NIGHT FLYING RESTRICTIONS AT HEATHROW

FOCUS GROUP CONSULTATION

Richmond Heathrow Campaign Response

July 2016

This document is the response of the Richmond Heathrow Campaign to the questions and issues contained in the Department for Transport (DfT) paper: *Night Flights Focus Group Evidence Review June 2016.* The specifics of our response relate mainly to Heathrow. We do not consider that the contents of this submission are confidential and we have no objection to its publication.

The Richmond Heathrow Campaign represents three amenity groups in the London Borough of Richmond upon Thames: The Richmond Society, The Friends of Richmond Green, and the Kew Society, which together have over 2000 members. The members of our amenity groups are adversely affected by noise from Heathrow Airport's flight paths, particularly at night. Over recent years we have undertaken extensive research on Heathrow and submitted a large number of papers to the Airports Commission and others - all of which can be found at www.richmondheathrowcampaign.org and www.rhcfacts.org. In preparing this response we have also referred to the report: *Noise from Heathrow Airport, 18 December 2014,* which contains the results of an Inquiry by the All Party Parliamentary Group on Heathrow and the Wider Economy. www.heathrowappg.com . We are an active participant in the Heathrow Community Noise Forum.

We have prepared this response at the DfT's request ahead of the Nighttime noise regime Stage 2 Consultation with a view to adding evidence where we can or seeking further evidence from the DfT and others so that the Stage 2 Consultation can consider all the feasible options and their evaluation based on robust evidence where ever possible.

We examine the objectives, the historic performance and future long term projections for nighttime noise. We then examine the structure of intervention in the context of the ICAO Balanced Approach. We conclude that the staggered introduction of a ban on night flights between 23:00 and 07:00 is practically feasible and should be consulted on as the major option for commencement in the next nighttime noise regime. We use the terms night period 23:00-07:00 and night quota period 23:30-06:00.

A. Summary of our position on night flights

Our overall position on night flight noise, as supported by the evidence in this response, is that the negative community impact is far too high with damaging consequences to health, productivity and children's learning. Furthermore, the noise impact, as experienced by each individual and in relation to the World Health Organisation Guidelines, has and will continue to reduce too slowly. The Airports Commission estimated in 2015 that the population exposed to noise from Heathrow aircraft above 48 decibels (LAeq 8 hour) in the night period would decrease by only around 10% over the next 35 years from 421,300 people in 2013. This underestimates the much larger numbers exposed if measurements were made, as we recommend, at the WHO Guideline level of 40 decibels (LAeq). The WHO

recommends most people need 8 hours sleep but those near or under an arrival flight path are lucky if they get 5 ½ hours sleep.

Despite a succession of Government restrictions on night flights at Heathrow over the last fifty years, more people around Heathrow than around any other European Union airport are exposed to levels of aircraft noise at night that exceed the World Health Organisation's guideline limit values on community noise. In 2013 the number of people exposed to aircraft noise above 48 decibels (LAeq 8 hour) in the night period was 11,600 people at Gatwick compared to 421,300 people at Heathrow.

We do not believe the results of the balanced approach and operating restrictions referred to in this paper are sufficient to reduce in a timely manner the already excessive level of aircraft noise. Evidence presented in this paper demonstrates that none of the night period destinations need to be served by night flights, which is a conclusion supported by the Airports Commission. The Commission thought a 3rd runway would be needed to add sufficient capacity to re-allocate night flights to the day/evening. But the evidence we provide suggests efficiency improvements being made add to existing hourly capacity and that together are sufficient to absorb a re-allocation of nighttime passengers into the daytime. We therefore propose a ban of movements from 23:00 to 07:00. We suggest this is introduced in stages over a period of time with the first stage completed by March 2019 whereby 16 scheduled flights in the night quota period are no longer permitted and are reallocated to slots after 07:00.

We have not had the time to write about the increasing evidence demonstrating the negative impact that night flights have on people's health, particularly the vulnerable. The DfT are aware of the research and we urge the DfT to publish the health position as part of Stage 2 Consultation.

B. <u>Nighttime noise Objectives</u>

We recommend that the objectives should include a commitment that operations at Heathrow Airport will move towards compliance with the World Health Organisation's limits on noise (individual noise level and average noise level) in each hour of the night period (23:00-07:00). Such a commitment is long overdue, bearing in mind that noise from air traffic at night is still a major disruption for many people living within audible distance of Heathrow's flight paths, despite night flying restrictions having been in operation at Heathrow for fifty years.

In July 2004 the DfT gave the following commitment regarding achieving the WHO targets for night flights by 2030: '*The guideline values are very low. It would be very difficult, if not impossible, to achieve them in the short to medium term without draconian measures - but that is not what the WHO proposed. The recommendation was that the Guidelines for Community Noise should be adopted as long term targets for improving human health. The UK Government is committed to take account of this. In respect of aircraft noise at night, the 30 year time horizon of the White Paper, provides a suitable parameter for 'longer term' '*.

In 1980 the WHO recommended community noise guideline of 45 decibels (LAeq) in the night. Then in 1999 it recommended an additional guideline of 60 decibels (Lmax) in the night. The WHO also recommended that most people need 8 hours sleep.

In 2009, the WHO Regional Office for Europe published the *Night Noise Guidelines for Europe*, which took into account research since 1999 and recommended:
- 40 decibels (LAeq) as the long term target at night (i.e. instead of 45 decibels (LAeq) as recommended since 1980); and
- 55 decibels (LAeq) as an interim target at night where 40 decibels cannot be achieved in the short term "for various reasons, and where policy-makers choose to adopt a stepwise approach."

WHO Guideline noise levels are not measured despite the existence of the Guidelines for 17 years. The gap between WHO Guideline noise levels and levels measured using existing indicators can only be guessed at but it is likely to be significantly adverse. Reducing the noise gap is likely to take time but can only begin to occur when WHO Guideline measurements are introduced into policy and management of aircraft noise; this should occur without further delay.

There has been a serious failure of policy in not translating the Guidelines into active management of aircraft noise. There is no practical reason for not doing so.

The Government needs to commit to the legal status of the WHO community noise guideline values. It needs to clarify the UK's strategy and timetable for reducing the levels of community noise for air traffic and from other major noise sources to below the WHO guideline values. It needs to provide the interim and long term targets over the next twenty years for reducing air traffic noise at Heathrow (and other UK airports) to below the WHO guideline values. This needs to be incorporated into the revision of the Aviation Policy Framework currently underway. We understand the WHO Guidelines will be updated later this year and we urge the Government to take the revisions into account.

The current consultation on the next 5 year nighttime noise regime from October 2017 is ahead of any revision to aviation policy early next year and arguably there is a case for deferring the next regime by one year, notwithstanding the current series of roll overs from 2014 (the current regime in effect came into force in 2006). However, we argue below the case for the staggered introduction of a ban on aircraft movements 23:00-07:00. The first stage could and should in our view be introduced by March 2019 and to this end should be included in the Stage 2 Consultation. It involves the 16 scheduled flights in the night quota period being no longer permitted but re-allocated to slots after 07:00.

