



London City Airport

Summary of Methodology & Results for Passenger and Air Traffic Forecasts to inform London City Airport Draft Master Plan April 2019

Introduction

This note provides information on the passenger demand forecasts used to inform the Draft Master Plan. It sets out the overall methodology used, the core assumptions used and the resulting forecasts.

Overview of the Approach

The demand forecasts have been built up via two streams of analysis:

- a ‘top-down’ analysis of passenger demand – this used a passenger allocation model that accounts for LCY’s competitive interactions with other airports in the London system and an assessment of the growth in passenger demand over time based on the Department for Transport’s national passenger demand forecasts. This analysis provided an assessment of the broad timescale over which a series of ‘bottom up’ forecast scenarios might be achieved;
- a ‘bottom up’ analysis of potential supply side development at LCY taking into account expected airline, route and fleet developments, and the capabilities of the infrastructure. This was used to test what level of aircraft movements and, hence, passenger demand would in practice be deliverable based on LCY’s infrastructure and within environmental limits considered ‘acceptable’.

A more detailed description of each process is set out below.

Top-Down Analysis of Passenger Demand

York Aviation’s ‘top down’ model is a competitive interaction model that uses econometric techniques to examine passengers’ past behaviour, as observed via the CAA Passenger Survey, to determine how they will react to different drivers of airport choice in the future as the market grows, the offer at individual airports changes, surface access changes and capacity at individual airports changes.

The model adopts three stage process for each forecast year:

1. Forecast Total Passenger Demand for the Study Area – the model provides an estimate of the total passenger demand by district for each market segment (UK / Foreign, Business / Leisure) and for each destination market (Domestic, Europe, North America, Other). The base has been determined using CAA Passenger Survey data. This total ‘pool’ of demand is then grown forward into the future based on the unconstrained growth rates from the DfT Aviation Forecasts 2017 adjusted as required taking into account any updated economic forecasts as the time of forecasting;
2. Allocate Demand to Airports – the passenger demand in each district is then allocated to the different airports being analysed using an alternate specific conditional logit model. This views passenger choice as a function of surface access time (road and public transport), frequency of service and airport specific constants. The latter represent other choice factors that are not estimated within the model, for instance

relative air fares, airline loyalty schemes, quality of service or airline choice. The airports within the model include the main London airports and a number of regional airports. The latter are included to provide competitive constraints on the margins of the catchment area;

3. Match Demand to Capacity – the final part of the process is making sure that the demand allocated to any given airport does not exceed the capacity available. Where demand exceeds capacity a shadow cost is applied to make the relevant airport less attractive to passengers and to push them towards their next best alternatives. The capacities of the main London airports were assumed to be as follows at the time of the modelling work, i.e. taking into account proposed increases in capacity as at September 2018¹:
 - Heathrow – around 90 million passengers prior to the third runway and then 135 million passengers from 2029;
 - Gatwick – around 50 million passengers;
 - Stansted – around 43 million passengers;
 - Luton – around 38 million passengers.

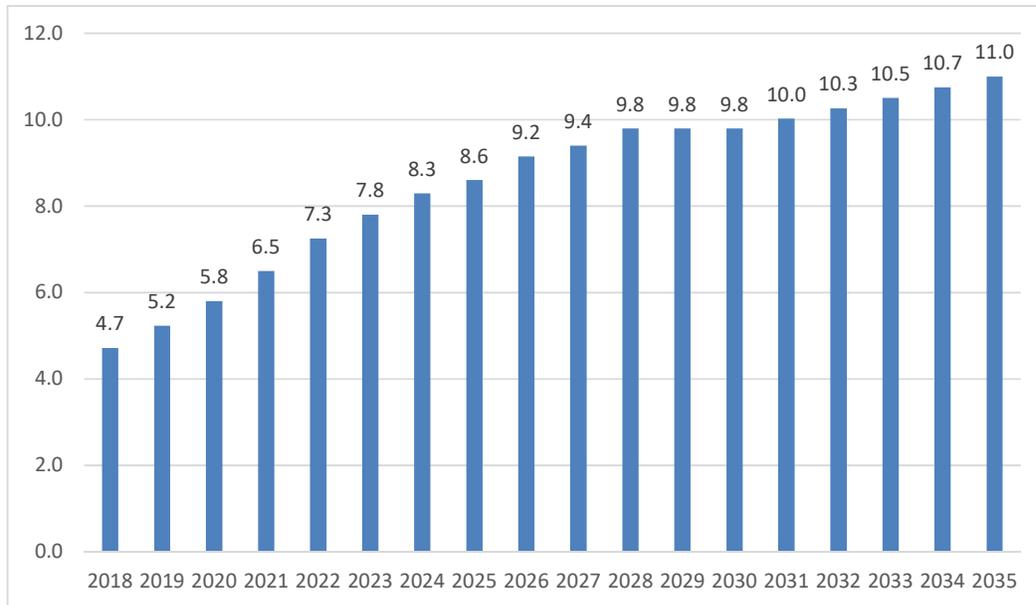
A number of further assumptions have been made specifically in relation to LCY and its market situation for the purposes of this analysis. These are summarised below. The purpose of some of these assumptions is to allow the model to better reflect LCY's unique features and circumstances. The areas where adjustments to the basic model to reflect the situation at LCY, future strategy for the Airport or known changes in the market generally moving forward are:

