Paper quotes the old 'seeded' population counts in para. 11.31, but notes, "...or maybe a little less in both cases", which refers specifically to the 'unseeded' results presented in this report in section 4.4.

Thus it must be stressed that this correction does not materially affect the overall conclusions reached and set out in the Government's White Paper.

4.2 Corrected results

4.2.1 2015 492,000 PATMs: one additional runway — corrected results

This corrected scenario assumes one additional runway to provide for 492,000 PATMs and 64mppa.

Tables 4.1(a) and 4.1(b) present contour areas and population/household counts using the correct ATM forecast and also the updated fleet mix and noise performance assumptions. Contour areas and population counts increase, due to the increased number of movements and the use of the larger aircraft. The revised contours are shown diagrammatically in **Figure 4.1**.

Note, however, this scenario has been replaced with the revised 'unseeded' scenario presented in section 4.4.1.

Table 4.1(a): London Stansted Year 2015 — contour areas with wide-spaced parallel runway (corrected forecast 492,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, original fleet mix/n.c.	Corrected forecast, revised fleet mix/n.c.	Change
>54	126.7	165.8	+39.1
>57	78.9	98.7	+19.8
>60	41.7	55.8	+14.1
>63	23.4	29.0	+5.6
>66	13.1	16.1	+3.0
>69	7.0	8.8	+1.8
>72	3.7	4.7	+1.0

Table 4.1(b): London Stansted Year 2015 — population and household count with wide-spaced parallel runway (corrected forecast 492,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, original fleet mix/n.c.	Corrected forecast, revised fleet mix/n.c.	Change	Original forecast, original fleet mix/n.c.	Corrected forecast, revised fleet mix/n.c.	Change
>54	14.5	24.3	+9.8	5.9	10.0	+4.1
>57	7.5	9.8	+2.3	3.1	4.0	+0.9
>60	3.8	4.8	+1.0	1.6	2.0	+0.4
>63	2.6	3.2	+0.6	1.1	1.3	+0.2
>66	1.6	2.0	+0.4	0.7	0.8	+0.1
>69	0.4	0.8	-3.6	0.2	0.3	+0.1
>72	<0.1	0.1	-	<0.1	<0.1	-

4.2.2 2030 492,000 PATMs: one additional runway — corrected results

As noted in the introduction, the consultation document described this scenario as having one additional runway to provide for a capacity of 513,000 PATMs. However, the consultation document quoted the forecast usage in 2030 to be 492,000 PATMs and 74mppa. The actual ATM forecast supplied contained 513,000 PATMs, i.e. the full capacity. This has now been scaled back to the quoted level of 492,000 PATMs.

Tables 4.2(a) and 4.2(b) show the corrected contour areas and population/household counts. The contours are shown diagrammatically in **Figure 4.2**.

The 57dBA L_{eq} contour reduces by 20.0km² or 16 per cent and the population count decreases by 2,600 to 11,100.

Note, however, this scenario has been replaced with the revised 'unseeded' scenario presented in section 4.4.2.

Table 4.2(a): London Stansted Year 2030 — contour areas with wide-spaced parallel runway (corrected forecast 492,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, original fleet mix/n.c.	Corrected forecast, revised fleet mix/n.c.	Change
>54	213.6	179.8	-33.8
>57	127.1	107.1	-20.0
>60	76.0	61.6	-14.4
>63	40.1	32.0	-8.1
>66	22.6	17.9	-4.7
>69	12.8	9.8	-3.0
>72	7.0	5.3	-1.7

Table 4.2(b): London Stansted Year 2030 — population and household count with wide-spaced parallel runway (corrected forecast 492,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, original fleet mix/n.c.	Corrected forecast, revised fleet mix/n.c.	Change	Original forecast, original fleet mix/n.c.	Corrected forecast, revised fleet mix/n.c.	Change
>54	27.1	25.3	-1.8	11.1	10.4	-0.7
>57	13.7	11.1	-2.6	5.6	4.6	-1.0
>60	7.1	5.0	-2.1	2.9	2.1	-0.8
>63	3.7	3.4	-0.3	1.5	1.4	-0.1
>66	2.6	2.3	-0.3	1.1	1.0	-0.1
>69	1.6	1.0	-0.6	0.7	0.4	-0.3
>72	0.4	0.1	-0.3	0.1	<0.1	-

4.3 Core forecasts

4.3.1 2015 237,000 PATMs: maximum use of existing runway

With maximum use of the existing runway, this scenario envisages 237,000 PATMs and a passenger throughput of 23mppa in 2015.

The revised contour areas and population/household counts are shown in **Tables 4.3(a) and 4.3(b)** respectively. The contours are shown diagrammatically in **Figure 4.3**.

As a result of the revised fleet mix and updated noise performance assumptions, contour areas have a reduced in size. The 57dBA L_{eq} contour area is 14 per cent smaller than previously estimated. The population count within the 57dBA L_{eq} contour has decreased by 1,000 to 4,200.

Table 4.3(a): London Stansted Year 2015 — contour areas with maximum use of existing runways (original forecast 237,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	74.3	64.5	-9.8
>57	43.3	37.4	-5.9
>60	25.2	21.6	-3.6
>63	14.8	12.4	-2.4
>66	8.7	6.9	-1.8
>69	4.8	3.7	-1.1
>72	2.6	1.9	-0.7

Table 4.3(b): London Stansted Year 2015 — population and household counts with maximum use of existing runways (original forecast 237,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	8.5	8.2	-0.3	3.4	3.3	-0.1
>57	5.2	4.2	-1.0	2.1	1.7	-0.4
>60	1.7	1.4	-0.3	0.7	0.6	-0.1
>63	0.8	0.6	-0.2	0.4	0.2	-0.2
>66	0.3	0.3	-	0.1	0.1	-
>69	0.1	0.1	-	<0.1	<0.1	-
>72	<0.1	<0.1	-	<0.1	<0.1	-

4.3.2 2030 624,000 PATMs: two additional runways

With two additional runways, it envisaged that Stansted could cater for 624,000 PATMs and 98mppa in 2030. The ATM forecast is unchanged from that used previously.

Contour areas and population/household counts are shown in **Tables 4.4(a) and 4.4(b)** respectively. The contours are shown diagrammatically in **Figure 4.4**. With two additional runways, significant growth in long-haul services with large aircraft is assumed. As noted earlier in the report, the revised fleet mix and noise performance assumptions have the greatest impact on larger aircraft and thus it is unsurprising to see that the contours and population counts reduced significantly, compared with earlier analysis. The 57dBA L_{eq} contour decreases by 44.1km² or 23 per cent and the population count within this contour falls by 6,000 to 18,400.

Table 4.4(a): London Stansted Year 2030 — contour areas with two additional runways (original forecast 624,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	325.5	249.0	-76.5
>57	190.7	146.6	-44.1
>60	110.7	85.7	-25.0
>63	63.1	46.7	-16.4
>66	34.7	25.7	-9.0
>69	20.2	14.7	-5.5
>72	11.8	8.4	-3.4

Table 4.4(b): London Stansted Year 2030 — population and household counts with two additional runways (original forecast 624,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	42.2	31.0	-11.2	16.9	12.5	-4.4
>57	24.4	18.4	-6.0	10.1	7.7	-2.4
>60	10.2	7.6	-2.6	4.2	3.1	-1.1
>63	5.8	4.1	-1.7	2.4	1.7	-0.7
>66	3.3	2.8	-0.5	1.4	1.2	-0.2
>69	2.0	1.2	-0.8	0.8	0.5	-0.3
>72	0.7	0.4	-0.3	0.3	0.1	-0.2

4.4 Unseeded scenarios

4.4.1 2015 456,000 PATMs: one additional runway, 'unseeded' fleet mix

This is a new scenario and reflects the impact of one additional runway assuming an 'unseeded' fleet mix as opposed to the 'seeded' fleet mix assumed in section 4.1.1. The unseeded fleet mix reduces PATMs to 457,000 and passenger throughput to 57mppa (from 64mppa).

The revised contour areas and population/household counts are shown in **Tables 4.5(a) and 4.5(b)** respectively. The contours are shown diagrammatically in **Figure 4.5**.

The change from a 'seeded' to an 'unseeded' fleet mix primarily reduces the forecast number of large aircraft as well as the overall number of movements. Together with the revised fleet mix and noise performance assumptions the contour areas and population count decrease significantly. The 57dBA L_{eq} contour area reduces by 23.7km² or 24 per cent and the population by 2,800 to 7,000.

Table 4.5(a): London Stansted Year 2015 — contour areas with wide-spaced parallel runway (revised 'unseeded' forecast 456,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	'Seeded' forecast, revised fleet mix/n.c.	'Unseeded' forecast, revised fleet mix/n.c.	Change
>54	165.8	123.6	-42.2
>57	98.7	75.0	-23.7
>60	55.8	38.3	-17.5
>63	29.0	20.9	-8.1
>66	16.1	11.2	-4.9
>69	8.8	5.9	-2.9
>72	4.7	3.0	-1.7

Table 4.5(b): London Stansted Year 2015 — population and household counts with wide-spaced parallel runway (revised ‘unseeded’ forecast 456,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	‘Seeded’ forecast, revised fleet mix/n.c.	‘Unseeded’ forecast, revised fleet mix/n.c.	Change	‘Seeded’ forecast, revised fleet mix/n.c.	‘Unseeded’ forecast, revised fleet mix/n.c.	Change
>54	24.3	13.6	-10.7	10.0	5.5	-4.5
>57	9.8	7.0	-2.8	4.0	2.9	-1.1
>60	4.8	3.6	-1.2	2.0	1.5	-0.5
>63	3.2	2.5	-0.7	1.3	1.0	-0.3
>66	2.0	1.0	-1.0	0.8	0.4	-0.4
>69	0.8	0.1	-0.7	0.3	<0.1	-
>72	0.1	<0.1	-	<0.1	<0.1	-

4.4.2 2030 513,000 ATMs: one additional runway, ‘unseeded’ fleet mix

This scenario is similar to that in section 4.2.2, except that the fleet mix is now assumed to be ‘unseeded’. As for the scenario in section 4.4.1, the main effect of this is to reduce the number of large aircraft forecast to be operating and increase the number of smaller aircraft types. The ‘unseeded’ fleet mix assumes throughput of 513,000 PATMs and 70mppa (from 74mppa).

The contour areas and population/household counts are shown in **Tables 4.6(a) and 4.6(b)** respectively. The revised contours are shown diagrammatically in **Figure 4.6**.

The 57dBA L_{eq} contour area reduces by 12.5km² or 12 per cent. This reduction is smaller than that for the unseeded 2015 scenario as the relative differences between the seeded and unseeded scenarios are also smaller in the 2030 forecasts.

Table 4.6(a): London Stansted Year 2030 — contour areas with wide-spaced parallel runway (revised ‘unseeded’ forecast 513,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	‘Seeded’ forecast, revised fleet mix/n.c.	‘Unseeded’ forecast, revised fleet mix/n.c.	Change
>54	179.8	154.6	-25.2
>57	107.1	94.6	-12.5
>60	61.6	53.0	-8.6
>63	32.0	27.8	-4.2
>66	17.9	15.4	-2.5
>69	9.8	8.3	-1.5
>72	5.3	4.3	-1.0

Table 4.6(b): London Stansted Year 2030 — population and household counts with wide-spaced parallel runway (revised ‘unseeded’ forecast 513,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	‘Seeded’ forecast, revised fleet mix/n.c.	‘Unseeded’ forecast, revised fleet mix/n.c.	Change	‘Seeded’ forecast, revised fleet mix/n.c.	‘Unseeded’ forecast, revised fleet mix/n.c.	Change
>54	25.3	21.6	-3.7	10.4	9.0	-1.4
>57	11.1	9.3	-1.8	4.6	3.8	-0.8
>60	5.0	4.5	-0.5	2.1	1.9	-0.2
>63	3.4	3.0	-0.4	1.4	1.2	-0.2
>66	2.3	2.0	-0.3	1.0	0.8	-0.2
>69	1.0	0.6	-0.4	0.4	0.2	-0.2
>72	0.1	0.1	-	<0.1	<0.1	-

5 Luton

5.1 2015 240,000 PATMs, option 2 (new 3,000m runway, 200m south of existing runway)

This scenario assumes a new 3,000m runway, 200m south of the existing runway. The airport would continue to operate with a single runway, the existing runway being converted into a parallel taxiway. The south-east consultation document quoted the movements for 2015 at 146,000 PATMs. However, the contours presented in the consultation document related to an earlier DfT supplied forecast of 240,000 PATMs. 240,000 PATMs has been retained for the revised forecast since PATMs are at this level in 2030. Revised forecast PATMs are around 240,000 PATMs in 2015; thus the analysis is conservative.

Tables 5.1(a) and 5.2(b) show contour areas and population/household counts respectively. The contours are shown diagrammatically in **Figure 5.1**.

As a result of the fleet mix changes and updated noise performance assumptions, some contour levels increase slightly in size whilst others decrease slightly in size. The most likely reason for this is the transfer of movements from Boeing 757 and 767 to the Boeing 7E7 and Airbus A300 replacement. Production of the Boeing 757 will end in 2005 and few orders remain for the Boeing 767. Whilst both the proposed models are expected to be significantly quieter than the Boeing 767, they are inevitably noisier than the Boeing 757 as they are significantly larger aircraft. The fleet mix has been developed on a consistent basis with other scenarios, but in practice, noting the dominance of charter operations at Luton, many of the Boeing 757 movements will likely be replaced by the Airbus A321 and Boeing 737-800/900 in the long term. So these results probably err on the side of caution.

Table 5.1(a): Luton Year 2015 — contour areas for Option 2(new 3,000m runway, 200m south of existing runway) (original forecast 240,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	58.7	62.4	+3.7
>57	35.5	36.7	+1.2
>60	20.6	20.7	+0.1
>63	11.7	11.2	-0.5
>66	6.6	6.0	-0.6
>69	3.5	3.2	-0.3
>72	1.9	1.7	-0.2

Table 5.1(b): Luton Year 2015 — population and household for Option 2 (new 3,000m runway, 200m south of existing runway) (original forecast 240,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change	Original forecast, original fleet mix/n.c.	Original forecast, revised fleet mix/n.c.	Change
>54	25.8	30.2	+4.4	11.5	13.3	+1.8
>57	9.0	9.9	+0.9	4.0	4.4	+0.4
>60	3.9	3.9	-	1.6	1.6	-
>63	1.2	1.2	-	0.5	0.5	-
>66	0.3	0.2	-0.1	0.1	0.1	-
>69	0.1	0.1	-	<0.1	<0.1	-
>72	<0.1	<0.1	-	<0.1	<0.1	-

5.2 2015 240,000 PATMs, existing runway extended to 3,000m

This is a new scenario not previously considered in the south east consultation document. Instead of relocating the runway further south, it is assumed that the existing runway is simply extended in length to 3,000m.

The scenario uses the same ATM and passenger throughput forecast as in section 5.1, except that the existing runway is assumed to have been extended rather than a new 3,000m runway having been built south of the current runway. The contour areas remain unchanged and thus only population/household counts are changed as shown in **Table 5.2**. The contours are shown diagrammatically in **Figure 5.2**. Populations within all contours except the 69 and 72dBA L_{eq} contours increase, since the runway and main flight tracks are now located closer to the main population centres of Luton. The population within the 57dBA L_{eq} contour increases by 3,400 to 13,300.

Table 5.2: Luton Year 2015 — population and household counts with existing runway extended to 3,000m (original forecast 240,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	South runway, Original forecast, original fleet mix/n.c.	Extended runway, Original forecast, original fleet mix/n.c.	Change	South runway, Original forecast, original fleet mix/n.c.	Extended runway, Original forecast, original fleet mix/n.c.	Change
>54	30.2	38.1	+7.9	13.3	16.7	+3.4
>57	9.9	13.3	+3.4	4.4	6.0	+1.6
>60	3.9	7.5	+3.6	1.6	3.3	+1.7
>63	1.2	3.6	+2.4	0.5	1.4	+0.9
>66	0.2	1.3	+1.1	0.1	0.5	+0.4
>69	0.1	<0.1	-	<0.1	<0.1	-
>72	<0.1	<0.1	-	<0.1	<0.1	-

6 Birmingham

6.1 2020 314,000 PATMs: with short wide-spaced parallel runway

The midlands consultation document proposed several options for Birmingham airport including an additional wide-spaced full-length runway. With this, the consultation document forecast a throughput of 439,00 PATMs and 44mppa.

This scenario considers the impact of an additional short wide-spaced runway. The runway is assumed to 2,000m long and utilised by aircraft up to Airbus A320 size (approx. 150 seats). The associated ATM forecast supplied now represents 314,000 PATMs and approximately 32mppa.

Tables 6.1(a) and 6.1(b) show the revised contour areas and population/household counts respectively. The contours are shown diagrammatically in **Figure 6.1**. As expected with a smaller number of movements and a reduced passenger throughput, contour areas and population counts are significantly reduced. The 57dBA L_{eq} contour area decreases by 17.3km² or 27 per cent. The population count within the 57dBA L_{eq} contour decreases by 36,000 to 81,400.

