Independent Transport Commission

AVIATION FUTURES: WHAT ARE THE STRATEGIC CHOICES FOR AVIATION CAPACITY IN THE UNITED KINGDOM?

SUBMISSION BY THE RICHMOND HEATHROW CAMPAIGN

October 2012

This submission is made in response to the call for evidence to inform a major study to be funded by the Independent Transport Commission on the subject "Aviation Futures: what are the strategic choices for aviation capacity in the United Kingdom".

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 2,000 members.

Our members are affected adversely by noise from Heathrow's flight paths, particularly in the night period. We nevertheless recognise the importance of air transport and we seek to make a positive contribution to the call for evidence.

We would be happy to provide additional information and would welcome the opportunity to give oral evidence. We are content for our response to be published.

Contact:
Peter Willan, Chair, Richmond Heathrow Campaign, 7 The Green, Richmond, Surrey, TW9 1PL.
Tel: 020-8948 4142
Email: willan829@btinternet.com

1. Is there a need for greater UK connectivity and capacity, and of what type?

(a) What is the relationship between connectivity and capacity? Does the UK need more aviation capacity, particularly in the South East of England? Given the financial cost and public controversy around any significant capacity increases, what are the economic benefits of providing more capacity? How robust are the available estimates? If there is a need, is it general or for "hub" airport capacity in particular?

What is the relationship between connectivity and capacity?

1.1 There are three components to airport connectivity:

- the identity of the individual destinations and the total number of destinations that are served or could be served;
- the frequency with which individual destinations are served or could be served over a given period of time (e.g. per week, per day, per morning, per afternoon, per evening, per night);
- the extent to which individual destinations are served or could be served directly (i.e. point to point) or indirectly (i.e. by transferring or transiting at an intermediary airport).

1.2 Three parameters determine airport capacity:

- terminal capacity for the number of passengers;
- runway capacity for the number of aircraft movements;
- passenger capacity per movement [1].

1.3 Where the capacity parameters at an airport exceed the level of demand from the travelling public, that demand should determine the connectivity profile of the airport (i.e. the identity of the individual destinations served and the frequency of service to each destination).

1.4 Even where the level of demand from the travelling public exceeds the capacity of an airport, that demand should still determine the connectivity profile, even if the demand cannot be met in full. The airlines would prioritise the connectivity options by reference to the relative popularity of destinations and the break-down of that popularity between the different classes of passenger. Destinations for which there was a high demand from first class passengers would get priority over destinations for which there was a low level of demand from second class passengers, with permutations between these two extremes.

1.5 The hub model for airports is based on the assumption that the best connectivity profiles occur at large airports such as Heathrow which have sufficient capacity to handle a large number transfer passengers from other airports in addition to "local" terminating passengers because the transfer passengers enable a wider range of destinations to be served with a greater frequency of service than would be economically viable if the hub handled only terminating passengers. But the hub model is not born out by what has actually happened at Heathrow over the last twenty years. Given the centrality of the hub model and Heathrow in the debate about future aviation strategy, the Heathrow experience merits analysis.

1.6 Transfer passengers at Heathrow have increased since 1991 in absolute numbers and at a faster rate than the increase in the number of terminating passengers [2], with a parallel increase in the number of air

[1] Surface access to and from the airport is also a consideration, which we address in relation to Heathrow Airport in response to Question (e) below.

[2] See Annex 1 to this response for fuller details on the numbers of terminating and transferring passengers at Heathrow since 1972. The breakdown between terminating and transferring passenger numbers has been published annually only since 1996. 1991 has been taken as the base year for this exercise partly to review the trend over twenty years and partly because 1991 is the earliest year in which the proportion of transfer passengers began to increase relative to terminating passengers compared to the years prior to 1991 (i.e. 1972, 1978, 1984, 1987) for which data have been published.

transport movements from 362 000 in 1991 to 476 000 in 2011. According to the hub airport model, Heathrow should have been serving more destinations in 2011 than it did in 1990. But in fact Heathrow served fewer destinations in 2011 than it did in 1990 [1]. As a result Heathrow now serves fewer destinations than Gatwick [2] even though the total number of passengers at Gatwick is half the total number at Heathrow, with far fewer transfer passengers at Gatwick than at Heathrow in absolute numbers and in proportion to terminating passengers.

1.7 The connectivity trend of fewer destinations at Heathrow cannot be explained by a lack of capacity. As is argued in fuller detail in response to the next question on whether the UK needs more aviation capacity, Heathrow has now reached virtually its runway capacity in unbroken segregated mode, but there is still has considerable unused actual terminal capacity and potential passenger capacity per aircraft movement. Moreover, the largest decrease in the number of destinations served by Heathrow occurred between 1990 and 2001 [3], during which period there was considerable spare runway capacity [4].

1.8 A closer examination of the changed destination profile at Heathrow since 1990 indicates that the lost destination were in declining order: (i) within the UK; (ii) to Western and Central Europe; and (iii) to the Near East and Africa. The great majority of lost destinations were on routes carrying less than 2 000 passengers per year. Some of these low demand destinations and the majority of lost destinations carrying larger passenger numbers (e.g. Antwerp, Corfu) are now served by one or more of London's main airports (Gatwick, Stansted, Luton, London City), so the a loss of connectivity at Heathrow has not meant a loss of connectivity for London.

1.9 Over the same period new destinations have been opened from Heathrow to Eastern Europe, the Far East and the Americas. But the largest impact of the net loss of destination connectivity - coinciding with growth in aircraft movements and total passenger numbers (and disproportionate growth in transfers) - appears to have been an increase in the frequency connectivity to destinations for which there was already a demand in 1990. Thus many popular destinations now have multiple daily services across the day, evening and night periods on long haul (e.g. New York) and short haul (e.g. Manchester). This enhanced frequency connectivity meets passenger demand. But it is argued in response to the next question that the number of daily movements to popular destinations could be reduced by carrying more per passengers per movement without any great inconvenience to passengers, thereby freeing up slots for other destinations.

1.10 The foregoing considerations suggest that passenger demand must be taken into account in an analysis of the relationship between connectivity and capacity; that the provision of extra capacity would not automatically translate into enhanced destination connectivity; and that enhanced destination connectivity may be possible without enhanced capacity.

Does the UK need more aviation capacity, particularly in the South East of England?

Heathrow

1.11 We consider that better use could be made of capacity at Heathrow to improve resilience in the short term and to increase passenger numbers (including to new destinations) in the medium term, while continuing to operate in unbroken segregated mode and within the existing limit of 480 000 air transport movements per year. We consider that the efficient use of this capacity would also enable movements to be phased out in the night period (2300-0700).

1.12 The Terminal Five Public Inquiry found that Heathrow - operating in unbroken segregated mode and with Terminal Five in full use - would have the capacity to handle 480 000 air transport movements

[1] See Annex 2 to this response for fuller details on the number of destinations served by Heathrow in 1990, 2001 and 2011. 1990 has been taken as the base year for this exercise because air travel was depressed in 1991 and it is assumed that 1990 would have been more representative of Heathrow's destinations approximately twenty years ago. A comparison has not been made between 1990 and 2010 because air travel in 2010 was still in recession in line with the global economic downturn.

[2] According to the respective websites for Heathrow and Gatwick.

[3] See Annex 2 to this response.

[4] The number of air transport movements increased from 362 000 in 1991 to 458 000 in 2001.

(ATMs) per year carrying 90 million passengers [1]. The number of ATMs at Heathrow in 2011 (476 000) virtually reached the forecast maximum number of ATMs per year with unbroken segregated mode, while the number of passengers (69 million) was 21 million short of the forecast maximum number of passengers per year.

1.13 In view of the fact that Heathrow is operating within its forecast ATM and passenger capacity, it must follow that the apparent lack of spare runway capacity with which to manage promptly periodic disruptions to flight schedules (particularly for arriving aircraft) and to serve new destinations is not due to the number of ATMs or passengers exceeding their forecast capacity. In our view both problems have arisen from a failure to utilise the capacity efficiently, with the disruption problem due to over-scheduling the number of ATMs in particular hours of the day; and the new destinations problem - in so far as it can be said to exist in reality at present [2] - due the shortfall between the number of passengers per ATM anticipated at the Terminal Five Public Inquiry and the actual number of passengers per ATM.

1.14 We consider that the disruption problem could be resolved by giving the airlines incentives (e.g. differential airport charges) to spread their slots more evenly across the day in order to avoid spikes in the number of slots in particular hours that are vulnerable to disruption. The simultaneous use of both runways for arrivals should be reserved only for the most extreme cases of disruption and not for routine disruption. We set out in Annex 3 to this response more details of the scheduled movements per hour at Heathrow.

1.15 As regards new destinations and passenger numbers, we estimate that Heathrow's 90 million passenger capacity would not be fully utilised until 2027 if the airlines increase the number of passengers per ATM to the level envisaged at the Terminal Five Public Inquiry and assuming a similar rate of increase to the annual average since 1991 [3]. We set out our analysis in more detail in Annex 4 to this response.

1.16 Increased passenger numbers per ATM in the short term could be delivered if the airlines aimed at a higher ratio of passenger numbers to passenger capacity in their existing fleet. The number of seats per ATM at Heathrow averaged at about 200 over each of the last five years, with the number of passengers per ATM in 2011 averaging at 146, a seat capacity use of about 73 per cent [4]. There is therefore scope to increase the average number of passengers per ATM, particularly on the most popular routes that are served by many flights per day [5].

1.17 Increased passenger numbers per ATM in the medium term could be delivered if the airlines replace much of their existing fleet at Heathrow with aircraft with larger passenger capacities. This would not mean switching every aircraft to Jumbo size; but it would mean more aircraft with seats for more than 200 passengers and fewer aircraft with seats for less than 200 passengers [6]. This could be done incrementally in line with routine fleet replacement, with the option of code-sharing between airlines to further defray the costs of switching to larger capacity aircraft.