C. <u>Nighttime noise metrics</u>

Aircraft noise and its impact varies significantly between the two shoulder periods 23:00-23:30 and 06:00-07:00 and the night quota period 23:30-06:00. The following table highlights the inconsistent use of noise metrics.

Table 1 Nighttime metrics AC: Airports Commission, H: Heathrow Noise Action Plans	
Summer average LAeq 8 hour 23:00-07:00. 48dB to 72dB and above in 3 dB intervals	AC
Annual average Lnight 8 hour 23:00-07:00 . 50dB to 70dB and above in 5 dB intervals	AC & H
Summer average N60 8 hour 23:00-07:00. Number of flights in intervals above 25, 50 and 100 flights with single event noise above 60dB Lmax	AC
Average LAeq 6.5 hour. 23:30-06:00. 48dB and above. Until 2011 this was an annual average. From 27 March 2011 this is the combined average summer and winter noise quota periods, i.e 27 March 2011-25 March 2012	H

There are major shortfalls in the metrics used and where possible we recommend the Stage 2 Consultation should seek to address these and upgrade the evidence provided:

1. Only one metric covers the core night quota period, 23:30-06:00, and this is an average LAeq metric used by Heathrow. There is no N60 metric reflecting the number of flights and their individual impact for this period. The N60 metric is important because people do not hear noise as an average. Also, the Airports Commission's appraisal does not include long term noise

projections for the core night quota period, and the Commission is the only source we have found for long term projections.

2. The several metrics for the whole night period, 23:00-07:00, are confusing. They are averages over different times of the year and with different contour intervals.

3. Some reports adjust the metrics to a standardised ratio of easterly/westerly operations, which adds to the confusion. The reports are not always immediately clear as to whether they are cumulative decibels or within decibel bands.

4. The metrics fail to reflect respite. Since 2000 Heathrow has been operating a rotation of easterly and westerly preference during the 6½ hour night quota period and runway alternation. This means that overflight of arrivals occurs once in every four weeks, weather permitting (there are no scheduled departures in this period). It would be helpful for there to be separate evidence of the intensity of use and noise for each of the four arrival flight paths and the noise levels during respite. We suggest a separate respite measurement because some locations on the ground are in the noise shadow of both the northern and southern runways.

5. It would be helpful to have some improved insight into background noise levels at night. For example, even in a town setting these can be low. In Richmond the nighttime background noise level is around 35dBA.

6. We would like to see Stage 2 Consultation detail intensity of use. This has been provided in the Focus Group for the night quota period but we would like to see scheduled flight numbers distinguished from unscheduled flights and divided into arrivals and departures. We would also like to see the intensity of use in the shoulder periods broken down into scheduled and unscheduled and departures and arrivals. Dispensations can have a particularly negative impact because when they occur it is often before 04:30 in the otherwise silent part of the night.

7. The evidence for the Stage 2 Consultation should expand the historic evidence and provide long-term projections going forward. Even though the next nighttime regime is for 5 years it is important to place it in the context of long term targets to reduce nighttime noise.

8. The number of people impacted not only depends on the area impacted but the population density. We find that while the area longitudinal trends can be correlated with some degree of confidence with trends in less noisy aircraft and fleet change, the population densities vary inexplicably. Presumably this is a function of population growth and how this is distributed across London but also the flight paths and contour shapes. It would help for the Stage 2 Consultation to provide a more in depth explanation of population changes in total and by distribution across London historically but also as a basis for long-term projections.

9. Importantly the metrics do not measure down to the WHO Guideline levels thus underestimating the number of people impacted and how this number is changing over time.

The DfT are urged in the Stage 2 Consultation to address the above issues.

D. <u>Nighttime noise performance</u>

The number of flights across the Night Period over a year is approximately as shown in Table 2 as follows.

TABLE 2 Number of flights in each interval averaged over a year									
	Shoulder	Night Quota Period							Shoulder
	23:00 23:30	23:30 00:00	00:00 01:00	01:00 02:00	02:00 03:00	03:00 04:00	04:00 05:00	05:00 06:00	06:00 07:00
Arrivals	?	0.3	0.2	0.1	00	0.1	4.5	9.2	40
Departures	?	0.6	0.4	0.1	0.1	0.0	0.0	0.1	28

We recommend that the Stage 2 Consultation update the above table.

D1. Night quota period 23:30-06:00

The DfT has provided evidence in the Focus Group for movements and quota point use from 2007 to 2015. It is encouraging to see the reduction in quota usage. Movements remain at around 16 scheduled flights. However, over a longer time period from say 1994 the noise reduction is less impressive and presumably the recent reduction is due to the phasing out of some 747-400 type aircraft; the trend may not continue but further evidence is needed. We illustrate the historic trends in Annex 1 where we have aggregated summer and winter data. It would be helpful for the DfT to match the noise quota data set with the 48 decibel (LAeq 6½ hour) contour population data. We have not been successful in finding the trend data other than the chart from ERCD 1305 for the years 2006 to 2012 which we reproduce in Annex 2. This shows a reduction in area and population exposed to noise within the 48 decibel (LAeq 6½ hour) contour.

We would like to see the long-term trends in noise quota and 48 decibel (LAeq 6½ hour) metric going forward and to project forward long term the aircraft types and noise characteristics during the night quota period. Hopefully, the DfT will be able to gather this evidence for the Stage 2 Consultation

We believe that to expose around 110,000 people to significant noise of 48 decibel (LAeq 6½ hour) (see Annex 2) and above in the night quota period is unacceptable. Moreover, the number exposed at the WHO Guideline level of 40 decibels is likely to be far higher. There are no metrics (e.g. N60 or Lmax) for the core night quota period that focus on the number of flights and their maximum noise levels which is key to the impact on people's sleep, health, productivity and children's learning.

We urge the DfT to remedy these deficiencies by providing longitudinal evidence of the population impacted by noise during the core night quota period using the 48 decibel (LAeq 6½ hour) and N60 metrics and examining any correlation with the noise quota data.

D2. <u>Night period 23:00-0700</u>

Annex 3 shows two metrics for the Night period. These are the cumulative 48 decibel (LAeq 8 hour) metric and the N60 metric. The figures are from the Airports Commissions Final report June 2015. We show the actuals in 2013 and projections for 2030, 2040 and 2050 for the 2 runway Do Minimum case and the Northwest runway option. The figures are shown cumulatively above each noise level.

In 2013 there were 421,300 people impacted by aircraft noise from Heathrow above 48 decibels during the Night period. We referred above to the 110,000 people impacted in the 6½ hour Night quota period. The big increase we suspect is mainly due to flights in the morning shoulder between 06:00 and 07:00. (Note the figures are not directly comparable because the latter is for 2012 and the former is for 2013).

Although the Commission assumed aircraft would become less noisy overtime, the increase in London's population tends to offset this gain. Annex 3 shows that the population density (people/square km) within the 48 decibel (LAeq 8 hour) noise contour was 3,496 in 2013 but is projected to rise to 4,693 by 2050. It is probable that the flight path detail and contour shape have some effect on the population exposed.