Although the fleet mix and noise performance assumptions have been revised for this assessment in line with other scenarios, these changes only account for a small proportion of the overall change, the greater proportion resulting from the lower forecast throughput.

Table 6.1(a): Birmingham Year 2020 — contour areas with short wide-spaced runway (revised forecast 315,000 PATMs)

L _{eq} (dBA)	Area (km ²)		
	Original forecast, original fleet mix/n.c.	Revised forecast, revised fleet mix/n.c.	Change
>54	99.9	74.2	-25.7
>57	62.9	45.6	-17.3
>60	39.9	28.4	-11.5
>63	25.2	16.3	-8.9
>66	14.5	7.7	-6.8
>69	6.8	3.9	-2.9
>72	3.4	2.0	-1.4

Table 6.1(b): Birmingham Year 2020 — population and household counts with short wide-spaced runway (revised forecast 315,000 PATMs)

L _{eq} (dBA)	Population (000s)			Household (000s)		
	Original forecast, original fleet mix/n.c.	Revised forecast, revised fleet mix/n.c.	Change	Original forecast, original fleet mix/n.c.	Revised forecast, revised fleet mix/n.c.	Change
>54	205.8	150.3	-55.5	84.1	62.2	-21.9
>57	117.4	81.4	-36.0	48.4	33.6	-14.8
>60	70.8	48.8	-22.0	29.1	20.3	-8.8
>63	40.7	21.5	-19.2	16.6	8.9	-7.7
>66	14.7	5.2	-9.5	6.1	2.2	-3.9
>69	3.3	1.0	-2.3	1.4	0.4	-1.0
>72	0.5	<0.1	-	0.2	<0.1	-

7 Manchester

Previously, a number of different growth scenarios were considered for Manchester airport that depended on a number of factors, such as the amount of growth expected in the south-east region. All the scenarios presented here are new although they appear similar to previous forecasts. In addition these assessments are based on a full noise modelling assessment using the CAA noise model ANCON version 2. Previously, the Manchester assessments, along with many other regional assessments were based on a simplified modelling approach. It is not, therefore, appropriate to make direct comparison with past results.

7.1 2030 367,000 PATMs: segregated-mode (55mppa)

This scenario assumes 367,000 PATMs and a throughput of 55mppa. Manchester airport's two runways are assumed to operate in segregated mode with departures on runway 06R-24L and arrivals on runway 06L-24R, as is the case today.

Contour areas and population/household counts are shown in **Table 7.1**. The contours are shown diagrammatically in **Figure 7.1**. The 57dBA L_{eq} contour is 77.2km² and the associated population count 82,500.

Previously, the closest scenario to this was the RASCO⁶ high-growth case, which assumed 390,000 PATMs and 56mppa. This forecast therefore represents slightly fewer movements with slightly larger aircraft. The 57dBA L_{eq} contour area varied from 66.0 to 76.8km² depending on noise modelling assumptions made. The latest estimates are therefore at the top of the previous range, despite changes to fleet mix and noise performance assumptions. Several factors may explain this, including the simplified noise modelling approach used previously, for which a broad range of uncertainty was always acknowledged.

Table 7.1: Manchester Year 2030 — contour areas, population and household counts with segregated-mode (revised forecast 367,000 PATMs)

L_{eq} (dBA)	Area (km ²)	Population (000s)	Households (000s)
>54	131.2	143.8	61.0
>57	77.2	82.5	35.8
>60	44.1	50.5	21.7
>63	25.2	27.2	11.4
>66	14.9	10.0	4.2
>69	8.6	2.7	1.1
>72	4.9	0.6	0.3

7.2 2030 367,000 PATMs: partial mixed-mode (55mppa)

There was some concern over whether 367,000 PATMs could be realistically achieved using Manchester airport's close parallel runways in segregated mode. The same forecast was therefore reassessed assuming partial mixed-mode:

- On westerly operations, all arrivals land runway 24R, 29% of departures from runway 24R and 71% from 24L;
- On easterly operations, all arrivals land runway 06L, 29% of departures from runway 06L and 71% from 06R.

Table 7.2 shows the contour areas and population/household counts. The contours are shown diagrammatically in Figure 7.2. Comparison with the segregated mode results, show that under this arrangement, contour area reduce in size. The 57dBA L_{eq} contour reduces by 11.5km² or 15 per cent. This reduction is mainly due to the change of arrival runway on easterly operations (from 06R to 06L) and the movement of 29 per cent of departures from 24L to 24R on westerly operations. These effects tend to shorten, but widen the overall contour shape, this having a consequential effect on contour areas. However, these results should *not* be taken as indicative that mixed-mode operation might result in overall noise benefits since there are a number of operational factors that may preclude this arrangement from being operated. Other aspects, in addition to L_{eq} contour areas, such as respite from aircraft noise may also need to be considered when considering a change from segregated-mode to mixed-mode.

⁶ Regional Air Services Co-Ordination

Table 7.2: Manchester Year 2030 — contour areas, population and household counts with partial mixed-mode (revised forecast 367,000 PATMs)

L _{eq} (dBA)	Area (km ²)	Population (000s)	Households (000s)
>54	112.5	125.3	53.3
>57	65.7	68.2	29.6
>60	37.2	39.1	16.9
>63	21.2	14.4	6.1
>66	12.6	3.8	1.6
>69	7.4	1.4	0.6
>72	4.2	0.2	0.1

7.3 2030 490,000 PATMs: mixed-mode (70mppa)

The high-end forecast previously considered for Manchester airport was 70mppa and 440,000 PATMs. A revised ATM forecast was provided that assumes 490,000 PATMs for the same 70mppa, *i.e.* a smaller average aircraft size. It was assumed that full mixed-mode would be required to accommodate 490,000 PATMs.

The contour areas and population/household counts for this revised forecast are shown in **Table 7.3**. The contours are shown diagrammatically in **Figure 7.3**. The 57dBA L_{eq} contour area is estimated to be 83.9km² with a population count of 92,900. Previously, the consultation document quoted a range between 76.0 and 102.2km² and a population count of 82,000 to 111,000. As noted already, these estimates were based on a simplified noise modelling process and for a different ATM forecast. Nevertheless the latest estimates are approximately in the middle of past estimates.

Table 7.3: Manchester Year 2030 — contour areas, population and household counts with full mixed-mode (revised forecast 490,000 PATMs)

L _{eq} (dBA)	Area (km ²)	Population (000s)	Households (000s)
>54	140.9	155.6	66.1
>57	83.9	92.9	39.9
>60	47.7	54.3	23.4
>63	27.2	22.4	9.3
>66	16.1	7.6	3.0
>69	9.4	1.3	0.5
>72	5.6	0.1	<0.1

8 Conclusions

This report describes the results of updated noise exposure contours around several UK airports, including London Heathrow, London Gatwick, London Stansted, Luton, Birmingham and Manchester airports. For some airports, previously presented scenarios are updated; in other cases new scenarios not previously presented are reported.

The updated forecasts are based on revised aircraft noise/performance information and revised airport fleet mixes. Detailed information describing the specific changes is given in Ref 2. For each scenario, tables of contour areas and population counts within each contour are provided. In addition diagrams illustrating the shape and location of the noise contours area shown.

For London Heathrow, the updated analysis reduces the 57dBA L_{eq} contour area by around 13 per cent for the two-runway 480,000 PATMs scenario to 95.8km². The corresponding population count decreases by 30,000 to 196,000. For the three-runway 655,000 PATMs scenario, the 57dBA L_{eq} contour area is reduced by around 8 per cent to 143.3km². A number of new scenarios are presented, ranging from 515,000 PATMs to 700,000 PATMs. The 515,000 PATMs case assumes the incorporation of mixed-mode operations on the two main runways. The 57dBA L_{eq} contour area is estimated to be 111.7km² and the corresponding population count is 226,000. A three-runway scenario with 600,000 PATMs results in a 57dBA L_{eq} contour of 129.9km² and a population count of 258,100. A high forecast of 700,000 PATMs results in a 57dBA L_{eq} contour area of 155.7km² and a population count of 334,100. Forecasts for 550,000 PATMs show slightly smaller impacts than those for 600,000 PATMs.

For London Gatwick, the updated analysis has little impact on the baseline scenario – maximum use of the existing runway. The 57dBA L_{eq} contour area is 52.2km² and the population count 4,300. This is mainly because this scenario has a relatively small number of operations by large aircraft – the types where the greatest changes have occurred. Again, only small changes are seen in the 2015 scenarios that assume either a close or wide-spaced second runway. However, in 2030, where additional passenger throughput is by the use of larger aircraft, scenarios with either the close-spaced and wide-spaced second runway see contour reductions of around 17 and 18 per cent respectively. The 57dBA L_{eq} contour areas are 67.5km² and 84.0km² with population counts of 5,500 and 13,200 respectively.

For London Stansted, the 57dBA L_{eq} contour area for the baseline scenario – maximum use of the existing runway in 2015 has reduced by 14 per cent to 37.4km² with a population count of 4,200. For 2015 with a 'seeded' forecast and a second runway, previously published results used an earlier ATM forecast, which used a lower number of movements than those stated. These have been corrected to reflect the quoted number of ATMs and passenger throughput. In 2015, the 57dBA L_{eq} contour area increases by 25 per cent to 98.7km² and a population count of 9,800. For 2030, the previous results used a forecast, which overstated the number of ATMs. Thus this forecast has been revised downward. The 57dBA L_{eq} contour reduces by 16 per cent to 107.1km² with a population count of 11,100. The 2030 scenario assuming two additional runways contained a high-proportion of movements by large aircraft and thus shows the largest reduction in contour area at 23 per cent to 146.6km². The population count also reduces to 18,400. As well as rejecting the case for two additional runways, the Government's White Paper ruled

out intervention in the market to direct airlines to build a hub there with significant long-haul services. Thus, the 'seeded' forecasts were revised with 'unseeded' forecasts assuming a second-runway for both 2015 and 2030. These forecasts assume natural traffic growth and are felt to more realistically reflect operations at London Stansted in 2015 and 2030. In 2015 the 'unseeded' 57dBA L_{eq} contour area reduces by 24 per cent to 75.0km² relative to the revised 2015 'seeded' forecast. The corresponding population count is 7,000. In 2030 the 57dBA L_{eq} contour reduces by 12 per cent to 94.6km² relative to the 2030 'seeded' forecast. The corresponding population count is 9,300. Population counts for the 'unseeded' 2015 and 2030 scenarios are lower at every contour level. Thus it must be stressed, that this correction does not materially affect the overall conclusions reached and set out in the Government's White Paper.

For Luton airport the updated analysis results in slightly larger contours. With the runway extended and moved 200m south, the population count within the 57dBA L_{eq} contour is 9,900. A new scenario, not considered previously, is to extend the existing runway, rather than build a new 3,000m runway just south of the existing one. Since the forecast is unchanged, the contour areas are also unchanged, but the population count within the 57dBA L_{eq} contour increases by 3,400 to 13,300, as extending the existing runway puts the noise exposure contours closer to the population centres of Luton.

For Birmingham airport, a new scenario is proposed – an additional short (2,000m) wide-spaced parallel runway. This scenario could accommodate 314,000 PATMs and approximately 32mppa. Previously, a full-length (3,000m) wide-spaced runway was proposed which would have accommodated 439,000 PATMs and 44mppa. With the short wide-spaced runway, the 57dBA L_{eq} contour area decreases by 27 per cent to 45.6km². The population count also decreases by 36,000 to 81,400.

At Manchester airport three new scenarios are presented. The first is based on forecast for 367,000 PATMs and 55mppa, operating in segregated mode. The 57dBA L_{eq} contour area is estimated to be 77.2km² and the population count within this contour is 82,500. There is some uncertainty over whether Manchester's close parallel runways could sustain 367,000 PATMs in segregated mode, so the scenario has been analysed assuming partial mixed-mode. At the 57dBA L_{eq} contour, the area decreases by 15 per cent to 65.7km² and the population count is 68,200. A third scenario analysed was based on a forecast for 490,000 PATMs and 70mppa. This scenario assumes full mixed-mode operation of both runways. The 57dBA L_{eq} contour area is estimated to be 83.9km² and the population count within this contour is estimated at 92,900.

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Figure 2.1: London Heathrow Year 2015 - Noise contours with maximum use of existing runways (original central forecast 480,000 PATMs)

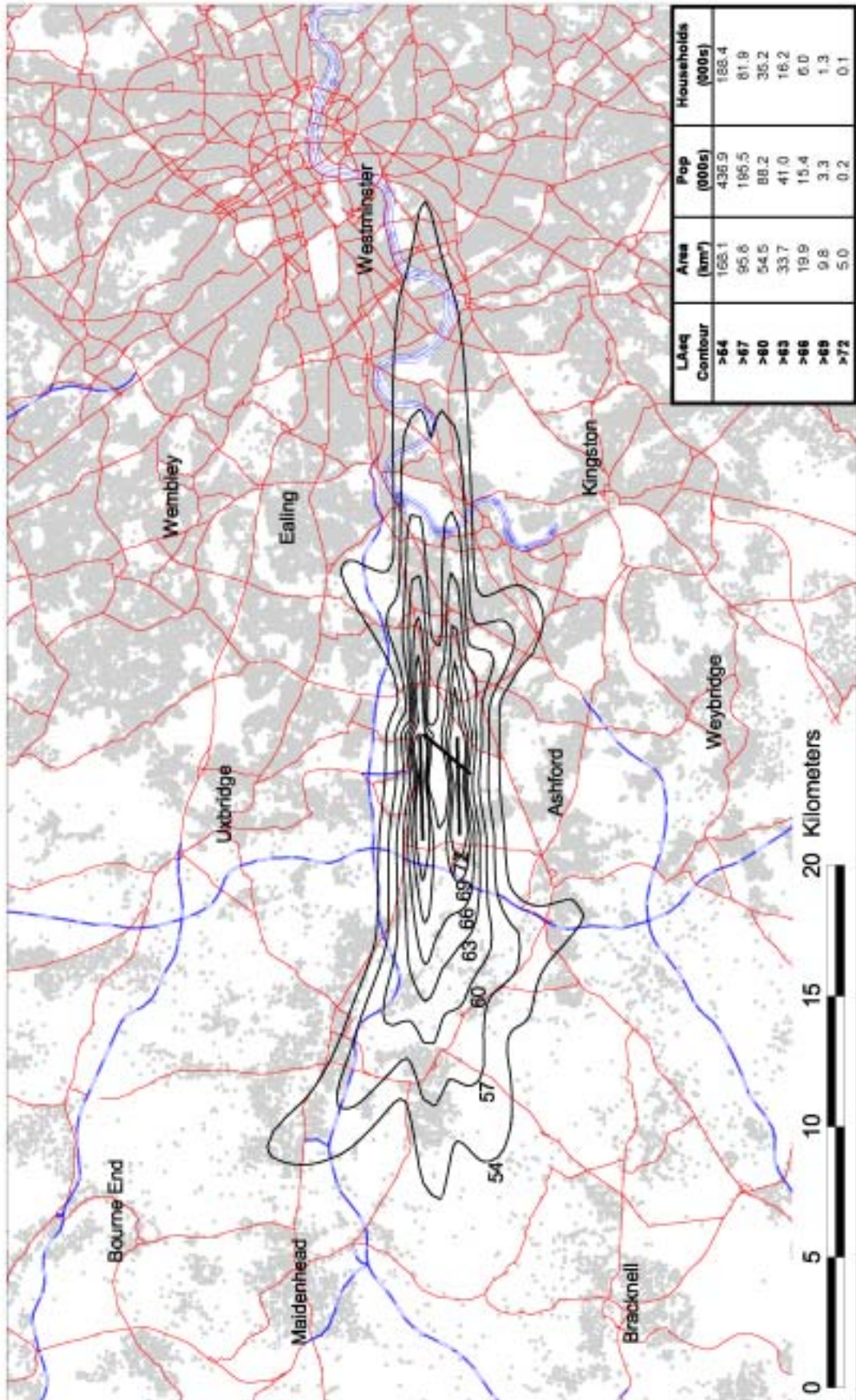


Figure 2.2: Heathrow Airport Year 2015 - Noise contours with a short third runway (original central forecast 655,000 PATMs)