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[1] See the report from the Terminal Five Public Inquiry to the Secretary of State for Transport.

[2] Business leaders have complained in the media in recent months that direct flights are not available from Heathrow to certain destinations in the Far East. But BA has acquired additional slots at Heathrow from BMI and has indicated that a proportion of these slots will be re-directed from existing short haul destinations to new long haul destinations as they become commercially viable. (The displaced passengers on the short haul routes can presumably be accommodated in the flights that BA already undertakes to those destinations). A more immediate route development has been the announcement by Virgin Atlantic that it will run six additional flights per day between Heathrow and Manchester from next spring, presumably a reflection that at present there is more actual demand on that route than on the Far Eastern routes to which the business leaders drew attention.

[3] Assuming also the continued disproportionate growth in transfer passengers at Heathrow and no loss of terminating passengers from Heathrow to other London airports or to airports in other UK regions. We consider transfer passengers in response to Questions (c) and (d) below.

[4] Data from the Civil Aviation Authority and Airports Co-ordination Limited websites.

[5] Our analysis - incomplete at the time of preparing this response - suggests that the ratio of passenger numbers to passenger capacity is lower on the most popular routes from Heathrow than the aggregated ratio on all routes from Heathrow.

[6] At present about 65 per cent of ATMs at Heathrow have a passenger capacity of less than 200 seats (data from Airports Co-ordination Limited website).

1.18 More passengers per ATM would enable the same number of passengers to be carried in fewer daily movements, particularly on the most popular routes, which in turn would free up slots for new destinations.

1.19 It is not clear why market forces and the rules of supply and demand - congestion pressures at Heathrow and competition between the airlines - have not resulted in larger passenger numbers per ATM. But carrying more passengers per ATM would create unused slots that would have to be surrendered without compensation under the European Union "use it or lose it" rule. The airlines may wish to retain the slots that they currently hold in order to open new routes in the future; or in order to keep competing airlines out; or in order to sell slots at their most lucrative value [1].

Other London Airports

1.20 We accept that passenger numbers are likely to increase at London's other main airports (Gatwick, Stansted, Luton, London City) over the next fifty years [2]. We have argued above that increasing the number of passengers per ATM would enable Heathrow to handle additional passenger numbers within its existing capacity. We consider that the same argument applies to London's other main airports. We consider in addition that existing capacity at London's five main airports could be put to better use if there was more co-ordination of the services offered at those airports.

1.21 Between 1977 and 1991 air traffic distribution rules were in operation at Heathrow and Gatwick in order to ease congestion at Heathrow and to assist the development of Gatwick. None of London's five main airports needs assistance in their development now, but the consequence of past development has been that many of the most popular destinations are now served by three or more of the airports. There may be a case for introducing new air traffic distribution rules across the region in order to promote larger passenger numbers per movement but with an overall reduction in the number of movements to the most popular destinations, thereby freeing up capacity across London for additional routes. This option has worked in the past and is likely to be less contentious than building new runways in the region.

Airports Outside South East England

1.22 Congestion at London's main airports is due in part to the continued dependence of the other regions of the United Kingdom on South East England for international aviation connections. We would welcome initiatives to increase the number of direct international services at airports in the other regions in order to reduce the number of domestic terminating and transferring passengers at Heathrow. For example, the development of improved surface access to airports within each region should not lag behind the development of improved surface access from other regions to airports in South East England.

1.23 There has been much public debate about the need to re-balance the UK economy away from excessive activity in South East England to other regions [3]. It might be helpful to commission a comparative study of the UK regions: to what extent can regional economic differences be attributed to the abundance or scarcity of aviation in each region? How does the international connectivity of major airports outside the South East (e.g. Manchester and Glasgow/Edinburgh) compare with airports in some of the smaller EU countries with similar population sizes to the UK regions?

Given the financial cost and public controversy around any significant capacity increases, what are the economic benefits of providing more capacity?

1.24 Following the rejection by the present Government of its predecessor's proposals for additional capacity in South East England a number of proposals have emerged, including:

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[1] The sale value would presumably by higher from a gradual release of spare slots rather than a sudden flooding of the market with all the available spare slots.

[2] See the table in Annex 5 to this response which shows the steady increase in passenger numbers at London's five main airports since 1972, with a diminishing proportion at Heathrow from a peak of 75 per cent to around 50 per cent in recent years.

[3] See the table in Annex 6 to this response which shows the imbalance between the number of passengers at London's airports compared with airports in all other UK regions, with a decrease in the imbalance by about only 10 per cent in the forty years between 1972 and 2011.

- new four-runway airport in the Thames Estuary;
- four new runways at Heathrow (to replace the existing two runways);
- mixed mode and an additional (i.e. third) runway at Heathrow;
- additional (i.e. second) runway at Gatwick;
- two additional (i.e. second and third) runways at Luton;
- three additional (i.e. second, third and fourth) runways at Stansted.

1.25 We have not yet been able to assess the extent to which any of these proposals have been costed and their environmental impacts identified. But the calls for mixed mode at Heathrow would over-turn the decision by the previous Government not to permit mixed mode on the grounds that the environmental disbenefits outweighed the economic benefits. The calls for a third runway at Heathrow similarly appear to ignore the condition applied by the previous Government that a third runway would be permitted only if the air quality around Heathrow complied with EU emissions limit values.

1.26 It must be the case that providing additional capacity would bring economic benefits because otherwise investment funding for the proposals now on the table would not be forthcoming. But we consider that those economic benefits could be realised by focussing on increasing the number of passengers per ATM (supplemented by better co-ordination of the services at London's five main airports and a reduction in transfer flights from other regions) instead of increasing the number of ATMs to the extent that additional runway capacity is needed. We consider that this alternative approach would be less controversial or costly than additional runways; and could be introduced incrementally, beginning within a very short timescale.

How robust are the available estimates?

1.27 We are not yet in a position to comment on the robustness of the available estimates.

If there is a need, is it general or for "hub" airport capacity in particular?

1.28 The aviation White Paper [1] states that airport capacity in South East England needs to be supplemented by the development of two additional runways: one for general traffic at Stansted, to be operational by 2011 or 2012; and one for hub traffic at Heathrow, to be operational between 2015 - 2020 if environmental conditions could be met (particularly regarding local air quality).

1.29 The White Paper also stated that the South East did not need a new four-runway airport to be developed at Cliffe (Kent); or a second hub to be developed at one of the other existing airports (i.e. Stansted with two runways was not expected to compete against Heathrow with three runways). But land was to be reserved for the development of an additional runway at Gatwick after 2019 if an additional runway at Heathrow could not meet the environmental conditions (i.e. by implication Gatwick would serve as a second hub to Heathrow).

1.30 We have argued above that we consider that additional runway capacity would not be needed at Heathrow or at other existing airports in the South East if ATMs carried more passengers than they do at present. As regards "hub" capacity, we argue in response to Questions (d) and (h) - (k) below that the hub model should be abandoned in favour of more direct flights between more airports, with a consequent reduction in the number international transfer passengers at Heathrow and other airports in the South East that would free up additional capacity for more direct flights.

[1] *The Future of Air Transport* (Cm 6046), December 2003.

2. Over what timescales do we need to solve our aviation needs, both in the short and the long term?

(b) Over what timeframe is any need for additional capacity likely to show itself and become critical for decision-making? Are there different challenges and needs over short and longer-term timescales?

2.1 The aviation White Paper stated that one additional runway needed to be operational at Stansted by 2011 or 2012; and that a second additional runway needed to be operational either at Heathrow between 2015 - 2020 or at Gatwick after 2019 if the environmental restrictions could not be guaranteed at Heathrow. All those dates will have presumably slipped, given that the White Paper was published in 2003 and no planning applications for the additional runways have been submitted in the interim.

2.2 We have argued in our response to Question (a) that Heathrow has the capacity to handle 21 million additional passengers per year with increased passenger numbers per aircraft movement and that this additional capacity would not be used up until 2027; and that better co-ordination of routes to the most popular destinations across London's main airports would free up additional capacity across the region. On that basis we do not consider that there is a crisis of capacity in the short or medium term.

3. What would be the implications of failing to provide additional capacity?

(c) What are the implications for the environment, for travel patterns and for the wider economy if there were to be no significant increase in capacity in the next decades? What impact would this have on our global competitiveness and connectivity to overseas markets, whether for business or leisure?

3.1 If no additional runway capacity were to be developed in South East England there would be a dramatic reduction in the number of projected aircraft movements. For example, the previous Government forecast that Heathrow with a third runway would handle 700 000 movements per year in 2030 compared with its capacity of 480 000 movements per year with two runways operating in unbroken segregated mode.

3.2 The environment would benefit from such a dramatic reduction in the number of movements to the extent that the quantity of climate change emissions, local air pollutants and air traffic noise would be considerably less by having for example 220 000 fewer movements per year at Heathrow.

3.3 The implications for travelling patterns and the wider economy (including global connectivity and competitiveness) are likely to be less dramatic because in the absence of additional runways the airlines would switch to a strategy of carrying more passengers per movement (which would of course exacerbate congestion problems for surface access at larger airports).

3.4 If the switch to larger passenger loads per movement instead of increased movements from additional runways would not deliver the capacity to meet fully the projected increase in passenger numbers, then the laws of supply and demand would continue to apply (see paragraphs 1.3 and 1.4 above). Connectivity priority would be given to those destinations for which there was a high level of demand at the expense of those destinations for which there was a low level of demand, with seating priority for those passengers prepared to pay for increased ticket prices at the expense those passengers not prepared to do so.

