

## Q5 traffic forecasts for Heathrow

### Introduction

1. This appendix sets out the positions of BAA, the CAA and the airlines on traffic forecasts for Heathrow and Gatwick in Q5. Following this introduction, it is structured as follows:
  - the first part outlines *BAA's methodology* as presented to the CC in a staff meeting on 8 May 2007;
  - the second part sets out *a simplified depiction of passenger forecasting*; and
  - the third part discusses the *process of the Constructive Engagement* as it relates to traffic forecasts.
2. There are two annexes, which present:
  - BAA's forecasts for passenger movements at Heathrow and Gatwick from 2005, the CAA's assumptions<sup>1</sup> in their reference to us in March 2007, and the interim output of the constructive engagement process, sent to the CC in July 2007; and
  - BAA's fuel price assumptions to 2030.

### BAA's methodology

3. BAA uses a detailed model to derive medium and long-term traffic forecasts for its London airports. The complexity and diversity of the airline traffic landing at and taking off from airports in the South-East, and the large number of major international airports, mean that this process is complicated. It consists of the following steps:
  - forecasting unconstrained passenger air traffic demand for London;
  - allocating demand to airports;
  - modelling capacity constraints at Heathrow and Gatwick; and
  - allocating excess demand to other airports.
4. This section outlines each in turn, then looks at:
  - how traffic forecasts may be derived; and
  - BAA's record in forecasting passenger traffic.

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<sup>1</sup>The CAA said in its reference that it had 'not ... sought to offer views on which traffic forecast is appropriate for this purpose ... The CAA .... encourages BAA and the relevant airlines to continue working towards a single, agreed traffic forecast'.

## ***Forecasting unconstrained passenger air traffic demand for the London area***

5. For forecasting demand for passenger air traffic for the London area, BAA uses three different methods of demand forecasting for different time periods:
  - in the short term, it extrapolates current trends and incorporates an assessment of airline intentions; and
  - for medium- and long-term projections, the econometric model is used.
6. BAA's econometric model provides the demand context for BAA's airport throughput forecasts over the next price control period. BAA has provided a short summary of the model to us.

## ***Allocating demand to airports***

7. The CAA data contained in the Origins and Destinations survey tells BAA how many passenger trips to specific airports are made to and from local authority districts in the South-East. Having created a matrix of trips from zones to airports BAA defines a zone as belonging to a particular airport catchment when the proportion it accounts for of that airport's total traffic is greater than the share it accounts for of the traffic of any of the other airports in the system.
8. With the catchments defined in this way it is then possible to measure the extent to which different passenger segments originating in the different catchments currently choose to use the airports in the system. This reveals that different segments respond differently to the attractions of individual airports.

## ***Modelling capacity constraints at Heathrow and Gatwick***

9. For the London area it is then necessary to model the effects of various constraints, particularly at Heathrow and Gatwick. There are a number of such limits at Heathrow:
  - at the moment, Heathrow is constrained by runway and apron capacity, but the opening of Terminal 5 next year will ease the apron constraint as well as improving the quality of service experienced by passengers. Until the completion of Runway 3 (which BAA considers will not happen before 2020), therefore, the major constraint on Heathrow will be runway capacity;
  - there are hourly limits on the number of takeoffs and landings during the 17-hour day period, for operational safety and delay reasons, and limits placed on the number of flights and the amount of noise at night, for environmental reasons; and
  - there is, however, an overriding limit of 480,000 ATMs a year, which was a condition of planning approval for Terminal 5.
10. At 254,227 aircraft movements (2004/05), compared with a theoretical capacity of 275,000 ATMs Gatwick's single runway is not yet fully utilized for parts of the year but is currently operating at over 92 per cent of capacity. At peak times, however, most obviously in July and August, the runway has no spare capacity for much of the day. A submission by an airline projected that, for 2007, between 25 May and 7 September, there would be no spare slots (either arrival or departure) between 6 am and 2 pm, and between mid-July and early September there would be none between 6 am and 9 pm. BAA's forecasts show the number of ATMs edging up towards 100 per cent of theoretical capacity over Q5 and Q6. The development of the second runway is constrained by a 'Section 53' agreement with West Sussex County Council

due to expire in August 2019. The Government's White Paper Progress Report confirmed that Gatwick had a potential role in providing additional capacity, should the environmental conditions attached to a new runway at Heathrow not be met, and considered that the option of constructing an additional runway at Gatwick after 2019 should be kept open.

