Gatwick Airport Northern Runway Project

Environmental Statement
Appendix 4.3.1: Forecast Data Book

Book 5

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1 Introduction

1.1. Introduction

1.1.1 This document forms Appendix 4.3.1 of the Environmental Statement (ES). The ES presents the findings of the Environmental Impact Assessment (EIA) process of the proposed Northern Runway Project ('the Project'). The Project proposes alterations to the existing northern runway which, together with the lifting of the current restrictions on its use, would enable dual runway operations. The Project includes the development of a range of infrastructure and facilities which, with the alterations to the northern runway, would enable the airport passenger and aircraft operations to increase. Further details regarding the components of the Project can be found in **Chapter 5: Project Description** (Doc Ref. 5.1).

1.1.2 This data book presents air traffic and other forecasts that have been prepared for the purpose of assessing the economic and environmental impacts of the Project.

1.1.3 For the purposes of the assessment, two scenarios (or cases) have been formulated.

1) **Existing Runway Case** – represents the airport as it is expected to develop and operate if development consent is not granted for the Project (referred to as the **'Baseline'** or **'Base' Case**). In this case, some further growth in airport passengers and air traffic movements would still occur on the existing runway in the years ahead, but not as much growth as would occur under the Northern Runway Case.

2) **Northern Runway Project Case** – represents the airport as it is expected to develop and operate if development consent is granted for the Project and assumes the northern runway would become operational in 2029 (referred to as the **'Northern Runway Case').**

1.1.4 Together they are referred to as the 'core' forecasts.

1.1.5 In addition to the Baseline and Northern Runway Case forecasts, two further sets of forecasts have been prepared to enable sensitivity assessments. These are the 'Slow Fleet Transition' and 'Slower Growth' sensitivity cases:

- In the **'Slow Fleet Transition'** sensitivity case the rate of transition of Gatwick's airline fleet to newer generation aircraft is assumed to be slower than in the core forecasts. This sensitivity case has the same number of passenger and aircraft movements as in the core forecasts. This sensitivity test forecast is used to assess the potential for higher aircraft noise and other emissions.
- The **'Slower Growth'** sensitivity case provides scenarios where the rate of growth at Gatwick is slower than in core forecasts. This means there are fewer passengers and aircraft movements. This sensitivity test is used to assess the economic implications if growth at Gatwick were to be slower than forecast in the core forecasts.

1.1.6 The following sections provide an overview of Gatwick's recent performance alongside wider market conditions, as well as providing insight on the future drivers and assumptions that relate to the core forecasts. Annexes 2 and 3 provide further information on the Slow Fleet Transition and Slower Growth sensitivity cases. Annexes 4 and 5 provide sensitivity cases assuming the development and operation of the third runway at Heathrow Airport and the current DCO proposals at Luton Airport.

1.1.7 Annexes 6 to 9 comprise the following, the context for which is explained in Section 2:

- Annex 6. Report on markets and pipeline assessment to support Gatwick's baseline and NRP Project;
- Annex 7. Response to capacity questions and issues raised in York Aviation report;
- Annex 8. Notes of simulation report for dual runway operations at London Gatwick Airport;
- Annex 9. Response to issues raised in York Aviation report related to obstacles and safety.

2 Consultation and Engagement

2.1.1 The PEIR was issued to inform the statutory consultation carried out on the Project in Autumn 2021. It presented the preliminary findings of the EIA process for the Project at that time.

2.1.2 The consultation responses specific to the Forecast Data Book (which was presented as Appendix 4.3.1 of the PEIR) and the way in which they have been taken into account in this ES chapter are set out in Table 2.1.1. Further detail about the consultation process for the Project and how the consultation responses have been taken into account in the development of the Project's DCO Application is provided in the separate **Consultation Report** (Doc Ref. 6.1).

2.1.3 The consultation responses included a number of comments on different aspects of the forecasts. The responses on behalf of the host and neighbouring Local Authorities were based on a report prepared by York Aviation dated 22nd November 2021 (the 'York Report'). The York Report also included a number of questions about both the forecasts and the capability of Gatwick to handle the forecast increase in passengers and air transport movements.

2.1.4 Outside of the above-described public consultation, GAL also continued to engage with key stakeholders. A series of Topic Working Group meetings on forecasting and capacity matters were held between May 2022 and March 2023 with representatives from York Aviation and the Local Authorities (Crawley Borough Council, Mid Sussex District Council, Horsham District Council, Reigate and Banstead Borough Council, Mole Valley District Council, Tandridge District Council, West Sussex County Council, Surrey County Council, East Sussex County Council and Kent County Council).

2.1.5 A range of aspects relating to forecasting and capacity were discussed at the meetings and responses were provided to the questions and matters raised both in the York Report and at the Topic Working Group meetings.

2.1.6 The key themes raised about forecasts and capacity in consultation responses and the way in which they have been taken into account in the preparation of this Forecast Data Book are set out in Table 2.1.1.

Table 2.1.1: Forecasting and Capacity Themes Raised in Consultation Responses

Key Theme	Raised by	Where/how taken into account in the Forecast Data Book
Further information requested to understand the methodology used for preparing the baseline and development case air traffic forecasts and key input assumptions	York Aviation*	Throughout this data book and in Annex 6
Need to consider effects on demand forecasts of growth at other London airports, including 3rd runway at Heathrow and the effects of Jet Zero	York Aviation* Nutfield Parish Council Cowden Parish Council Withyham Parish Council Wisborough Parish Council Speldhurst Parish Council Pulborough Parish Council Penshurst Parish Council Ockley Parish Council Leigh Parish Council	Sections 4 and 7 and Annexes 4 and 5
Further consideration needed for sensitivity tests of different growth trajectories including lower growth	York Aviation*	Annexes 2 and 3
Rate of assumed Recovery from COVID 19 pandemic	York Aviation* Leigh Village Parish Council Sevenoaks Weald Parish Council	Section 3
Baseline Case Forecasts and Capacity – Further information sought on capacity constraints; assumed maximum hourly runway throughput and technology needed to support increases in hourly throughput; and change in seasonality and how this varies between long and short haul	York Aviation* Oxted Parish Council	Section 8 and Annex 7
NRP Case Forecasts and Capacity – Further information sought on basis of projections including hourly runway throughput and technology needed for safe introduction of dual runway operations; airspace capacity - including update on safety case support of CAA and annual growth in ATMs	York Aviation*	Section 8 and Annex 7
NRP Case – Further information requested on airspace capacity for dual runway operation including explaining line up times, interweaving operations on both runways and SID usage / time separation between movements	York Aviation*	Annex 7
Further information sought on simulations carried out to support information on operational performance of the airfield including departure holding delays, and arrival and departure taxi times	York Aviation*	Annex 8
Fleet mix forecasts including the proportions of current and new generation aircraft in fleet forecasts	York Aviation*	Annex 1
In relation to the Northern Runway proposals, specific comments were raised about: - Safety and feasibility of aircraft holding between the runways - Safety of use of the proposed End Around Taxiways - Safety of proposed reconfigured Juliet Taxiway	York Aviation*	Annex 9
In relation to the Northern Runway proposals, specific comments were raised about airline and passenger service levels from the proposed configuration of the airfield and passenger access to remote Pier 7	York Aviation*	Annex 7

* York Aviation on behalf of Crawley, Horsham, Mid Sussex, Mole Valley, Reigate and Banstead and Tandridge District / Borough Councils and East Sussex, West Sussex, Surrey and Kent County Councils

3 Implications of COVID-19 Pandemic

3.1.1 The COVID-19 pandemic had a very severe impact on the global aviation industry in 2020. Gatwick, along with all other UK airports, experienced a significant reduction in passenger air traffic levels as a result of both Government-imposed restrictions on air travel and reduced passenger demand driven by low consumer confidence. UK passenger volumes for the calendar year 2020 were 75% down on volumes for 2019 (75 mppa[1] v 300 mppa), with passenger numbers at Gatwick falling from 46.6 mppa in 2019 to 10.2 mppa in 2020.

3.1.2 Following the removal of the UK's travel restrictions in April 2022, airline capacity and passenger demand returned to Gatwick and other UK airports. During summer 2022 passenger demand at Gatwick had recovered to over 80% of 2019 levels which was in line with the wider UK market. Capacity and demand would have been higher had it not been for ongoing travel restrictions in other markets / countries, as well as resourcing challenges faced across the UK aviation industry meaning airports/airlines were unable to fulfil the underlying demand.

[1] mppa, million passengers per annum

3.1.3 Whilst recognising some current market uncertainty, the pandemic is not expected to alter consumer behaviours in a way that will have a significant permanent impact on the long-term demand for air travel. Therefore, it is expected that overall demand for air travel will recover to previous levels as consumer behaviours return and are driven by factors such as global and UK economic growth, disposable income, consumer confidence and the relative time savings and cost of air travel.

3.1.4 There is confidence that passenger and airline demand at Gatwick will return to previous levels over the course of the next few years and then continue to grow thereafter. Through 2022 airlines continued to re-establish their schedules and Gatwick returned to 85% of its passenger throughput in the peak summer months. This is notwithstanding the fact that some headwinds remain reflecting the weakening macro-economic environment alongside the ongoing conflict in Ukraine, as well as some markets in Asia continuing to be impacted by ongoing travel restrictions.

3.1.5 Overall, the updated forecasts presented in this data book predict that commercial air traffic at Gatwick will return to 2019 pre-COVID-19 levels by 2025. This speed of recovery is comparable to other industry forecasts[2] which typically focus on wider regional outputs such as Europe. By the end of the 2020s passenger levels at Gatwick will have returned broadly to where they were forecast to be had the pandemic not occurred. This reflects the combination of ongoing capacity constraints already experienced before and during 2019 and underlying market growth across the London system. For example, Gatwick has been operating very close to its full potential in the peak summer months for several years. Gatwick's slot capacity has been oversubscribed for many years with significant levels of unmet demand from a range of airlines and business models.

4 Implications of Heathrow's Third Runway

4.1.1 An important factor that would affect the level of air traffic at Gatwick in the future is whether a third runway is brought forward at Heathrow Airport (Heathrow R3).

4.1.2 National policy, as set out in the Airports National Policy Statement (NPS) (Department for Transport, 2018), supports the construction of Heathrow R3. When the NPS was published it was expected that Heathrow R3 would be provided by 2030.

4.1.3 Following the designation of the NPS, Heathrow Airport Holdings Ltd (HAHL) – the owner and operator of Heathrow and the promotors of Heathrow R3 - commenced work on the extensive and detailed studies that would be required to support a Development Consent Order application to seek formal consent for Heathrow R3. However, as a result of the COVID-19 pandemic, HAHL suspended its work in 2020. HAHL has not provided any timeframe for recommencing its process for seeking development consent and there is no indication that work will be recommencing in the short term. Even if HAHL does restart work and secures DCO consent, it is considered unlikely that Heathrow R3 could be operational much before the mid-2030s as a result of the delays to their consenting process.

4.1.4 There is therefore significant uncertainty surrounding when, or indeed if, a third runway will now be developed at Heathrow. Due to this uncertainty, the forecasts prepared in support of the Northern Runway Project are based on a 'no Heathrow R3' scenario. This approach is considered robust as it provides a realistic worst-case assessment of the environmental impacts of the Project. If Heathrow R3 was to come forward, air traffic levels at Gatwick would be likely to decline in the period immediately following the opening of Heathrow R3. This would mean that the environmental impacts of the Project, including in relation to noise, air traffic and emissions, may have been understated were the assessment to assume that Heathrow R3 was operational. In the longer term, the scale of forecast demand is such that, even with Heathrow R3, Gatwick's traffic would subsequently return to levels forecast in the longer term, albeit with some changes to the traffic characteristics.

4.1.5 However, as Heathrow R3 remains Government policy, a separate sensitivity test has been undertaken to consider the potential for cumulative effects with a proposed expansion of Heathrow Airport through the provision of a third runway in the event it was to come forward (see Chapter 20: Cumulative Effects and Inter-relationships). Annex 4 summarises how the Project's core forecast passengers and aircraft movements would be affected if Heathrow R3 was to come into operation in 2032[3].

5 The Basis of the Forecasts, Assessment Cases and Assessment Years

5.1. Realistic Forecasts

5.1.1 Whilst there is inherent uncertainty in predicting long term aviation growth, the forecasts presented have been prepared jointly by GAL's in-house airline relations and marketing and research teams and ICF, one of the UK's foremost experts in air traffic forecasting.