3.5 The table in Annex 7 to this response sets out the number of terminating business and leisure passengers at Heathrow 1972 - 2011 (i.e. transfers are excluded). It can be seen that leisure passengers have considerably outnumbered business passengers since at least 1996. Bearing in mind that business passengers generally travel in the most expensive seats, there is clearly plenty of scope for the air ticket price mechanism to "squeeze" the leisure passenger share in favour of destinations and seats for business passengers, thereby protecting future international commercial connectivity needs.

3.6 If the number of leisure passengers do not increase to the levels that they would from additional runways the international leisure industry would not grow as much as it would be expected to. But the proportion of consumer spending lost to international leisure would be re-directed within domestic economies. There would be no loss of overall consumer spending.

3.7 It might be argued that enabling some leisure passengers to be priced out of flying for a holiday would be socially divisive. But studies show that consumers on low income are already priced out of flying for leisure. The growth in leisure travel has largely been confined to the relatively wealthy who may undertake several trips per year, which presumably explains why the number of leisure passengers increased in each of the years of recession (2008 - 2011) at Heathrow.

(d) If there were no significant expansion at Heathrow, and no new hub elsewhere, could it continue to act as a major European hub? How might the composition of the market change over time if it remains capacity-constrained? Might European hub traffic increasingly concentrate around (say) Frankfurt, Paris, Schiphol and Madrid and, if so, would this greatly matter for the UK?

3.8 At most airports the great majority of passengers (described as terminating passengers) fly direct to or from their destination, while a small number of passengers (called transfer and transit passengers [1]) are on flights between two other airports. At hub airport there is the much higher proportion of transfer and transit passengers relative to terminating passengers.

[1] Transfer passengers arrive at the hub in one aircraft and depart in a second. Transit passengers arrive at and depart from the hub in the same aircraft. Transfer passengers greatly outnumber transit passengers.

3.9 Heathrow is said to be in competition with the hub airports at Amsterdam (Schiphol), Frankfurt and Paris (Charles De Gaulle) for the international transfer and transit market. These other hubs already have four or more runways in operation or under development. Each airport therefore has the capacity to handle more aircraft movements than Heathrow, with shorter waiting times between connecting flights (important for attracting transfers and transits) and less vulnerability to air traffic disruption. Moreover, the proportion of transfers and transits to terminating passengers is close to 50 per cent at the other hubs but is less than 40 per cent at Heathrow. It is therefore difficult to see how Heathrow could maintain its premier hub status without additional runway capacity. But there are strong arguments that the projected increase in passenger numbers will render the hub model obsolete in the near future.

3.10 The large number of transfers and transits are said to enable the hub to serve a wider range of destinations and at a greater frequency than non-hubs, thereby offering more direct flights to the hub's terminating passenger base who might otherwise have to take connecting flights via another hub. But as we have stated (see paragraphs 1.6 to 1.9) the number of destinations served by Heathrow in 2011 had decreased compared with 1990 and 2001, despite an increase in the overall number of passengers and a disproportionate increase in the number of transfers and transits. We have not yet completed our analysis of the number of transfers and transits on each destination and movement at Heathrow. Not have we yet been able to undertake an analysis of the long term trend in the number of destinations served by the other hubs.

3.11 Turning to the question of passenger preference, it is likely that most passengers would prefer to fly direct to their ultimate destination if given the choice rather than transferring at a hub, because direct flights should be quicker and cheaper than transfers. There were relatively few passengers in the early days of civil aviation so transferring at hubs emerged as the only economically viable option between many destinations for which there was insufficient direct demand. But the projected growth in future passenger numbers should mean that more direct services become economically viable at more airports. Assuming that the airlines respond to passenger preference, there should be an increase in the number of direct services with a corresponding decrease in the number of transfers and a diminished need for hub airports at Heathrow or elsewhere.

3.12 It has to be said that recent trends at Heathrow point in the opposite direction. The table in Annex 1 to this response shows that the number of transfer and transit passengers at Heathrow increased in absolute numbers and relative to the number of terminating passengers between 1991 and 2010 (with a slight reversal in 2011). It is not clear why the number of transfers should have increased at a faster rate than the number of terminating passengers. In its evidence to the Terminal Five Public Inquiry BAA said that the increase in transfers reflected a new airline strategy. This strategy may have been stimulated by the exemption of transfers from the new air passenger duty [1]; and possibly also by the introduction of the new EU "use it or lose it" rule for holders of slots at major airports [2]. But despite these market distortions, future aviation strategy will at some stage have to take account of passenger preference for more direct flights and fewer connecting flights.

[1] Transfer and transfer passengers have been exempt from air passenger duty ever since the duty was introduced in order that it did not deter passengers from transferring at UK airports: *We are concerned to maintain the international position of the British air transport industry particularly that of Britain's hub airports, such as Heathrow, and to help the airlines serving them, by preventing the tax from acting as a disincentive to passengers changing planes in Britain*: Sir John Chope MP (Paymaster General), Hansard, 31 Jan 1994, Col. 643.

[2] Council Regulation (EEC) No 95/93 of 18 January 1993 on common rules for the allocation of slots at Community airports introduced the requirement that slots have to be used for not less than 80 per of their allocation or they must be surrendered (without financial compensation) for re-allocation to competing airlines.

4. What are the key criteria for determining environmental acceptability of any development?

(e) Are there thresholds that determine when an airport development proposal can be considered acceptable? How can we ensure that technological advancement in aviation and improved environmental performance will benefit the communities around airports and not simply be used to justify more flights?

4.1 It is assumed that this question focuses on the local environmental impacts of airports. At Heathrow there are three main impacts: (i) air quality within the immediate vicinity of the airport; (ii) surface access to and from the airport; (iii) air traffic noise under the approach and departure flight paths. Local air quality and air traffic noise in the night (2300-0700) period already exceed what can be considered acceptable. Surface access (particularly in view of the knock-on effects on local air quality) and air traffic noise in the day (0700-1900) and evening (1900-2300) periods are fast approaching the limits of acceptability.

Air Quality

4.2 The Terminal Five Public Inquiry found that the air quality in areas around Heathrow exceeded what were at the time voluntary World Health Organisation (WHO) limit values for exposure to nitrogen dioxide; and that the exceedences would continue in future with or without Terminal Five. By the time the Secretary of State authorised the development of Terminal Five the WHO limit values had been made mandatory within the European Community, with a deadline for compliance by the end of 2010.

4.3 In paragraphs 77 and 78 of the letter dated 21 November 2001 authorising the development of Terminal Five the Secretary of State took issue with what he regarded as an unduly relaxed attitude towards the prospect of continued nitrogen dioxide exceedences around Heathrow:

> *He [the Secretary of State] considers that the Inspector placed too little weight on the European Community law aspects of the air quality issues and he recognises the obligations that Community law imposes on the UK Government … The Secretary of State reaffirms his recognition of the UK Government's obligations under the EU Directive. It remains the Government's intention to meet the requirements of the Directive .*

4.4 But compliance was not achieved by the end of 2010 and the Government had to apply to the European Commission for an extension for compliance until the end of 2015. With the extended deadline due to expire in just over two years' time, compliance has still not been achieved.

4.5 Although road traffic in the Heathrow area is considered to be the main source of nitrogen dioxide (and of particulates, another cause of local pollution for which limit values have been set), much of that road traffic is Heathrow bound; and aviation emissions (particularly take offs) make an additional contribution to the overall nitrogen dioxide and particulate levels. Any significant increase in passenger numbers using road access in future would make compliance with the limit values even more difficult.

4.6 Quite apart from the legal obligations on the Government to comply with the EU Directive, the nitrogen dioxide and particulate levels pose a health threat to adults living and working near Heathrow and to children living and attending schools near Heathrow. Recent research by the Massachusetts Institute of Technology has confirmed the health risks from air pollution in areas around Heathrow.

Surface Access

4.7 Heathrow has spare capacity to handle an additional 21 million passengers per year (see paragraph above). Assuming a continuation of the ratio of two terminating passengers to one transferring passenger (a ratio that has been roughly constant at Heathrow since the mid 1990s) then there would be an additional 14 million terminating passengers per year at Heathrow by the time that its passenger capacity is fully utilised. How would those additional 14 million passengers get surface access to Heathrow?

4.8 The table in Annex 8 to this response sets out the different modes of transport that have been used by terminating passengers for surface access to Heathrow between 1972 and 2010. In 2010 (the most recent year for which the detailed data was available at the time of drafting this response) 30.8 million passengers accessed by road (private car, hire car, taxi/minicab, bus/coach) and 10.8 million passengers accessed by rail (including underground), a ratio of three road accesses to one rail access that has been roughly constant at Heathrow since the opening of the Paddington connection in 2000 (prior to 2000 the ratio was 4:1). Assuming the future continuation of the 3:1 ratio, 10.5 million of the additional terminating

passengers would use road access, an increase in the total number of road access to 41.3 million per year. Increased passenger numbers would in turn increase the quantity of consumer goods and other supplies that are delivered to Heathrow primarily by road.

4.9 The road network around Heathrow already experiences significant levels of road traffic congestion, in part because of the high volume of road traffic to and from Heathrow. In many of these areas the air quality is already poor, with road traffic emissions identified as the main pollutant source. Reducing these related adverse impacts is proving difficult even with the present level of Heathrow access road traffic. If increased terminating passenger numbers stimulate increased Heathrow access road traffic there will be a corresponding increase in the magnitude of the adverse impacts on local road traffic congestion and air quality.

Air Traffic Noise

4.10 The high nitrogen dioxide levels are restricted to certain areas within the immediate vicinity of Heathrow. Noise from air traffic extends over a much wider area, several miles to the east and west of the airport to those communities over which Heathrow's arrival and departure flight paths are routed.