Moreover, the Commission's projections show 271,200 people impacted in 2030, 337,000 in 2040 and 373,100 in 2050 for the Do-Minimum case. Notwithstanding the reduction in the number of people impacted by 2030, the number rises thereafter and we believe the long term nighttime noise climate illustrated by these figures is most unsatisfactory. We should also be aware that the number of people impacted in the inner contours with higher noise levels also remain high going forward.

The NWR expansion option reduces the noise going forward compared to the 2-runway case, presumably because the flights are rotated over three runways instead of two in the Night quota period, notwithstanding the increased number of flights in the shoulder periods. The three runway nighttime noise climate illustrated by the Commission's figures is for there to be 297,400 people in 2050 within the 48 decibel (LAeq 8 hour) contour, which is also most unsatisfactory. We suspect the offer by Heathrow to ban scheduled movements between 23:00 and 05:30 in the event of a 3rd runway will have little impact on the numbers of people impacted and their health and well being.

The N60 8 hour metric in Annex 3 shows similar trends to those shown by the 48 decibel (LAeq 8 hour) metric.

The Airports Commission's figures for Gatwick for comparison in 2013 are 11,200 people within the 48 decibel (LAeq 8 hour) contour.

We believe the above figures demonstrate the noise impact of Heathrow during the Nighttime is far too high and is not reducing fast enough when considering the actual impact but also in relation to the WHO Guidelines. The WHO recommends most people need 8 hours of sleep. Also the Guideline value is 40 decibels so that the number impacted is probably far greater than shown by the 48 decibel metric.

E. Intervention in nighttime aircraft noise

E1. Balanced Approach

The four elements of the Balanced Approach are listed below. The aim is to ensure that operating restrictions are employed only as a last resort after full consideration has been given to the other dimensions of the ICAO Balanced Approach, namely:

- Reduction of noise at source
- Land use planning and management
- Noise abatement operational procedures
- Operating restrictions

Aircraft are becoming less noisy and together with revised operations can improve the noise climate on the ground. It is important that the benefits are not all taken by the industry in the form of increased capacity and greater resilience and efficiency and that in accordance with the National Aviation Policy Framework benefit is also shared with the community in the form of reduced noise. A more transparent process of sharing the benefits is needed.

E2. Reduction of noise at source

HAL assumes most of the current Heathrow fleet (around 3,500 aircraft) are phased out by 2030, which would appear to be a significant shortening of the fleet life to just over 15 years where the aircraft life historically extends to around 25 years. The table below compares the fleet composition for Heathrow, as estimated in the *HAL Report* and in the *Airports Commission's Noise Report – Technical Papers Noise-Local Assessment (2014).* HAL's phasing out of the current aircraft types at Heathrow, according to the table, is much faster than that estimated by the Airports Commission.

TABLE 3 Heathrow Fleet

Aircraft Generation	Two runway 2030		Two runway 2040		Three runway 2030		Three runway 2040	
Percent of fleet	HAL	AC	HAL	AC	HAL	AC	HAL	AC
Current	6	35	0	15	7	32	0	13
Imminent	94	65	78	73	93	67	80	76
Future	0	0	22	12	0	0	20	10
Total	100	100	100	100	100	100	100	100

Source: *Heathrow fleet HAL Report Table C1, 2014; Airports Commission (AC) Aviation Noise Local Assessment Appendix A Table A2, 2014*

We recommend for Stage 2 Consultation that the DfT provide an up-to-date analysis of current aircraft in the two shoulder periods and the night quota period along with long term projections, reconciling where possible the different estimates of HAL and the Airports Commission.

E3. Land Use Planning and Management

The replacement of the planning guidance PPG24 with a new National Planning Policy Framework and Localism Act has thrown into some confusion the ability of local authorities to prevent new buildings when noise levels are high. Combined with the demand for new housing, schools, etc. on account of population growth in London, the pressures to build are probably paramount except close to Heathrow. Moreover, the modernisation of London's airspace (LAMP) has hardly got off the ground so it is impossible to know where flight paths will be in the future. We suggest it would be helpful for the DfT to provide further evidence on the distribution of population density and population growth across London.

E4. Noise abatement operational procedures

There are several improvements to operations, such as in-line queueing, time based separation, CDA, etc. It would assist the Stage 2 Consultation for the DfT to provide further details of operational improvements projected in the future and how the benefits might be shared with the community. Particularly important is the early morning shoulder period when we understand the first-in-first-out system encourages pilots to arrive early thus bunching ahead of 06:00. A more orderly system could reduce use of stacks and could reduce the need for TEAM (use of two runways) in the 06:00-07:00 period. Importantly, the operational improvements improve the efficiency and resilience of the airport as well as a potentially positive impact on noise reduction. We believe the benefits free up enough capacity in the daytime to re-allocate all the scheduled flights between 23:00 and 07:00 (as discussed later).

E5. Operating Restrictions

Annex 4 details the current restrictions as we understand them to be. We query Figure 1 in the DfT's Focus Group evidence in respect of QC4 aircraft which the figure says can be scheduled.

- Movement Limits

The community is undoubtedly opposed to increased numbers of aircraft in the shoulder periods and night quota period. We recommend the DfT explicitly disclaim any increase as an option for the next regime.

- Quota point limits

The noise quota limits are much higher than the points actually used and do not bear down on the noise. So we recommend more realistic targets showing significant reduction each year. But by and large airlines choose their aircraft for worldwide use and it may be optimistic to expect Heathrow's noise quota limit to reduce noise; the noise quota serves to monitor noise levels.

- QC aircraft bans

We recommend the DfT provide details of the aircraft types and their QC rating for arrivals and departures during the shoulder and noise quota periods and also how these details might change in the future. We do not have the information at hand but it would appear that consideration could be given to placing an operational ban on QC4 aircraft during the Night period. A scheduled ban already exists. We also suggest consideration be given to placing a scheduled ban on QC2 aircraft during the night quota period. Concerning the question of including the currently exempt aircraft below QC 0.25 we believe no aircraft should be exempt. The number of such aircraft is increasing and this fact needs to be reflected in the noise quota.

- Penalties and Landing Charges

Penalties and Landing charges provide some incentive for airlines to reduce the number of more noisy aircraft. Our understanding is that landing charges are not permitted to exceed costs incurred by the airport and therefore have limited impact on restricting the more noisy aircraft.

F. <u>Ban on Aircraft movements 23:00-07:00</u>

We do not believe the results of the balanced approach and restrictions referred to above are sufficient to reduce the already excessively high level of aircraft noise and in a timely manner. We therefore propose a ban on scheduled movements from 23:00 to 07:00. We suggest this is introduced in stages over a period of time such that in the first stage the 16 flights in the night quota period are no longer permitted but slots for the airlines are reallocated after 07:00.