5.1.2 In preparing the forecasts, regard has been had to the importance of having a realistic view of the level and characteristics of air traffic growth that would occur at Gatwick, whilst also ensuring that the environmental impacts of Gatwick's growth, some of which, such as noise, traffic and carbon, rely heavily on the forecasts, are not understated.

5.2. Opening Date of Northern Runway

5.2.1 The forecasts assume Gatwick's northern runway would become operational in 2029.

5.3. Northern Runway Project Assessment Cases

5.3.1 The assessment cases for the Project are therefore as follows:

- **Existing Runway Case** – assumes continued growth of Gatwick Airport based on continued use of Gatwick's existing main runway (referred to as the **'Baseline'** or **'Base' Case**)
- **Northern Runway Project Case** - the airport as it is expected to develop and operate by bringing Gatwick's existing northern (standby) runway into operation alongside the existing main runway and operating the two runways simultaneously (referred to as the **'Northern Runway Case'**)

5.4. Assessment Years

5.4.1 In respect of each of these two cases, forecasts have been prepared for four primary assessment years – 2029, 2032, 2038 and 2047:

[2] For example, IATA, ACI, Eurocontrol assume similar recovery timescales for the wider European market.

[3] This sensitivity is in addition to a slower fleet and slower growth sensitivities discussed in the introduction

- 2029: represents the forecast year the northern runway is assumed to become operational (and therefore the first point at which effects arising from its operation would occur).
- 2032: an interim assessment year (and surface access improvements opening year), which also reflects the forecast year when aircraft noise impacts of the Project would be at their greatest due to the airline fleet containing a greater number of current generation aircraft and fewer new generation aircraft than would be the case in later forecast years.
- 2038: representing the forecast year in which the development works as part of the Project are assumed to be completed.
- 2047: representing the long term forecast year and to meet a specific requirement of guidance in the Design Manual for Roads and Bridges to assess impacts 15 years after the last of the key highways works associated with the Project are due to be completed.

5.4.2 Forecasts are therefore set out in this data book for the following four assessment years:

Table 5.4-1 - Outline of Forecasts presented

Cases	Design Years			
	Year 2029	Year 2032	Year 2038	Year 2047
Base Case	✓	✓	✓	✓
Northern Runway Case	✓	✓	✓	✓

5.4.3 Data are also presented for the year 2019 – the most recent full year of operations pre-COVID 19. Subsequent outputs are typically presented as annual numbers but represent financial years (e.g. where this data book quotes Year 2029, this represents forecasts for the financial year 2029/30).

5.5. Forecast Approach and Methodology

5.5.1 In the core forecasts, and in the context of the total London market, the Northern Runway Project would deliver a material increase in runway capacity at Gatwick but outstanding demand would remain. By 2029, Gatwick is forecast to be operating in a more capacity constrained environment than it experienced pre-COVID-19, this reflects the ongoing passenger growth being forecast across the London airports in the context of only limited new runway capacity being made available in this period. By 2029 latest Government forecasts indicate that unconstrained London passenger demand will be 21% above that of pre-COVID-19 levels[4]. As explained in Section 7, for the purpose of the core forecasts Heathrow and Luton are assumed to continue operating at their current planning caps[5] with only Stansted offering notable headroom for growth reflecting the recent lifting of its previous 35mppa planning cap allowing growth to 43mppa. London City serves a very specific market segment and is unlikely to provide significant growth prospects in the context of the wider London demand projections.

5.5.2 The Northern Runway is assumed to become operational in 2029 and following a phased release of capacity and ramp up of demand, Gatwick will once again return to a constrained position where passenger demand in London continues to exceed capacity . By 2032 government forecasts predict that London demand is forecast at over 220mppa, over 40m passengers above 2019 levels whilst the Northern Runway Project is likely to cater at that time for an increase of some 13m passengers[6].

5.5.3 In order to understand the long-term performance of a constrained airport such as Gatwick, a primarily 'bottom-up' approach to preparing the air traffic forecasts has been adopted to better understand the potential throughput of the airport. This approach has been favoured over a 'top-down' econometric approach as the latter approach is not able to capture the operating characteristics of the airport as well as a bottom-up approach. In circumstances where the overall scale of demand is greater than capacity, only so much can be learned from a top-down approach. A top-down approach was used, however, to validate the levels of demand being assumed at Gatwick in the context of the expected performance across the wider London airport system. Understanding the nature of the overall scale of demand does help to provide context and this has been used to help inform the bottom up assessment. However, focussing on the potential theoretical demand rather than the nature of the demand which Gatwick can and is likely to achieve would not generate such realistic forecasts for Gatwick.

5.5.4 The bottom-up approach considers the key long-term drivers for a constrained airport's performance, capturing the airline and market mix as well the potential future fleet composition and operational performance. For example, the impact of more long haul year-round air traffic operating with larger aircraft is not readily captured by a top-down model unless supported by such bottom-up assumptions.

5.5.5 Gatwick is in frequent dialogue with many carriers including current airlines already serving Gatwick and seeking to expand their services and future airline targets. These provide a sound basis for understanding the pipeline of demand that Gatwick will serve in the future. This incorporates a wide range of carriers including full service as well as (ultra) low-cost carriers and provides a balanced view for the potential demand expected to use Gatwick in both the Baseline and Northern Runway cases. These carriers (current and future) are expected to continue serving a diverse and expanding network. For example, pre-COVID-19, new long haul routes to China and other parts of Asia had been added and post-COVID-19 these trends and demand for new services is starting to return. Gatwick's network continues to be the most extensive across all the London airports with an evolving mix of carriers adding new competition on current markets or opening new routes. Further information is provided in Annex 6.

5.5.6 The bottom up forecasts were prepared at a relatively granular level of market and airline detail. For example, long haul market forecasts were prepared for the worldwide regions of focus – North America, Asia, China, Central and South America, Africa and Middle East and where Gatwick is actively targeting airline growth. For each region, Gatwick's assumed pipeline[7] was compared to the top down market projections to ensure consistency. With limited growth options in the London market at other airports, Gatwick is able to achieve an increasing share of long-haul traffic and therefore to continue recent growth trends.

5.5.7 For example, North America is one of the largest long haul markets where Gatwick handled over 3 million passengers in 2019. A future market growth rate between London and North America of just over 1% would still translate to an additional 50+ daily frequencies[8] by the 2030s in the London market. In the case of the Northern Runway, Gatwick is assumed to achieve nearly 25 daily frequencies in this market

[4] Jet Zero forecasts, dataset, https://www.gov.uk/government/publications/jet-zero-strategy-delivering-net-zero-aviation-by-2050
[5] 480,000 Air Transport Movements equivalent to over 80 million passengers at Heathrow and 18mppa at Luton
[6] Gatwick capacity analysis and forecasts for NRP
[7] Gatwick's commercial team maintain a 'current' view of current and potential airlines wishing to use the airport. This list of airlines and target markets is referred to as their pipeline
[8] A daily frequency relates to one departure or arrival, therefore a daily service consisting of one arrival and one departure would account for two frequencies

representing less than half the market growth anticipated in this period. Similar growth comparisons were prepared and are provided in Annex 6 for the other regions.

5.5.8 Short haul market growth forecasts also considered the wider context of the London market. In 2019 Gatwick had already achieved the largest share of short haul demand originating/terminating in the London market. Airlines continue to demonstrate a strong growth preference for Gatwick over other airports, for example slot subscriptions continue to outstrip supply[9] and Gatwick has a well-developed secondary slot market, meaning that airlines are prepared to pay a premium to operate from Gatwick versus other London airports. The growth assumed in the core forecasts is set below that achieved at Gatwick in the European market in the 2010-2019 period, despite the lack of capacity at other London airports. During this period the share of capacity between Eastern, Northern, Western and Southern Europe remained relatively stable.

5.5.9 UK Department for Transport (DfT) and more recently UK Jet Zero aviation forecasts have been used to support the long-term growth trajectory for the London market.

6 Recent Growth at Gatwick Airport

6.1. Introduction

6.1.1 Despite operating with a high degree of slot constraint, Gatwick still experienced significant levels of growth in the years leading up to the COVID-19 pandemic.

6.1.2 As shown in Figure 6.1-1, in the decade prior to the COVID-19 pandemic Gatwick grew by over 14 million passengers, reaching 46.6 million in 2019. This 44% growth in passengers resulted in a 15% growth in commercial air traffic movements (ATMs)[10], reflecting the larger and fuller aircraft now in operation.

6.1.3 This growth occurred in spite of the collapses of Monarch (2017) and Thomas Cook (2019) which had only short term impacts on Gatwick's air traffic growth.

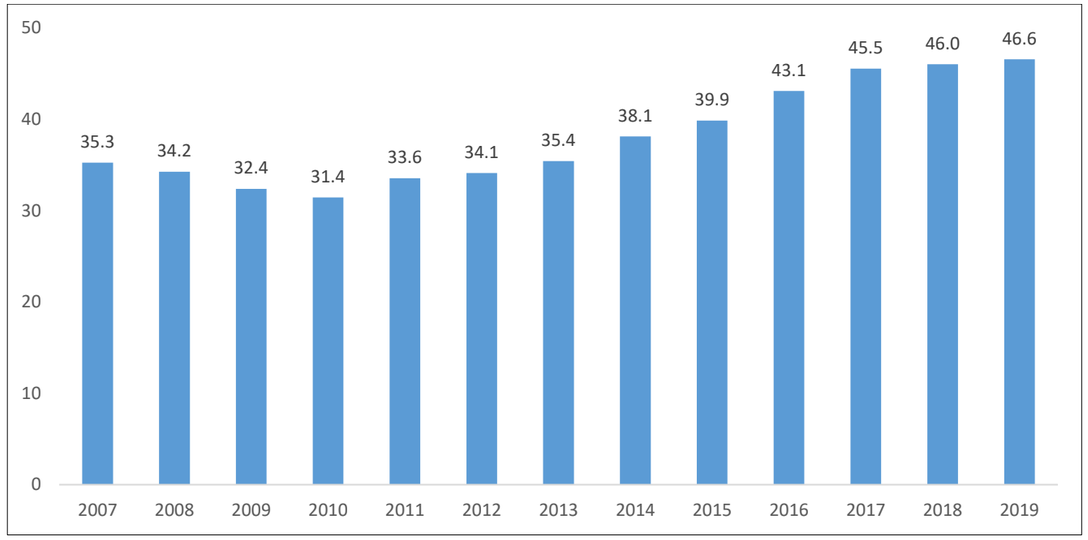
6.1.4 Whilst the COVID-19 pandemic led to a significant decline in passenger air traffic in 2020 and 2021, air traffic levels have substantially recovered already.

6.1.5 For example, whilst Norwegian have scaled back their short haul network and ceased their long haul flying and Virgin has also ceased their operations at Gatwick, significant volumes are being back filled by the likes of Wizz and easyJet[11] on short haul markets and other carriers such as Norse, JetBlue and Air India on long haul markets.

6.1.6 In 2022 Gatwick's air traffic consistently reached over 80% of 2019's passenger volumes through the summer months. Recovery would have been even stronger had it not been for supply side challenges which limited airline and airport capacity during this typically peak period.