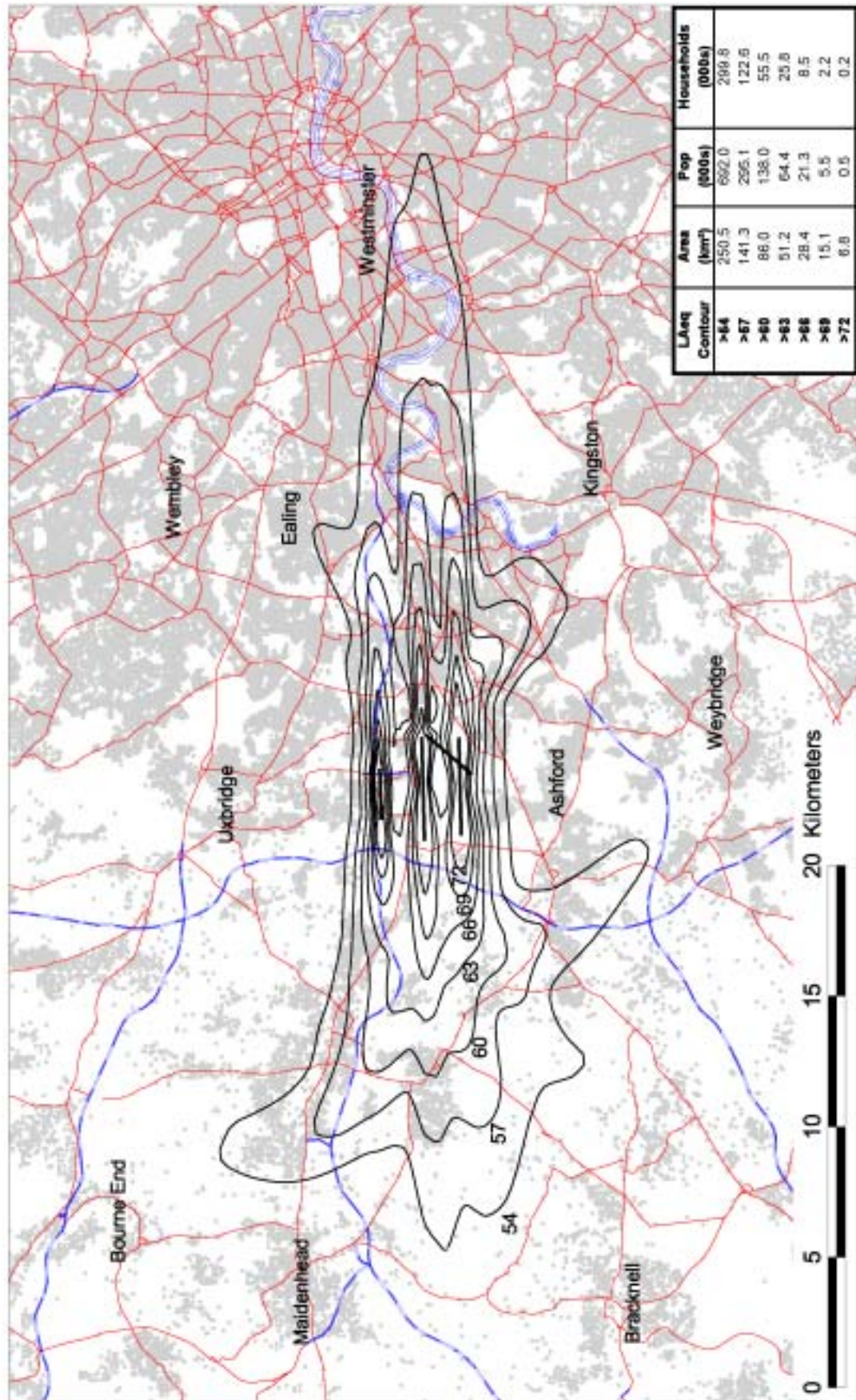


Figure 2.3: London Heathrow Airport Year 2015 - Noise contours with a short third runway (revised central forecast 655,000 PATMs)

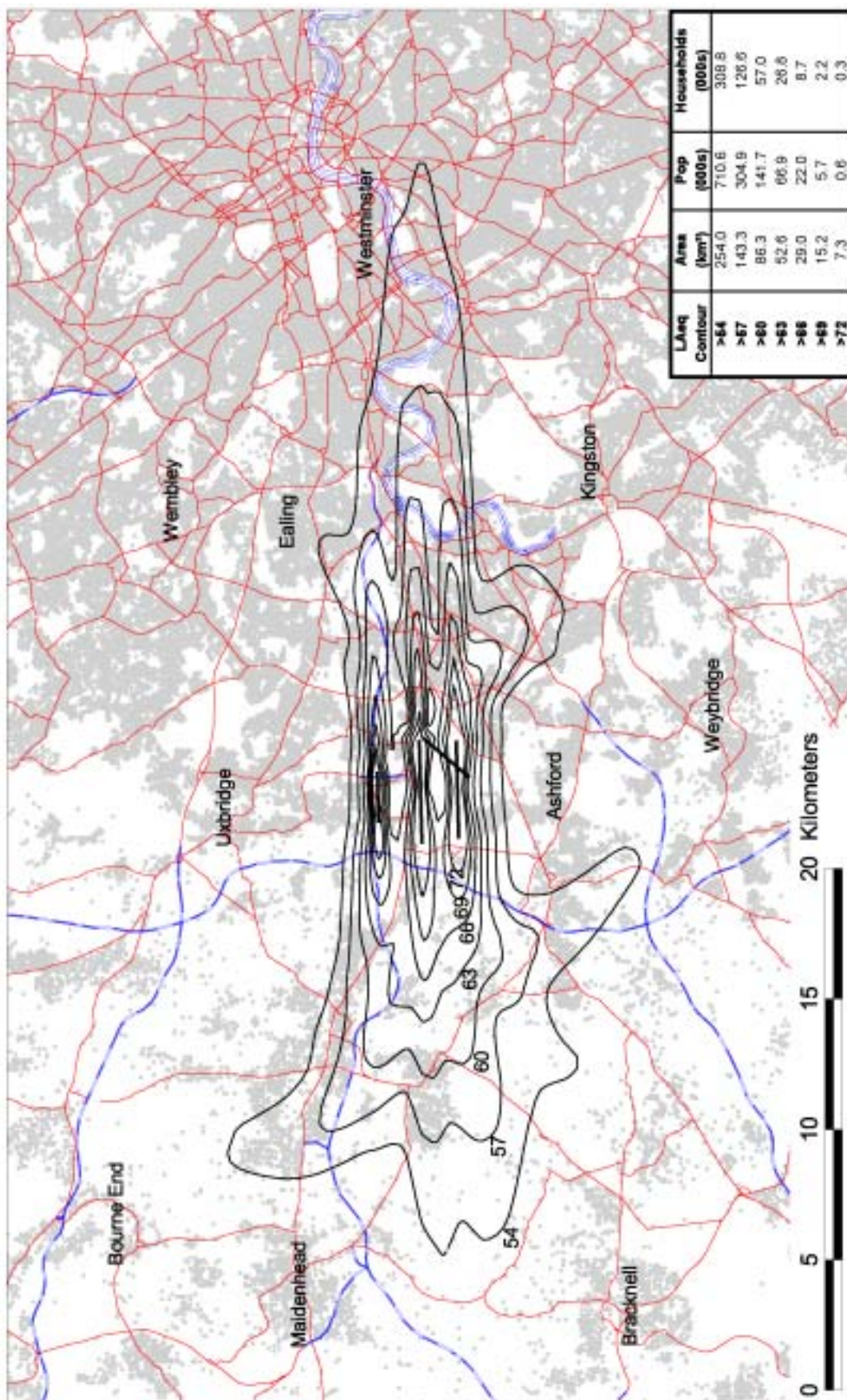


Figure 2.4: London Heathrow Airport Year 2015 - Noise contours with a short third runway (revised low forecast 600,000 PATMs)

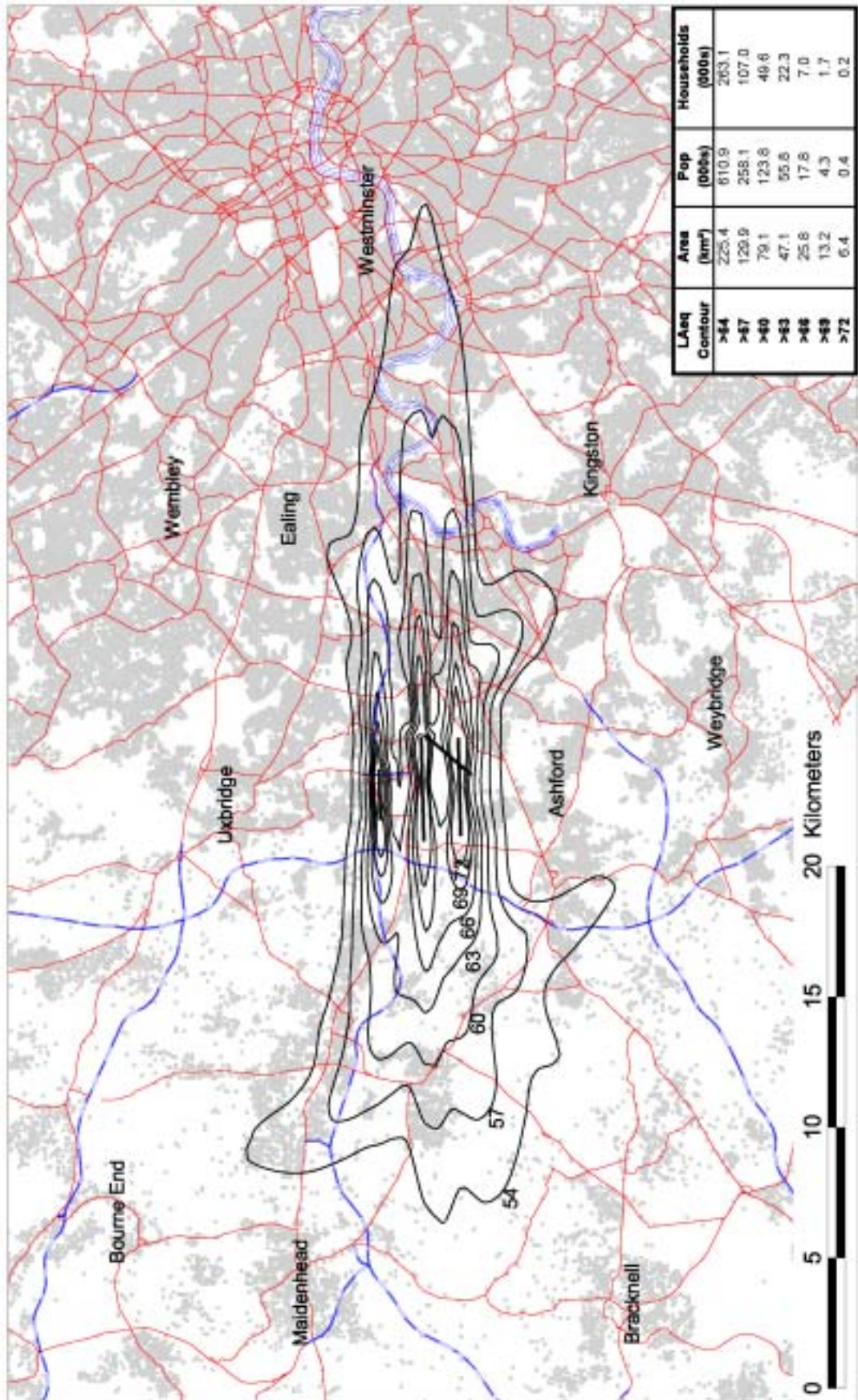


Figure 2.5: London Heathrow Airport Year 2015 - Noise contours with a short third runway (revised high forecast 700,000 PATMs)

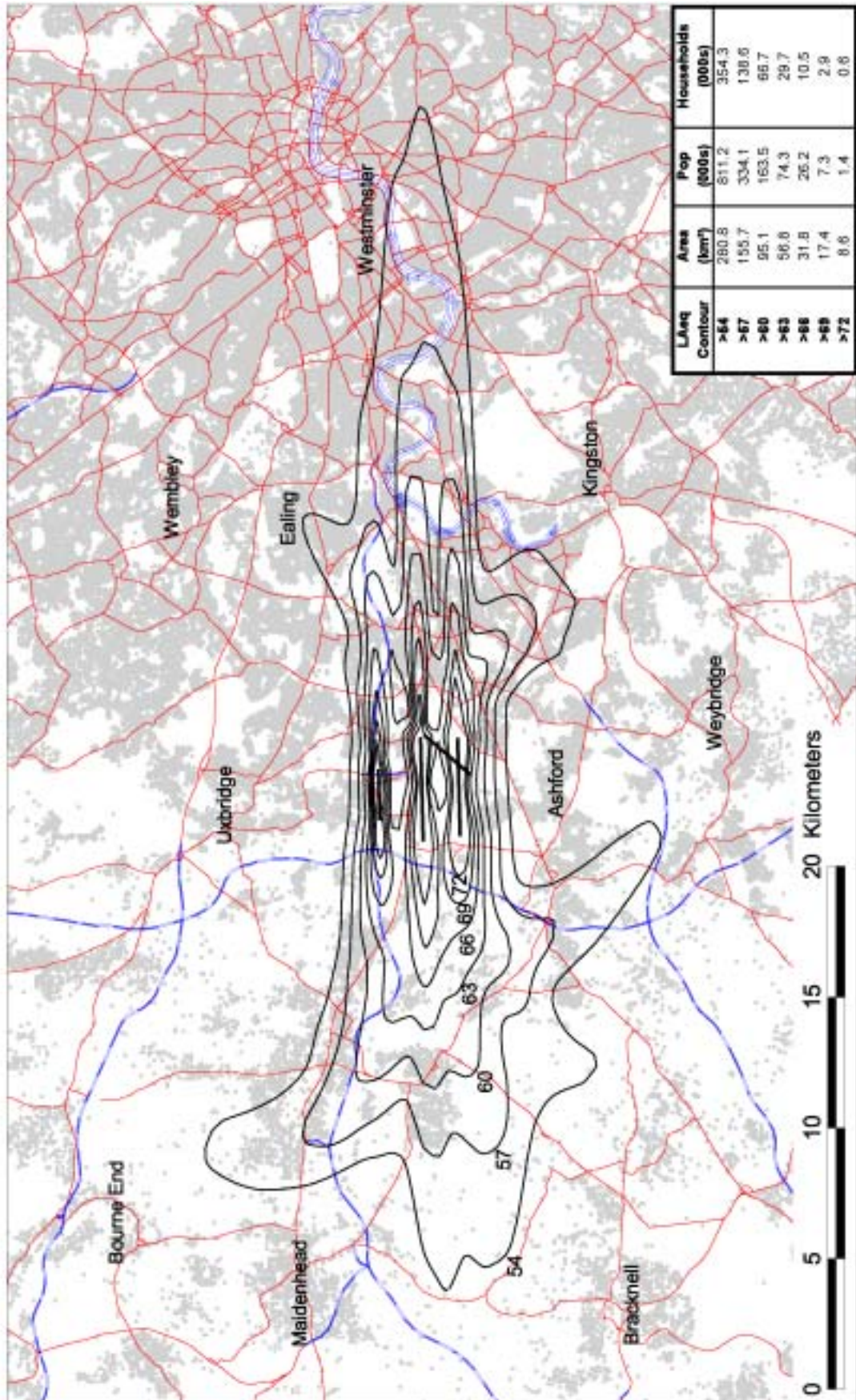


Figure 2.6: London Heathrow Airport Year 2010 - Noise contours for existing runways with mixed-mode (revised forecast 515,000 PATMs)