F1. Daytime capacity

As far as we are aware neither HAL nor the DfT has raised the lack of day and evening capacity as preventing a nighttime ban. We attach as Annex 5 Heathrow's runway scheduling limits for the winter and summer seasons. These are for 12 years up to 2012. We have not had the time to update them further. The largest scheduling limit in any hour is 90 movements (arrivals and departures) in the winter season. The scheduled flights between 06:00-07:00 is around 65 flights in the winter and summer seasons and between 07:00-08:00 around 78 in the winter and 85 in the summer. The theoretical unused hourly capacity across the day is around 5% but we appreciate resilience is important and some spare capacity is needed. But the various operational improvements being implemented at Heathrow add further resilience and there must surely be sufficient capacity to re-allocate 16 flights or less than 1% of daily flights from the noise quota period to the day time after 07:00. We go further and believe there is capacity to re-allocate the flights in the two shoulder periods out of these periods so as to result in no scheduled flights between 23:00 and 07:00.

F2. Specific destinations

We attach in Annex 6 details of the sequence and number of pre-0600 arrivals at Heathrow and the timetables for destinations with pre- 06:00 arrivals at Heathrow. The data variously refers to 2011 or 2013 but has not been updated to more recent years.

- Heathrow handled 192 destinations in 2011 with more than 2,000 passengers over the year. Annex 6 shows 13 destination served in the night quota period. 12 of these had post 06:00 services. 179 destinations were served without flights in the night period. So what makes the 13 destinations require night flights?

- Heathrow served 30 destinations in the far east so why do only 6 need pre-06:00 access to Heathrow. Apart from Melbourne the far east destinations all have post 06:00 services?

- Boston, Chicago, Hong Kong and Singapore are among the most heavily subscribed destinations. But other popular destinations such as New York, Los Angeles, Delhi and Dubai do not have pre 06:00 services. Route density does not appear to be a reason for the 13 destinations at night.

- The tables show that within a 65 minute period (04:50 - 05:55) services from the following five destinations were duplicated: Hong Kong (4 every night), Nairobi (2 every night) Riyadh (two every night), Singapore (4 every night) and Sydney (2 every night).

There does not seem to be any reason why specific services should operate at night other than that the DfT allows them to.

The Airports Commission appears to come to the same conclusion, although it also adds the lack of daytime capacity as a reason. See the Commission's Final Report 2015 para 14.29:

'*A review of existing schedules at Heathrow suggests that there would be no insurmountable demand or supply-side barriers to providing alternative overnight services to arrive after 6:00am:*
• *Of 13 arrival routes in the core night period with a scheduled capacity of more than 10,000 seats in 2014, 11 were also served by an arrival between 6:00am and 8:00am.*
• *Of the two remaining routes (Lagos and Kuala Lumpur) there is currently no operating curfew at the originating airport that would prevent a later departure and arrival.*
• *Additional capacity from a third runway could support around 40 additional movements per hour in this period which could be used to accommodate retimed flights, whilst still allowing scope for growth.*
• *The majority of passengers on arrivals in the core night period are origin and destination passengers for whom a slightly later arrival would be unlikely to be a cause not to travel. Travelling via a rival European hub would remain a longer and less attractive option.*
• *Transfer passengers (those arriving at Heathrow to transfer to another flight) make up on average around 37% of passengers on core night arrivals. For some of these passengers there may be a quicker option via an alternative hub airport, but this will only be relevant to the most time-sensitive customers within a relatively small transfer window for whom arrival at Heathrow before 6:00am is necessary to achieve their final arrival time.'*

The Commission does not favour a ban extending to 07:00 because it believes there will insufficient capacity with a 2 runway airport. But the Commission does not appear to take account of operational improvements that release hourly capacity at Heathrow. Furthermore, it is inconsistent to say there is not sufficient capacity with a 2 runway airport but to ignore the fact that the 3 runway airport will become 'full' in due course. The Commission recommended a ban on flights between 23:00 and 06:00 in the event of a 3rd runway

We urge the DfT to include the option of a ban 23:00-06:00 and an extension to 07:00 in the Stage 2 Consultation.

G. Health Impacts

We have not had the time to write about the increasing evidence that night flights have on people's health, particularly the vulnerable. The DfT are aware of the research and we urge the DfT to publish the health position as part of Stage 2 Consultation.

H. Monetisation

We support the monetisation of the costs and benefits when appraising night flights. However, we note that the webtag approach tends to focus on an incremental approach comparing options. While this can be useful we urge the Government to also present absolute values in any appraisal.

Richmond Heathrow Campaign
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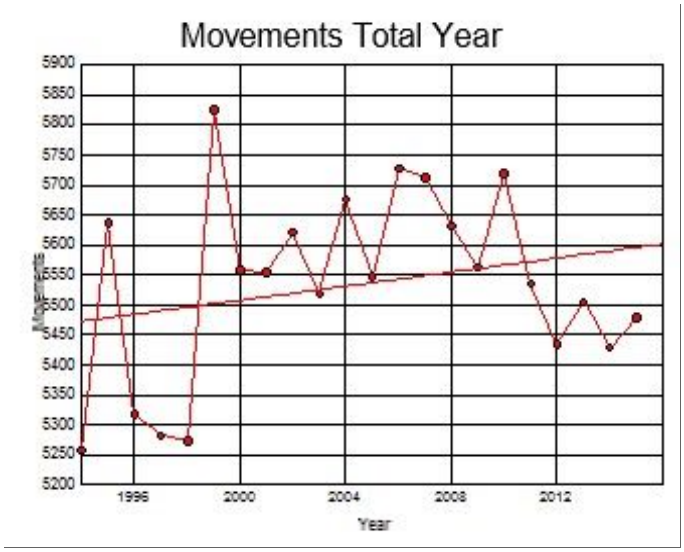
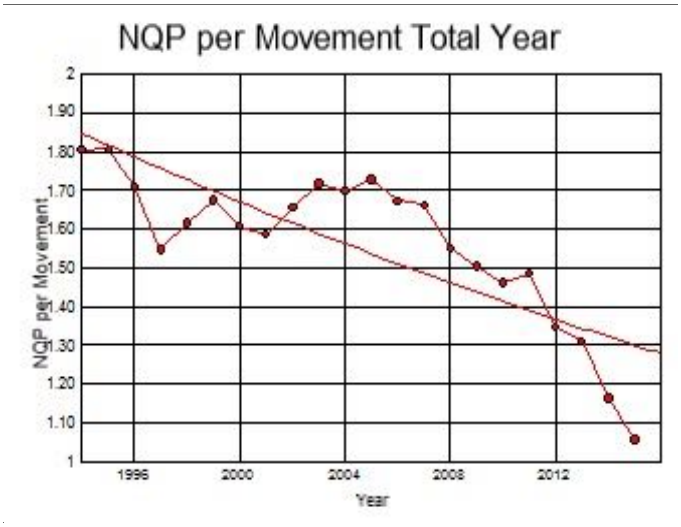
Annexes 1-6 follow