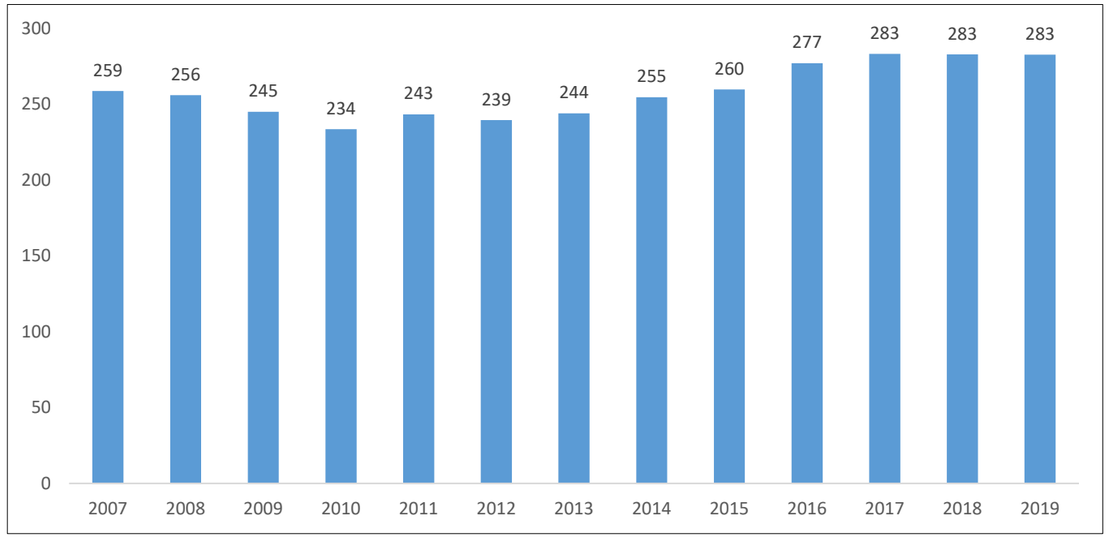
6.1.7 As noted in Section 3 GAL expects traffic to recover further as the effects of the pandemic decline and are forecasting passenger levels to reach pre-pandemic levels by 2025.

Figure 6.1-1- Gatwick Airport Passengers (millions)



Source: CAA Statistics

Figure 6.1-2 – Gatwick Airport Commercial ATMs (thousands)



Source: CAA Statistics, (Passenger ATMs)

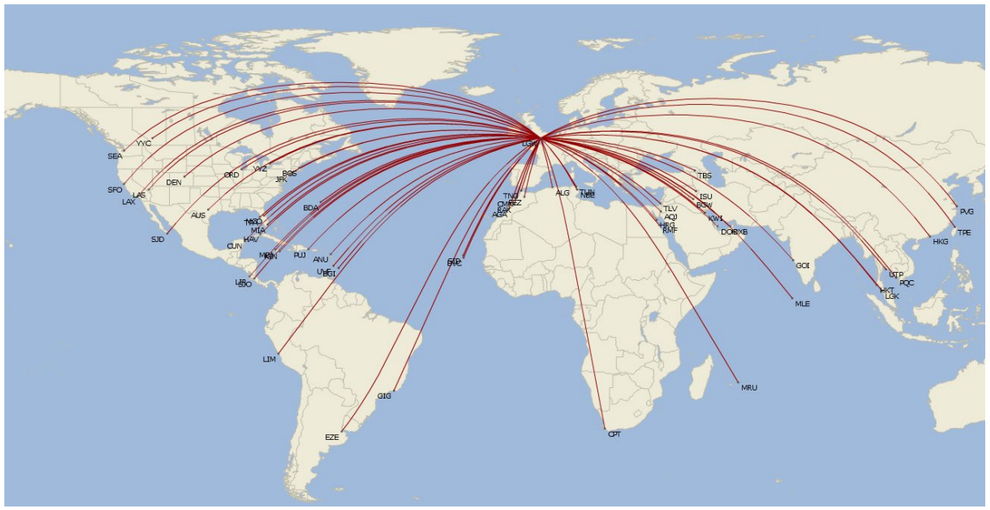
[9] Reports from ACL (Airport Coordination Limited) highlight the levels of excess demand, over the last 5 summer season approx. 20 airlines have failed to receive 40% or more of their requested slots meaning many airlines have been turned away

[10] Commercial air traffic movements (ATMs), or passenger ATMs, exclude non-commercial flights such as positioning flights and business aviation. In 2019, non-commercial flights accounted for approximately 1% of Gatwick's movements and are forecast to remain at about this level.

[11] Note: both acquired some of Norwegian's slot pool

6.1.8 During the period 2009-2019 domestic volumes remained relatively flat whilst over 10 million and 4 million passengers were added in the short haul and long haul market categories respectively. The growth in short haul markets was driven by ongoing growth from low cost carriers (LCCs)[12], which continue to account for a significant share of growth in the European aviation market. The long haul growth has been driven by many new intercontinental markets being added by a range of carriers (full service and LCCs) as Gatwick continues to expand its long haul connectivity.

Figure 6.1-3 – Gatwick Routes (outside Europe)



Source: IATA Schedules, March 2020

6.1.9 There have been three main characteristics of growth over the decade leading up to 2019.

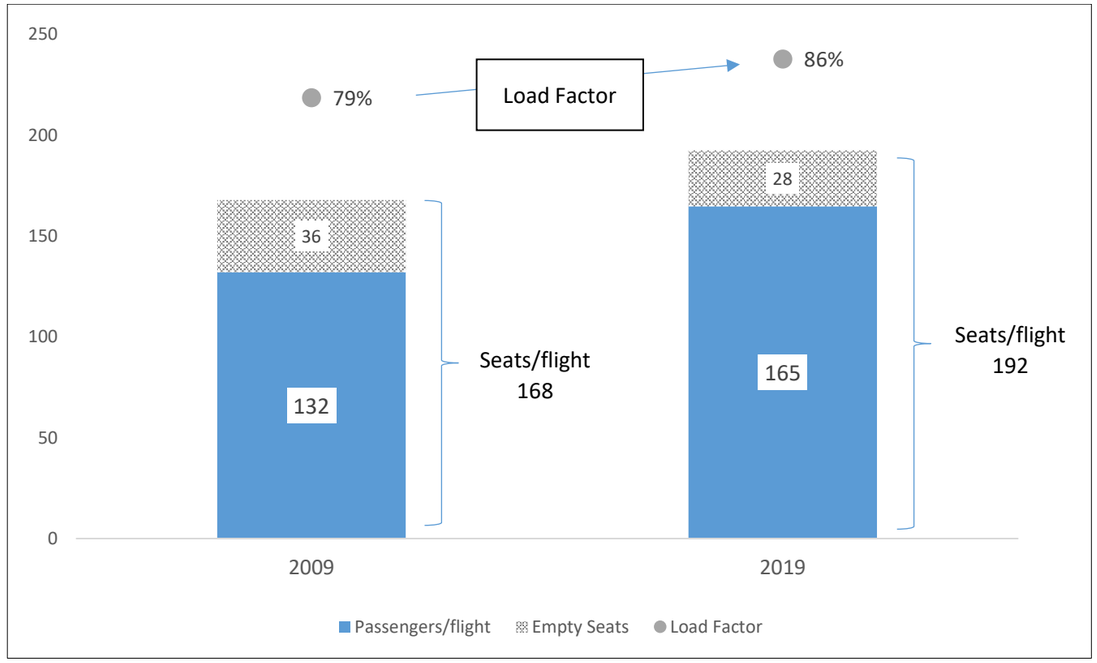
i) More passengers per flight: Average passengers per aircraft movement have grown from 132 in 2009 to 165 in 2019. This has been achieved by higher load factors (the percentage of seats filled), and an increase in the average size (and therefore number of seats) of aircraft used.

ii) Peak spreading: There has been a change in the profile of flights over the year, with a higher level of growth in the traditionally quieter periods of the year. This 'peak spreading' makes use of spare capacity on the runway outside of peak months and leads to a higher level of annual utilisation of the existing assets on the airport. Gatwick is still busier in the summer months than the winter months, however, and so there is further potential for this peak spreading to continue.

iii) Growth in peak runway capacity: The maximum number of scheduled aircraft movements that can be accommodated on the runway has grown from 53 an hour in 2012 to 55 an hour in 2019. This increase has been made possible due to improvements in operating procedures and air traffic management tools which improve the efficiency in the way arriving and departing aircraft use the runway.

6.1.10 Growth in average loading and aircraft size is summarised in the following chart.

Figure 6.1-4 – Gatwick Growth in Average Aircraft Size & Load Factor

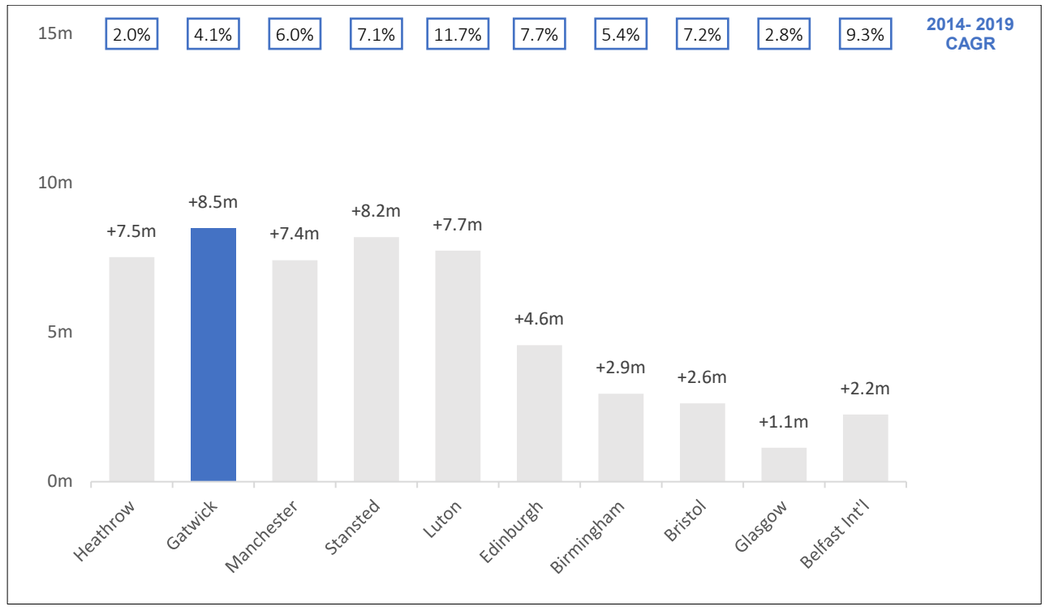


Source: CAA/GAL Statistics

6.1.11 Air traffic growth has been supported by the continuing growth and diversification of airlines, including low cost carriers. Growth in passengers at Gatwick over the five year period prior to the pandemic (2014-2019) averaged 4.1% per annum compared to the UK average of 4.5% over the same period. In 2019 Gatwick reached 46.6 million passengers and remained the second largest airport in the UK by passenger volume.

[12] LCCs = Low Cost Carriers (e.g. easyJet, Ryanair etc.)

Figure 6.1-5 - Passenger Growth Comparisons, UK Market (5 years: 2014-19)



Source: CAA Statistics (Top 10 UK airports chosen based on passenger ranking in 2019)

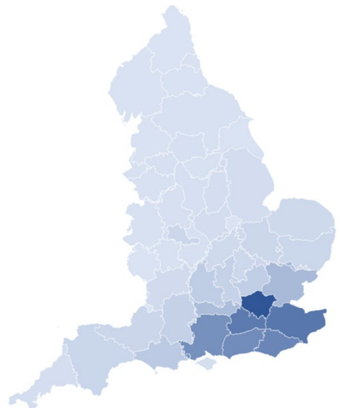
6.2. Catchment Area

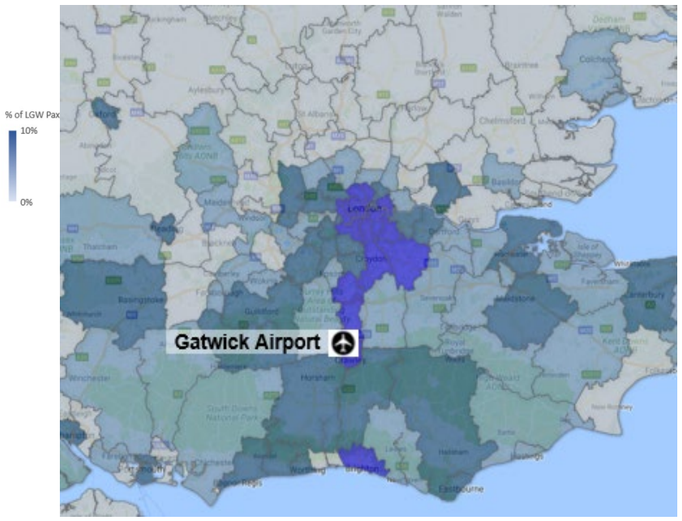
6.2.1 Gatwick's proximity to London and surface access links to the wider South East (and beyond) provide a wide catchment area. Recent analysis by Gatwick estimates a population of 17m people within 90 minutes of the airport. According to CAA Survey data[13], 81% of Gatwick's terminating passengers (i.e. excluding transfer passengers) were travelling to/from destinations in London or the South East. Greater London is the largest source market (42%), but the nearby counties Kent, Surrey and Sussex account for a further 27%. Of the 19% of passengers travelling to/from destinations outside of the South East, the majority were travelling to/from the East or South West of England.