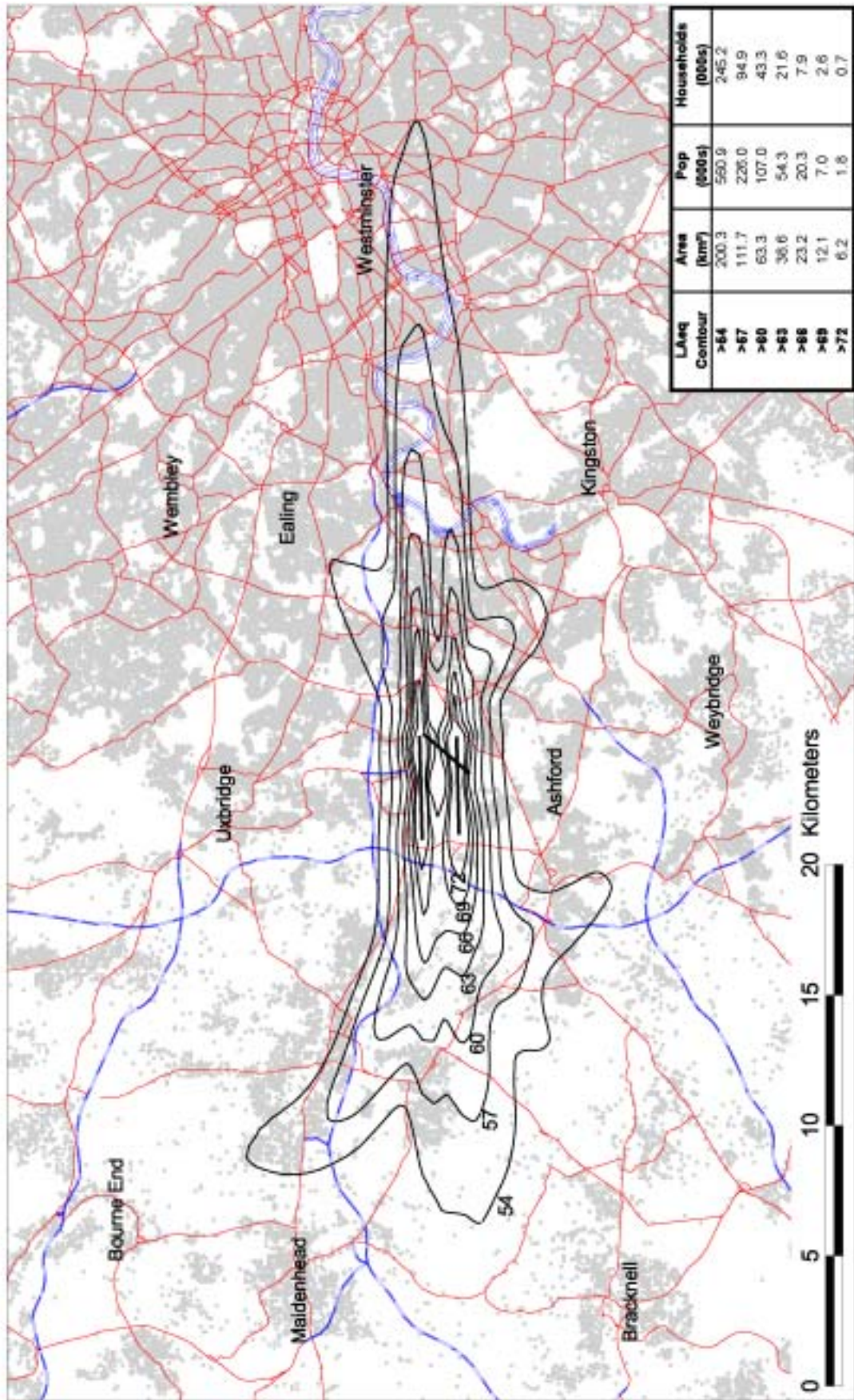


Figure 2.7: London Heathrow Airport Year 2015: Noise contours with a short third runway, existing southern runway used for departures only, existing northern runway used for arrivals only (revised forecast 550,000 PATMs)

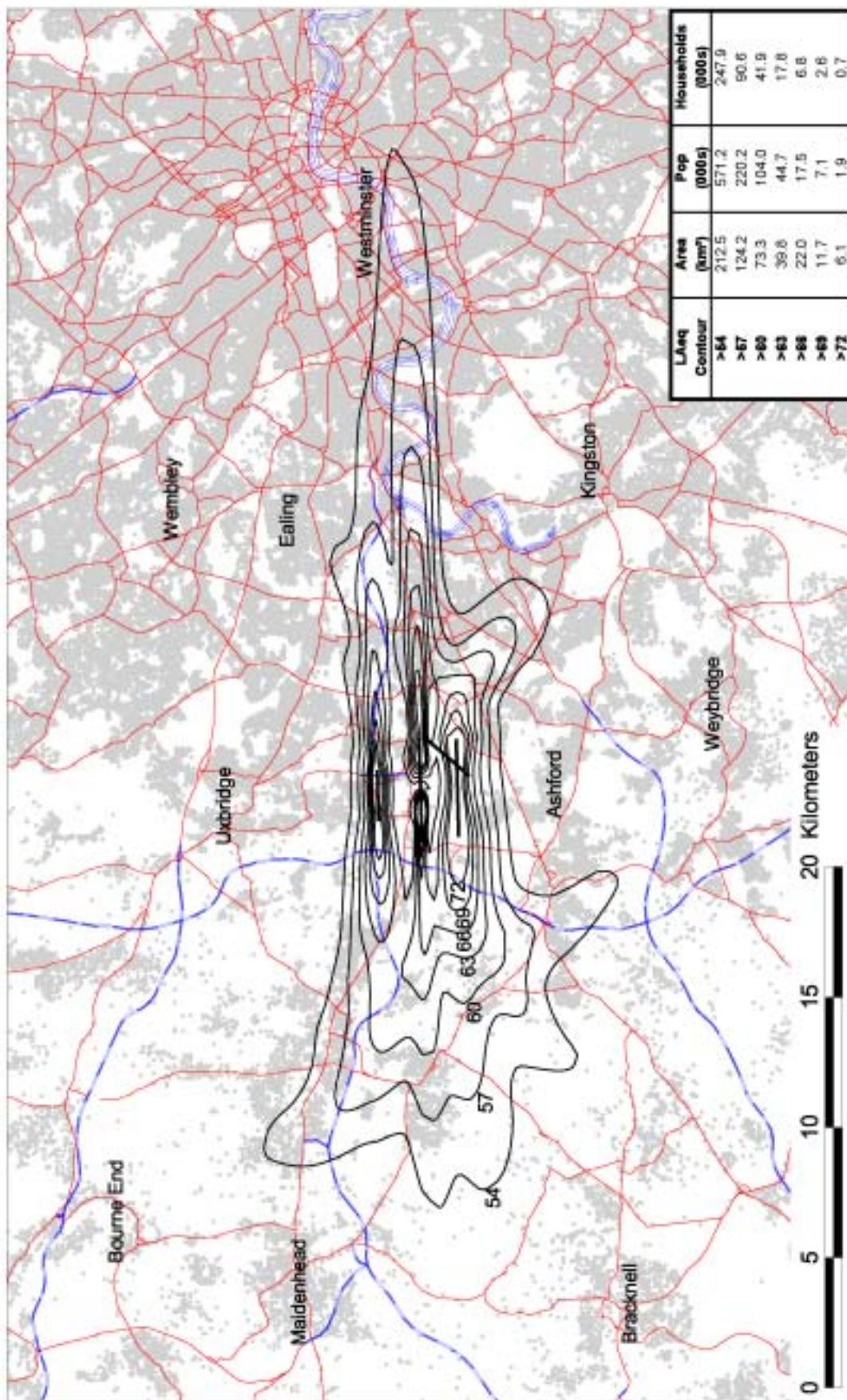


Figure 2.8: London Heathrow Airport Year 2015: Noise contours with a short third runway, existing southern runway, existing southern runway used for departures only, including a displaced start of roll on 27L for smaller aircraft types, existing northern runway used for arrivals only (revised forecast 550,000 PATMs)

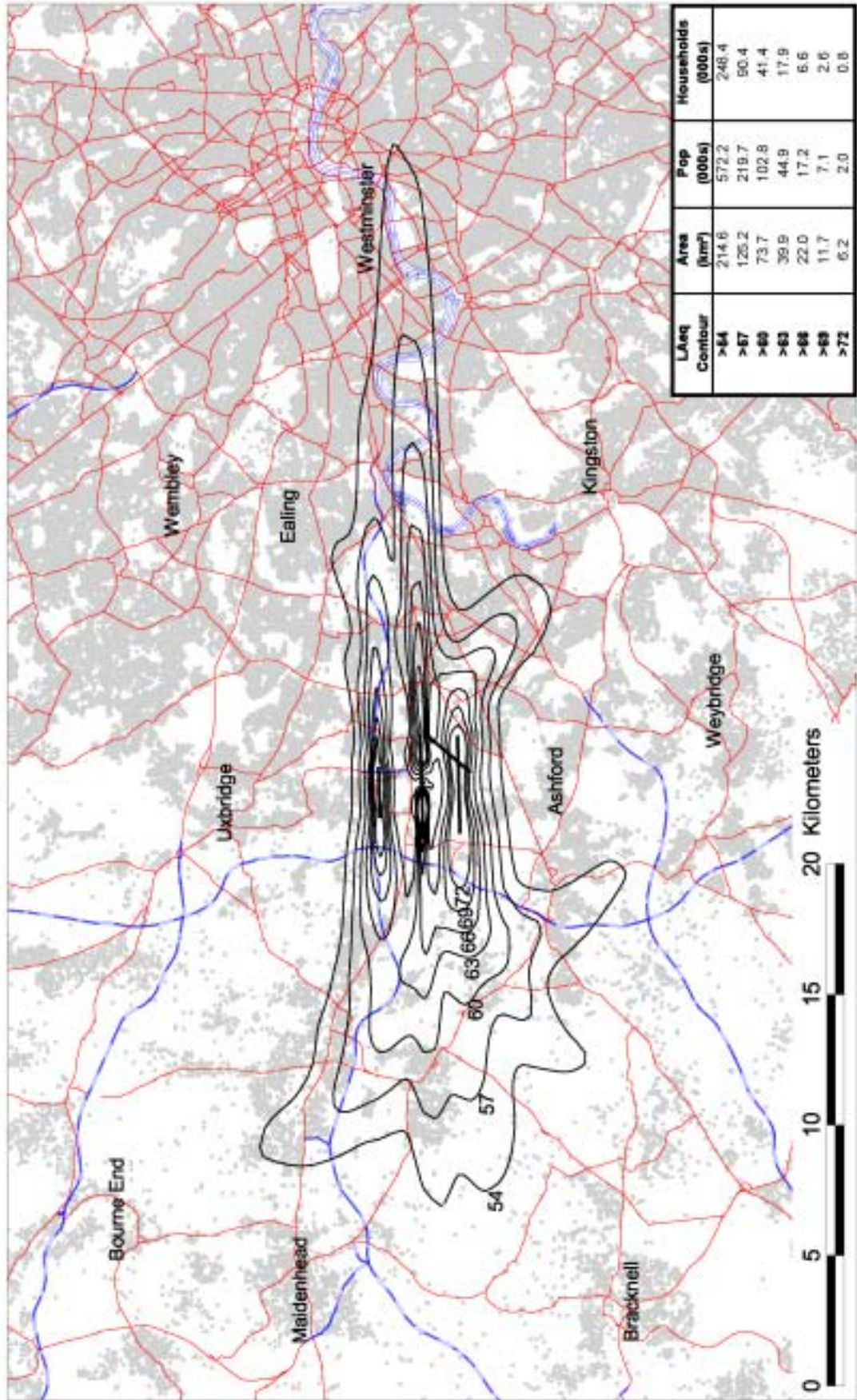


Figure 2.9: London Heathrow Airport Year 2020 - Noise contours with a short third runway, existing southern runway, existing northern runway for departures only, existing northern runway for arrivals only (revised forecast 550,000 PATMs)

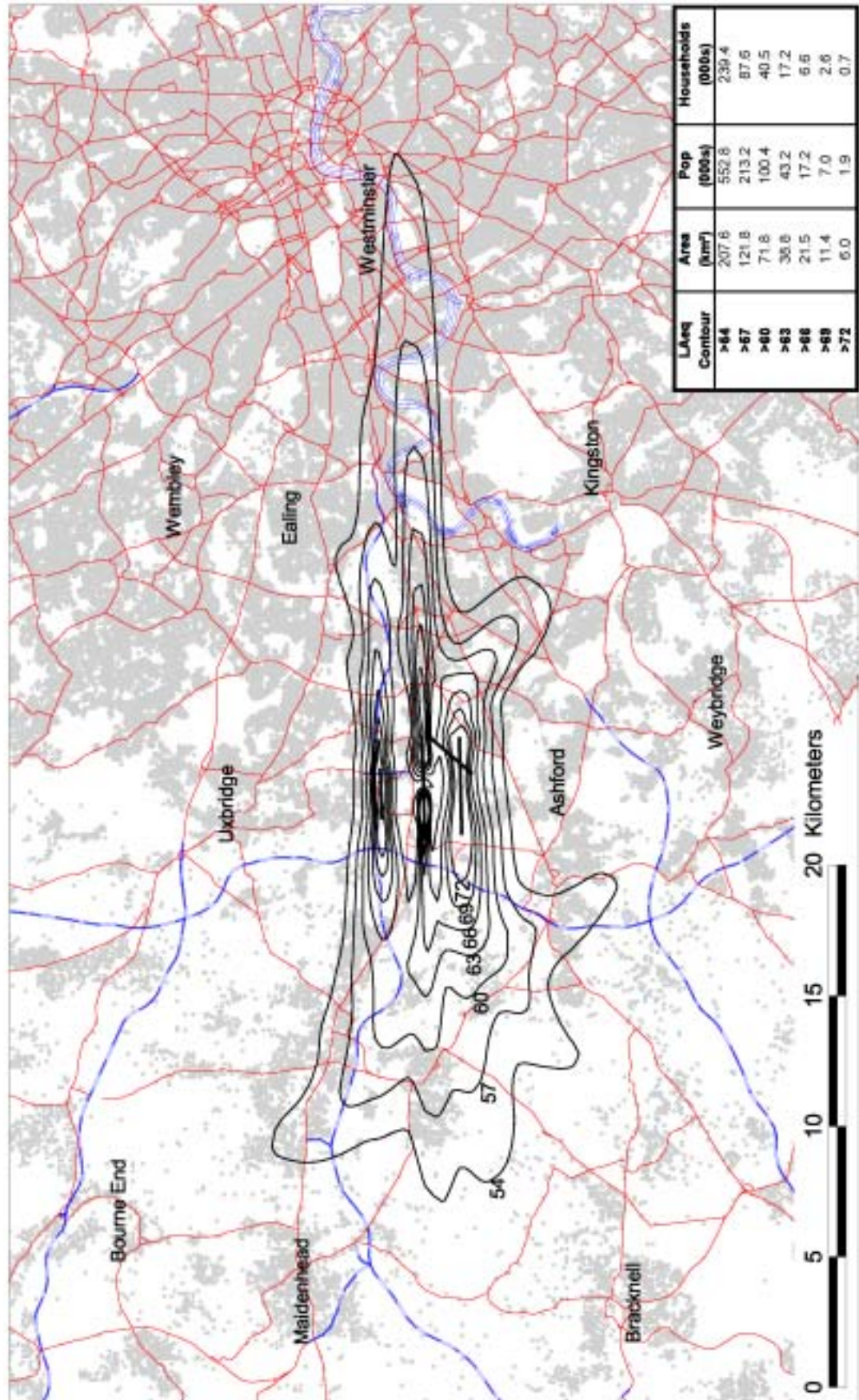


Figure 2.10: London Heathrow Airport Year 2020 - Noise contours with a short third runway, existing southern runway used for departures only, existing northern runway used for arrivals only (revised forecast 600,000 ATMs)

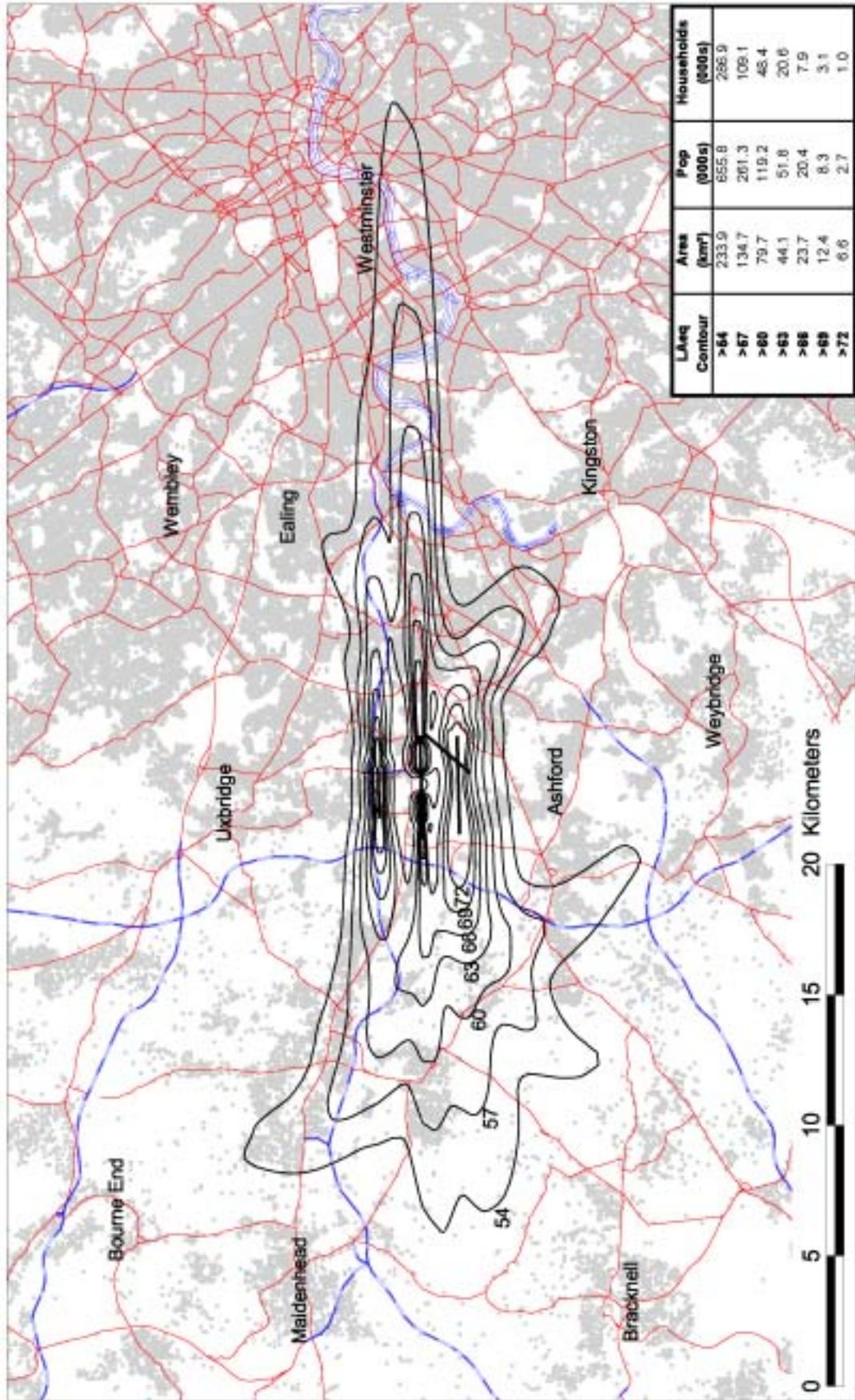


Figure 2.11: London Heathrow Year 2015 - Noise contours with a short third runway and Chapter 3 -10dB operating restriction (revised central forecast 655,000 PATMs)