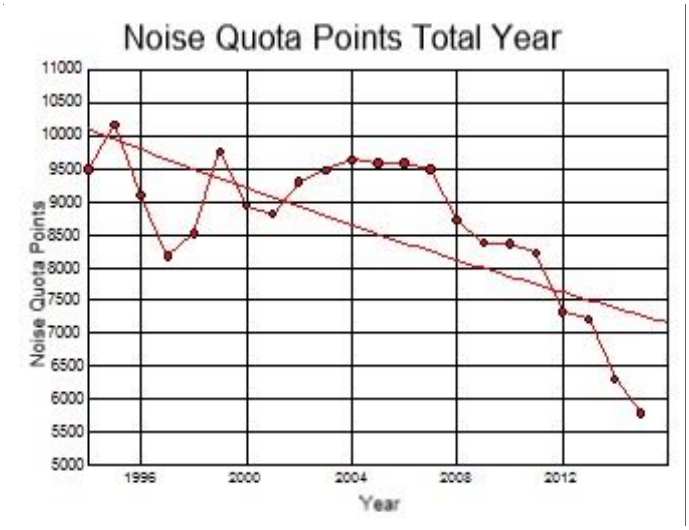
Total Year

	Movements	NQP	NQP/Movmnt
1994	5257	9493	1.81
1995	5636	10179	1.81
1996	5317	9100	1.71
1997	5282	8177	1.55
1998	5274	8526	1.62
1999	5826	9765	1.68
2000	5557	8939	1.61
2001	5554	8812	1.59
2002	5621	9308	1.66
2003	5519	9481	1.72
2004	5676	9643	1.70
2005	5547	9586	1.73
2006	5728	9587	1.67
2007	5712	9501	1.66
2008	5632	8734	1.55
2009	5563	8377	1.51
2010	5719	8367	1.46
2011	5535	8226	1.49
2012	5434	7321	1.35
2013	5505	7222	1.31
2014	5429	6313	1.16
2015	5478	5787	1.06



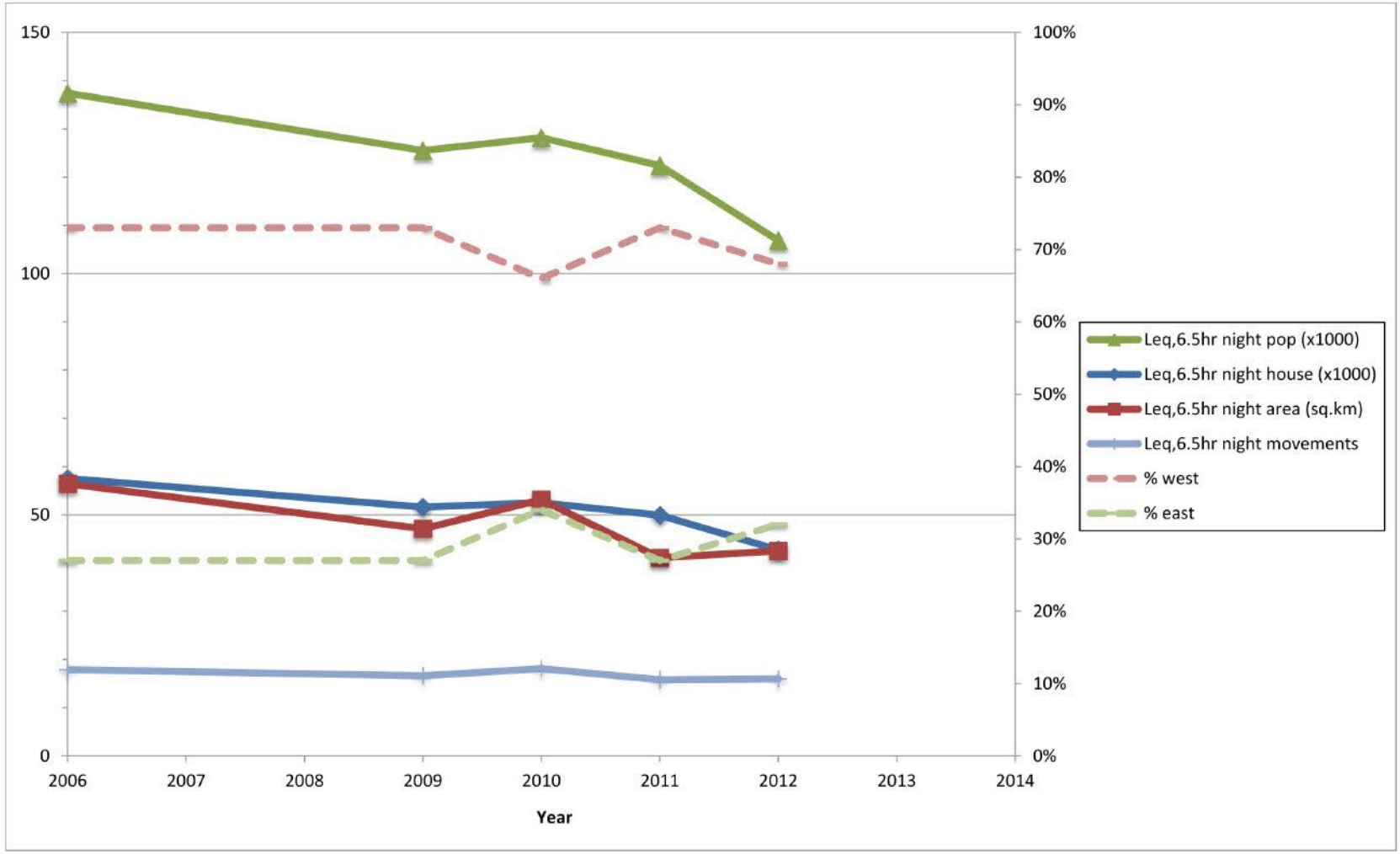
Trend line: common log fit





Source DfT

Figure 3.10 Heathrow 2006 to 2012 $L_{eq,6.5hr\ night}$ 48 dBA contour area, population and households trend



NIGHTTIME METRICS 23:00-07:00 Cumulative contour bands

Do Minimum AON Carbon Capped Summer average 8-Hour LAeq

	2013			2030			2040			2050		
	Area	Pop	Density	Area	Pop	Density	Area	Pop	Density	Area	Pop	Density
>48	120.5	421,300	3,496	71.9	271,200	3,772	76.5	337,000	4,405	79.5	373,100	4,693
>51	70.1	190,800	2,722	42.3	151,300	3,577	44.9	184,600	4,111	46.5	197,400	4,245
>54	41.3	103,200	2,499	18.7	61,100	3,267	20	81,300	4,065	21.0	89,200	4,248
>57	21.5	48,200	2,242	9.2	21,900	2,380	9.8	31,400	3,204	10.2	33,900	3,324
>60	11.3	16,700	1,478	4.8	3,900	812	5.0	6,400	1,280	5.2	7,100	1,365
>63	6.0	4,500	750	2.6	1,300	500	2.7	2,400	889	2.9	2,600	897
>66	3.3	1,200	364	1.7	<50		1.7	<50		1.8	<50	
>69	1.9	<50		1.2	<50		1.2	<50		1.3	<50	
>72	1.3	<50		0.9	<50		0.9	<50		1.0	<50	