6.2.2 Gatwick's core catchment area includes the surrounding counties and south London boroughs where Gatwick attracts the highest share of inbound and outbound passengers. In 2019 Gatwick achieved a 53% share in these areas compared to 29% for Heathrow, 10% for Stansted and 5% for Luton. Higher market shares (>60%) were achieved for the short haul market segment and Gatwick is the number one London airport for local short haul demand (i.e. excluding transfers).

[13] CAA Survey statistics from 2018 were used
[14] UK CAA Statistics for aviation activity
[15] London Airports (LHR, LGW, STN, LTN, LCY, SEN)

Figure 6.2-1 - Gatwick Catchment





Source: CAA Survey

7 UK Aviation Demand and Key Assumptions

7.1. Introduction

7.1.1 The UK airports handled a record 300 million passengers in 2019[14], of which the London airports[15] accounted for 181 million or 60% of total activity. Demand in the London system continues to post strong growth. Over 34 million passengers were added in the 5 years preceding COVID-19, representing a compound annual growth rate (CAGR) of 4.3%.

7.1.2 Some of this growth has come through up-gauging (larger) aircraft and higher load factors (seat occupancy rates). During the same period aircraft movements grew at a rate of 2.5%.

7.1.3 Demand forecasts prepared by the DfT in 2017 have now been superseded by the more recent UK Jet Zero forecasts from Q1 2022. These continue to use the same model/approach as the 2017 forecasts but have been updated with more recent market data as well as updated segmentation[16].

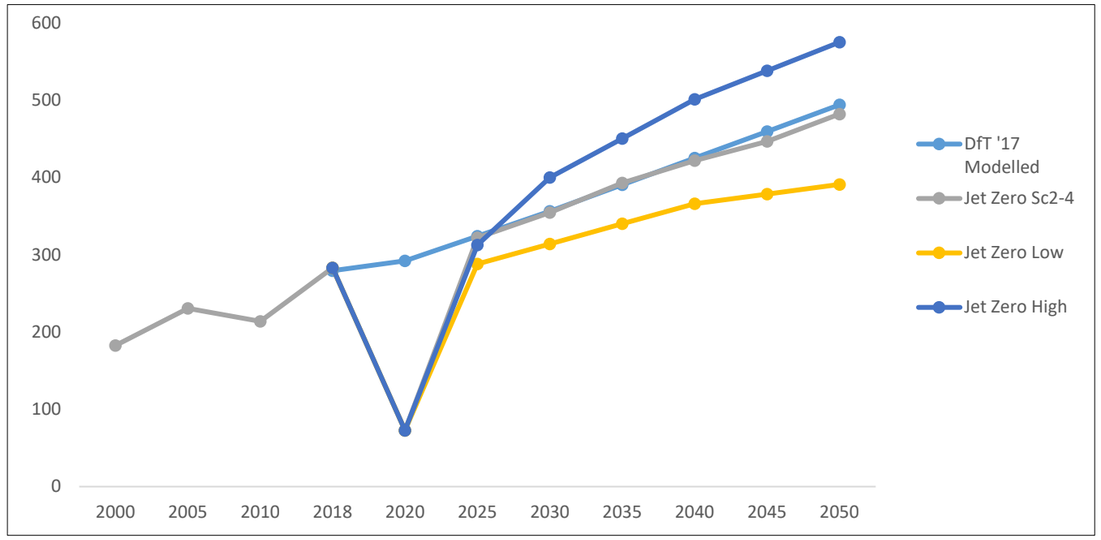
7.1.4 The UK Jet Zero forecasts continue to predict that UK passenger demand will grow at around 1.7% p.a. in the long term (2018-2050[17]). This period will therefore see demand increase by an additional 200 million passengers across the UK's airports.

[16] Jet Zero forecast were updated to include a new baseline of demand, market segmentation, historical analysis of multipliers and inputs including GDP, carbon prices and cost of flying assumptions
[17] 2018 has been chose to remain consistent with the JZ presentation of +70% demand growth vs a 2018 baseline

7.1.5 The outputs for this projection alongside sensitivities prepared as part of the Jet Zero modelling are shown in the following graph. The DfT's projection from 2017 has also been added to provide context in terms of the long-term growth projections being used by Government bodies in 2022 compared to 2018.

7.1.6 Jet Zero forecasts assume UK air passengers will grow approx. 70% by 2050 compared to the 2018 baseline, which is only marginally different to the DfT's projections from 2017. Between 2018 and 2050 UK demand is forecast to grow from 283m to 482m annual passengers[18].

Figure 7.1-1 - UK Aviation Passenger Demand Forecast (millions)



Source: CAA, UK Jet Zero, DfT UK Aviation Forecasts, 2017 (baseline numbers are modelled)

7.1.7 By 2030, without expansion, the London airports would have an annual terminal capacity of approx. 210[19] million passengers, which is 30 million above the annual throughput in 2019. It is recognised that Heathrow and Gatwick already experience serious capacity constraints[20]. .

7.1.8 By 2030 an additional 42 million[21] passengers are forecast in the London market which will result in demand being well above current planned airport capacity. It is clear that there is a significant need for additional airport capacity in London and the South East to meet consumer demand for flying in the short and medium term.

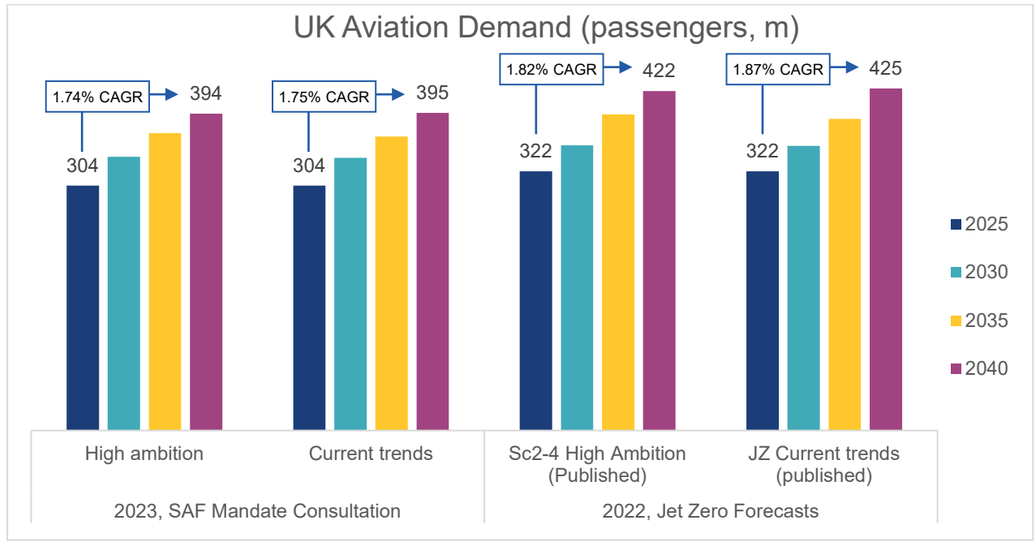
7.2. Further Government Forecasts (April 2023)

7.2.1 The DfT is currently conducting a consultation regarding the UK's sustainable aviation fuel (SAF) mandate. On the 12th of April 2023 they released various data sets focusing on potential scenarios which also include a reference to updated UK aviation demand forecasts. These forecasts were prepared using a range of updated macro inputs, including the OBR outlook from November 2022.

7.2.2 Both sets of forecasts focus on the long-term trends with traffic growing from an updated 'base' year of 2025, likely intended to reflect a year of stability following the Covid impacts seen in the 2020-2023 period.

7.2.3 In the period 2025-2040, the latest forecasts assume growth of 1.74% whilst the previous Jet Zero forecasts published in 2022 assume growth of 1.82%. By 2040 the demand for aviation is forecast to have increased 29% in the latest outputs compared to 31% in the 2022 JZ forecasts.

7.2.4 Whilst the 2022 JZ forecasts are provided to 2050 the latest consultation only provides passenger and ATM projections out to 2040. The following chart compares the two sets of forecasts.



7.2.5 Whilst the latest long term growth trajectory is consistent with previous DfT/Jet Zero modelling published in 2022, there have been revisions made to the short-term outlook. In 2025 the latest forecasts assume UK aviation demand of 304 million passengers which is 7% above the modelled JZ baseline of 283 million passengers in 2018. The 2022 JZ forecasts assumed 322 million passengers in 2025 reflecting a more rapid recovery from Covid and short-term growth.

7.2.6 Whilst the short-term outlook has reduced, significant levels of growth are still forecast across the UK aviation industry. By 2040 the UK's demand for aviation is forecast to increase from 283 million in 2018 to 394 million passengers in 2040. This represents an increase of 111 million passengers versus the baseline or growth of 40%. Continuing the maturing growth trends will see demand of circa 450 million passengers by 2050, approximately 60% above 2018's baseline.

[18] Jet Zero forecasts, Jet Zero: further technical consultation dataset for Scenarios 2-4
[19] Assuming 85m (Heathrow), 58m (Gatwick), 43m (Stansted), 18m (Luton), 8m (London City/Southend combined)
[20] Previous DfT forecasts have assumed a terminal capacity assumption of 45m passengers for LGW which was passed in 2019. Heathrow operates close to its planning cap of 480k annual ATMs whilst LGW operates at capacity during peak seasons
[21] Difference between estimated Jet Zero London forecast of 223m in 2030 and 2019 baseline of 181m

7.3. Capacity at Other London Airports

7.3.1 In this section some of the other potential capacity developments within the London airport system that are assumed in the forecasts are set out.

Heathrow

7.3.2 As has been noted in Section 3 above, there remains significant uncertainty surrounding when, or indeed if, a third runway will become operational. As set out above, the forecasts assume a third runway is not brought forward. The reasons why this approach has been adopted are described in Section 4.

7.3.3 Without a third runway, capacity at Heathrow will continue to grow slowly, reflecting larger and fuller aircraft as demand was approaching 81 mppa in 2019, up from 73 mppa just 5 years earlier[22]. Further growth is expected with larger and fuller aircraft likely supporting approximately 90 mppa in the long term.

Other Airports

7.3.4 Aside from Heathrow, other London airports have announced growth plans to develop beyond today's current capacity and planning limits.

- Stansted has now gained planning permission to increase its planning cap to allow growth to 43 mppa.
- An application for development consent is being progressed for growth at Luton. Its forecasts predict that it could handle 32 mppa by 2038 should its current planning cap of 18 mppa be lifted and development consent granted to support this growth[23]. The new terminal facilities to support the substantial majority of this growth are not assumed to open before 2037, some 8 years after Gatwick's NRP is assumed to open. Annex 5 summarises how the NRP core forecast passengers and aircraft movements would be affected if the Luton DCO project was to be consented and progressed.
- London City Airport as part of their development programme is seeking to increase their current planning cap of 6.5 mppa and 111,000 flights. As of December 2022 they are seeking to increase their planning cap to 9 mppa[24] whilst keeping the same number of permitted movements.
- Prior to the COVID-19 pandemic Southend was serving around 2.0 mppa (in 2019), Southend has, however, been particularly badly affected by the pandemic with only a handful of passenger services now operating. The timeframe for any growth at Southend is therefore uncertain.

7.3.5 With the exception of Stansted, these plans do not currently have approval. There is therefore little that can be concluded about these plans with any degree of certainty. Further, Gatwick Airport is, to a large extent, isolated from the impact of some of these plans, for the reasons set out below.

7.3.6 By the time Luton's new terminal capacity is due to become operational Gatwick's NRP would have been in operation for many years and unconstrained demand is still forecast to exceed the supply across the London airports. Also, Gatwick is firmly established as one of the top two airports for serving the London system as demonstrated both by its throughput, the over-subscription of its slot capacity and by the sizeable long haul component already served today.

7.3.7 Geographically, Gatwick serves a mostly distinct catchment area when compared to Stansted and Luton, resulting in a relatively small amount of overlap in outbound (i.e. UK originating) markets. There is more overlap in inbound markets where a large proportion of passengers are travelling to central London destinations, but here Gatwick has the advantage of a stronger network of international connectivity and far better transport links to central London than these other airports.