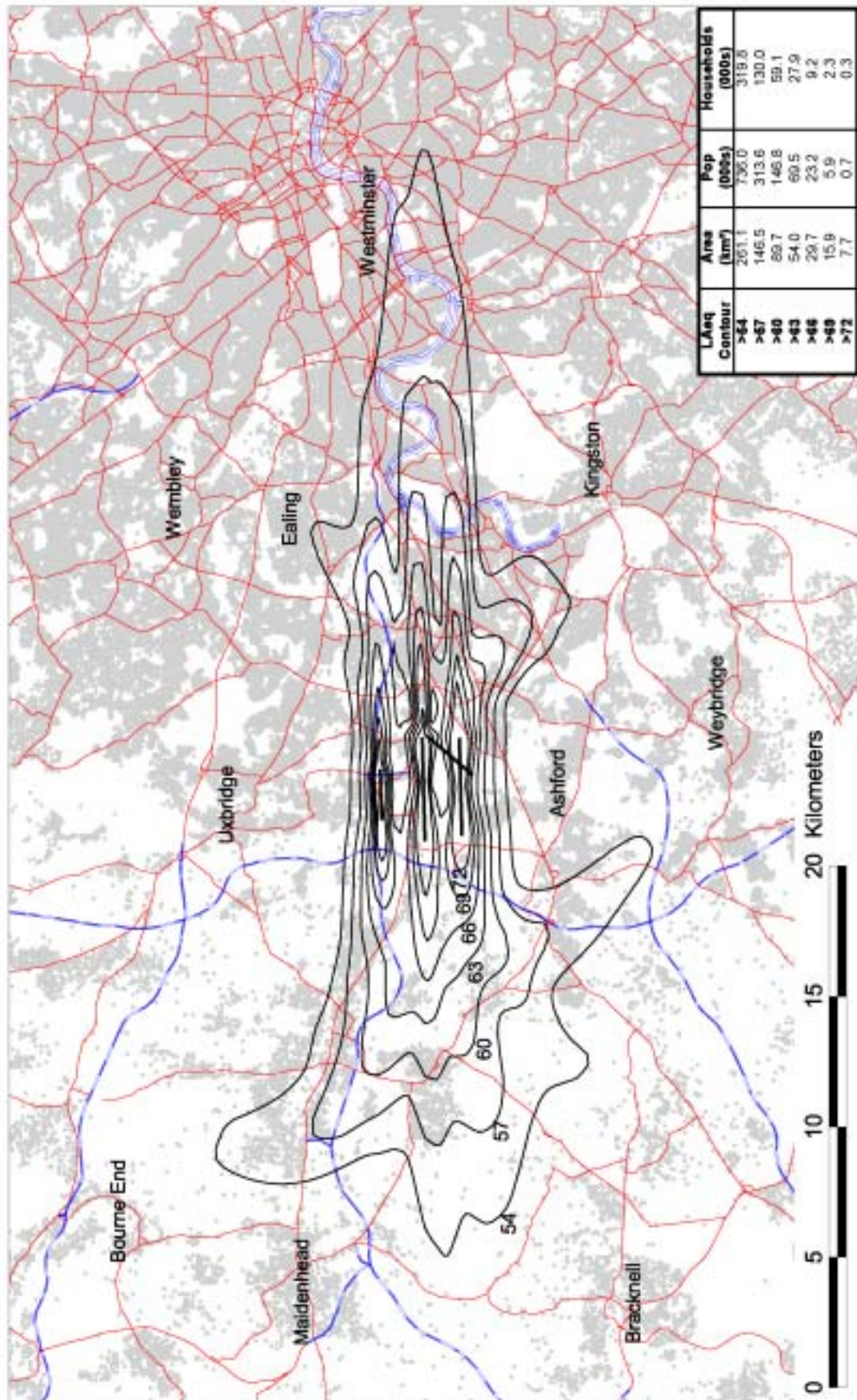


Figure 3.1: London Gatwick Year 2015 - Noise contours with maximum use of existing runways (original forecast 260,000 PATMs)

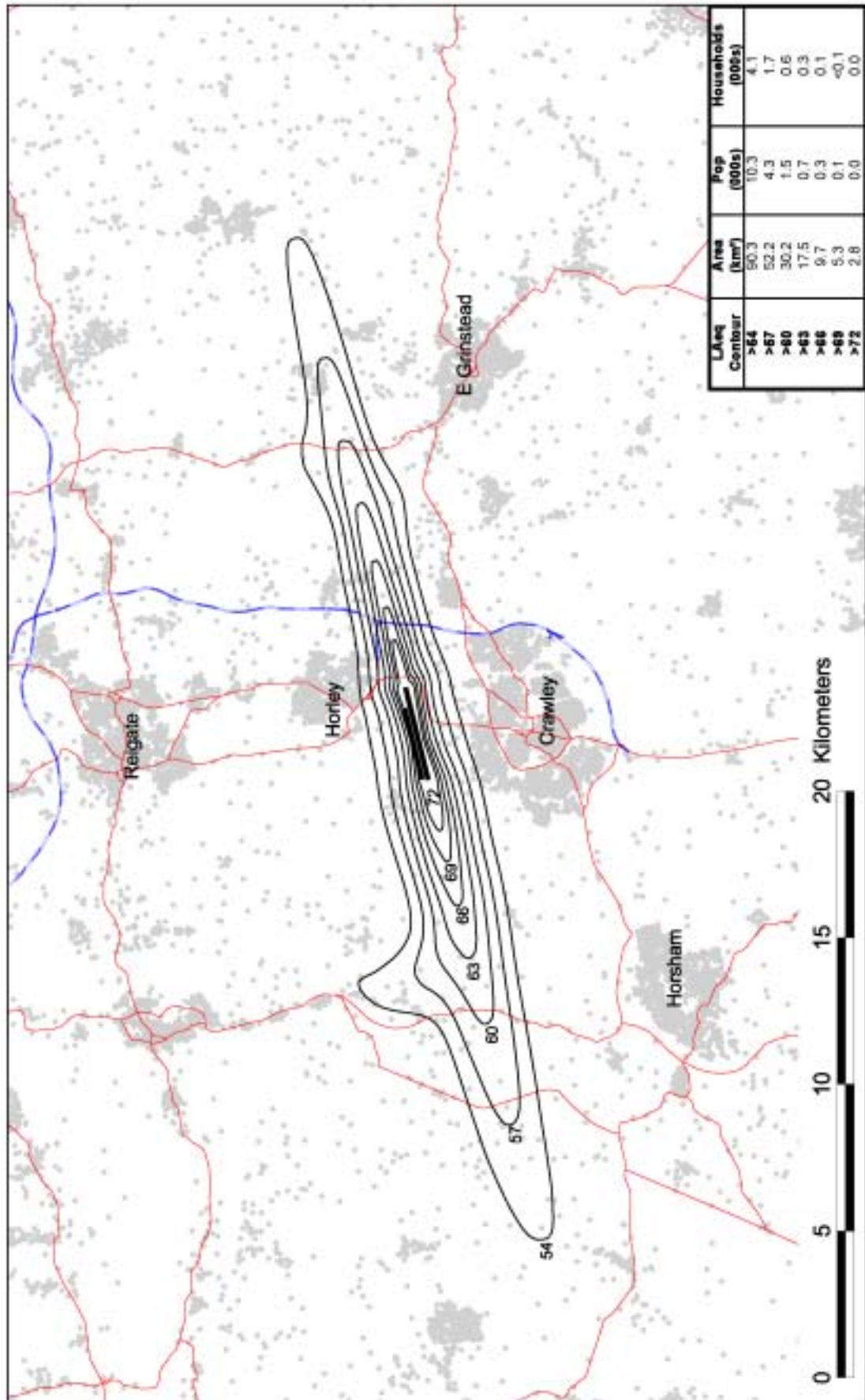


Figure 3.2: London Gatwick Year 2015 - Noise contours with wide-spaced parallel runway (original forecast 486,000 PATMs)

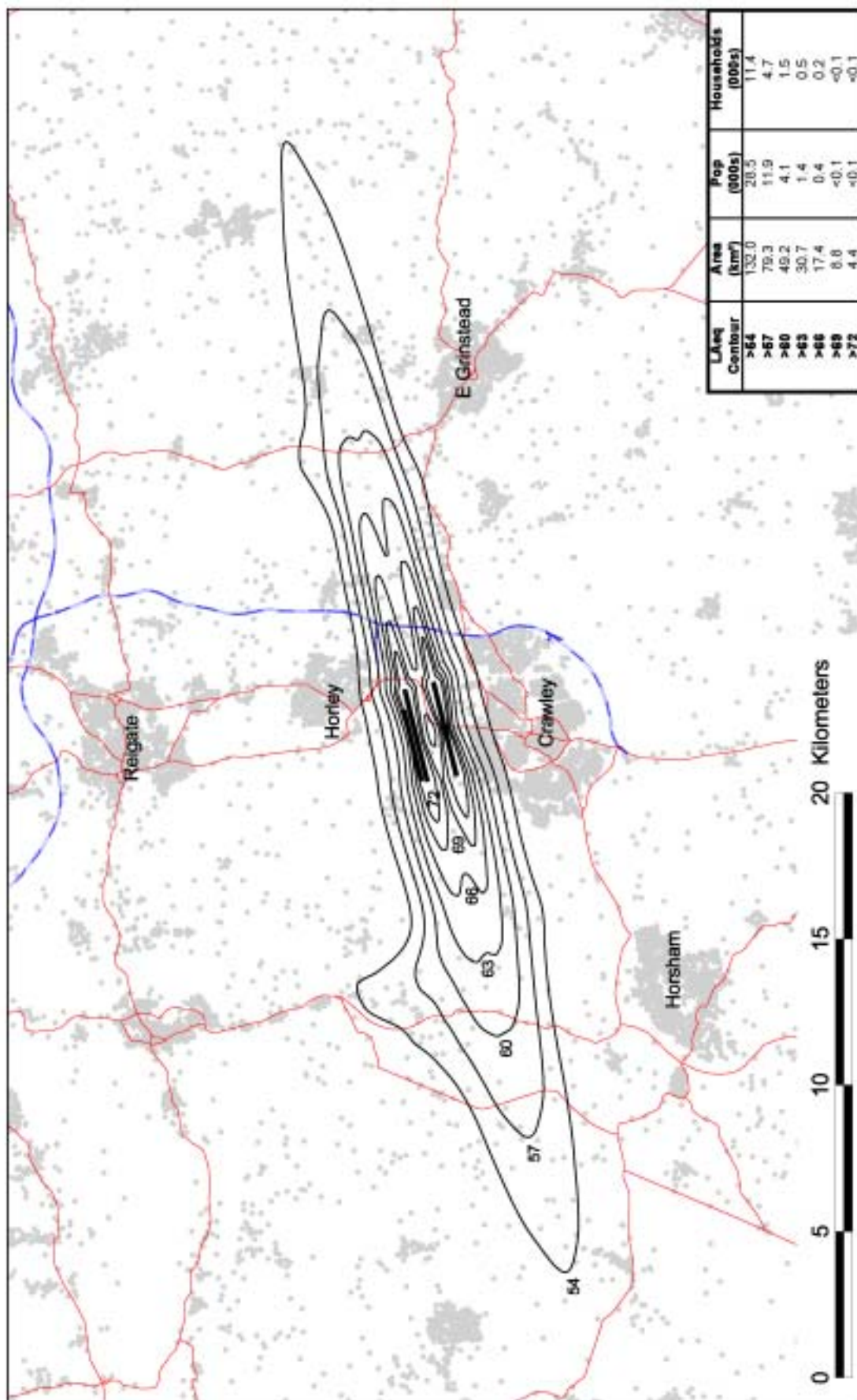


Figure 3.3: London Gatwick Year 2030 - Noise contours with close-spaced parallel runway (original forecast 378,000 PATMs)

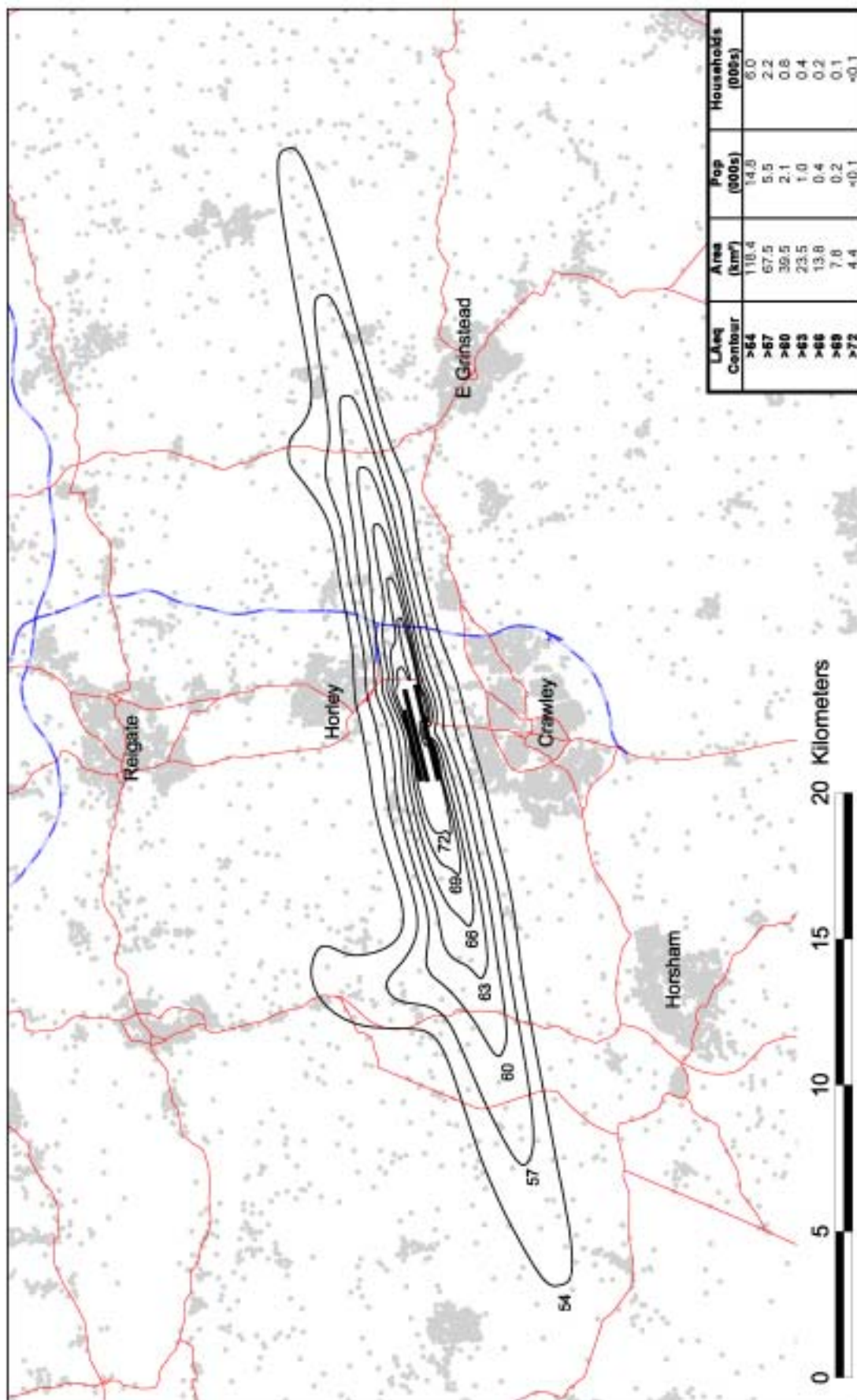


Figure 3.4: London Gatwick Year 2030 - Noise contours with wide-spaced parallel runway (original forecast 486,000 PATMs)