4.11 The harmonised mapping of air traffic noise around major EU airports - undertaken in compliance with Directive 2002/49/EC on the assessment and management of environmental noise - demonstrates that noise from Heathrow air traffic affects more people in the day-evening and night periods than at any other major EU airport.

4.12 Although the noisiest classes of aircraft have been phased out at Heathrow the recent noise trends are not encouraging:

- Day and evening period (0700-2300) The size of the air traffic noise contour shrank by 50 per cent between 1991 and 2001 but the rate of shrinkage has been much slower since 2001. The number of aircraft movements (i.e. the number of individual noise events) increased by 26 per cent in 2011 compared with 1991 (see Annex 9 to this response for fuller details).

- Night noise quota period (2330-0600) The number of aircraft movements increased between winter 1993/4 and summer 2011 but by a much lower percentage than the day and evening period. The noise per movement has not reduced to the same extent as in the day and evening period, as judged by the total number of night noise quota points used and the number of quota points per movement (see Annex 10 to this response for fuller detail).

- Night shoulder periods (2300-2330 and 0600-0700) The number of aircraft movements has increased compared with the situation in the early 1990s, with an average 40 arrivals and 17 departures per night in 2010 (figures for 2011 not yet available).

4.13 Turning to Heathrow's noise climate in the future, the Department of Transport is proposing to introduce a "noise envelope" at any new hub airport or at any other airport development which is a nationally significant infrastructure project. It is not clear whether a noise envelope would apply at Heathrow if Heathrow was selected for hub expansion (i.e. not a new hub airport) or if hub expansion is to take place elsewhere. But in either event we are deeply suspicious of a noise envelope.

4.14 The basis of our suspicion is that the noise envelope would apparently be based on limiting the size of the 57 decibel air traffic noise contour over 16 hours (0700-2300). A similar restriction already applies at Heathrow as a planning condition for Terminal Five, but the size of the permitted contour is so large that it has not provided any incentive to introduce quieter aircraft. The Planning Inspector at the Terminal Five Public Inquiry had severe reservations about the Department's preferred method of assessing the impact of noise levels, which would form the basis for assessing compliance with the contour limit. For those reasons he recommended the setting of a 480 000 limit on the number of air transport movements per year at Heathrow. The Secretary of State accepted the Inspector's reservations about noise assessment and imposed the 480 000 limit as a planning condition for Terminal Five.

4.15 We also have concerns about how the noise envelope would apply to the night period. Again, the precedents are not good. The original restrictions on night flights at Heathrow excluded the noisiest classes of aircraft and imposed a limit on the number of movements by other aircraft. But the last Administration attempted to abolish the limit on the number of movements in favour of sole reliance on a noise quota allowance (in effect a sort of noise envelope) which would have enabled the number of movements in the

night period to increase provided that their individual and collective noise levels did not exceed the quota allowance. Again, the noise quotas have been too lax to produce any significant reduction in night noise at Heathrow.

4.16 In our view the only way to reduce the noise from air traffic in the day and evening periods is to set ever-tightening noise standards with which aircraft must comply within a reasonable deadline. That is how the dramatic reductions in the noise contour in the 1990s at Heathrow were delivered. The ultimate objective must be to ensure that the noise levels at Heathrow and other airports do not exceed the guideline values recommended by the World Health Organisation. As regards air traffic arriving or departing in the night period, we consider that the only solution is a blanket prohibition 2300-0700 which could be delivered by increasing the number of passengers per aircraft movement: see our comments in paragraphs 1.15 - 1. 19 above.

(f) Assuming the effective operation of the EU Emissions Trading System to cap CO2 emissions, what more needs to be done to address the global environmental impact of aviation?

4.17 The implications of a significant increase in the number of air passengers in future are that there would be corresponding increases in the number of aircraft movements, in the consumption of fuel, and in the emissions of CO2. Studies should be undertaken of the extent to which these corresponding increases could be reduced by the more widespread use than is currently the case of aircraft with larger passenger capacities.

(g) If CO2 can be addressed by an ETS-style "cap and trade" system, could a similar approach be used - together with other measures - to drive down noise impacts?

4.18 The jury is still out on whether the EU Emissions Trading System will cap CO2 emissions; and whether the rest of the world will adopt the system. So it may be premature to hold out for a similar solution for air traffic noise. Adopting a cap and trade system for air traffic noise would - on the basis of the ETS precedent - take many years to agree even within the European Union; and the rest of the world may be even more sceptical about the need for such action given that the rest of the world at least recognises that CO2 emissions will have to be limited at some stage whereas there is no such consensus over air traffic noise. Finally, whereas all CO2 emissions contribute to overloading the global environment, the impact of air traffic noise is significant only within the vicinity of airports. Any regional or global caps on future air traffic noise levels may not prevent an increase in local air traffic noise hotspots around airports.

5. If more capacity is needed, what are the main options and the issues they raise?

(h) Is it feasible to deliver sufficient capacity and the benefits of a UK hub through better utilisation and connections between existing airports e.g. better links between Midland airports (or airports further from London) and Heathrow (using HS2)? Or between Heathrow and Stansted (e.g. using and extending Crossrail)? Or through better links between Gatwick, Heathrow and Luton? Would such improvements alone, without major capacity at a single hub, be sufficient?

5.1 We are not yet able to comment on the technical feasibility or environmental impact of improved surface connections between Heathrow and other airports. The underlying rationale appears to assume that it is necessary to shuttle as many transfer passengers as possible between Heathrow and other airports (hence the need for enhanced surface connections between the airports). In our view excessive cultivation of the transfer market has contributed to congestion at Heathrow without enhancing connectivity significantly (see our arguments in paragraphs 1.6 - 1.9 and paragraphs 3.8 - 3.12 above). We argue in response to Questions (i) and (k) below that the hub model should be abandoned at Heathrow; and should not be replicated at any other existing airport.

(i) Heathrow: is there a case for re-opening the option of a third runway (as previously proposed, or in some modified form)? Would that provide sufficient long-term capacity? If not, is it feasible to include ex-RAF Northolt in a revised proposal or are there fundamental obstacles? What would be the timescale for a revised Heathrow approach?

5.2 We do not consider that there is a case for re-opening the option of a third runway at Heathrow because the adverse local environmental impacts from Heathrow with two runways are already significant, as explained in our response to Question (e), and those impacts would increase with a third runway (including exposing communities that do not experience air traffic noise at present to air traffic noise in future).

5.3 We have argued that good connectivity does not depend now and will depend in the future on the existence of a dedicated hub airport; and that Heathrow has significant passenger capacity that could be utilised by increasing the number of passengers per movement rather than by building additional runway capacity: see our response to Question (a)

5.4 We have questioned the whether the hub model that is invoked to justify additional runway capacity at Heathrow will have the same importance in the future that it has had in the past at Heathrow and at other hub airports, given the likely future demand for more direct flights and the consequent reduction in transfer flights upon which the hub model is based: see our responses to Questions (c) and (d).

5.5 The aviation sector in the United States first developed hub airport model, a key feature of which is the simultaneous use of four runways, two central long runways with a short runway either side. Those who argue for a short third runway to the north of the existing two long runways in order to maintain Heathrow's hub status need to explain for how long a third runway would be able to maintain hub status before a fourth runway would be needed (and where it would be located) bearing in mind not just the US four runway hub model but also the presence of four or more runways at the hub airports in Amsterdam, Frankfurt and Paris, with all of whom Heathrow is said to be in competition for transfer passengers.

5.6 We are not yet in a position to comment on the feasibility of including ex-RAF Northolt as a fourth runway at Heathrow but the US hub model points towards the need for an additional short runway to the south of the existing two long runways rather than to the north of the proposed third runway.

(j) A new Thames Estuary airport: there are potential attractions with a "blank slate" approach to airport construction. Recent proposals suggest combining an airport with other key infrastructure needs - e.g. a new Thames Barrier and improved energy and communications connections. What are the key issues surrounding the feasibility of these plans?

5.7 We are not yet able to comment on the technical feasibility or the environmental impact of a new Thames Estuary airport. As regards financing, the development costs would be large and would be "up front" for the airport owners, with the return on investment deferred for many years.

5.8 It is our understanding that the Thames Estuary airport would have four runways from the outset, which would match the US hub model better than would the proposals for an additional runway at one or more of London's existing main airports. But we question whether the hub model is the best way forward in future.

5.9 Some commentators favouring a Thames Estuary airport have argued that it would succeed financially only if Heathrow were to be closed but it has not been explained how the closure would be brought about.

5.10 The whiff of anti-competition also comes through in some of the non-environmental objections to a Thames Estuary airport. For example, airlines with significant slot holdings at one or more of London's existing main airports could hardly expect to replicate such a dominant presence at the new airport, and therefore have an anti-competitive interest in preventing existing and new competitors from challenging their customer base from a new airport.

5.11 A new Thames Estuary airport would in all probability create over-capacity in South-East England, enabling projected passenger demand to be met in full and with sufficient surplus capacity to increase the scope for competition across the South East between airports and between airlines. But the debate about providing additional capacity has generally avoided competition considerations, particularly given the emphasis that has been placed on the need to maintain a single (i.e. monopoly) hub supplier.

(k) Alternative hub development(s): if Heathrow expansion remains ruled out and a new Thames Estuary airport were deemed too costly and difficult, are there other feasible options to develop a new SE England hub, either replacing Heathrow or complementing it (2-hub approach)? What are the relative merits of alternative expansion at Stansted or Gatwick? Could either of those airports be expanded to serve as a major European-style hub? Would a more modest expansion at just one site, alongside a 2-runway Heathrow, be viable commercially?