7.3.8 When examining the outbound demand in greater detail, Gatwick is ranked the number 1 airport across nine catchment areas achieving nearly 60% of demand. In these catchments Heathrow provides the greatest overlap with Gatwick taking a further 26% of demand whilst other airports achieve much lower shares, for example Luton attracts a 4% market share in these regions. Extending this analysis to catchment areas where Gatwick is ranked the #1 or #2 airport results in a share of 45% of passengers for Gatwick compared to 34% for Heathrow while Luton only achieves a modest uplift to 6% of demand.

7.4. Night Flight Regime

7.4.1 In preparing these forecasts, GAL has assumed that the existing controls on night flying, as set out in the Government's 2017 Night Flight Restrictions for Heathrow, Gatwick and Stansted, which cover the period to 2022, will continue to be carried forward, with no changes to the current regime for Gatwick. This assumption aligns with proposals set out in the Government's most recent consultation on night flying restrictions, which will establish the controls and limits until 2024[25].

8 Gatwick's Growth With and Without the Northern Runway Project

8.1. Introduction

8.1.1 Unlike other London airports Gatwick is not subject to passenger or air transport movement caps. Even without the additional capacity facilitated by the Project, Gatwick would continue to be able to accommodate a level of further throughput growth. Firstly, demand across Gatwick's core and wider catchment is forecast to grow in line with wider UK aviation projections of around 1.7% per annum into the long term. Secondly, the ongoing supply side trends highlighted earlier, including larger and fuller aircraft and peak spreading, will continue to deliver increased annual throughput.

8.2. Baseline Growth to 67 mppa in 2047

8.2.1 In the Baseline Case, (i.e. without the Northern Runway Project), it is estimated that Gatwick will be able to handle approximately 326,000 commercial ATMs in 2047, reflecting an increase of around 10% compared to the 2019 throughput. As overall system capacity will continue to sit well below demand, forecasts can be based on the assumption that any additional capacity released at Gatwick will be filled. This increase in movements will be achieved through better year-round slot utilisation and further capacity release, whilst up-gauging (the use of larger aircraft) and load factor growth will also support higher passenger volumes of around 67mppa. These trends include the impact of changes in the market mix at Gatwick, for example growth in long haul markets (larger aircraft types and more year round operations) and reductions in the share of seasonal charter air traffic. Gatwick has committed plans to bring forward a

[22] HAL Statistics, 73.4 million in 2014.
[23] Luton is also currently seeking to increase its planning cap by 1mppa (from 18mppa to 19mppa), ahead of any further expansion plans which assume 21.5mppa in 2027 before the increase to 32 mppa in 2038
[24] https://www.londoncityairport.com/thefuture
[25] https://www.gov.uk/government/consultations/night-flight-restrictions-at-heathrow-gatwick-and-stansted-airports-between-2022-and-2024-plus-future-night-flight-policy/night-flight-restrictions

number of developments[26], most of which were deferred as a result of the COVID-19 pandemic. The anticipated progress of these developments is set out in **ES Chapter 4** (Doc Ref. 5.1).

8.2.2 Over the forecast period limited 'new' runway capacity is assumed as the current maximum throughput of 55 ATMs/hour is assumed to remain in the future. However, there is scope to improve performance and achieve these levels of throughput on a more consistent basis throughout the day. In the busiest days it is therefore expected that the number of hours where the runway will be scheduled to handle 55 movements will increase from 2 hours per day in 2019 to 6 hours per day in 2038 and 2047. Busy day schedules for the Baseline Case in 2038 and 2047 are provided in Annex 1[27].

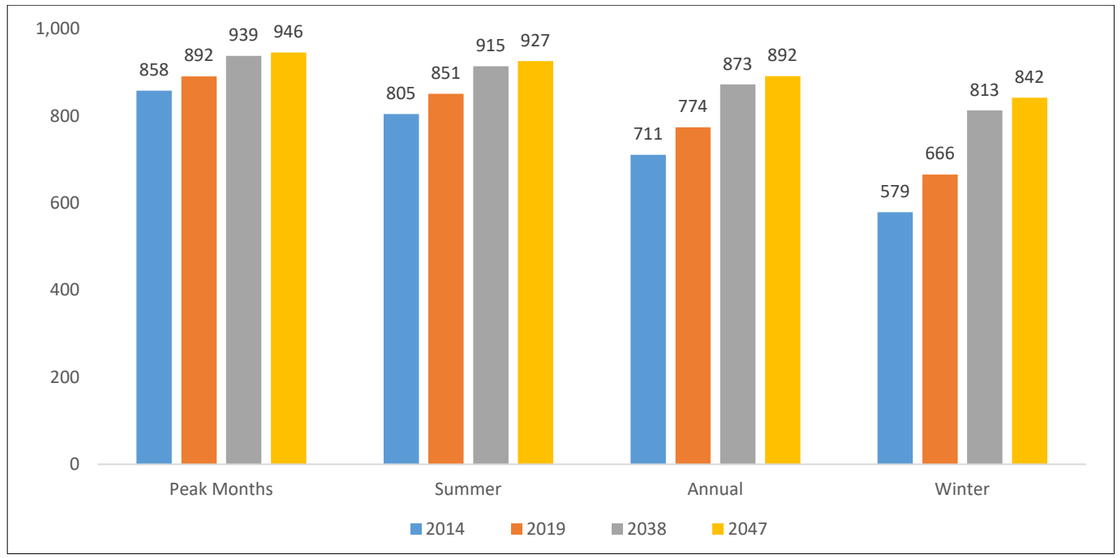
8.2.3 Growth in the Baseline Case from the current 46.6 mppa to the future forecast of 67.2 mppa in 2047 (as shown in Figure 8.2.4) is anticipated to come from increased capacity derived from three main and well-established factors, set out below.

1. Growth in Runway Utilisation in Off Peak Periods

8.2.4 In the busy summer months (July, August and September), Gatwick is often already operating at, or close to, its peak capacity. In the Baseline Case GAL is anticipating only modest growth during this period as daily commercial ATMs are forecast to increase by 6% from an average of around 900 in 2019 to 946 in 2047.

8.2.5 For the total summer season (Apr-Oct), daily commercial ATMs are forecast to increase 9% from an average of 851 in 2019 to 927 in 2047. In contrast, the less utilised winter period is forecast to increase from an average of 666 in 2019 to 842 by 2047. By 2047, this represents an increase of 27% versus 2019. For context, Gatwick's winter utilisation has increased by 15% in just the 5 years to 2019 as daily commercial ATMs have grown from 579 to 666.

Figure 8.2-1 - Gatwick Daily Movement Growth – Base Case



Source: CAA Commercial/Passenger ATM Statistics

8.2.6 The increase in runway utilisation during off peak periods will result in annual air traffic profiles flattening as demand spreads to the less utilised periods of the year, although some seasonality would remain. In 2047, busy month commercial ATMs are forecast to be 6% higher than the annual average compared to 17% in 2019 and 23% in 2014.

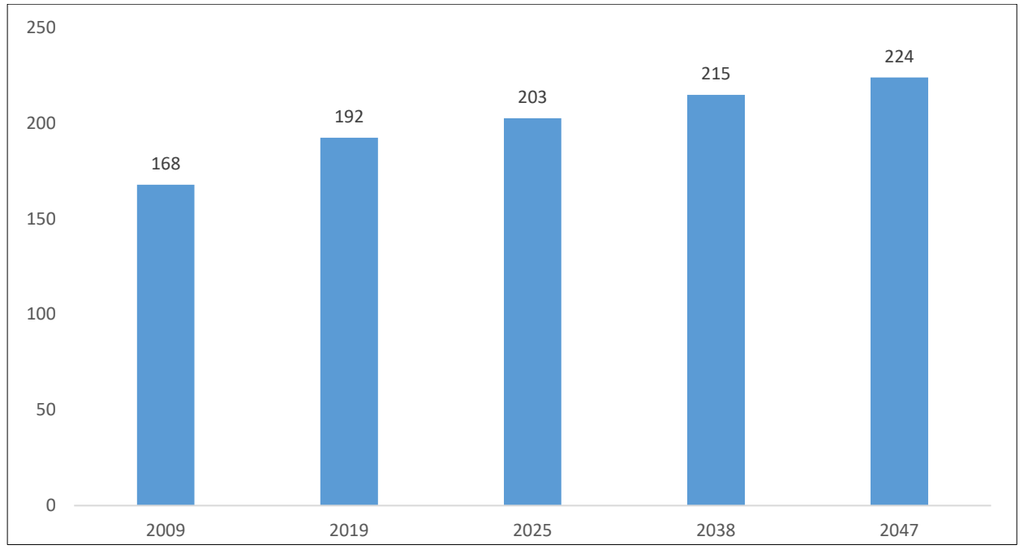
2. Up-gauging of Fleet over Time to Larger Aircraft

8.2.7 The second important and year-round factor that will drive passenger growth is the trend for airlines to up-gauge their fleets with larger aircraft. Seats per ATM are expected to increase from an average of 192 in 2019 to 224 in 2047, as shown in the chart below.

[26] These include an extension to Pier 6, a further rapid exit taxiway, additional passengers parking, an electric vehicle charging forecourt and minor improvements to north and south terminal roundabouts

[27] Busy day schedules represent a typical busy day, not the peak day in the year or the busiest hour in the year but a typical busy period

Figure 8.2-2 - Average Seats per ATM - Base Case



Source: CAA/GAL Statistics

8.2.8 Two good examples of this can be seen in Gatwick's two largest airlines - easyJet and British Airways - which currently account for over 60% of Gatwick's passengers.

8.2.9 For example, easyJet is moving towards Airbus A320 and A321 aircraft (with 186 seats and 235 seats respectively) from the current A319 (156 seats) and A320 fleet (previously 180 seats). Similarly, British Airways is continuing to 'densify' its Boeing 777 fleet alongside longer term fleet replacement plans for their short haul fleet (e.g. the Boeing 777 densification resulted in seat configurations growing from 220/275 to 232/336) which will result in significant increases in average seats per aircraft[28].

8.2.10 New long haul markets and the usage of Boeing 787s (often replacing 757/767) and Airbus A350s entering airline fleets are other examples of airlines up-gauging at Gatwick over the long term.

8.2.11 The above changes are already underway for easyJet and British Airways and other large carriers such as Tui, and it is realistic to assume this will continue, especially as new slot capacity at UK airports continues to become scarcer and the UK aviation market demand continues to grow.

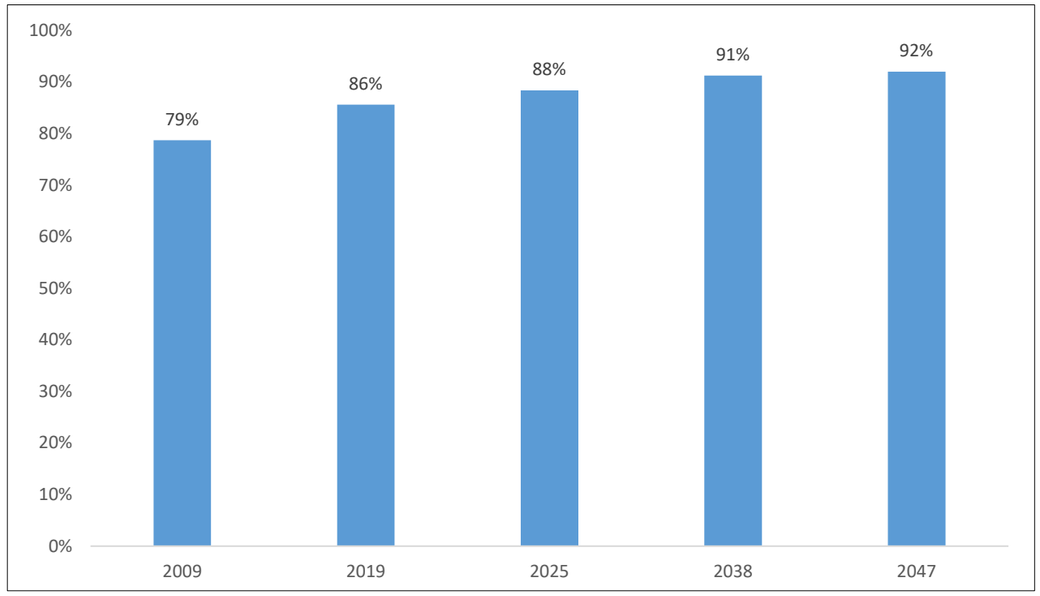
8.2.12 Fleet orders also support further up-gauging, Airbus and Boeing have seen a significant shift to orders of larger aircraft types within their narrow body offerings. For example, orders of the larger Airbus A321 sized aircraft account for the majority of Airbus' order book for the A320 series aircraft whereas historically the A321 accounted for under 25% of deliveries from the same series of aircraft.