### ***Allocating excess demand to other airports***

11. Once the 'unrestricted' demand is modelled, therefore, and allocated to BAA's three London airports, it is necessary for BAA to allocate the excess demand at Heathrow and Gatwick to other London or regional airports. It does this based on two dimensions: firstly, a hierarchy of second choice for the four types of passenger groups (UK business; UK leisure; foreign business; foreign leisure) and secondly, according to place of origin and destination. Again, we have not looked in detail at how they model these choices, but BAA has explained to us that it makes extensive use of the CAA's Origin and Destination passenger surveys. The methodology runs as follows:
  - a comparison of the demand with capacity at a specified future date reveals whether that level of demand can be accommodated;
  - having identified the amount of excess demand, a process of re-allocation then follows, using the estimated relative propensity of different passenger segments to switch to another airport;
  - these 'attrition factors' are applied to any excess demand at any airport and form the composition of the spillover demand;
  - the spillover traffic is then re-allocated using another set of rules that vary according to passenger type. Not all of this spillover traffic is assumed to remain within the south-east system. Some of the 'lost' traffic may switch to other airports or simply not fly; and
  - the process is repeated until excess demand is eliminated and airports are either at or below their estimated capacity.
12. As an illustration the model assumes that international to international transfer passengers are eight times more likely to switch to another airport (UK or overseas) than UK resident business passengers with origins inside the airport's catchment area.
13. In the short term, particularly for the period covering the next eighteen months, BAA focuses more on recent trends in sub-markets and/or airlines' performance; on assessments of airline plans for the coming seasons; and on current economic issues (such as interest rate or taxation changes). This effectively combines demand and supply side issues. BAA uses the latest actual throughput numbers as the basis for forecasting future months, and will take into account any known significant events such as the implementation of the Open Skies agreement or the timing of Easter. For time horizons into the medium term, BAA blends the short term and long term approaches.

### ***BAA's passenger traffic forecasting record***

14. BAA's forecasting record for its London area airports for Q3 and Q4 is presented in Table 1. Q3 has the MMC forecasts, which were nearly the same as BAA's forecasts

with the exception of a small upward adjustment for Stansted. As it turned out, these forecasts were 3.4 per cent too low for Heathrow, 10.4 per cent too low for Gatwick and 49.2 per cent too low for Stansted. It will be seen that its overall forecast in Q4 was within about 1 per cent of the outturn, but its forecasts by airport are not accurate, and its Q3 overall total was 9 per cent away from the outturn. It is the airport forecasts rather than the overall forecasts that are important for the Quinquennial Review, because price caps are set by individual airports rather than at the overall level. It is difficult therefore to regard five-year forecasts as reliable to a level of more than 5 per cent.

TABLE 1 Comparison of actual and projected passenger numbers over Q3 and Q4

	Q3 forecast	Q3 actual	% difference	Q4 forecast	Q4 actual <sup>2</sup>	% diff
Heathrow	296.0	306.1	3.4	347	334.8	-3.5
Gatwick	135.7	149.9	10.4	179.3	164.9	-8.0
Stansted	32.9	49.1	49.2	91.3	111.4	22.0
Total	464.4	505.1	8.7	617.6	611.1	-1.1

Source: CC.

15. BAA gives two main reasons for the variations from its forecasts at the airport level in Q4:

- Heathrow has been particularly affected by unanticipated external events such as SARS, the Iraq War the 2005 bombings and the Gate Gourmet dispute; and
- Gatwick and Stansted have been affected by the shift from charter traffic (mostly based at Gatwick) to low-cost airlines (which fly from Stansted to a greater extent).