5.12 The solution that we have suggested for Heathrow – more passengers per aircraft movement instead of additional runway capacity – would apply equally to the other airports in South East England. Our criticisms of the hub model would apply to all airports, not just Heathrow, so we would not support hub development at any existing airport in the South East.

5.13 The previous Government ruled out a second hub in South East England, unless Heathrow was not able to comply with the environmental conditions for a third runway; in which case a second hub would be developed at Gatwick. We cite this not in support of hub development at Gatwick but as evidence of confused thinking about whether a hub airport can be ring-fenced from other airports.

5.14 The airlines, and particularly the airline alliances, decide at which airport to mount hub operations, not the airport owners. It is difficult to see how the Government could guarantee that hub operations would take place only at airport A and not at airport B, particularly now that BAA's ownership of the three largest London airports - Heathrow, Gatwick and Stansted - has been broken up on the recommendation of the Competition Commission in order to promote more competition between airports in the region.

ANNEX 1

Heathrow: Terminating and transfer passengers 1972 - 2011

Years	*Terminating passengers*		*Transfer passengers*		*Total passengers*	
	(millions)	%	(millions)	%	(millions)	%
1972	14.3	*76.4*	4.4	*23.6*	18.7	*100.0*
1978	20.8	*77.2*	6.1	*22.9*	26.9	
1984	22.6	*76.6*	6.9	*23.4*	29.5	
1987	27.0	*76.9*	8.1	*23.1*	35.1	
1991	29.8	*73.8*	10.6	*26.2*	40.4	
1996	37.3	*66.8*	18.5	*33.2*	55.8	*100.0*
1997	38.6	*66.6*	19.1	*33.0*	57.9	
1998	40.6	*67.4*	19.6	*32.5*	60.3	
1999	?	?	?	?	?	
2000	44.7	*70.2*	19.0	*29.8*	63.7	
2001	41.1	*68.6*	18.8	*31.4*	59.9	*100.0*
2002	39.6	*64.0*	22.3	*36.0*	61.9	
2003	40.1	*63.7*	22.8	*36.3*	62.9	
2004	43.6	*65.2*	23.3	*34.8*	66.9	
2005	43.6	*65.3*	23.2	*34.7*	66.8	
2006	44.2	*65.9*	22.9	*34.1*	67.1	*100.0*
2007	44.0	*65.8*	22.9	*34.2*	66.9	
2008	43.2	*64.6*	23.6	*35.3*	66.8	
2009	40.9	*62.1*	24.9	*37.9*	65.8	
2010	42.2	*64.2*	23.5	*35.8*	65.7	
2011	45.9	*66.4*	23.3	*33.6*	69.2	*100.0*

Source: Civil Aviation Authority *Passenger Surveys Reports* [1]. Where the totals do not sum this is due to rounding. At the time of preparing the table the Report for 1999 had not been consulted.

Note: The Reports for the years 1972 to 1998 give the number of terminating and transfer passengers only as percentages of the annual total number of passengers. The numbers in the table for the years to 1998 have therefore been calculated from the percentages and the total number.

Comment: The table shows consistent growth in the total number of passengers at Heathrow between 1972 and 2004, with stabilisation between 2004 and 2010 and renewed growth in 2011. Within this overall growth there were increases in the absolute number of terminating and transferring passengers throughout the period. But since 1991 the rate of growth has been faster among transfers, who have accounted for one or more passengers in three since 2002 compared with less than one passenger in four prior to 1991. The number of air transport movements (ATMs) at Heathrow increased from 362 000 in 1991 to 476 000 in 2011.

The large number of transfer passengers increase the present levels of congestion at Heathrow. It is argued that transfers enable the airlines at Heathrow to serve a wider range of destinations than would be economically viable with only terminating passengers. But the period of exponential growth in transfers since 1991 coincided with a fall - rather than an implied increase - in the number of destinations served by Heathrow (see separate table for details).

[1] The surveys have been undertaken annually at Heathrow since 1996, and at less frequent intervals prior to 1996.

ANNEX 2

Heathrow: Number of destinations in 1990, 2001 and 2011

Region	*1990*			*2001*			*2011*		
United Kingdom	24	(18)	(6)	14	(10)	(4)	11	(7)	(4)
Western Europe	54	(40)	(14)	33	(32)	(1)	35	(29)	(6)
Central Europe	53	(41)	(12)	33	(31)	(2)	35	(32)	(3)
Eastern Europe	16	(13)	(3)	26	(23)	(3)	21	(21)	(-)
Near East	20	(17)	(3)	18	(17)	(1)	15	(14)	(1)
Africa	29	(24)	(5)	24	(21)	(3)	23	(23)	(-)
Far East	25	(25)	(-)	29	(28)	(1)	30	(30)	(-)
Americas	43	(33)	(10)	35	(34)	(1)	41	(36)	(5)
Totals	***264***	***(211)***	***(53)***	***212***	***(196)***	***(16)***	***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 per listed region served by air transport movements from Heathrow in the years 1990, 2001 and 2011. The first column of numbers is the total number of destinations. The second column of numbers is the number of destinations to which 2 000 or more passengers (arrivals and departures) were transported. The third column of numbers is the number of destinations to which less than 2 000 passengers (arrivals and departures) were transported.

The number of passengers at Heathrow increased from 45.6 million in 1990 to 60.4 million in 2001 (an increase by 32 per cent compared with 1990), and to 69.4 million in 2011 (an increase by 52 per cent compared with 1990). The number of air transport movements (ATMs) increased from 368 000 in 1990 to 458 000 in 2001 and to 476 000 in 2011.

Comment: The table shows that the total number of destinations served by Heathrow decreased by approximately 20 per cent in 2001 compared with 1990, with a further decrease of less than one per cent in 2011 compared with 2001, despite the increase in the number of ATMs in 2001 and 2011.

The number of destinations that carried less than 2 000 passengers in 1990 decreased by approximately 65 per cent. The number of destinations that carried 2 000 or more passengers in 1990 decreased by approximately 5 per cent.

The table shows that changes in the number of services to destinations carrying more than 2 000 passengers in 1990 varied between regions, with five regions experiencing net decreases and three regions experiencing net increases.

The largest decreases in destinations served affected the United Kingdom (down from eighteen destinations to seven), Western Europe (down from forty destinations to twenty nine) and Central Europe (down from forty one destinations to thirty two), with smaller decreases in the Near East (down from seventeen destinations to fourteen) and Africa (down from twenty four destinations to twenty three).

There were increased services to Eastern Europe (up from thirteen destinations to twenty one), the Far East (up from twenty five destinations to thirty) and the Americas (up from thirty three destinations to thirty six).

Analysis of the individual destinations within the regions served by Heathrow shows variation between regions and within countries, with some destinations closed and others newly opened. The data upon which the table is based indicate that the majority of destinations that are no longer served by Heathrow (e.g. Antwerp, Corfu, Las Palmas) are now served by one or more of London's other major airports (Gatwick, Stansted, Luton, London City).

ANNEX 3

Heathrow: Runway scheduling limits - movements per hour

	2006/07			*2007*			*2010/11*			*2011*		
	arrive	*Depart*	*total*	*arrive*	*depart*	*total*	*arrive*	*depart*	*total*	*arrive*	*depart*	*total*
0600-	35	26	61	36	27	63	37	28	65	38	25	63
0700-	36	41	77	40	43	83	35	41	76	39	46	85
0800-	34	42	76	38	42	80	33	43	76	37	43	80
0900-	39	41	80	39	42	81	41	42	83	40	43	83
1000-	41	42	83	39	40	79	40	42	82	40	41	81
1100-	38	42	80	42	42	84	37	42	79	41	42	83
1200-	42	43	85	40	41	81	43	44	87	39	41	80
1300-	39	41	80	43	43	86	39	40	79	43	43	86
1400-	42	38	80	41	41	82	42	39	81	43	42	85
1500-	44	43	87	44	44	88	44	43	87	41	44	85
1600-	43	46	89	42	44	86	44	46	90	42	43	85
1700-	41	45	86	42	43	85	40	45	85	43	43	86
1800-	40	44	84	43	44	87	40	42	82	44	44	88
1900-	40	42	82	43	44	87	39	43	82	43	44	87
2000-	38	40	78	39	39	78	38	40	78	38	38	76
2100-	40	37	77	44	39	83	41	36	77	44	38	82
2200-	20	21	41	21	30	51	22	21	43	21	31	52
Total	652	674	1 326	676	688	1 364	655	677	1 332	676	691	1 367
Hourly average												
	38.4	39.6	78.0	39.8	40.5	80.3	38.5	39.8	78.3	39.8	40.6	80.4

Source: Airport Co-ordination Ltd (ACL), seasonal reports for Heathrow, unnumbered tables entitled "Runway Scheduling Limits - Movements per Hour".

Notes: The table shows the scheduled number of aircraft arrivals departures in each hour at Heathrow between 0600-2300 in the winter seasons Oct-March 2006/07 and 2010/11 and the summer seasons March-Oct 2007 and 2011.

Comment: Heathrow handled its largest number of ATMs (476 000) in 2007 and 2011, so the seasons in the table reflect the near-capacity scheduling of movements. It can be seen that the number of scheduled arrivals and departures varies depending on the hour. A more even spread of the traffic across the day and evening would produce a scheduling in each hour that is closer to the hourly average, which would reduce the risk of disruption in "over-subscribed" hours from movements ahead of or behind schedule.