NWR AON Carbon Capped Summer average 8-Hour LAeq

	2013			2030			2040			2050		
	Area	Pop	Density	Area	Pop	Density	Area	Pop	Density	Area	Pop	Density
>48	120.5	421,300	3,496	99.4	272,600	2,742	101.5	308,900	3,043	94.5	297,400	3,147
>51	70.1	190,800	2,722	63.6	173,000	2,720	65.9	190,600	2,892	61.5	189,600	3,083
>54	41.3	103,200	2,499	34.9	73,400	2,103	36.9	97,200	2,634	32.5	89,700	2,760
>57	21.5	48,200	2,242	16.0	11,600	725	16.8	18,300	1,089	14.5	12,500	862
>60	11.3	16,700	1,478	8.2	900	110	8.4	2,400	286	7.6	900	118
>63	6.0	4,500	750	4.9	200	41	5.0	200		4.7	200	
>66	3.3	1,200	364	3.3	<50		3.3	<50		3.1	<50	
>69	1.9	<50		2.1	<50		2.1	<50		1.9	<50	
>72	1.3	<50		1.1	<50		1.1	<50		1.0	<50	

Do Minimum AON Carbon Capped Summer average 8-Hour LAeq

	2013			2030			2040			2050		
	Area	Pop	Density	Area	Pop	Density	Area	Pop	Density	Area	Pop	Density
>25	70.2	346,300	4,933	34.6	150,500	4,350	47.2	258,300	5,472	53.5	320,700	5,994
>50	1.7	2,600	1,529	0.5	<50		0.8	<50		1.6	6,500	

NWR AON Carbon Capped Summer average 8-Hour LAeq

	2013			2030			2040			2050		
	Area	Pop	Density	Area	Pop	Density	Area	Pop	Density	Area	Pop	Density
>25				51.7	141,200	2,731	65.2	194,200	2,979	55.1	165,100	2,996
>50				4.2	2,600	619	8.2	5,400	659	5.2	3,400	654

Source: Airports Commission:ERCD Noise Modelling Compendium of Results June 2015

ANNEX 4

NIGHT FLYING RESTRICTIONS AT HEATHROW

The Current Situation July 2016

The Night Period from 23:00 to 7:00 is divided into three periods: late evening Shoulder, a Night Quota Period and early morning Shoulder. Table 1 describes the restrictions currently applied in these periods:

TABLE 1	Late Evening Shoulder		Night Quota Period		Early Morning Shoulder	
	23:00-23:30		23:30-6:00		6:00–7:00	
Movement Limits ATMs	None		Winter 2011/12: 2,550 Summer 2012: 3,250 Unchanged during regime		None	
Noise Quota Points- Limit	None		Winter 2011/12: 4,080 Summer 2012: 5,100 Gradual decrease during current regime		None	
Carry-over between seasons - Movements			Yes			
Carry-over between seasons - NQ Points			Yes			
Ban on Noisiest Aircraft:	Scheduled	Operational	Scheduled	Operational	Scheduled	Operational
QC/16 & QC/8	Ban	Ban	Ban	Ban	Ban	Ban
QC/4, approx. ATMs 261,89,3 respectively	Ban	No Ban	Ban	No Ban	Ban	No ban
QC/2, QC/1, QC/0.5 & QC/0.25	No Ban	No Ban	No Ban	No Ban	No Ban	No Ban
QC less than 0.25	Exempt	Exempt	Exempt	Exempt	Exempt	Exempt
Dispensations: approx 150pa	Yes		Yes		Yes	
Runway preference	Westerly		No preference		Westerly	
Runway Rotation	Yes		Yes		Yes	

ANNEX 5

Heathrow: Runway scheduling limits – Movements per hour: Winter season totals (arrivals and departures combined)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
0600-	61	61	61	61	61	61	61	62	64	65	65	64
0700-	78	78	78	78	78	77	77	77	76	76	76	78
0800-	78	78	78	78	78	76	76	76	74	75	76	77
0900-	78	78	78	80	80	80	80	80	81	83	83	84
1000-	82	82	82	83	83	85	83	83	83	82	82	81
1100-	82	82	82	81	81	80	80	80	80	79	79	78
1200-	83	83	83	83	83	84	85	86	88	87	87	87
1300-	79	78	78	78	78	78	80	81	80	79	79	81
1400-	74	79	79	77	80	80	80	81	80	82	81	83
1500-	83	85	85	86	86	86	87	87	87	87	87	86
1600-	85	86	86	86	87	89	89	89	**90**	**90**	**90**	88
1700-	83	82	82	84	85	85	86	85	85	85	85	84
1800-	82	84	84	85	84	84	84	82	82	82	82	82
1900-	81	82	82	80	80	81	82	82	83	82	82	82
2000-	80	80	80	79	79	79	78	78	78	78	78	78
2100-	74	73	73	71	73	75	77	77	76	76	77	78
2200-	35	37	37	40	41	42	41	41	41	43	43	43
Daily total	1 298	1 308	1 308	1 310	1 317	1 322	1 326	1 327	1 328	1 331	1 332	1 334
Hourly average	76.3	76.9	76.9	77.1	77.5	77.8	78.0	78.1	78.1	78.3	78.3	78.5

Source: Airport Co-ordination Ltd (ACL), Heathrow Airport seasonal reports, unnumbered tables entitled "Runway Scheduling Limits – Movements per Hour", from which daily total and hourly averages have been calculated.

Notes: The table shows the scheduling limits for the number of movements per hour at Heathrow between 0600-2300 in each winter season since 2000-01 (arrivals and departures combined). The table does not include the permitted number of scheduled movements in the night quota period (2330-0600), which is currently 2 550 in the winter season (approximately 16.9 per night), with usage slightly below the permitted number.

Comment: The largest scheduling limit in any hour was 90 movements (arrivals and departures) in the winter seasons 2008-09, 2009-2010, and 2010-11. Averaging 90 movements across every hour of a 16-hour day (0700-2300) across 365 days sums to 526 000 movements. A deduction of 26 000 slots (5 per cent) for resilience contingency gives a net total of 500 000 movements across 365 days, with no scheduled movements 2300-0700. The legal limit of 480 000 air transport movements (ATMs) per year leaves 20 000 slots available for 6 000 non-ATMs and 14 000 additional contingencies.

Heathrow: Runway scheduling limits – Movements per hour: Summer season totals (arrivals and departures combined)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
0600–	63	63	63	63	63	63	63	65	64	63	63	63
0700–	83	83	83	82	82	83	83	82	83	85	85	85
0800–	82	82	82	82	82	80	80	80	79	80	80	81
0900–	81	81	80	80	80	81	81	81	82	83	83	83
1000–	80	80	81	82	82	80	79	79	80	81	81	81
1100–	83	83	84	84	84	84	84	84	83	83	83	83
1200–	80	80	80	79	80	81	81	81	81	80	80	80
1300–	83	84	85	85	85	86	86	86	86	86	86	86
1400–	78	80	80	80	80	80	82	85	85	85	85	86
1500–	80	82	83	86	86	87	**88**	87	86	85	85	85
1600–	85	86	87	87	86	86	86	86	86	85	85	84
1700–	83	84	85	85	85	85	85	85	86	86	86	86
1800–	84	86	86	86	86	87	87	**88**	**88**	**88**	**88**	**88**
1900–	85	85	84	84	85	86	87	86	86	87	87	87
2000–	81	81	79	79	78	78	78	77	77	76	76	76
2100–	85	86	84	83	83	83	83	84	84	82	82	81
2200–	51	51	51	51	51	51	51	50	52	52	52	52
Daily total	1 347	1 357	1 357	1 358	1 358	1 361	1 364	1 366	1 367	1 367	1 367	1 367
Hourly average	79.2	79.8	79.8	79.9	79.9	80.1	80.3	80.4	80.4	80.4	80.4	80.4

Source: Airport Co-ordination Ltd (ACL), Heathrow Airport seasonal reports, unnumbered tables entitled "Runway Scheduling Limits – Movements per Hour", from which daily total and hourly averages have been calculated.