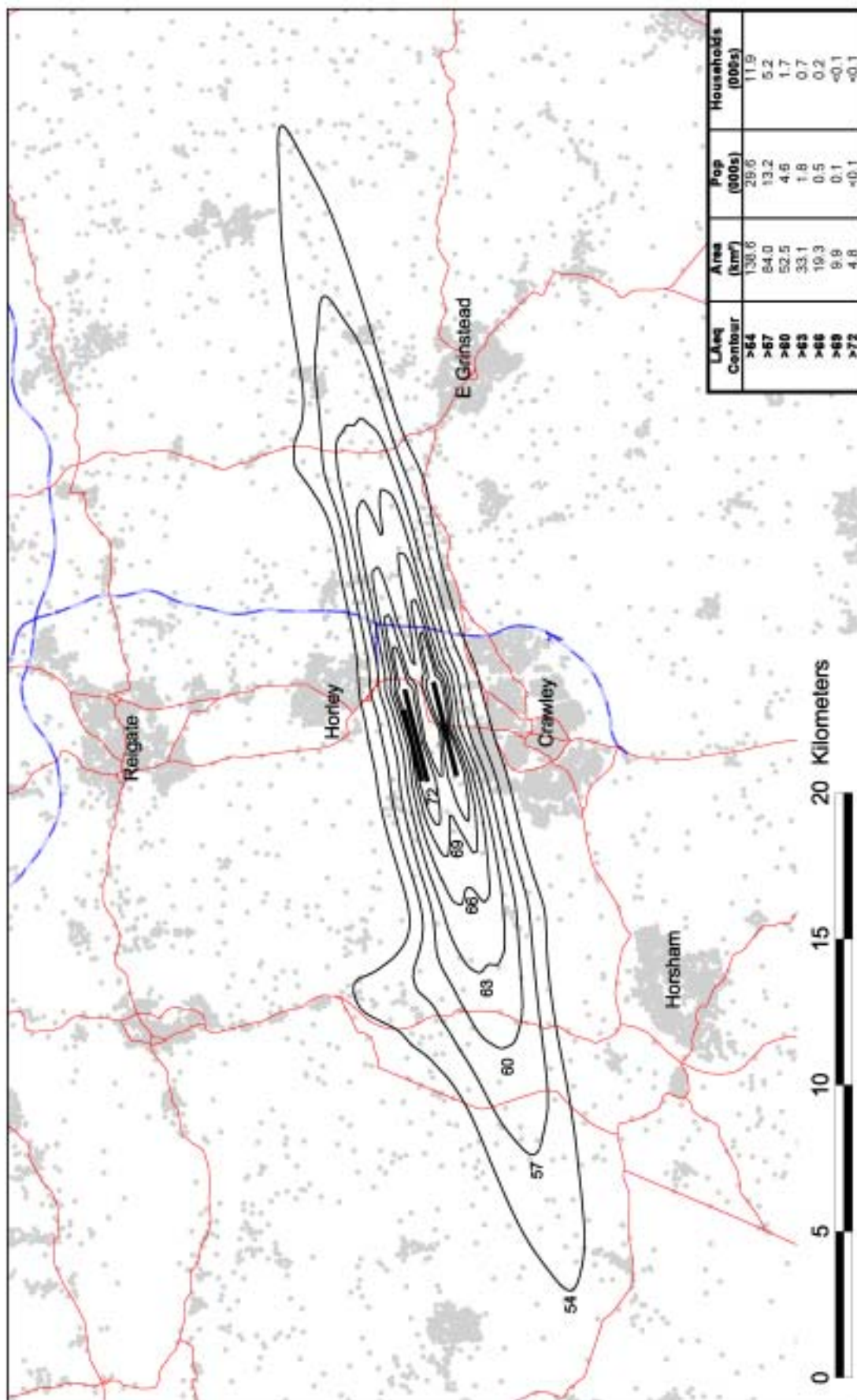


Figure 4.1: London Stansted Year 2015 - Noise contours with wide-spaced parallel runway (corrected forecast, 492,000 PATMs)

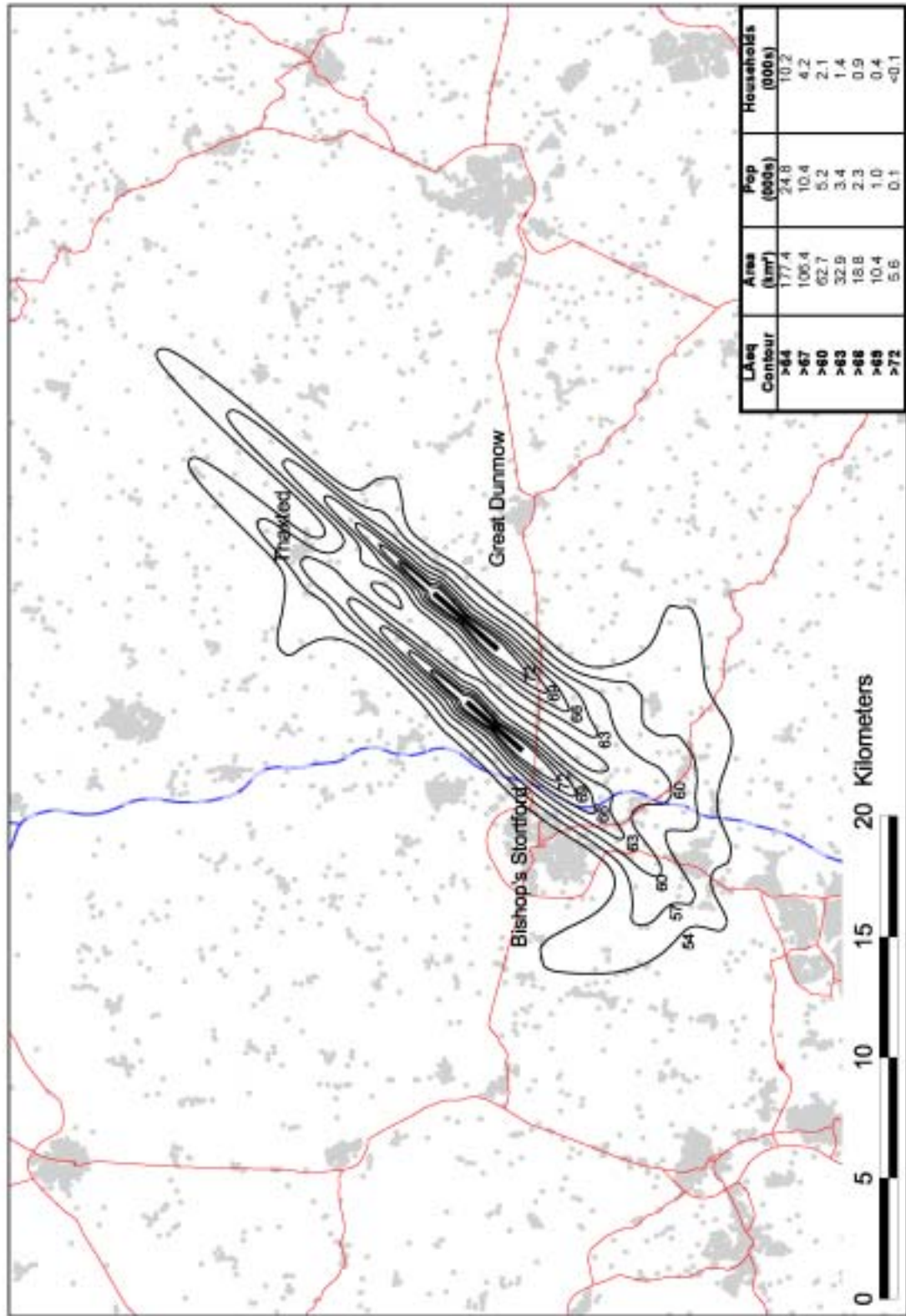


Figure 4.2: London Stansted Year 2030 - Noise contours with wide-spaced parallel runway (corrected forecast, 492,000 PATMs)

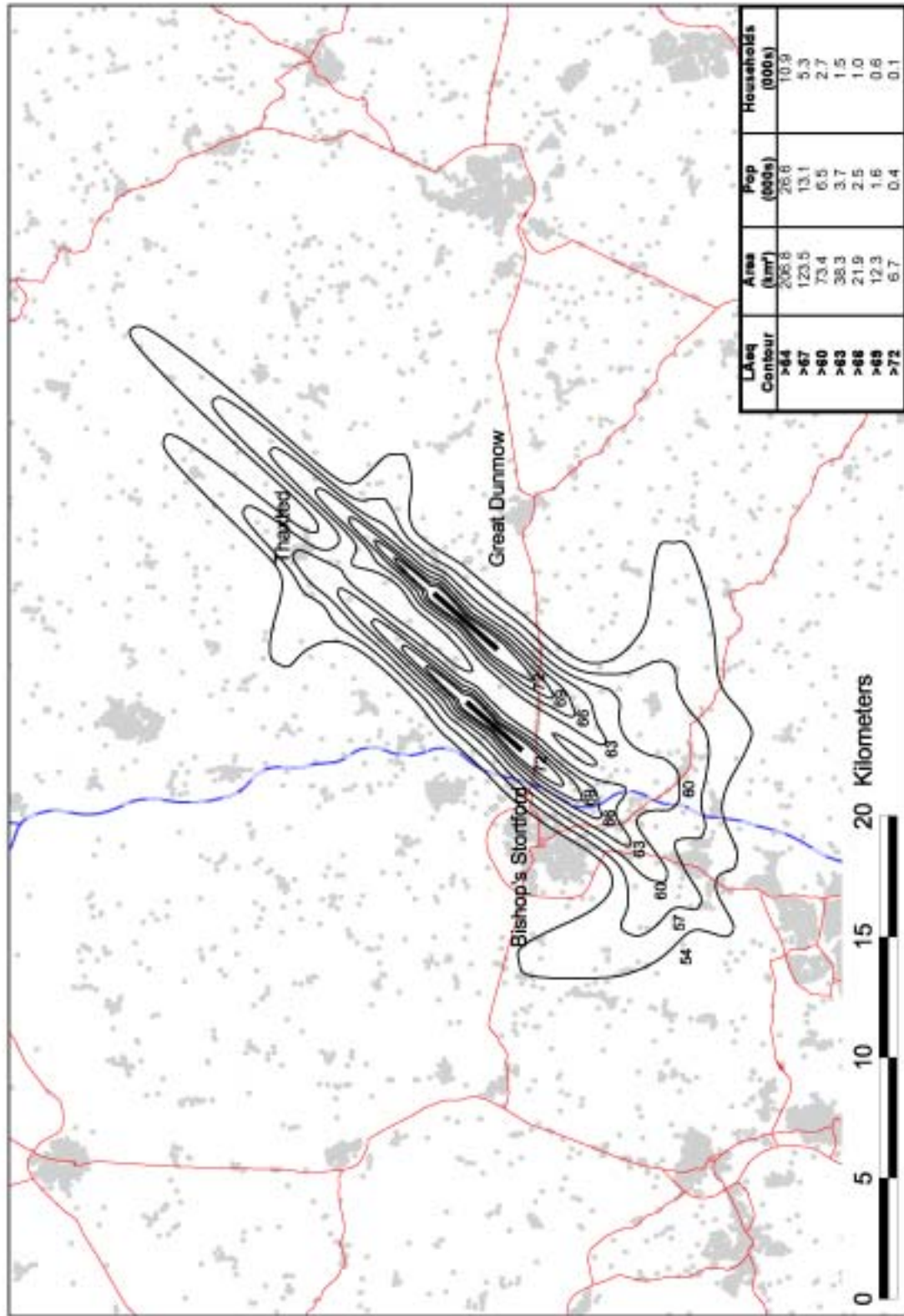


Figure 4.3: London Stansted Year 2015 - Noise contours with maximum use of existing runway (original forecast 227,000 PATMs)

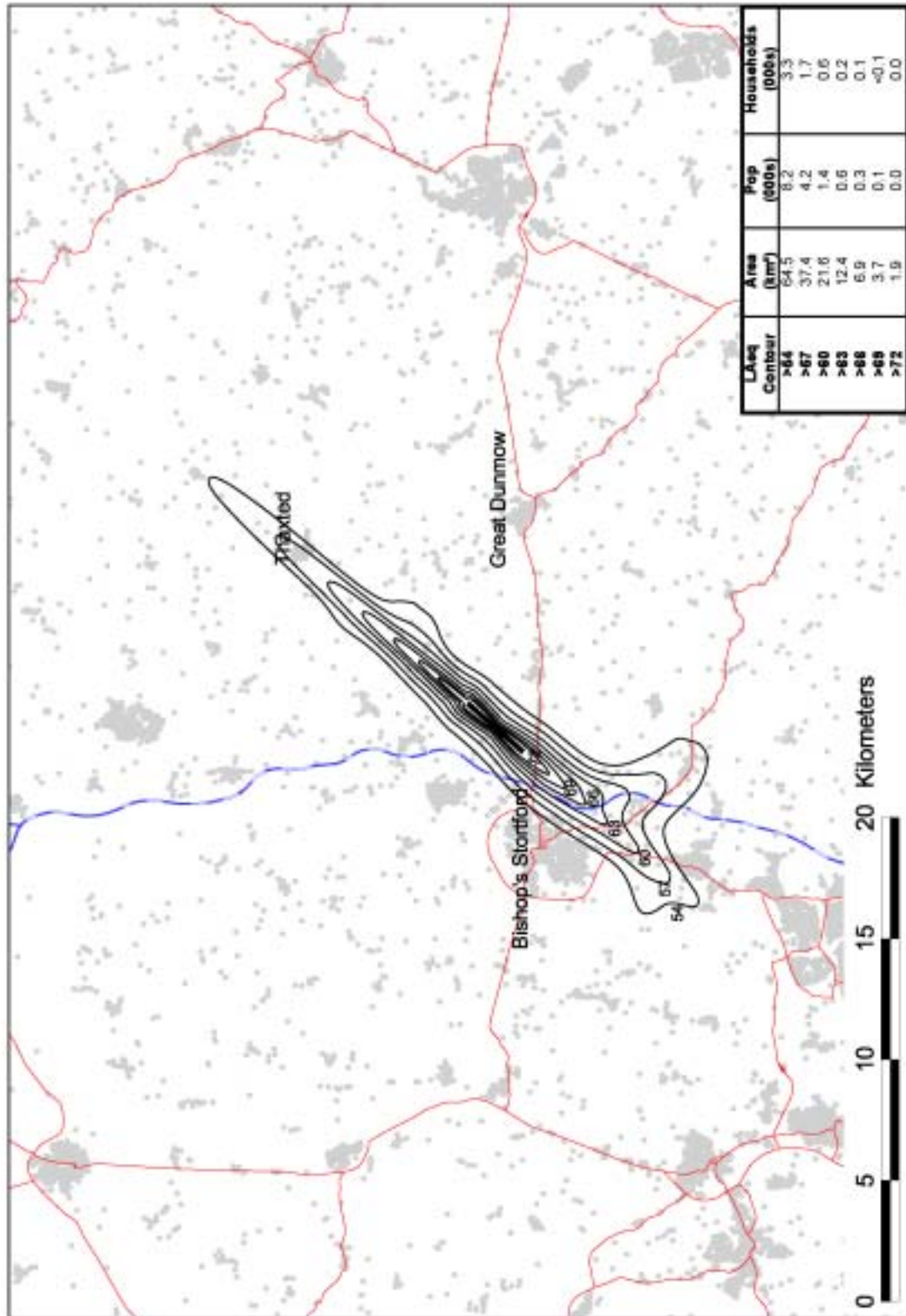


Figure 4.4: London Stansted Year 2030 - Noise contours with two additional runways (original forecast 624,000 PATMs)