ANNEX 4

Heathrow: Number of passengers per movement 1991 - 2011

Years	*Passengers*		*Movements*		*Average per movement*	
	(millions)	%	(thousands)	%		%
1991	40.3	*100.0*	362	*100.0*	111.3	*100.0*
1992	45.0	*111.7*	388	*107.2*	116.0	*104.2*
1993	47.6	*118.1*	396	*109.4*	120.2	*108.0*
1994	51.4	*127.5*	412	*113.8*	124.8	*112.1*
1995	54.1	*134.2*	421	*116.3*	128.5	*115.5*
1996	55.7	*138.2*	428	*118.2*	130.1	*116.9*
1997	57.9	*143.7*	431	*119.1*	134.3	*120.7*
1998	60.4	*149.9*	442	*122.1*	136.7	*122.8*
1999	62.0	*153.8*	451	*124.6*	137.5	*123.5*
2000	64.3	*159.6*	460	*127.1*	139.8	*125.6*
2001	60.5	*150.1*	458	*126.5*	132.1	*118.7*
2002	63.0	*156.3*	460	*127.1*	137.0	*123.1*
2003	63.2	*156.8*	457	*126.2*	138.3	*124.3*
2004	67.1	*166.5*	470	*129.8*	142.8	*128.3*
2005	67.7	*168.0*	472	*130.4*	143.4	*128.8*
2006	67.3	*167.0*	471	*130.1*	142.9	*128.4*
2007	67.9	*168.5*	476	*131.5*	142.6	*128.1*
2008	66.9	*166.0*	473	*130.7*	141.4	*127.0*
2009	65.9	*163.5*	460	*127.1*	143.3	*128.8*
2010	65.8	*163.3*	449	*124.0*	146.6	*131.5*
2011	69.4	*172.2*	476	*131.5*	145.8	*131.0*

Source: Civil Aviation Authority, *UK Airport Statistics*

Notes: The source gives the number of passengers and air transport movements, from which the number of passengers per movement have been calculated. The percentage columns are calculated from 1991 as the base year.

There are minor discrepancies in the passenger numbers given in *UK Airport Statistics* compared with the Civil Aviation Authority's *Air Passenger Surveys*. The *Air Passenger Surveys* are published later in the year than *UK Airport Statistics* and presumably contain the more accurate data. But the *Air Passenger Surveys* have been published annually for Heathrow only since 1996, so *UK Airport Statistics* have been used to compile this table.

Comment: The report to the Secretary of State on the Heathrow Terminal Five Public Inquiry advised that Heathrow would have an annual runway capacity of 480 000 air transport movements operating in unbroken segregated mode and would be able to handle 90 million passengers per year with Terminal Five fully operational. 480 000 movements carrying 90 million passengers is equivalent to an annual average of 187.5 passengers per movement.

The number of air transport movements (ATMs) per year increased from 362 000 in 1991 to 476 000 in 2011, an increase over twenty years of 114 000 ATMs (31.5 per cent). At the end of 2011 there was spare capacity to handle a further 4 000 ATMs per year (i.e. 480 000 less 476 000). The rate of increase in the number of ATMs between 1991 and 2011 was equivalent to an average annual increase of approximately 5 700. If the same rate of increase continues, the 4 000 spare capacity would be fully utilised by late 2012.

The number of passengers per year increased from 40.3 million in 1991 to 69.4 million in 2011, an increase over twenty years of 29.1 million (72.2 per cent). At the end of 2011 there was spare capacity to handle a further 20.6 million passengers per year (i.e. 90 million less 69.4 million). The rate of increase in the number of passengers between 1991 and 2011 was equivalent to an average annual increase of approximately 1.45 million. If the same rate of increase continues, the 20.6 million spare capacity would be fully utilised by early 2027.

The average number of passengers per movement increased from 111.3 in 1991 to 145.8 in 2011, an increase over twenty years of 34.5 passengers per movement (31.0 per cent). At the end of 2011 there was spare capacity - as implied by the findings of the Terminal Five Public Inquiry - to handle a further 41.7 passengers per movement (i.e. 187.5 less 145.8). The rate of increase in the number of passengers per movement between 1991 and 2011 was equivalent to an average annual increase of approximately 1.7 passengers. If the same rate of increase continues, the 41.7 spare capacity would be fully utilised by early 2036.

In view of the legal limit of 480 000 on the permitted number of ATMs per year and the impending arrival at that number of ATMs, the only way that Heathrow can make full use of its 90 million annual passenger-handling capacity is to increase significantly the number of passengers per ATM.

ANNEX 5

Passenger numbers at London airports 1972 - 2011

	Gatwick		Heathrow		London City		Luton		Stansted		Total	
	millions	*%*	*millions*	*%*	*millions*	*%*	*millions*	*%*	*millions*	*%*	*millions*	*%*
1972	5.3	*20*	18.3	*68*	-	-	3.1	*11*	0.3	*1*	27.0	*100.0*
1973	5.7	*19*	20.3	*69*	-	-	3.2	*11*	**0.2**	*1*	29.4	
1974	**5.1**	*19*	**20.1**	*73*	-	-	**2.0**	*7*	0.2	*1*	27.4	
1975	5.3	*18*	21.3	*74*	-	-	**1.9**	*7*	0.2	*1*	28.7	
1976	5.7	*18*	23.2	*75*	-	-	**1.8**	*6*	0.3	*1*	31.0	
1977	6.6	*20*	23.4	*73*	-	-	1.9	*6*	0.3	*1*	32.2	
1978	7.8	*21*	26.5	*72*	-	-	2.1	*6*	0.3	*1*	36.7	
1979	8.7	*22*	28.0	*71*	-	-	2.2	*6*	0.3	*1*	39.2	
1980	9.7	*24*	27.5	*69*	-	-	**2.1**	*5*	0.3	*1*	39.6	
1981	10.7	*27*	**26.4**	*67*	-	-	**2.0**	*5*	0.3	*1*	**39.4**	*100.0*
1982	11.2	*28*	26.4	*66*	-	-	**1.8**	*5*	0.3	*1*	39.7	
1983	12.5	*30*	26.8	*65*	-	-	**1.7**	*4*	0.3	*1*	41.3	
1984	14.0	*31*	29.2	*64*	-	-	1.8	*4*	0.5	*1*	45.5	
1985	14.9	*31*	31.3	*65*	-	-	**1.6**	*3*	0.5	*1*	48.3	
1986	16.3	*32*	31.3	*62*	-	-	2.0	*4*	0.5	*1*	50.1	
1987	19.4	*34*	34.7	*60*	-	-	2.6	*4*	0.7	*1*	57.4	
1988	20.7	*33*	37.5	*60*	0.1	-	2.8	*4*	1.0	*2*	62.1	
1989	21.1	*32*	39.6	*61*	0.2	-	2.8	*4*	1.3	*2*	65.0	
1990	**21.0**	*31*	42.6	*63*	0.2	-	**2.7**	*4*	**1.2**	*2*	67.7	
1991	**18.7**	*30*	**40.2**	*64*	0.2	-	**2.0**	*3*	1.7	*3*	**62.8**	*100.0*
1992	**19.8**	*29*	45.0	*65*	0.2	-	**1.8**	*3*	2.3	*3*	69.1	
1993	20.1	*28*	47.6	*66*	0.2	-	**1.7**	*2*	2.7	*4*	72.3	
1994	21.0	*27*	51.4	*66*	0.5	*1*	1.8	*2*	3.2	*4*	77.9	
1995	22.4	*27*	54.1	*65*	0.6	*1*	1.8	*2*	3.8	*5*	82.7	
1996	24.1	*28*	55.7	*64*	0.7	*1*	2.4	*3*	4.7	*5*	87.6	
1997	26.8	*28*	57.8	*61*	1.2	*1*	3.2	*3*	5.3	*6*	94.3	
1998	29.0	*29*	60.4	*59*	1.4	*1*	4.1	*4*	6.8	*7*	101.7	
1999	30.4	*28*	62.0	*57*	1.4	*1*	5.2	*5*	9.4	*9*	108.4	
2000	31.9	*28*	64.3	*56*	1.6	*1*	6.2	*5*	11.8	*10*	115.8	
2001	**31.1**	*27*	**60.5**	*53*	1.6	*1*	6.5	*6*	13.6	*12*	**113.3**	*100.0*
2002	**29.5**	*25*	63.0	*54*	1.6	*1*	6.5	*6*	16.0	*14*	116.6	
2003	29.9	*25*	63.2	*53*	**1.5**	*1*	6.8	*6*	18.7	*15*	120.1	
2004	31.4	*24*	67.1	*52*	1.7	*1*	7.5	*6*	20.9	*16*	128.6	
2005	32.7	*24*	67.7	*51*	2.0	*1*	9.1	*7*	22.0	*16*	133.5	
2006	34.1	*25*	**67.3**	*49*	2.4	*2*	9.4	*7*	23.7	*17*	136.9	
2007	35.2	*25*	67.9	*49*	2.9	*2*	9.9	*7*	23.8	*16*	139.7	
2008	**34.2**	*25*	**66.9**	*49*	3.3	*2*	10.2	*7*	**22.3**	*16*	**136.8**	
2009	**32.4**	*25*	**65.9**	*51*	**2.8**	*2*	**9.1**	*7*	**19.9**	*15*	**130.1**	
2010	**31.3**	*25*	**65.7**	*52*	2.8	*2*	**8.7**	*7*	**18.6**	*15*	**127.2**	
2011	33.6	*25*	69.4	*52*	2.9	*2*	9.5	*7*	**18.0**	*13*	133.6	*100.0*

Sources: Civil Aviation Authority, *Passengers at London Airports in 1991 (*published in 1993), Table 1, for the years 1972 - 1991. Civil Aviation Authority, *UK Airports - Annual Statements of Movements, Passengers and Cargoes*, for the years 1992 - 2007. Where the totals do not sum this is due to rounding.

Note: The entries marked in bold indicate a decrease in the number of passengers compared with the previous year.