### A simplified depiction of passenger forecasting

16. Passenger numbers can be disaggregated using the following equations:

Total passengers = long-haul passengers + short-haul passengers

Long-haul passengers = total ATMs x %age of long-haul ATMs x long-haul load factor x average size of long-haul planes

Short-haul passengers = total ATMs x %age of short-haul ATMs x short-haul load factor x average size of short-haul planes

17. Since the number of ATMs at Heathrow is capped, and is currently almost at that cap, significant further growth in passenger traffic at Heathrow must be through more passengers on each plane. More passengers on each plane must come from either larger planes with more seats (ie changes in fleet mix) or filling a higher percentage of the seats available (ie changes in load factor), or a combination of the two. The proportion of long-haul to short-haul flights will also influence the fleet mix greatly because long-haul planes are much larger, on average, than short-haul planes.

18. In addition to the factors discussed in the main text, BAA and the airlines took different views on two factors which demand context against which forecasts of changes in aircraft size and load factors are made: *oil prices* and the *proportion of*

<sup>2</sup>Including forecasts for 2007/08.

*transfer passengers*. We outline their arguments below, though the CC has not considered it necessary to take a view on the appropriate levels of these factors.

### ***Oil prices***

19. BAA took a considerably more pessimistic view on oil prices in January 2007, increasing its projections by \$5–\$10/barrel in real terms between 2006 and 2030 compared with its January 2006 forecasts. It surveyed a number of forecasters and looked at press comment and noted that the interim scenarios for NIER and OECD had recently increased their forecasts to \$65–\$67. Oxford Economics had not, however, changed its forecasts and they were still much lower. Jet fuel had recently risen above \$2/gallon. BAA therefore considered that prices were likely to be high in the medium term, and that the increase in refining capacity and recovery from the 2005 hurricane Katrina was likely to have a limited effect. Planes were likely to become more efficient in the long term, and BAA had built in an increase of 1 to 1.5 per cent in this metric into its forecasts. If this increase in oil prices is reflected in airfares, it might be expected to deter passengers from flying, but it has a smaller effect on demand at Heathrow than on overall unconstrained demand in the south-east, as Heathrow is operating at capacity.
20. The airlines had not seen any major change in the oil price between September and January to justify the changes in BAA's assumptions. Oil prices remained volatile in the short term but a five-year view showed a gradual easing of the oil price. They argued that there was some evidence that output would increase to match the current high level of prices, and that between March and June 2007, there had been unusually high demand which might ease. The airlines had also observed a widening in the margin between the prices of oil and of jet fuel, which might be reversed as more refining capacity came on stream (reversing the impact of hurricane Katrina). The airlines provided the CC with some data on this trend. The DfT update paper in December 2006 had used Oxford Economics forecasts that were significantly lower than the forecasts used by BAA. Oil prices were unlikely to be recovered through airline prices in their entirety: it could be that only around 45 per cent were passed through into prices and hence demand calculations. The DfT paper had also modelled scenarios with an estimated impact per \$5 change in the oil price. The impact it had found was only one-tenth of BAA's.

### ***Transfer passengers***

21. One factor feeding in to expectations of future load growth is the continuing growth of the transfer market. As transfer passengers record two arrivals and two departures per return journey, they will count four times in BAA's statistics while a point-to-point passenger would only count twice. The airlines have argued that BAA has consistently under-projected transfer growth, and should take a more optimistic view of its potential. The concentration of the alliances into single terminals at Heathrow showed its potential as a hub and the increase in revenue caused by filling otherwise empty seats surely indicated that transfer traffic would grow faster than BAA had assumed. The possible improvements in quality of service following the opening of Terminal 5 and improved processing times in the Flight Connections Centre also pointed in this direction.
22. BAA, however, argued that the trend in transfer passengers had been downwards since August 2006, making even its lower projections seem optimistic. Heathrow's advantage in this area was the frequency of services which it offered. This might erode over time relative to airports on the continent with greater runway capacity. New aircraft with longer ranges meant significant future increases in point-to-point

services, such as Birmingham or Glasgow to Dubai. The demand for domestic transfers had weakened at Heathrow; people from outside London were often choosing to transfer in Amsterdam or Paris instead.