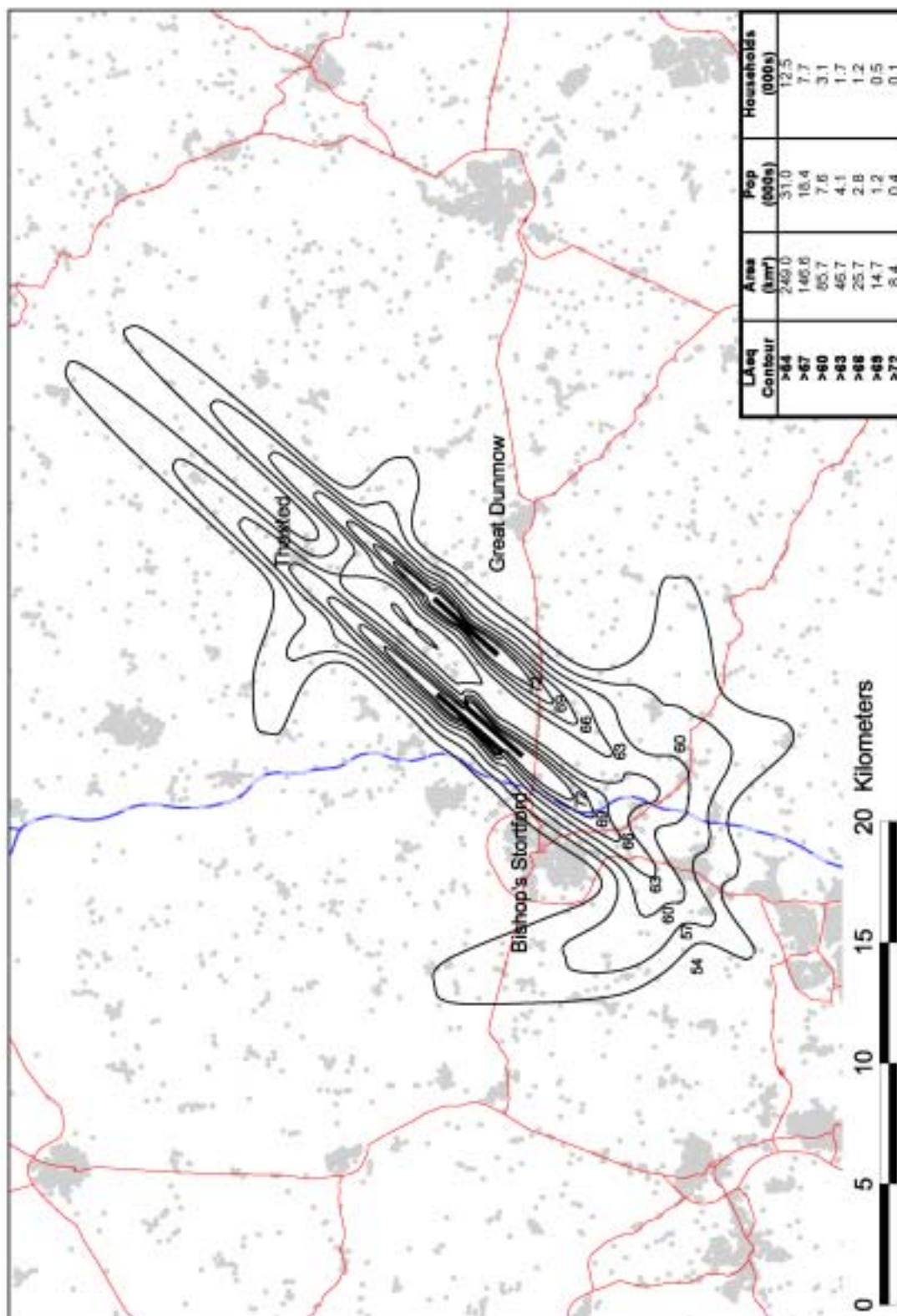


Figure 4.5: London Stansted Year 2015 - Noise contours with wide-spaced parallel runway (revised (unseeded) forecast 456,000 PATMs)

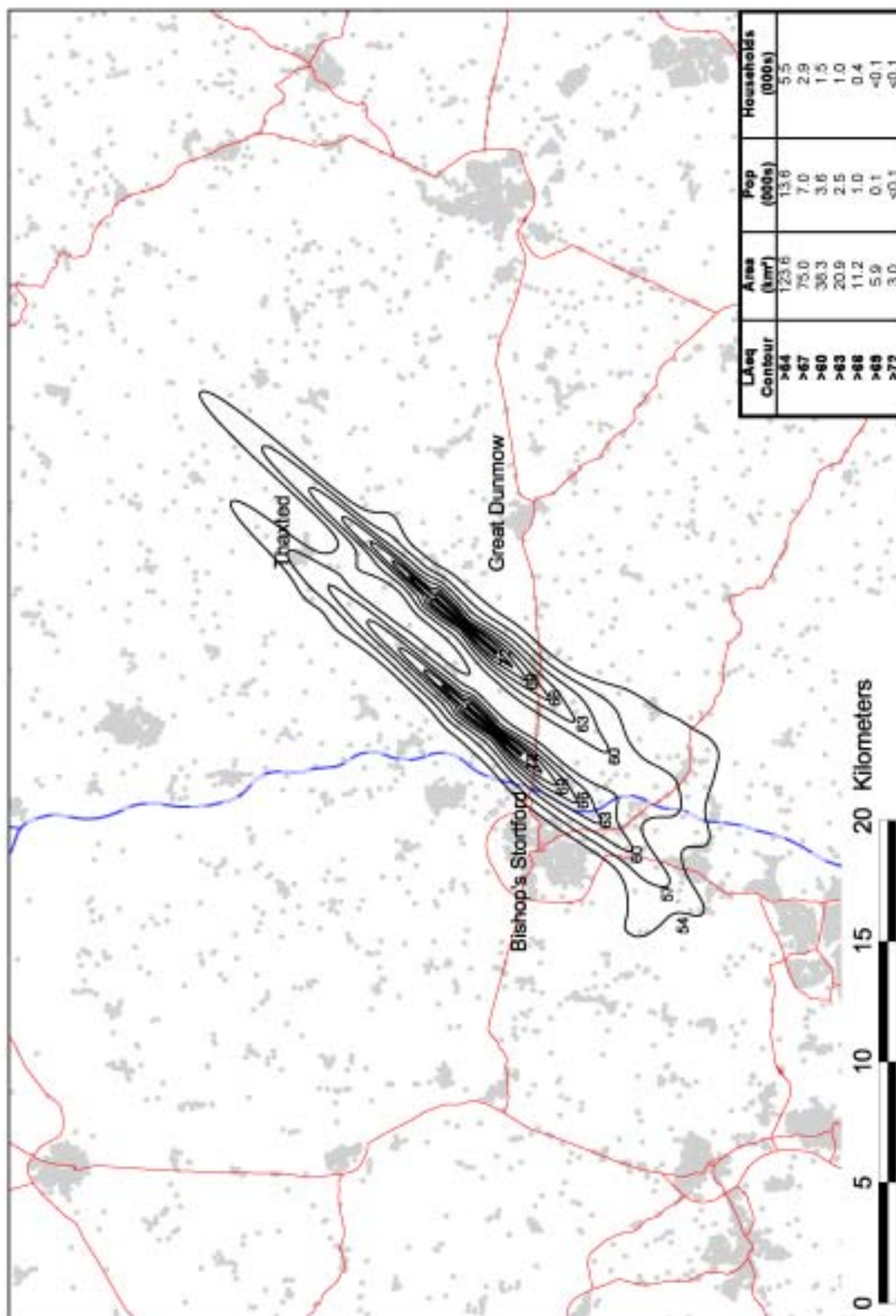


Figure 4.6: London Stansted Year 2030 - Noise contours with wide-spaced parallel runway (revised (unseeded) forecast 513,000 PATMs)

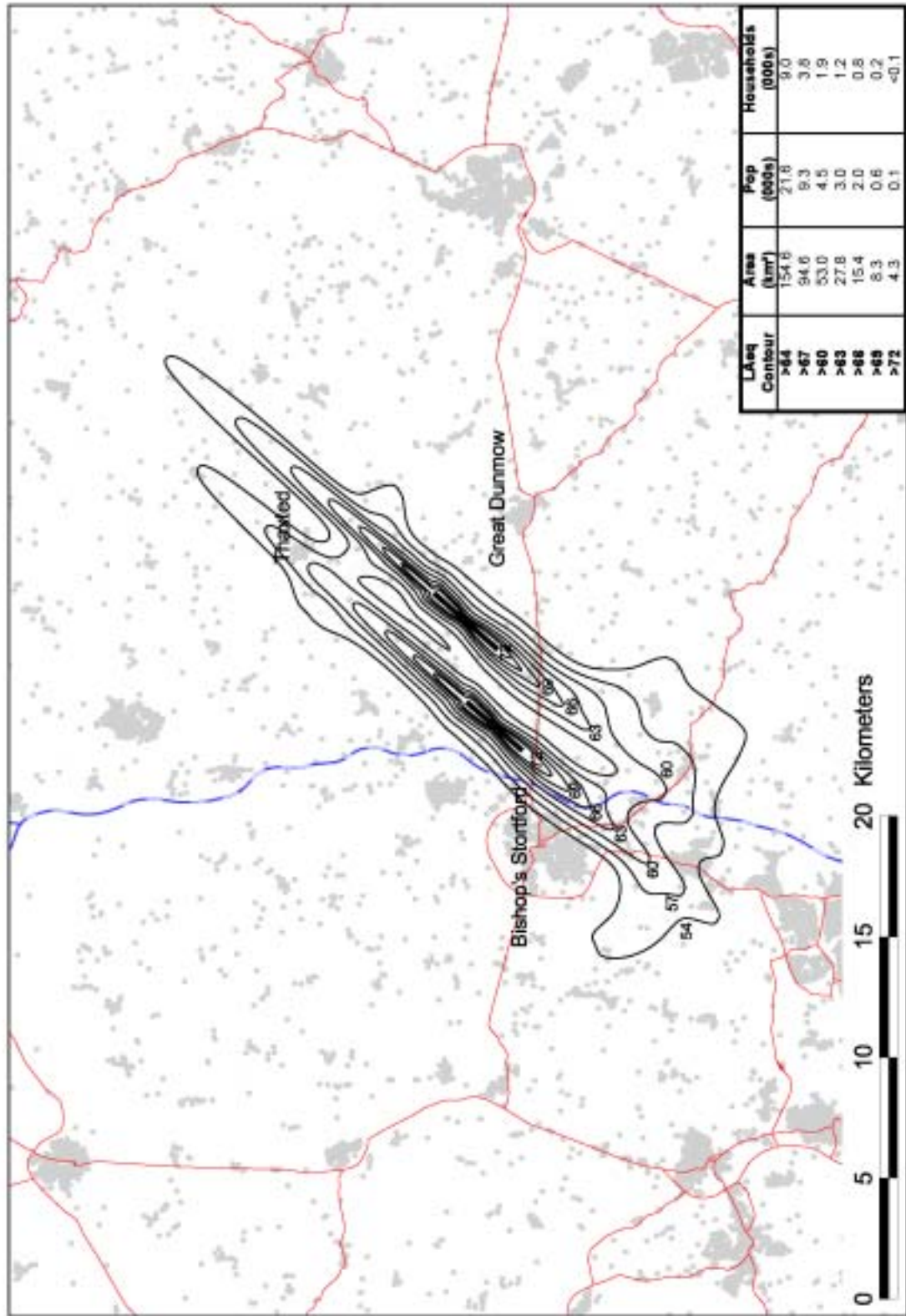


Figure 5.1: Luton Year 2015 - Noise contours for Option 2 (new 3,000m runway, 200m south of existing runway) (original forecast 240,000 PATMs)

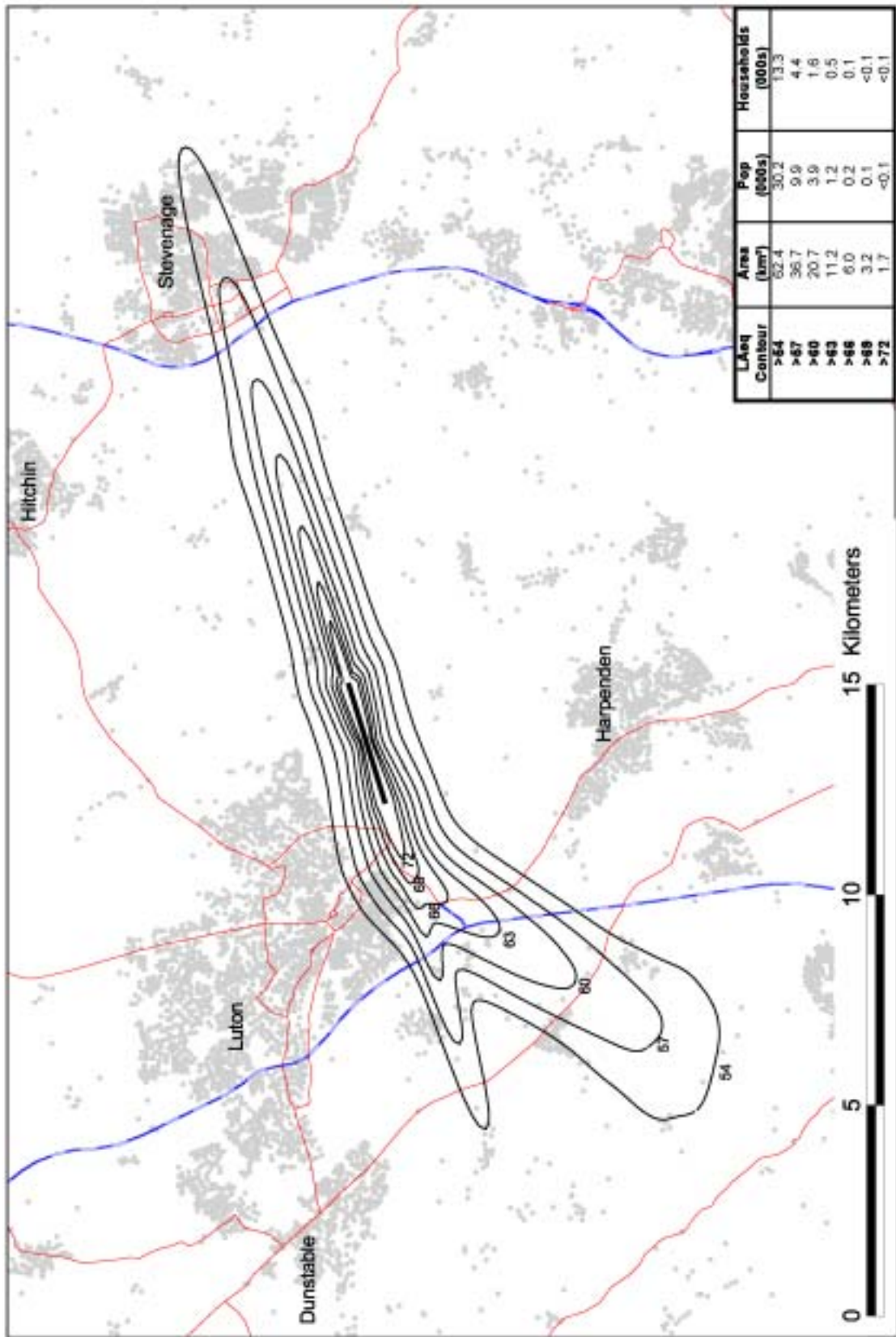


Figure 5.2: Luton Year 2015 - Noise contours with existing runway extended to 3,000m (original forecast 240,000 PATMs)

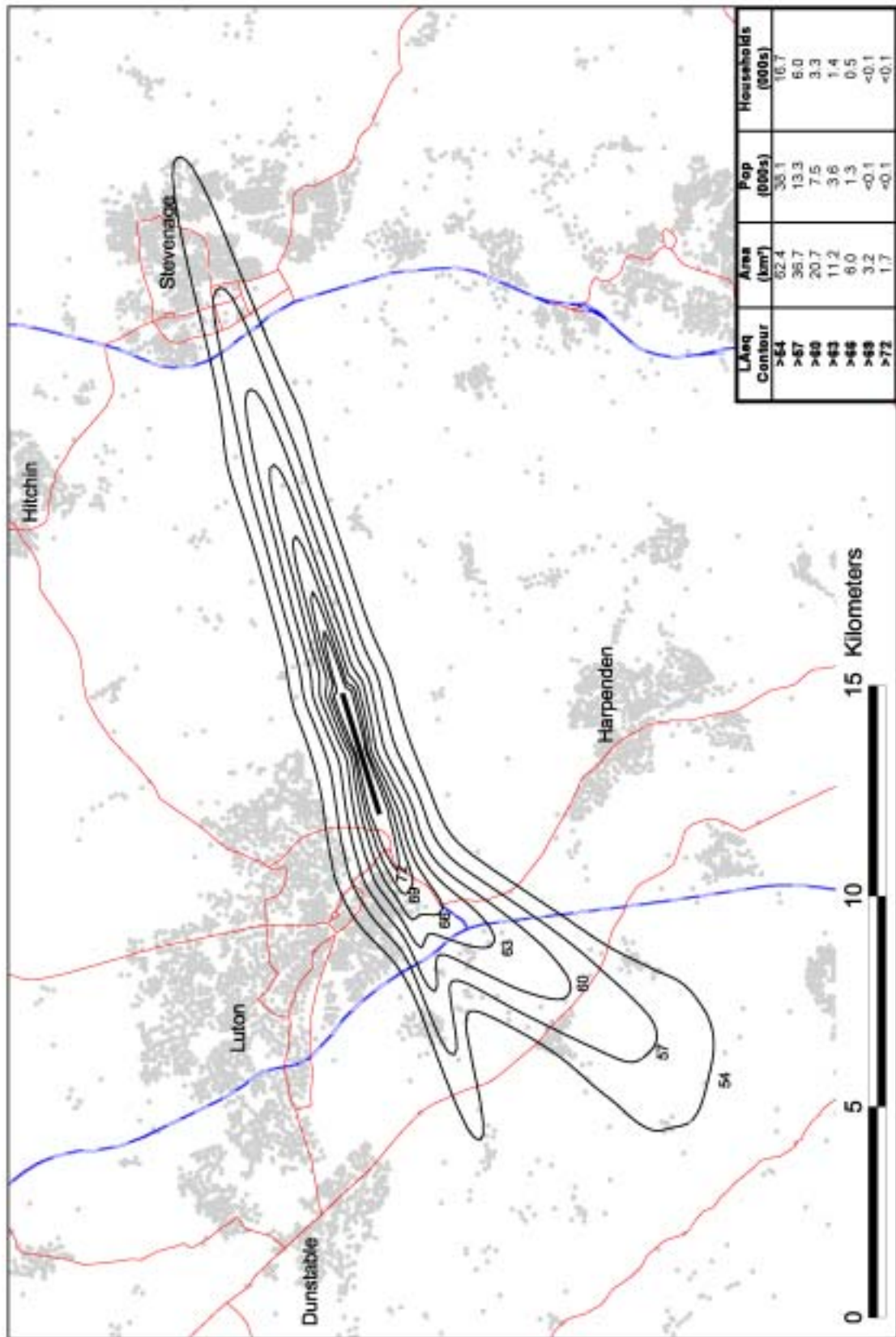


Figure 6.1: Birmingham Year 2020 - Noise contours with short wide-spaced runway (revised forecast 315,000 PATMs)