Comment: The table shows that the number of passengers have increased significantly at all of London's main airports in the period between 1972 and 2011.

As regards the distribution of the total number of passengers between the individual airports, Heathrow accounted for more than 70 per cent between 1974 and 1979, reaching a peak of 75 per cent in 1976. Since then the general trend has been for the other airports to account for an increasing proportion of passengers, with Heathrow's share decreasing to 49 per cent in the years 2006 - 2009, before increasing to 52 per cent in 2010 and 2011.

ANNEX 6

Passenger numbers at UK airports: 1972 - 2011

	London airports		Other UK airports		All UK airports	
	millions	*%*	*millions*	*%*	*millions*	*%*
1972	27.0	*69.4*	11.9	*30.6*	38.9	*100.0*
1973	29.4	*68.4*	13.6	*31.6*	43.0	
1974	**27.4**	*68.5*	**12.6**	*31.5*	**40.0**	
1975	28.7	*68.5*	13.2	*31.3*	41.9	
1976	31.0	*69.5*	13.7	*30.6*	44.7	
1977	32.2	*70.2*	13.7	*29.8*	45.9	
1978	36.7	*69.3*	16.1	*30.5*	52.8	
1979	39.2	*68.8*	17.8	*31.2*	57.0	
1980	39.6	*68.4*	18.2	*31.5*	57.8	
1981	**39.4**	*68.2*	18.4	*31.8*	57.8	*100.0*
1982	39.7	*67.5*	19.1	*32.5*	58.8	
1983	41.3	*67.6*	19.8	*32.4*	61.1	
1984	45.5	*67.2*	22.1	*32.7*	67.6	
1985	48.3	*68.6*	22.1	*31.4*	70.4	
1986	50.1	*66.7*	25.1	*33.4*	75.2	
1987	57.4	*66.7*	28.6	*33.3*	86.0	
1988	62.1	*66.7*	31.1	*33.4*	93.2	
1989	65.0	*65.9*	33.9	*34.3*	98.9	
1990	67.7	*66.3*	34.7	*33.9*	102.4	
1991	**62.6**	*65.5*	**33.2**	*35.6*	**95.8**	*100.0*
1992	69.3	*63.8*	39.3	*36.2*	108.6	
1993	72.4	*63.1*	42.2	*36.8*	114.7	
1994	77.9	*62.4*	46.9	*37.6*	124.9	
1995	82.7	*62.6*	49.3	*37.3*	132.1	
1996	87.8	*63.3*	50.8	*36.7*	138.6	
1997	94.4	*63.1*	54.1	*36.2*	149.5	
1998	101.7	*62.9*	59.9	*37.0*	161.7	
1999	108.4	*63.4*	62.6	*36.6*	171.1	
2000	115.8	*63.4*	66.7	*36.6*	182.6	
2001	**113.4**	*61.8*	70.3	*38.3*	183.6	*100.0*
2002	116.7	*61.1*	74.4	*38.9*	191.1	
2003	120.1	*59.3*	82.3	*40.7*	202.4	
2004	128.6	*59.0*	89.5	*41.0*	218.1	
2005	133.5	*57.9*	97.1	*42.1*	230.6	
2006	136.9	*57.6*	100.7	*42.4*	237.6	
2007	139.7	*57.4*	103.6	*42.6*	243.2	
2008	**136.9**	*57.3*	**101.8**	*42.6*	**238.7**	
2009	**130.1**	*58.8*	**91.1**	*41.2*	**221.3**	
2010	**127.2**	*59.5*	**86.5**	*40.5*	**213.7**	
2011	133.6	*60.1*	88.8	*39.9*	222.4	*100.0*

Source: For the years 1972 - 1991: Civil Aviation Authority, *Passengers at London Airports in 1991*, Table 1. For the years 1992 - 2007: Civil Aviation Authority, *UK Airports - Annual Statements of Movements, Passengers and Cargoes*. Where the totals do not sum this is due to rounding.

Notes: The passenger numbers for the London airports are the aggregate for five airports (Gatwick, Heathrow, London City, Luton, and Stansted). The passenger numbers for the other UK regions (including the Isle of Man and the Channel Islands) are the aggregate for fifty seven airports listed in the source. The entries marked in bold indicate a decrease in the number of passengers compared with the previous years

Comment: The total number of passengers at all airports experienced a near continuous year-on-year increase in the period 1972 - 2007, with rates of increase by a factor of five at the London airports and by a factor of more than eight at the other UK airports. Passenger numbers then decreased in each year between 2008 and 2010 in both London and the other regions, with renewed increases in 2011.

London's airports accounted for more than half of passengers at all UK airports in every year since 1972. But the airports in other regions increased their share of total passenger numbers from 30.6 per cent in 1972 to 42.6 per cent in 2007 and 2008, with disproportionate growth particularly noticeable relative to London in the period 1989 - 2007. In the last three years (2009 - 2011) that trend has reversed, with London increasing its share of all passenger numbers.

ANNEX 7

Heathrow: Terminating business and leisure passengers 1972 - 2011

Years	Business passengers		Leisure passengers		Total terminating passengers	
	millions	*%*	*millions*	*%*	*millions*	*%*
1972	5.3	*37.1*	9.0	*62.9*	14.3	*100.0*
1978	10.0	*48.1*	10.8	***51.9***	20.8	
1984	11.1	*49.1*	11.5	***50.9***	22.6	
1987	12.0	***44.4***	14.8	*54.8*	27.0	
1991	13.7	*46.0*	16.0	***53.7***	29.8	
1996	15.6	***42.2***	21.6	*57.8*	37.3	*100.0*
1997	16.0	***41.7***	22.5	*58.4*	38.5	
1998	16.6	***40.9***	23.9	*59.0*	40.6	
1999	-	-	-	-	-	-
2000	18.6	*41.6*	26.1	***58.4***	44.7	
2001	**17.0**	***41.4***	**24.1**	*58.6*	**41.1**	*100.0*
2002	**16.2**	***40.9***	**23.4**	*59.1*	**39.6**	
2003	**15.7**	***39.1***	24.3	*60.6*	40.1	
2004	17.6	*40.4*	26.0	***59.6***	43.6	
2005	**16.7**	***38.3***	26.9	*61.7*	43.6	
2006	17.5	*39.6*	**26.7**	***60.4***	44.2	*100.0*
2007	**17.4**	***39.5***	**26.6**	*60.4*	**44.0**	
2008	**16.1**	***37.3***	27.1	*62.7*	**43.2**	
2009	**12.9**	***31.5***	28.0	*68.4*	**40.9**	
2010	13.7	*32.5*	28.4	***67.3***	42.2	
2011	15.1	*32.9*	30.8	***67.1***	45.9	*100.0*

Source: Civil Aviation Authority *Passenger Survey Reports* [1]. At the time of preparing the table the Report for 1999 had not been consulted. Where the totals do not sum this is due to rounding.

Notes: The Reports for the years 1972 to 1998 give the number of terminating and transfer passengers only as percentages of the annual total number of passengers. The numbers in the table for the years to 1998 have therefore been calculated from the percentages and the total number.

The numbers marked in bold indicate a decrease in the number of passengers or in the percentage of total passengers compared with the previous years.

Comment: The table shows that the number of terminating business and leisure passengers at Heathrow increased in every year 1972 - 2000. The pattern in the eleven years since 2001 has fluctuated between increases and decreases:

- The number of business passengers increased in four of the years (including in 2010 and 2011) and decreased in seven of the years, with fewer business passengers in 2011 than in any of the earlier available years back to 1991.

- The number of leisure passengers increased in seven of the years (including in 2008 - 2011) and decreased in four of the years, with more leisure passengers in each year 2008 - 2011 than in any of the earlier available years.

The table shows that the number of leisure passengers has always exceeded the number of business passengers, with the difference between the two widening since 1987, albeit with minor departures from the trend in some years.

[1] The surveys have been undertaken annually at Heathrow since 1996, and at less frequent intervals prior to 1996.

ANNEX 8

Heathrow: Passenger numbers per transport mode for surface access 1972 - 2010

Year	*Car/taxi*		*Bus/coach*		*Tube/rail*		*Other*		*Total*	
	millions	*%*	*millions*	*%*	*millions*	*%*	*millions*	*%*	*millions*	*%*
1972	-	*59*	-	*32*	-	*0*	-	*2*	14.3	*93*
1978	-	*63*	-	*14*	-	*20*	-	*1*	20.8	*98*
1984	14.9	*66*	3.3	*14*	4.5	*20*	0.2	*1*	22.6	*101*
1987	17.2	*64*	4.0	*15*	5.4	*20*	0.2	*1*	26.8	*100*
1991	19.7	*66*	3.9	*13*	6.0	*20*	0.2	*1*	29.8	*100*
1996	25.0	*67*	6.0	*16*	6.0	*16*	0.3	*1*	37.3	*100*
1997	25.3	*66*	6.2	*16*	6.6	*17*	0.4	*1*	38.5	
1998	27.2	*67*	5.7	*14*	6.3	*18*	0.4	*1*	40.6	
1999										
2000	28.4	*63.7*	6.2	*13.9*	9.8	*22.1*	0.3	*0.4*	44.6	
2001	26.6	*64.7*	5.4	*13.1*	8.9	*21.5*	0.3	*0.7*	41.2	*100*
2002	25.9	*65.3*	4.9	*12.3*	8.8	*22.1*	0.1	*0.3*	39.7	
2003	25.9	*64.3*	5.1	*12.6*	9.2	*22.9*	0.2	*0.3*	40.2	
2004	27.8	*63.7*	5.4	*12.4*	10.2	*23.5*	0.3	*0.3*	43.6	
2005	27.3	*62.7*	5.7	*13.0*	10.4	*23.9*	0.2	*0.4*	43.6	
2006	28.5	*64.4*	5.8	*13.1*	9.9	*22.9*	0.0	*0.0*	44.2	*100*
2007	27.2	*61.5*	5.8	*13.2*	11.0	*24.9*	0.1	*0.3*	44.1	
2008	25.7	*59.8*	6.1	*14.1*	11.1	*25.7*	0.1	*0.3*	43.0	
2009	24.5	*59.6*	5.7	*14.0*	10.6	*26.0*	0.2	*0.5*	40.9	
2010	25.2	*60.5*	5.6	*13.4*	10.8	*25.9*	0.1	*0.3*	41.7	

Source: Civil Aviation Authority *Passenger Survey Reports*. The surveys have been undertaken annually from 1996 at Heathrow; at less frequent intervals before 1996. The report for 1999 had not been consulted at the time of preparing the table.