3. Higher Average Load Factors

8.2.13 Allied to the increase in average aircraft size is a predicted increase in average seat occupancy rates across the year, also referred to as load factors. In 2019, average load factors ranged between 78-92% (averaging 86%) across the year and have increased from 79% to 86% over the previous 10 years. This increase has been supported by the growth of LCCs, who have been actively increasing load factors across their networks.

8.2.14 Over the next 20 years load factors are forecast to increase at a slower rate, with the gains seen in the last 10 years not being repeated. Factors such as seasonality, directional imbalances and 'no shows' will continue to present challenges for airlines to increase their seat occupancy rates further. By 2047 and beyond, average load factors are forecast to increase more modestly to 92%, which is comparable to Gatwick's most efficient carriers operating today.

Figure 8.2-3 - Average Load Factor - Base Case



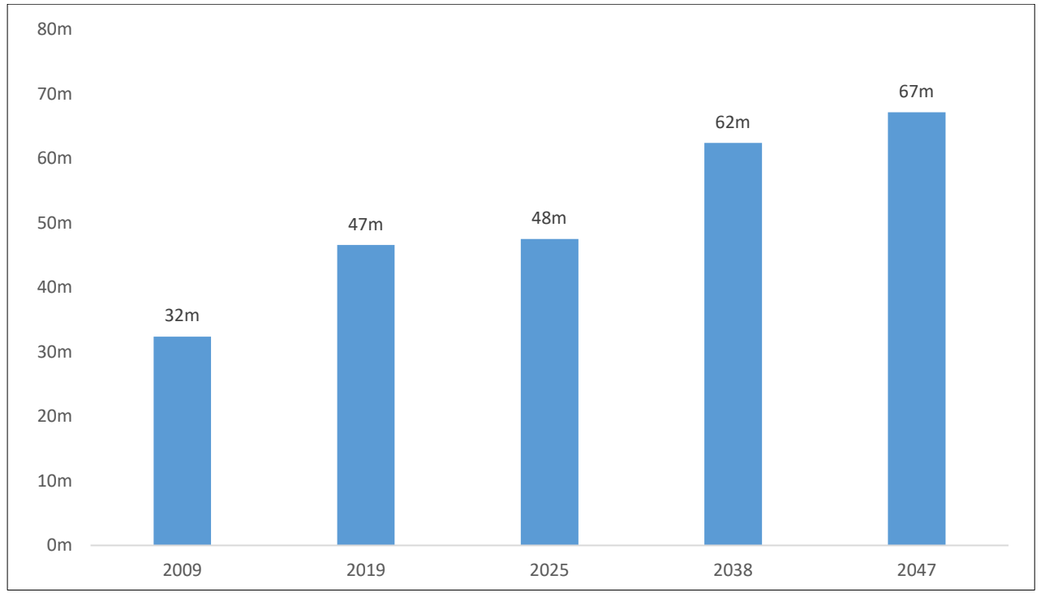
Source: CAA/GAL Statistics

8.2.15 When combined, the aircraft size and load factor assumptions result in the average number of passengers per flight increasing from the base of 165 (in 2019) to 206 in 2047.

8.2.16 The resulting annual passenger numbers shows volumes passing pre Covid levels in 2025 when they reach 48mppa before growing to 62m in 2038 and 67m in 2047.

[28] BA's 777 economy class seating being reconfigured from traditional 3-3-3 configuration to 3-4-3 - increasing seating from current 220/275 seats per aircraft towards 232/336 seats. IAG announced plans to replace Gatwick fleet with larger sized short haul aircraft such as the 737Max from the early/mid 2020s

Figure 8.2-4 - Gatwick Passengers - Base Case



Source: CAA/GAL Statistics

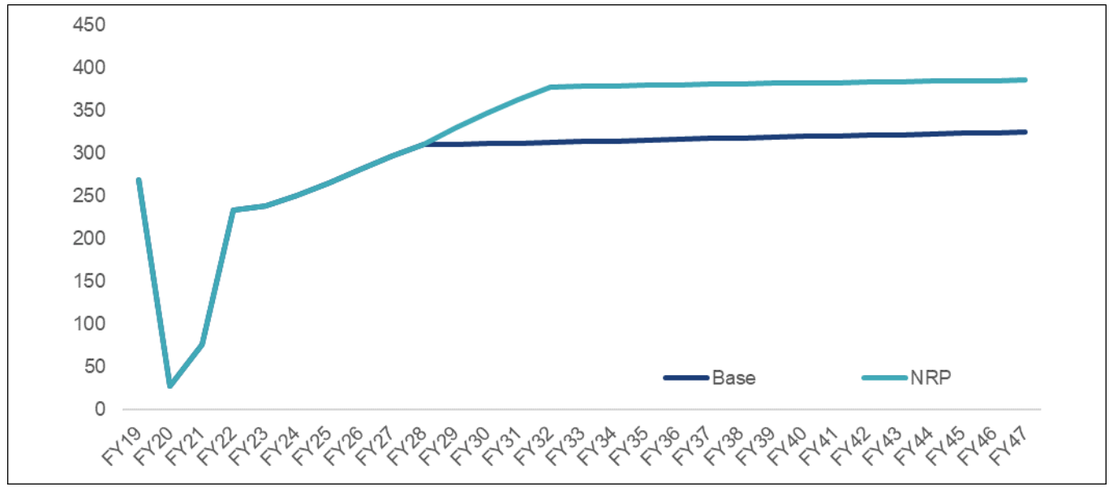
8.3. Growth with the Northern Runway Project

8.3.1 The introduction of the Project would allow both of Gatwick's runways to be used concurrently. This would allow Gatwick to handle additional aircraft movements. The northern runway would be used for departing aircraft (mostly Code C or smaller) whilst the main runway would be capable of handling all movements as it is today. This has the potential to add significant levels of capacity and accommodate some of the ongoing growth in demand for aviation across the wider UK market.

8.3.2 Hourly capacity is assumed to increase from 55 movements in the Baseline Case to 69 movements per hour in peak periods under Northern Runway operations. This will permit Gatwick to grow its busy day and year-round air traffic profile significantly[29]. Busy day schedules[30] for the Northern Runway case in 2038 and 2047 are provided in Annex 1.

8.3.3 With the Project, it is estimated that by the end of the forecast period in 2047 the number of commercial ATMs could increase to approximately 386,000 compared to 326,000 in the Base case.

Figure 8.3-1 - Gatwick Commercial Annual Air Traffic Movements - Base and Northern Runway Cases (thousands)



Note: FY22 (YE Mar 2023) is an estimate as of Jan'23
Source: CAA/GAL Statistics (Total Commercial ATMs)

8.3.4 In addition to the increased commercial ATM throughput, as seen in the Base case, the NRP is also expected to attract larger and fuller aircraft operating from Gatwick, providing a larger increment in passenger throughput. Industry trends around airlines up-gauging their fleets will apply in either the baseline or NRP scenario. By 2047 a 20% uplift in average aircraft loadings is forecast, meaning that Gatwick will be able to serve around 80.2 mppa with the Project.

9 Annual Passengers

9.1. Introduction

9.1.1 GAL has prepared detailed annual passenger and movement forecasts for the period 2019-2047. This bottom up approach captures detailed market and airline assumptions reflecting Gatwick's pipeline of demand under various capacity scenarios. The bottom up approach provides an informed picture of how the new capacity at Gatwick would be likely to be utilised. Gatwick's assumed performance has also been validated against wider London level top down passenger and ATM forecasts, taking into account the dynamics of the wider London market, including airline and supply side assumptions at the other airports.

9.2. London Market

9.2.1 As can be seen in Table 9.2.1, in 2019 Gatwick had a 26% share of the London aviation market which is forecast to decline to 23% in 2047 under the Baseline Case when compared to the underlying unconstrained demand of 290 mppa. This arises as Gatwick's passenger demand is only able to grow at a modest rate of 1.3% CAGR from 2019-50 compared to wider London growth expectations of 1.7%.

[29] Note: Further detail around hourly movement profiles on a busy day are provided in Annex 1

[30] Busy day schedules represent a typical busy day, not the peak day in the year or the busiest hour in the year but a typical busy period

9.2.2 In the Northern Runway Case, Gatwick would increase its market share to nearly 30% by 2038 which is equivalent to 75.6 million passengers. These share gains are delivered as the Northern Runway permits Gatwick to outgrow the wider London market in the 2029-32 period. By 2038 with the Project, Gatwick is forecast to achieve an incremental 13.2 million passengers compared to the Baseline Case..

Table 9.2-1 - Gatwick Share of the London Passenger Market under Base and Northern Runway Cases (millions)

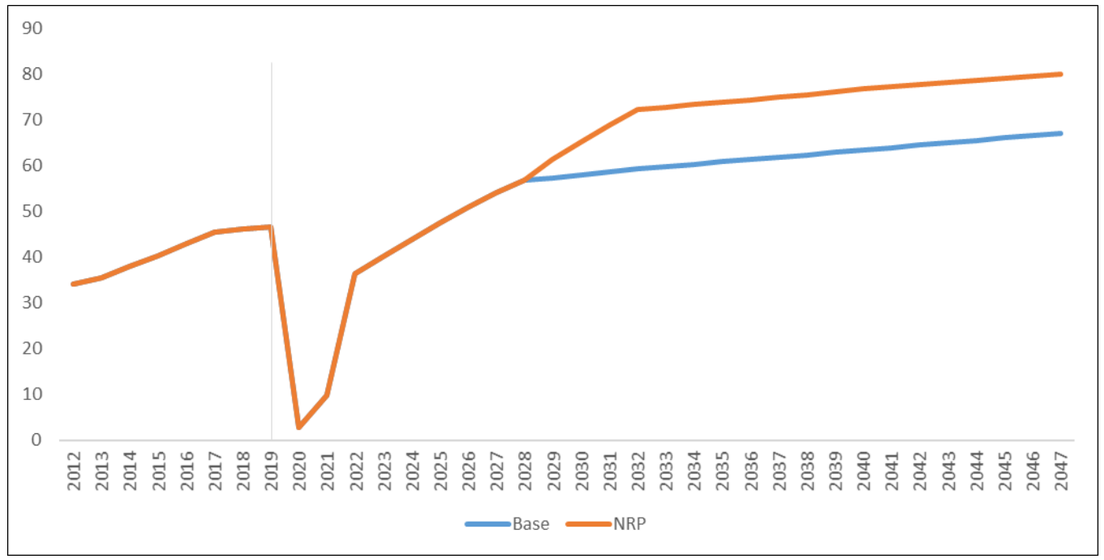
Focus Scope	2018	2019	2029	2032	2038	2047	2047 vs18
LON (JZ)*	178	**181**	215	232	260	290	+63%
LGW (Base)	46	**46**	57	59	62	67	+44%
LGW % (Base)	26%	**26%**	27%	26%	24%	23%	-3%
LGW (NR)	46	**46**	61	72	76	80	+72%
LGW % (NR)	26%	**26%**	29%	31%	29%	27%	+1%

Note: London volumes taken by applying the JZ UK growth rate to a 2018 London baseline on an unconstrained basis

9.2.3 Figure 9.2.1 highlights the annual growth profile assumed at Gatwick for the Baseline and Northern Runway cases. In both cases, passengers are assumed to return to 2019 levels by around 2025 before growing towards 58 million by 2030. Beyond 2030 the growth path differs depending on whether additional capacity offered by the Project is released.

9.2.4 Under the Northern Runway Case the northern runway offers significant additional capacity. Demand is forecast to grow strongly when capacity is assumed to be available from 2029. Through the early 2030s Gatwick is forecast to grow to over 70 million passengers, capturing a greater share of London demand. Once the majority of incremental runway slots are full, further growth is anticipated to arise through a greater share of year round services as well as larger and fuller aircraft. Over time passenger numbers are predicted to grow to just over 80 million by 2047.