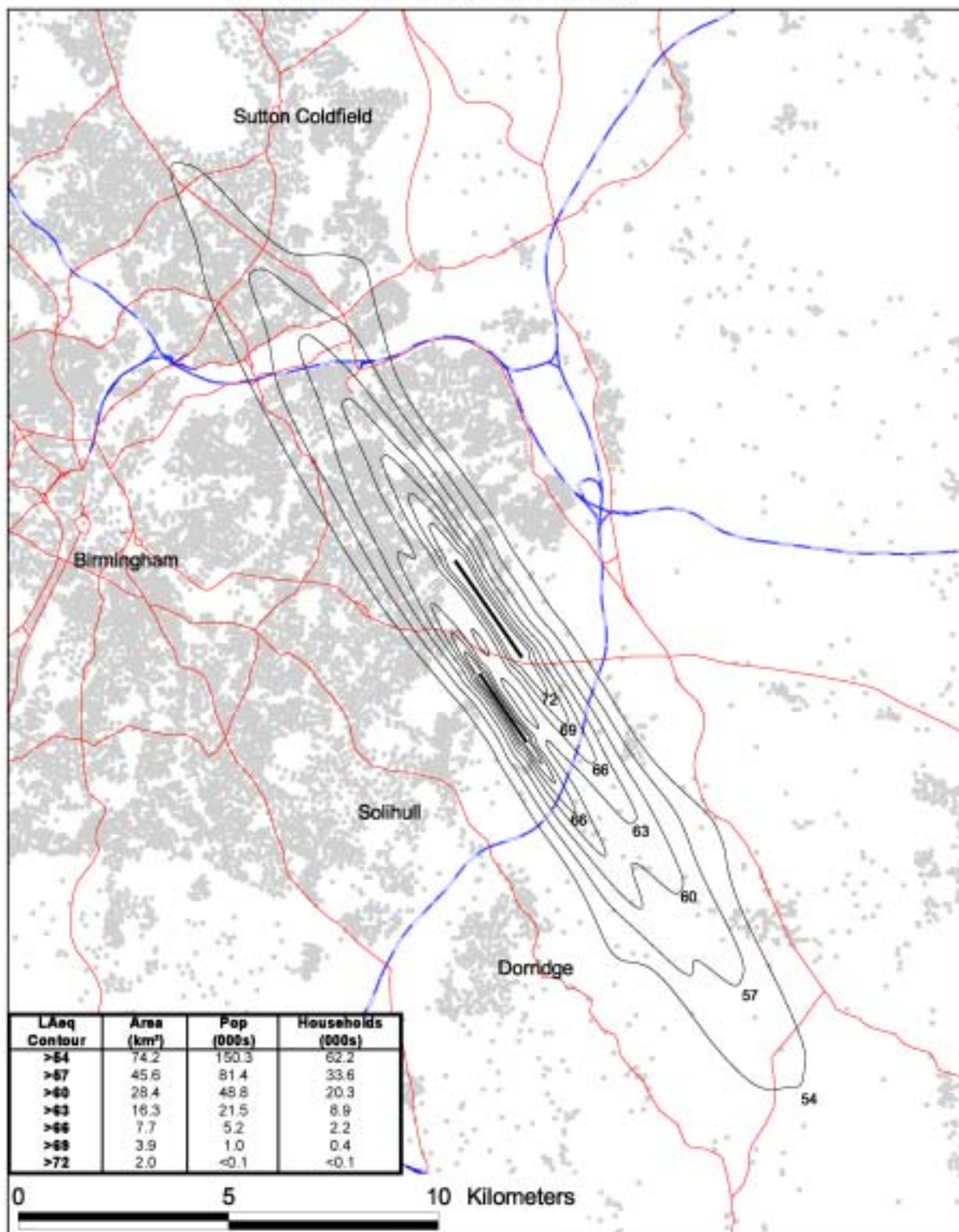


Figure 7.1: Manchester Year 2030 - Noise contours with segregated mode (55mppa)
(revised forecast 367,000 PATMs)

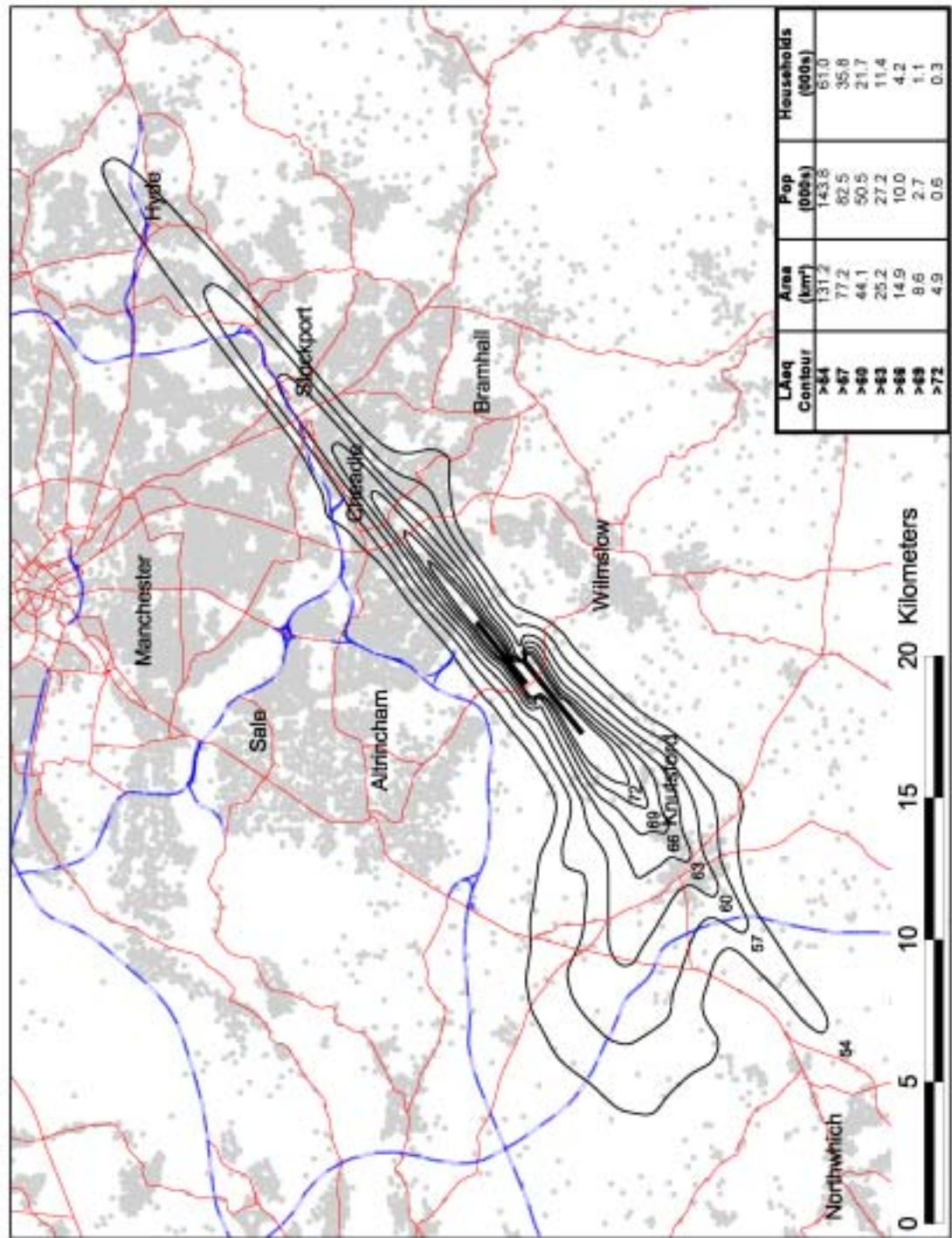


Figure 7.2: Manchester Year 2030 - Noise contours with partial mixed-mode (55mpppa)
(revised forecast 367,000 PATMs)

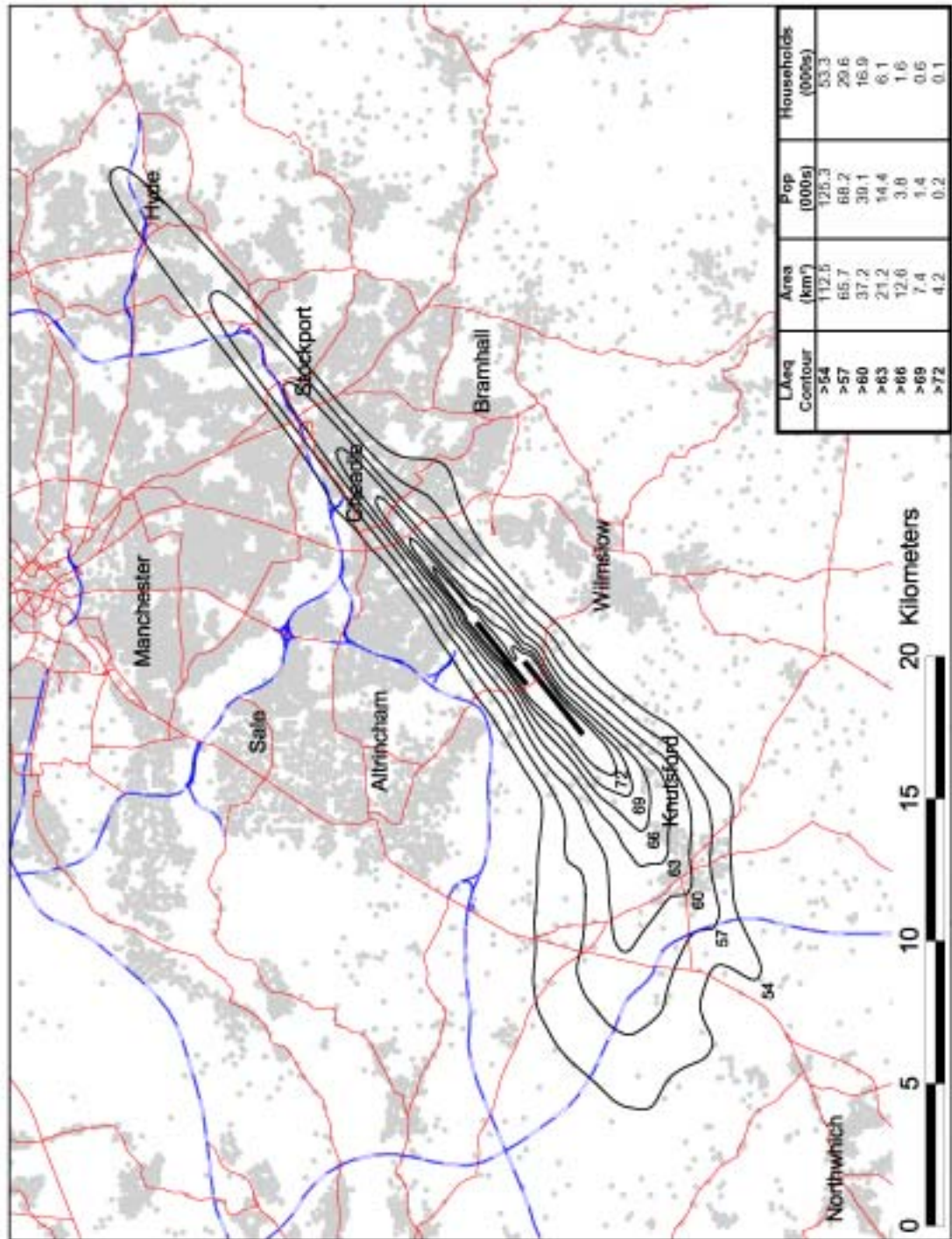
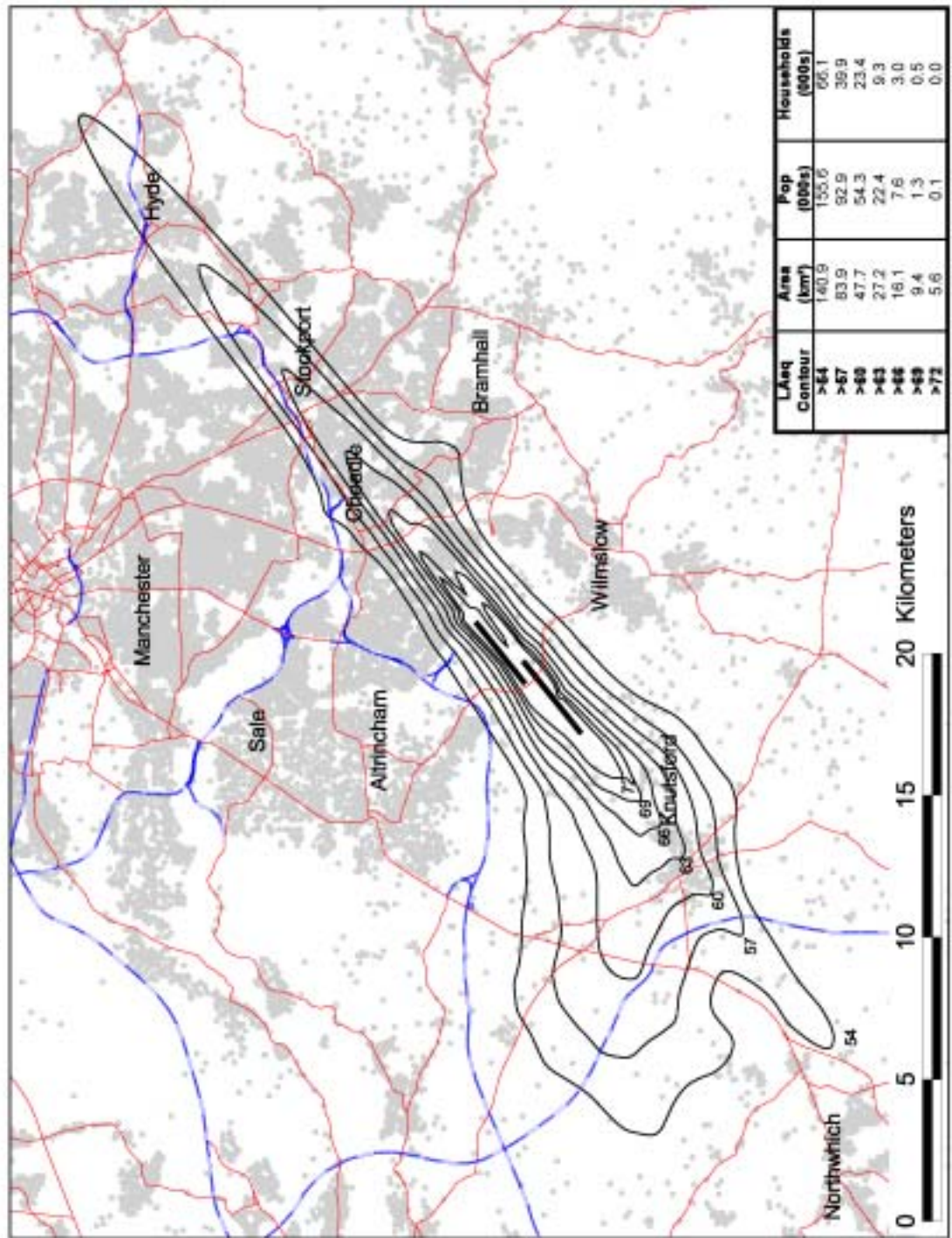


Figure 7.3: Manchester Year 2030 - Noise contours with full mixed-mode (70mppa)
(revised forecast 490,000 PATMs)



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