Notes: The reports indicate the use of each mode of transport shown in the table [1] as a percentage [2] of the total number of terminating passengers [3]. The reports from 2007 onwards indicate the percentage use of private, public and other surface modes of transport. The number of passengers using each mode has been calculated by applying the individual percentages to the total number of terminating passengers in each year from 1984 onwards [4]

The column car/taxi includes private hire cars and minicabs.

[1] The reports since 2007 indicate the percentage use of public, private and other surface modes of transport, but not the percentages for the individual modes of transport published in the reports prior to 2007. The percentages for the individual modes since 2007 have been supplied by BAA Heathrow to the local authorities.

[2] Rounded percentages prior to 2000, percentages to one decimal point since 2000. The individual percentages for 1972, 1978 and 1984 sum to 93 per cent, 98 per cent and 101 per cent respectively. For the subsequent years, the individual percentages sum to 100 per cent (or to one decimal point for 2000, 2003 and 2004).

[3] Transfer passengers are excluded because they do not arrive at or depart from Heathrow by surface transport.

[4] 1972 and 1978 are excluded because the data are evidently incomplete for those years - see footnote 2.

ANNEX 9

Heathrow: Aircraft movements and 16-hour (0700-2300) noise exposure contours: 1991-2011

Years	*Number of aircraft movements*				*Size of 57 dBA contour*	
	calendar year		*24-hours*	*16-hours*	*km²*	*%*
	000s	*%*				
1991	382 (362)	*100.0*	1 046.6	-	234.9	*100.0*
1992	406 (388)	*106.3*	1 109.2	-	204.0	*86.8*
1993	411 (396)	*107.6*	1 126.0	-	182.3	*77.6*
1994	425 (412)	*111.3*	1 164.4	-	175.5	*74.7*
1995	435 (421)	*113.9*	1 191.8	-	169.2	*72.0*
1996	440 (428)	*115.2*	1 202.2	1 178.4	164.7	*70.1*
1997	441 (431)	*115.4*	1 208.2	**1 167.0**	158.3	*67.4*
1998	451 (442)	*118.1*	1 235.6	1 206.1	**163.7**	***69.7***
1999	458 (451)	*119.9*	1 254.8	1 215.5	155.6	*66.2*
2000	467 (460)	*122.3*	1 276.0	1 236.3	135.6	*57.7*
2001	**464** (**458**)	***121.5***	**1 271.2**	1 237.7	117.4	*50.0*
2002	467 (460)	*122.3*	1 279.4	1 243.2	**126.9**	***54.0***
2003	**464** (**457**)	***121.5***	**1 271.2**	**1 232.2**	126.9	*54.0*
2004	476 (470)	*124.6*	1 300.5	1 263.0	117.4	*50.0*
2005	478 (472)	*125.1*	1 309.7	**1 248.7**	117.2	*49.9*
2006	**477** (**471**)	***124.9***	**1 306.8**	**1 248.0**	**117.4**	***50.0***
2007	481 (476)	*125.9*	1 317.8	1 258.2	**119.6**	***50.9***
2008	**479** (**473**)	***125.4***	**1 308.7**	1 264.8	**123.1**	***52.4***
2009	**466** (**460**)	***122.0***	**1 276.7**	**1 230.5**	112.5	*47.9*
2010	**455** (**449**)	***119.1***	**1 246.6**	1 263.8	108.3	*46.1*
2011	481 (476)	*125.9*	1 317.8	1 268.6	**108.8**	***46.3***

Sources: Civil Aviation Authority: *UK Airport - Movement, Passenger and Cargo Statistics* for the number of aircraft movements per year. The number of aircraft movements per 24-hour day (Jan to Dec) have been calculated from the number of movements per year. Civil Aviation Authority: *Noise Exposure Contours for Heathrow Airport* for the size of the noise contour and the number of aircraft movements per 16-hour day (mid-June to mid-Sept). At the time of compiling the table the number of movements had not been identified for the years 1991 - 1995.

Notes: The percentage columns for the number of aircraft movements per year and for the size of the air traffic noise exposure contour take 1991 as the base year for observing the extent of subsequent changes. The numbers marked in bold indicate the years in which there was a reversal in the prevailing trend compared with the preceding year (an increase in the number of aircraft movements and a decrease in the size of the air traffic noise exposure contour - see comments below). The numbers in brackets in the column for the number of aircraft movements per year are the numbers of *air transport movements* (i.e. engaged in the transport of passengers, cargo or mail).

Comment: The general trends (0700-2300 hours) have been for an increase in the number of aircraft movements in parallel with a decrease in size in the air traffic noise exposure contour. These trends were most pronounced and were continuous in virtually every year 1991 - 2001. The trends have been flatter since 2001, with several years showing a reversal in the trend for the number of movements or for the contour size; or for both.

ANNEX 10

Heathrow: Aircraft movements and noise quota points in the night quota period (2330 - 0600)

Winter seasons 1993/4 - 2010/11

Seasons	*Number of aircraft movements*		*Number of noise quota points used*			
			total points used		*points per movement*	
		%		*%*		*%*
1993/4	2 352	*100.0*	4 384	*100.0*	1.86	*100.0*
1994/5	**2 668**	***113.4***	**5 020**	***114.5***	**1.88**	***101.1***
1995/6	**2 751**	***117.0***	4 760	*108.6*	1.73	*93.0*
1996/7	2 525	*107.4*	3 901	*89.0*	1.54	*82.8*
1997/8	2 446	*104.0*	3 858	*88.0*	**1.58**	***85.0***
1998/9	**2 688**	***114.3***	**4 423**	***100.9***	**1.65**	***88.7***
1999/00	2 529	*107.5*	3 972	*90.6*	1.57	*84.4*
2000/1	**2 615**	***111.2***	**4 118**	***93.9***	1.57	*84.4*
2001/2	**2 684**	***114.1***	**4 257**	***97.1***	**1.59**	***85.5***
2002/3	2 620	*111.4*	**4 316**	***98.5***	**1.65**	***88.7***
2003/4	**2 683**	***114.1***	**4 425**	***100.9***	1.65	*88.7*
2004/5	2 591	*110.2*	4 361	*99.5*	**1.68**	***90.3***
2005/6	**2 669**	***113.5***	4 355	*99.3*	1.63	*87.6*
2006/7	2 659	*113.1*	4 266	*97.3*	1.60	*86.0*
2007/8	**2 710**	***115.2***	4 100.25	*93.5*	1.52	*81.7*
2008/9	**2 715**	***115.4***	3 947.50	*90.0*	1.45	*78.0*
2009/10	2 686	*114.2*	3 863.25	*88.1*	1.44	*77.4*
2010/11	2 577	*109.6*	3 735.25	*85.2*	**1.45**	***78.0***

Summer seasons 1994 - 2011

Seasons	*Number of aircraft movements*		*Number of noise quota points used*			
			total points used		*points per movement*	
		%		*%*		*%*
1994	2 905	*100.0*	5 109	*100.0*	1.76	*100.0*
1995	**2 968**	***102.2***	**5 159**	***101.0***	1.74	*98.9*
1996	2 566	*88.3*	4 340	*85.0*	1.69	*96.0*
1997	**2 757**	***94.9***	4 276	***83.7***	1.55	*88.1*
1998	**2 828**	***97.4***	**4 668**	***91.4***	**1.65**	***93.8***
1999	**3 138**	***108.0***	**5 342**	***104.6***	**1.70**	***96.6***
2000	3 028	*104.2*	4 967	*97.2*	1.64	*93.2*
2001	2 939	*101.2*	4 694	*91.9*	1.60	*90.9*
2002	2 937	*101.1*	**5 051**	***98.9***	**1.72**	***97.7***
2003	2 899	*99.8*	**5 165**	***101.1***	**1.78**	***101.1***
2004	**2 993**	***103.0***	**5 218**	***102.1***	1.74	*98.9*
2005	2 956	*101.8*	**5 225**	***102.3***	**1.77**	***100.6***
2006	**3 059**	***105.3***	**5 232**	***102.4***	1.71	*97.2*
2007	3 053	*105.1*	**5 235**	***102.5***	**1.72**	***97.7***
2008	2 922	*100.6*	4 634	*90.7*	1.59	*90.3*
2009	2 848	*98.0*	4 429.25	*86.7*	1.56	*88.6*
2010	**3 033**	***104.4***	**4 504.75**	*86.2*	1.49	*84.7*
2011	2 958	*101.8*	4 491	*87.9*	**1.52**	***86.4***

Sources: Department of Transport and BAA Heathrow for the number of aircraft movements and noise quota points used, from which the number of quota points per movement has been calculated.

Notes: The percentage columns take winter 1993/4 and summer 1994 as the base seasons for observing the extent of subsequent changes. The numbers marked in bold indicate an increase compared with the previous season.