- Employment & Population Growth in East London – there is an expectation of faster population and economic growth in the East of London. District level outputs from the DfT's TEMPRO model have been used to make adjustments to underlying growth in London to reflect this phenomenon;
- Crossrail / Elizabeth Line – the first phase of Crossrail is expected to open in around 2020 and will provide substantially improved journey times east-west across London and, in this context, particularly to/from Heathrow. ;
- Leisure Strategy and Aircraft Technology – some adjustments to the model have been made reflecting the change towards larger jet aircraft including new generation variants and increased proportion of leisure services to better reflect LCY's potential;
- Recent Capacity Constraints at LCY – some adjustments to the model have been made to reflect the release of current capacity constraints as the CADP infrastructure come on stream;
- Greater Focus on Hub Access – in terms of the Airport's strategy, there is a subtle shift towards improving hub access from LCY. This will ultimately enable the Airport to be more of a factor in long haul markets using hub connections, e.g. Amsterdam, than previously. Some adjustments have, therefore, been made to the model in long haul markets to reflect this increased attractiveness of hub connections.
- Operating restrictions – some nominal allowances have been made for future adjustments to operating restrictions beyond 2022. It is noted that any future changes have not yet been defined pending the outcome of the master plan process.

The resulting top down forecasts for passengers are shown in **Figure 1** below. A slowing of growth reflects the competitive effect of Heathrow's new runway coming on stream, which for the purpose of the Master Plan was assumed to be 2029.

¹ We recognise that there have been some more recent changes in plans, specifically in relation to Luton and Gatwick but these potential act in opposite directions in relation to the LCY forecasts.

Figure 1: Top Down Demand Forecasts for London City Airport



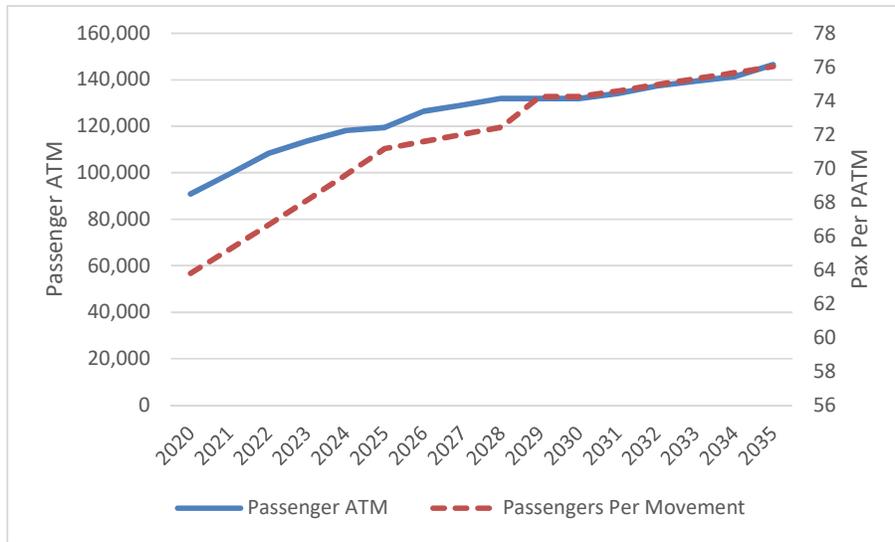
Source: York Aviation

Bottom Up Assessment of Annual Movements and Fleet Mix

The annual passenger movements have been derived by dividing the overall passenger forecast by a projected number of passengers per movement going forward. This average number of passengers per movement has been established through a combination of analysis of the recent trend for this to increase, combined with some consideration applied for likely future fleet plans for the airlines operating at LCY, including for example the assumption that British Airways Cityflyer (BACF) will replace their 76-seat aircraft with larger new generation aircraft, accommodating more passengers, over time. In considering the future number of passengers per movement compared to fleet changes, we have assumed a 70% load factor across all airlines over the long term.

A further check on the average aircraft size and passengers per movement was derived from the busy day timetable (BDTT) as described below. As average aircraft size, and passengers per movement, is expected to continue to grow, then the number of passenger movements at the airport is not expected to grow in proportion to overall passenger forecasts. The projected trend and passenger movements can be seen in **Figure 2**.

Figure 2: Projected Passengers Per Movement and Passenger Movements



Source: York Aviation

The rapid growth in passengers per movement in the period to 2025 reflects the change from Embraer 170 to Embraer 190 aircraft by BACF, representing a 28% increase in seats over what currently represents nearly 15% of all current annual movements. As there will be less scope for aircraft size change thereafter, so the growth in average number of passengers per movement slows and there is a closer relationship between the two.

A BDTT was developed to assess infrastructure requirements over a typical day’s operation for 2025, 2030 and 2035 and to provide the basis for the environmental assessments. This BDTT is based on anticipated changes to individual airline fleets, as well as representing a realistic network of destinations and pattern of operation. The output fleet from this was factored up to an annual fleet, with some adjustment required for business orientated airlines which are more likely to reduce flying to LCY in the summer months.

This fleet mix was then used to provide a cross check on the reliability of the average passengers per movement calculation and confirmed that this was an appropriate projection for the draft master plan passenger forecast. This broad fleet mix, along with an indication of the new generation types within it, is shown for key years in **Table 1** overleaf. It should be noted that this provides a broad indication of the expected fleet mix for master planning purposes and will be kept under review prior to bring forward any development proposals.

Table 1: Master Plan Projected Broad Fleet Mix and New Generation Share

Aircraft Type	2017	2020	2025	2030	2035
Turboprops	19,750	16,700	22,100	15,000	15,000
Small Jets	900	900	900	0	0
Current Generation Code-C Jets (E170, E190 etc.)	55,320	67,100	49,000	40,500	32,000
New Generation Code-C Jets (A220, E190-E2 etc.)	80	6,200	47,500	76,500	99,000
Jet Centre	3,900	5,000	5,000	5,000	5,000
Total Movements	79,950	95,900	124,500	137,000	151,000
New Generation % of Commercial Jets	0%	11%	49%	65%	75%