Figure 9.2-1- Gatwick Annual Passengers - Base and Northern Runway Cases (millions)



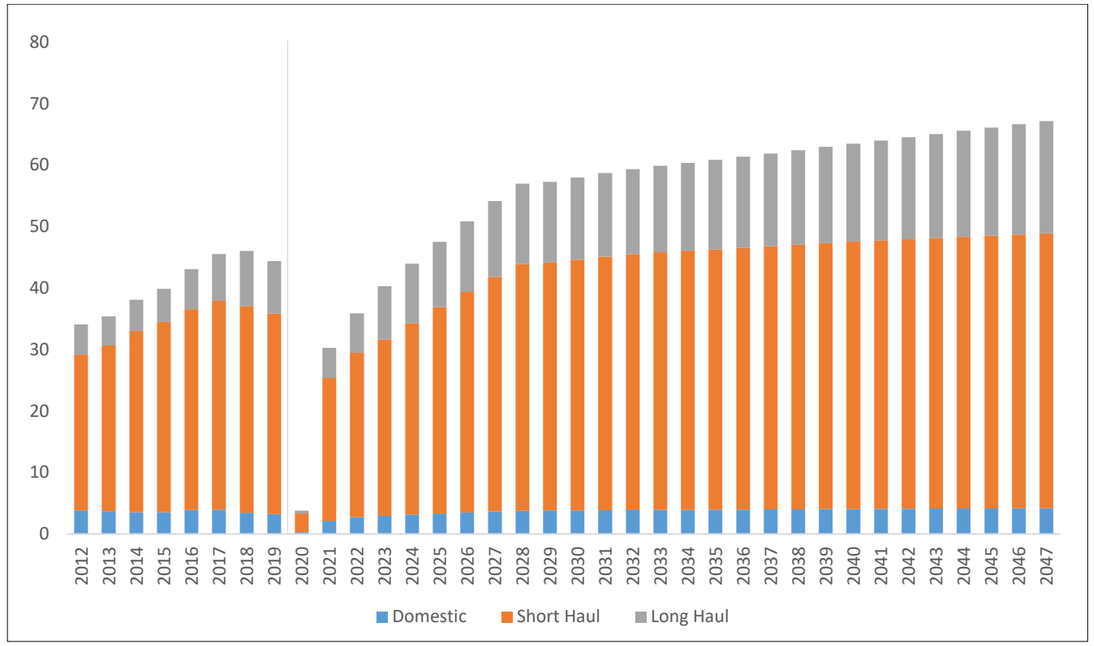
Note: FY22 (YE Mar 2023) is an estimate as of Jan'23

Source: CAA/GAL Statistics

9.3. Market Mix – Haul

9.3.1 In 2019, just under 20% of Gatwick's passenger demand was long haul air traffic which grew from a share of 13% just 5 years before. This period saw long haul passengers grow from under 5m to 9m reflecting a CAGR of 12%, which is ahead of the wider London average.

Figure 9.3-1 - Gatwick Annual Passengers, Base Case (millions) – by haul



Total (millions)	46.6	57.3	61.3	59.4	72.3	62.4	75.6	67.2	80.2

9.3.2 Looking ahead, growth in long haul volume is forecast to continue taking share away from domestic and short haul markets. Long haul demand is forecast to increase to a 23% share of Gatwick's traffic before the introduction of any new capacity. In the Baseline Case, beyond 2029 the long haul share is assumed to remain relatively flat at around 23% of the airport as Gatwick continues to accommodate growth in this segment through substitution.

9.3.3 In the Northern Runway Case, long haul demand is forecast to account for 27% of Gatwick's traffic by 2047. This increase in share reflects the incremental Northern Runway capacity being used proportionally more by long haul traffic compared to the Base case. This is supported by historical trends where long haul traffic has displaced that of domestic/short haul flights over time.

Table 9.3-1 - Gatwick Passengers, Market Mix (%)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Domestic	7%	7%	6%	7%	5%	6%	5%	6%	5%
Short Haul	73%	70%	70%	70%	70%	69%	69%	67%	67%
Long Haul	19%	23%	23%	23%	25%	25%	26%	27%	27%

9.4. Market Mix – Purpose/Residency

9.4.1 Passenger type forecasts have been prepared for Gatwick's demand (excluding transfer passengers), however the respective shares are assumed to remain comparable to 2019.

- **Business share**: This is forecast to remain at around 15% through the forecast period, reflecting a combination of new routes and growth on established markets. This remains the case in both the Base and Northern Runway Cases.
- **Foreign resident share**: This share is also forecast to remain relatively static at around 25% through the forecast period. Again, this holds for both cases.

Figure 9.4-1 - Gatwick Purpose of Travel and Residency (2019)

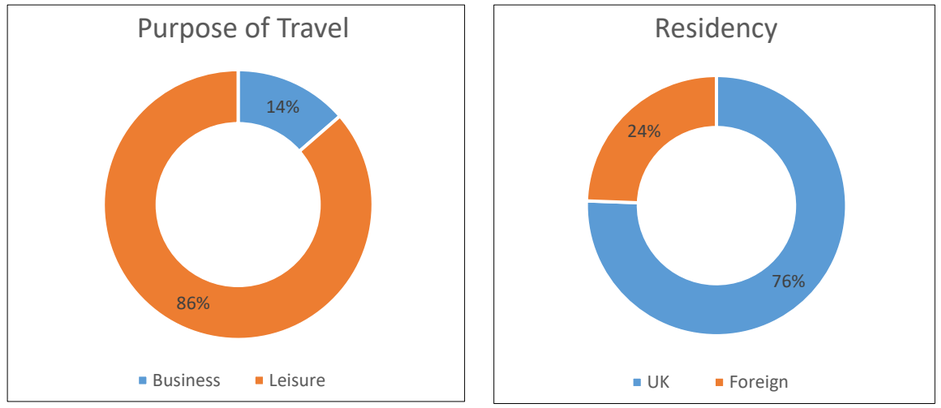


Table 9.4-1 - Passenger Type: UK/Foreign/Business/Leisure split (millions)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
UK Resident									
Business	4.0	4.7	5.0	4.9	5.7	5.1	6.0	5.4	6.3
Leisure	29.9	36.7	39.2	38.1	46.7	40.1	48.9	43.3	51.9
Total	33.8	41.4	44.2	42.9	52.4	45.2	54.8	48.7	58.1
Foreign Resident									
Business	2.1	2.6	2.7	2.7	3.3	2.8	3.4	3.0	3.6
Leisure	8.8	10.9	11.7	11.3	14.0	11.9	14.7	12.9	15.6
Total	10.9	13.5	14.4	14.0	17.2	14.7	18.0	15.9	19.1

Note: Excludes Transfer Passengers

9.5. Market Mix – Transfers

9.5.1 In 2019, transfer passengers were estimated to account for approximately 4% of demand, equivalent to 1.8 million passengers. These volumes reflect flows via traditional connecting itineraries[31].

9.5.2 No significant change is forecast in the future with Gatwick remaining predominantly a point-to-point airport. Therefore, the number of connecting passengers is forecast to grow in line with the total growth as they maintain a share of around 4% of total demand across all scenarios in future years.

Table 9.5-1 - Transfer Passengers (millions and %)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Transfer Passengers	1.8	2.5	2.7	2.5	2.7	2.6	2.7	2.6	2.9
% of total Passengers	3.9%	4.5%	4.7%	4.4%	3.8%	4.3%	3.7%	4.0%	3.8%

9.6. Terminal Splits

9.6.1 Terminal splits have been considered reflecting airline allocation assumptions for each case and the assumed growth by airline. In 2019, approximately 25 million passengers were handled in the North Terminal, with the remaining 21 million handled by the South Terminal.

9.6.2 Over the forecast horizon and respective cases, airlines are forecast to grow at different growth rates and the resulting passenger volumes by terminal will change. With the Project, the North Terminal is forecast to serve some 37 million passengers in 2038 whilst the South Terminal would serve some 38 million. By 2047 40 million passengers are assumed to be using each terminal.

Table 9.6-1 - Passengers by Terminal (millions)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
North	25	31	32	32	36	33	37	36	40
South	21	27	29	28	36	29	38	31	40

[31] Whilst other passengers make their own connections, due to lack of available data these have not been included. This would only have a relatively minor impact on the surface access assumptions, potentially over estimating access requirements.

9.7. Catchment Splits

9.7.1 Surface access estimates for Gatwick's non-transfer passenger demand have been prepared reflecting Gatwick's extensive catchment which is forecast to continue drawing on demand from the surrounding area. Greater London contributes by far the largest share of demand, reflecting inbound and outbound demand and accounts for 19 million passengers, equivalent to a 42% share. Over the forecast period, the splits are assumed to remain relatively stable, reflecting similar catchment characteristics as 2019.

Table 9.7-1 - Passenger Surface Access Split (millions, excludes transfers)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Greater London	19	23	28	24	30	25	31	27	33
South East	17	21	25	22	27	23	28	25	30
East England	3	4	4	4	5	4	5	4	5
Other	6	7	8	7	9	7	9	8	9
Total	45	55	66	57	70	60	73	64	77

10 Annual Aircraft Movements

10.1. Introduction

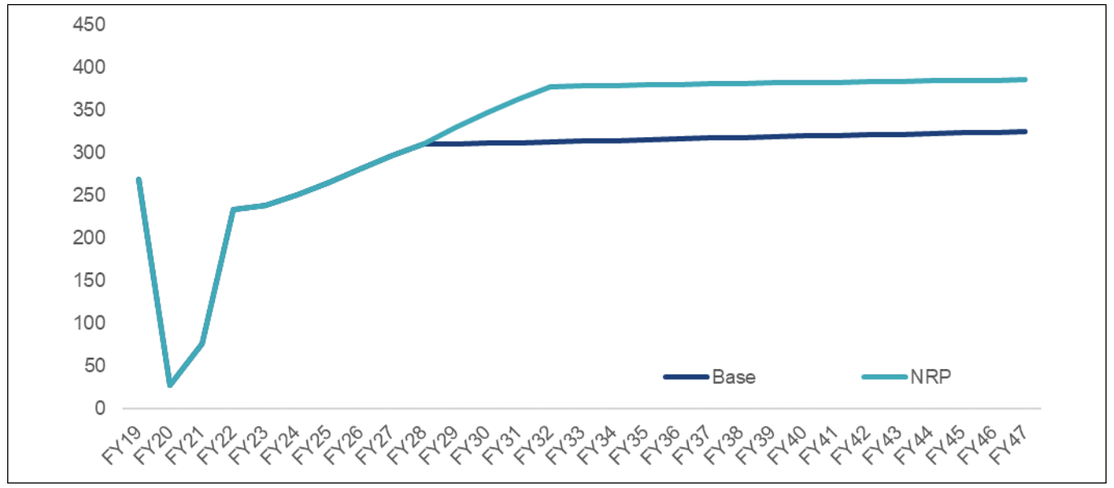
10.1.1 In addition to passengers, aircraft movements have also been forecast capturing supply side trends within the industry and of Gatwick's major airlines. Over the five years leading up to 2019, Gatwick's passengers grew over 22%, whilst movements only grew by 11%, reflecting a trend towards larger and fuller aircraft. In this period the average passenger loading increased from 150 to 165, a 10% increase.

10.1.2 Looking ahead, growth in average aircraft sizes is forecast to continue, recognising the aircraft order books of some of Gatwick's largest carriers. They are forecast to take delivery of aircraft with larger capacities than those currently in operation. This, combined with ongoing industry growth in load factors and a growing LCC share will drive further improvement in average passenger throughput. In the next 10 years average passengers per ATM are forecast to increase by a further 12% to 184.

10.1.3 Consequently, Gatwick's annual growth in air traffic movements is lower than its passenger growth. In the Baseline Case annual commercial ATMs (excluding non-commercial flights such as positioning flights) are forecast to reach approximately 311,000 by 2029 up from around 280,000 in 2019 representing a CAGR of 0.9% compared to 2.1% for passengers.

10.1.4 The annual commercial ATM forecasts for both the Base and Northern Runway Cases are compared in the following chart, taking a comparable path to that of passengers. In both cases commercial ATMs are forecast to pass 300,000 by the late 2020s and by 2038 are able to grow towards 382,000 in the Northern Runway Case, whilst reaching 318,000 in the Baseline Case. In the final period of the forecast only modest growth is assumed and by 2047 the Northern Runway Case is forecast to provide 386,000 commercial ATMs compared to 326,000 in the baseline scenario.