Notes: The table shows the scheduling limits for the number of movements per hour at Heathrow between 0600–2300 in each summer season since 2001 (arrivals and departures combined). The table does not include the permitted number of scheduled movements in the night quota period (2330–0600), which is currently 3 250 in the summer season (approximately 15.2 per night), with usage slightly below the permitted number.

Comment: The largest scheduling limit in any hour was 88 movements (arrivals and departures) in each of the summer seasons 2007–2012. Averaging 88 movements across every hour of a 16-hour day (0700–2300) across 365 days sums to 514 000 movements. A deduction of 26 000 slots (5 per cent) for resilience contingency gives a net total of 488 000 movements across 365 days, with no scheduled movements 2300–0700. The legal limit of 480 000 air transport movements (ATMs) per year leaves 8 000 slots available for 6 000 non-ATMs and 2 000 additional contingencies.

ANNEX 6

Table 1: Number of destinations at Heathrow in 2011

Region	*All destinations*	*More than 2 000 passengers*	*Less than 2 000 passengers*
United Kingdom	11	7	4
Western Europe	35	29	6
Central Europe	35	32	3
Eastern Europe	21	21	–
Near East	15	14	1
Africa	23	23	–
Far East	30	30	–
Americas	41	36	5
Totals	***211***	***192***	***19***

Source: Civil Aviation Authority, *Aviation Statistics*, Table 12.1 (International Air Passenger Traffic to and from Reporting Airports) and Table 12.2 (Domestic Air Passenger Traffic to and from Reporting Airports)

Notes: The table sets out the number of destinations in each region that had air traffic with Heathrow in 2011. The first column is the total number of destinations. The second column is the number of destinations to which 2 000 or more passengers (arrivals and departures combined) were transported. The third column is the number of destinations to which less than 2 000 passengers (arrivals and departures combined) were transported.

Table 2: Sequence and number of pre-0600 arrivals at Heathrow

Arrival time	Originating destination	Days of the week
0450	Hong Kong (China)	Monday – Sunday
0450	Singapore (Singapore)	Monday – Sunday
0450	Sydney (Australia) via Hong Kong (China)	Monday – Sunday
0500	Hong Kong (China)	Monday – Sunday
0500	Hong Kong (China)	Monday – Sunday
0500	Lagos (Nigeria)	Monday – Sunday
0510	Melbourne (Australia) via Singapore (Singapore)	Monday – Sunday
0515	Boston (United States)	Monday – Thursday, Saturday, Sunday
0515	Johannesburg (South Africa)	Monday – Sunday
0520	Riyadh (Saudi Arabia)	Monday – Sunday
0520	Sydney (Australia) via Singapore (Singapore)	Monday – Sunday
0525	Accra (Ghana)	Monday – Sunday
0525	Kuala Lumpur (Malaysia)	Monday – Sunday
0530	Nairobi (Kenya)	Monday – Sunday
0545	Nairobi (Kenya)	Monday – Friday, Sunday
0555	Bangkok (Thailand)	Friday
0555	Chicago (United States)	Monday - Sunday
0555	Riyadh (Saudi Arabia)	Thursday, Sunday
0555	Singapore (Singapore)	Monday - Sunday

Source: Heathrow Airport website: Flight Information/Flight Timetables (Winter Season 2012-13)

Note: The table shows the scheduled air traffic at Heathrow pre-0600 (all arrivals) in the winter season 2012-13. The arrival times are the scheduled times of arrival. In practice some flights begin arriving ahead of schedule from 0430.

Comment: There were no scheduled pre-0600 departures. There were nineteen scheduled pre-0600 arrivals from thirteen destinations (i.e. there was more than one arrival from some destinations). Fifteen of the arrival times were scheduled for every day of the week, with two arrival times scheduled on six days (Boston 0515 and Nairobi 0545), one arrival time scheduled on two days (Riyadh 0555), and one arrival time scheduled on one day (Bangkok 0555). There were in total, 120 scheduled arrivals from Monday to Sunday, averaging just over seventeen per day for the winter season 2012-13.

There were no scheduled pre-0600 departures at Heathrow in the summer season 2012. The average number of scheduled pre-0600 arrivals in the summer season 2012 was just over thirteen per day.

Table 3: Timetables for destinations with pre-0600 arrivals at Heathrow

Accra			**Kuala Lumpur**		
Days	*Depart*	*Arrive*	*Days*	*Depart*	*Arrive*
We	0825	1520	Mo-Su	1045	1615
Tu	1045	1740	Mo-Su	2355	**0525**
Fr	1100	1755			
Mo, Sa	1105	1800	**Lagos**		
Mo-Su	2240	**0525**	*Days*	*Depart*	*Arrive*
			Mo-Su	1100	1655
Bangkok			Tu, Fr, Su	1110	1655
Days	*Depart*	*Arrive*	We	1205	1750
Fr	0005	**0555**	Mo	1240	1825
Mo-Su	0015	0620	We	1245	1830
Mo-Th, Sa, Su	0030	0620	Sa	1305	1850
Mo-Su	1310	1910	Mo-Su	2330	**0500**
Mo-Su	1330	1935			
			Melbourne		
Boston			*Days*	*Depart*	*Arrive*
Days	*Depart*	*Arrive*	Mo-Su	1640	**0510**
Mo-Th, Sa, Su	1755	**0515**			
Fr-Su	1830	0635	**Nairobi**		
Mo-Th	1840	0635	*Days*	*Depart*	*Arrive*
Fr	1915	0635	Mo-Su	2340	**0530**
Mo-Su	1920	0705	Mo-Fr, Su	2350	**0545**
Mo-Su	1950	0720	Sa	2359	0625
Mo-Su	2110	0825			
			Riyadh		
Chicago			*Days*	*Depart*	*Arrive*
Days	*Depart*	*Arrive*	Mo-Su	0045	**0520**
Mo-Su	0845	2240	Th, Su	0140	**0555**
Mo-Su	1550	**0555**	Fr	0210	0625
Mo-Su	1705	0645	Tu	0935	1350
Mo-Su	1750	0755	We	1200	1615
Mo-Su	1800	0745	Mo	1240	1655
Mo-Su	2030	1010	Sa	1250	1705
Mo-Su	2100	1105			
Mo-Su	2135	1135	**Singapore**		
			Days	*Depart*	*Arrive*
Hong Kong			Mo-Su	0115	0720
Days	*Depart*	*Arrive*	Mo-Su	0900	1510
Mo-Su	0110	0620	Mo-Su	1255	1905
Tu, We, Fr-Su	0905	1445	Mo-Su	2255	**0450**
Mo-Su	0950	1500	Mo-Su	2255	**0510**
Mo-Su	1505	2010	Mo-Su	2315	**0520**
Mo-Su	2325	**0450**	Mo-Su	2345	**0555**
Mo-Su	2330	**0450**	Mo-Su	2359	0620
Mo-Su	2345	**0500**			
Mo-Su	2355	**0500**	**Sydney**		
			Days	*Depart*	*Arrive*
Johannesburg			Mo-Su	1545	**0450**
Days	*Depart*	*Arrive*	Mo-Su	1625	**0520**
Mo-Su	2015	**0515**	Mo-Su	1720	0620
Mo-Th	2040	0625			
Fr-Su	2055	0625			
Mo-Su	2155	0650			
Mo-Su	2135	0720			
Mo-Su	2140	0645			