## **Process of Constructive Engagement**

23. The traffic forecasts workstream of Constructive Engagement was designed to produce traffic forecasts which BAA and the airlines could endorse, for the purposes of the other workstreams, in particular capital expenditure. It has had a number of important successes, for instance:
- disagreement between the airlines and BAA has focused on the inputs to BAA's methodology, rather than on the methodology itself;
  - traffic forecasts have been agreed at Gatwick, with the exception of a small difference on the extent and speed of 'backfill' following the implementation of the Open Skies agreement; and
  - the airlines and BAA have agreed on short-haul load factors at Heathrow.
24. It is nevertheless a matter of some concern that, despite agreement on forecasts for Heathrow earlier in the process a material difference remained at the end of the process between the airlines' position and BAA's. After consulting both BAA and the airlines, we believe that more involvement by the CAA in this workstream in the future would be desirable. We understand that the CAA has attended very few of the meetings between BAA and the airlines, and has chaired none of them. The CAA might be able, as a neutral facilitator, to mediate between the parties. While it is not certain that such an approach would produce a consensus in every area, it might narrow significantly the number and magnitude of differences between the parties. Further, the airlines have represented to us that BAA has revised its forecasts unnecessarily often over the past few years, and BAA has argued that the airlines have not answered numerous working papers and notes which it has provided. It is not appropriate for us to adjudicate on these arguments, but if the CAA had been more involved in this workstream, it might have been able to take remedial action once these problems had arisen.

## Traffic volumes and forecasts for Q5 for Heathrow and Gatwick

TABLE 1 **Heathrow: out-turn passenger volumes in 2006/07: 67.3 million**

	2008/09	2009/10	2010/11	2011/12	2012/13
<i>Without Open Skies</i>					
CC 2002 projections	75.5	80.0	81.5	83.0	84.7
BAA 2005 projections	75.0	78.0	80.0	81.5	83.0
BAA 2006 projections	74.0	75.7	77.5	79.5	81.5
CAA CC Reference (Mar 2007)	71.7	73.2	74.8	76.4	78.5
<i>With Open Skies</i>					
BAA 2006 projections	74.9	77.2	79.0	80.5	82.0
BAA CC submission (May 2007)	70.6	72.8	74.2	75.3	77.2
CE Interim Report (July 2007)—BAA	70.6	72.5	74.0	75.3	77.2
CE Interim Report (July 2007)—airlines	72.6	74.5	75.9	77.3	78.8

Source: BAA, IATA, CAA, CC.

TABLE 2 **Gatwick: out-turn passenger volumes in 2006/07: 34.4 million**

	2008/09	2009/10	2010/11	2011/12	2012/13
<i>Without Open Skies</i>					
CC 2002 projections	40.0	40.5	41.0	41.5	42.0
BAA 2005 projections	37.0	38.0	38.5	39.5	40.0
BAA 2006 projections	36.2	36.9	37.5	38.2	39.0
CAA CC Reference (Mar 2007)	34.6	35.1	35.5	36.0	36.5
<i>With Open Skies</i>					
BAA 2006 projections	35.8	36.1	36.5	37.2	38.0
BAA CC submission (May 2007)	36.2	36.6	36.8	37.3	37.7
CE Interim Report (July 2007)—BAA	36.2	36.6	36.8	37.3	37.7
CE Interim Report (July 2007)—airlines	36.2	36.6	37.0	37.5	38.2

Source: BAA, IATA, CAA, CC.

**BAA's projections for oil prices****BAA's projections for oil prices, \$/barrel constant prices**

\$

	<i>January 2006</i>	<i>January 2007</i>
2006	55	65
2010	50	60
2015	50	55
2020	50	55
2025	55	60
2030	60	65

Source: BAA.

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