Source: Heathrow Airport website: Flight Information/Flight Timetables (Winter Season 2012-13)

Notes: The departure and arrival columns refer to the scheduled local times of departure from the destination and of arrival at Heathrow. The arrival from Melbourne was via Singapore. Two of the three arrivals from Sydney were via Hong Kong, with the third arrival via Singapore.

Comment: Twelve of the thirteen destinations with pre-0600 arrivals also have post-0600 arrivals. The one exception is Melbourne. Nairobi has only a Saturday arrival post-0600. Accra, Kuala Lumpur, Riyadh and Sydney have only one daily post-0600 arrival. The other seven destinations have four or more post-0600 arrivals, the majority of which operate seven days a week.

Table 4: Arrivals at Heathrow from Far East destinations for winter season 2012-2013

	Arrival times			
	before 0600	*0600-0700*	*after 0700*	*per 24 hours*
Hong Kong (China) [1]	4	1	3	8
Kuala Lumpur (Malaysia)	1	–	1	2
Melbourne (Australia) [2]	1	–	–	1
Singapore (Singapore) [3]	4	1	3	8
Sydney (Australia) [4]	2	1	–	3
Auckland (New Zealand)	–	–	2	2
Bangkok (Thailand) [5]	–	2	2	4
Beijing (China)	–	–	2	2
Seoul (South Korea)	–	–	5	5
Shanghai (China)	–	–	3	3
Tokyo (Narita) (Japan)	–	–	5	5

Source: Heathrow Airport website: Flight Information/Flight Timetables (Winter Season 2012-13)

Comment: The first five destinations all have scheduled arrivals at Heathrow pre-0600 on every day of the week (see Tables 2 and 3). Four of the five destinations have arrivals post-0600, with Melbourne as the one exception. The last six destinations are important business centres within similar time zones to the first five destinations but do not have any services to Heathrow pre-0600 (except for Bangkok on Friday - see Tables 2 and 3).

Table 5: Air traffic in calendar year 2011 for destinations shown in Table 4

	Number of Movements		*Number of Passengers*		
	per year	*per 24 hours*	*passengers*	*per movement*	*transfers (%)*
Hong Kong (China)	4 375	12.0	1 412 749	322.9	*28*
Kuala Lumpur (Malaysia)	1 459	4.0	433 198	296.9	*23*
Melbourne (Australia)	1 409	3.9	403 827	286.6	*51*
Singapore (Singapore)	2 901	7.9	1 069 706	368.7	*31*
Sydney (Australia)	3 553	9.7	698 036	196.5	*34*
Auckland (New Zealand)	1 330	3.6	257 504	193.6	*29*
Bangkok (Thailand)	1 437	3.9	579 002	402.9	*22*
Beijing (China)	1 410	3.9	310 758	220.4	*15*
Seoul (South Korea)	1 240	3.4	311 093	250.9	*24*
Shanghai (China)	1 746	4.8	351 933	201.6	*22*
Tokyo (Narita) (Japan)	2 865	7.8	604 045	210.8	*31*

[1] Including an interline arrival pre-0600 from Melbourne en route to Heathrow.

[2] No direct arrivals from Melbourne. Interline arrival pre-0600 via Singapore. Transfer options post-0600.

[3] Including interline arrivals pre-0600 from Melbourne and Sydney and 0600-0700 from Sydney en route to Heathrow.

[4] No direct arrivals from Sydney. Interline arrivals pre-0600 and 0600-0700 via Singapore. Transfer options post-0600

[5] On Friday, one arrival at 0555 and one arrival 0600-0700.

Source: Civil Aviation Authority, *Aviation Statistics*, Table 12.1 (International Air Passenger Traffic to and from Reporting Airports) and Table 12.2 (Domestic Air Passenger Traffic to and from Reporting Airports), supplemented with information from the Department for Transport

Note: The difference in the number of movements per 24 hours for destinations in Table 4 compared with Table 5 is due to the fact that the Table 4 data are for the five-month winter season 2012-13 whereas the Table 5 data are for the full calendar year 2011.

Table 6: Air traffic at Heathrow in 2011

	Number of air transport movements		Number of passengers		
	Per year	*Per 24 hours*	*Per year*	*Per movement*	*Transfers (%)*
Accra	1 069	2.9	159 641	149.3	*39%*
Boston	5 522	15.1	1 030 867	186.7	*53%*
Chicago	6 382	17.5	1 207 424	189.2	*44%*
Hong Kong	4 375	12.0	1 412 749	322.9	*28%*
Johannesburg	3 540	9.7	886 146	250.3	*43%*
Kuala Lumpur	1 459	4.0	433 198	296.9	*23%*
Lagos	2 180	6.0	453 694	208.1	*33%*
Melbourne	1 409	3.9	403 827	286.6	*51%*
Nairobi	2 352	6.4	469 345	199.5	*45%*
Riyadh	1 028	3.0	180 855	175.9	*41%*
Singapore	2 901	7.9	1 069 706	368.7	*31%*
Sydney	3 553	9.7	698 036	196.5	*34 %*

Sources: Heathrow website (live flight information) for the destinations from which arrivals at Heathrow are scheduled pre-0600. Department for Transport for the number of movements per destination in 2011 (arrivals and departures combined), from which the average number of movements per 24 hours (arrivals and departures combined) have been calculated. Civil Aviation Authority website for the number of passengers per year per destination in 2011 (arrivals and departures combined), from which the average number of passengers per movement (arrivals and departures combined) have been calculated. Department for Transport for the average number of transfer passengers per destination in 2010, expressed as a percentage of the total number of passengers per destination.

Note: The data represent the total number of movements and passengers between the listed destinations and Heathrow in 2011 (i.e. the data includes but is not limited to the data for pre-0660 arrivals). Bangkok (Thailand) is not included because it has only one flight per week arriving at Heathrow pre-0600.

Comment: Approximately one passenger at three at Heathrow is a transfer. The percentage of transfers shows that apart from Kuala Lumpur (23 per cent), Honk Kong (28 per cent) and Singapore (31 per cent), the other nine routes carry an above-average number of transfers. We have not been able to identify the percentage of transfers on the pre-0600 arrivals.