Figure 10.1-1 - Gatwick Annual Commercial ATMs - Base and Northern Runway Cases (thousands)



Note: FY22 (YE Mar 2023) is an estimate as of Jan'23

Source: CAA/GAL Statistics (Total Commercial ATMs)

Table 10.1-1 - Gatwick Commercial Air Traffic Movements and Non-Commercial Air Traffic Movements (thousands, rounded to nearest thousand)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Commercial ATMs	283	311	330	313	378	318	382	326	386
Non- Commercial ATMs	2	2	3	2	3	2	3	2	3
Total Annual Aircraft Movements	285	313	333	316	381	321	385	328	389

10.1.5 The above table uses the following definitions.

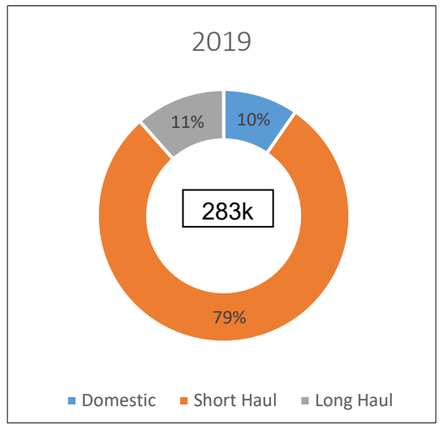
- Commercial ATMs: Landings or take-offs of aircraft engaged on the transport of passengers, freight or mail on commercial terms (i.e. scheduled, charter and dedicated freighter flights).

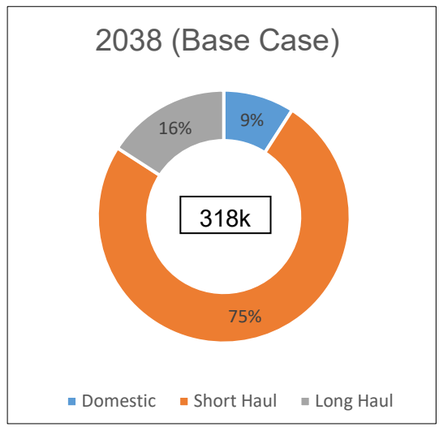
- Non-Commercial ATMs ("NATMs"): Landings or take-offs of aircraft movements, excluding Commercial ATMs. Includes positioning flights by commercial operators, business aviation and recreational / military flights.
- Total Annual Aircraft Movements: = Commercial ATMs and NATMs.

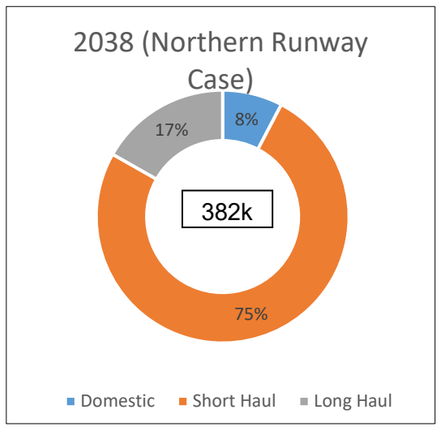
10.1.6 NATMs include positioners, business aviation and other categories. Their share of movements has been falling over time whilst total movements have continued to grow. In 2019, they accounted for approximately 1% of total movements and this share is forecast to remain relatively stable.

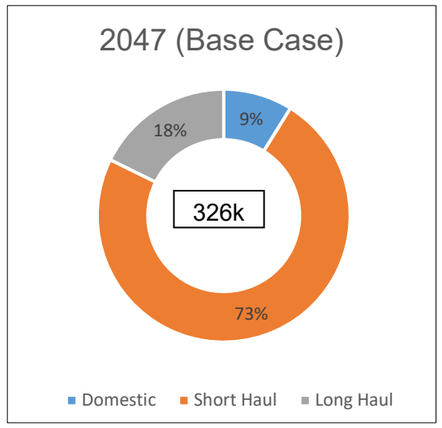
10.1.7 The commercial ATMs are broken down into the main market types namely domestic, short haul and long haul.

Figure 10.1-2 - Gatwick Commercial ATMs by Haul









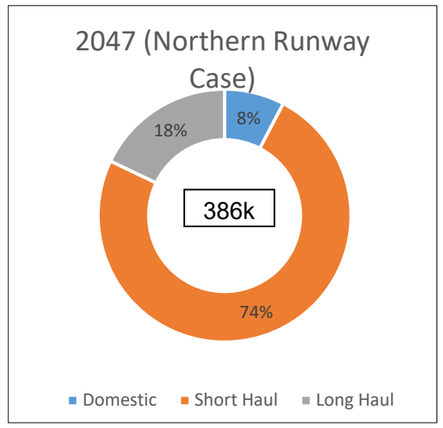


Table 10.1-2 - Gatwick Commercial Air Traffic Movements by Market Mix (thousands)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Domestic	28	29	29	29	29	29	29	29	30
Short Haul	222	237	252	237	288	239	288	239	287
Long Haul	32	45	49	47	61	51	64	58	69
Total Commercial ATMs	**283**	**311**	**330**	**313**	**378**	**318**	**382**	**326**	**386**
Non-Commercial Air Traffic Movements	2	2	3	2	3	2	3	2	3
Total Annual Aircraft Movements	**285**	**313**	**333**	**316**	**381**	**321**	**385**	**328**	**389**

Note: Sums may not add up due to rounding

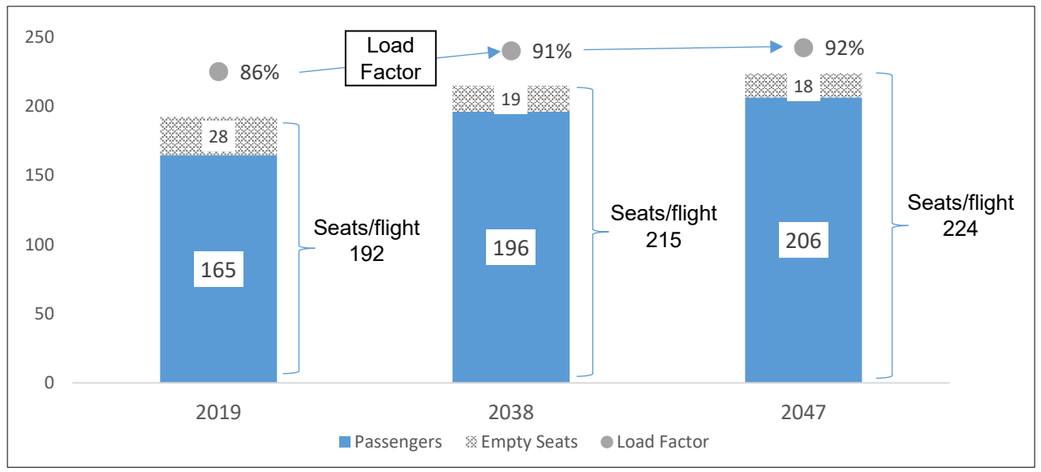
10.2. Average Aircraft Size and Passenger Loading

10.2.1 In 2019, Gatwick's average aircraft size of 192 seats per movement reflected a wide range of aircraft types (regional, narrow body and wide body) across many airline business models. This metric has been steadily increasing having grown from 180 in 2014 to the 2019 level, representing 7% growth in just 5 years. In the future, reflecting the main airlines' order books and trends for larger and more densely configured aircraft this is forecast to increase to 205 by 2029 representing a further 7% growth. By 2047 average aircraft are forecast to have increased to between 224 and 227 seats in the Baseline and Northern Runway Cases respectively, which would be approximately 17% above 2019.

10.2.2 Alongside the trend for larger aircraft, the rate at which airlines fill this capacity has also been improving. In 2019, average load factors of 86% were achieved, which is more than 3% higher than 5 years previously. Looking ahead, the rate at which this will continue to grow is assumed to slow down, but some growth will still occur. These positive trends will be achieved through better year-round capacity management alongside a higher proportion of LCCs which operate with higher load factors. By 2047 average load factors are assumed to pass 90%.

10.2.3 Growth in average loading and aircraft size through the forecast period is summarised in the following charts.

Figure 10.2-1 - Gatwick Growth in Average Aircraft Size & Load Factor (2019, 2038 & 2047 Base Case)



Source: CAA/GAL Statistics

Table 10.2-1 - Gatwick Commercial Air Traffic Movements Average Loads

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Average Aircraft Loads – Seats	192	206	208	210	213	215	218	224	227
Average Aircraft Loads - %	86%	89%	89%	90%	90%	91%	91%	92%	92%

11 Air Cargo

11.1. Cargo Summary

11.1.1 High level annual cargo forecasts have been prepared considering Gatwick's evolving air traffic mix. The supply side dynamics of the routes and carriers play a pivotal role in the airport's cargo performance, with long haul widebody movements to markets such as Asia/Middle East providing significant opportunity.

11.1.2 Gatwick's cargo performance has been increasing in recent years reflecting the growth in the number of long haul markets and carriers. Future growth in cargo tonnage is linked to supply side assumptions around the carrier and market types being served.

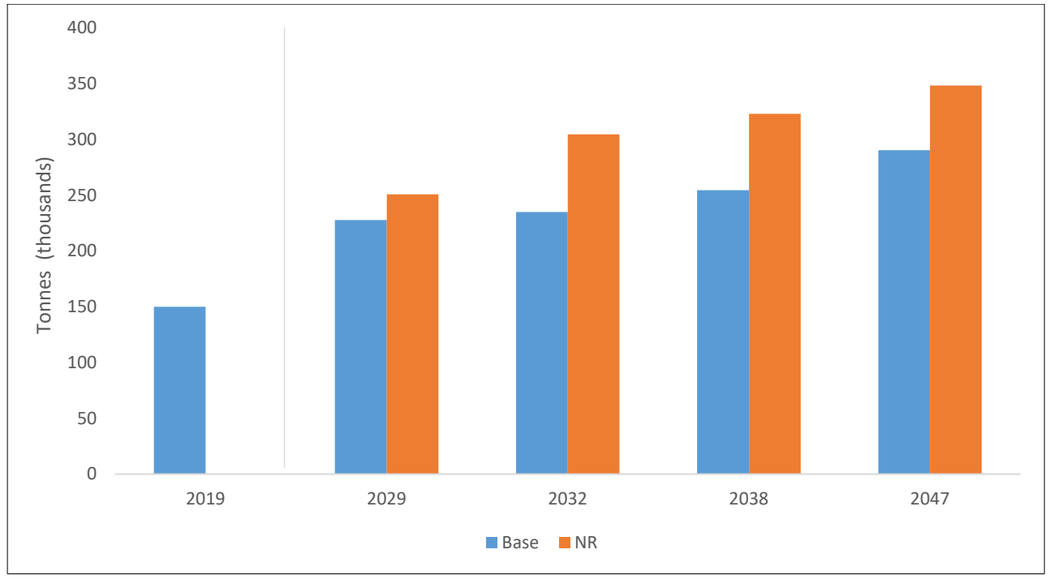
11.1.3 Published statistics for Gatwick's cargo performance have historically been unreliable, typically understating volumes as a result of many flights reporting zero when in fact they carried material volumes of cargo. To ensure the application for development consent is based on accurate figures, GAL has undertaken a one year validation exercise to identify the magnitude of this. Adjusting for the figure in 2019/20 results in an increase from the reported 118,000 tonnes to 150,000 tonnes (i.e. approx. 30% higher than the published figures).

11.1.4 Under the Northern Runway case cargo tonnages are forecast to increase to over 200,000 tonnes as the northern runway enters service. By 2047 cargo tonnages are forecast to be approaching 350,000 tonnes per year in the Northern Runway Case by comparison to approximately 290,000 tonnes in the Base Case.

Table 11.1-1 - Air Cargo (thousands of tonnes)

	2019		2029		2032		2038		2047	
	Reported	Adjusted	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Cargo	118	150	228	251	235	305	254	323	290	348

Figure 11.1-1 - Gatwick Annual Cargo (thousands of tonnes)



Source: CAA/GAL Statistics

12 On Airport Employment

12.1. Employment Summary

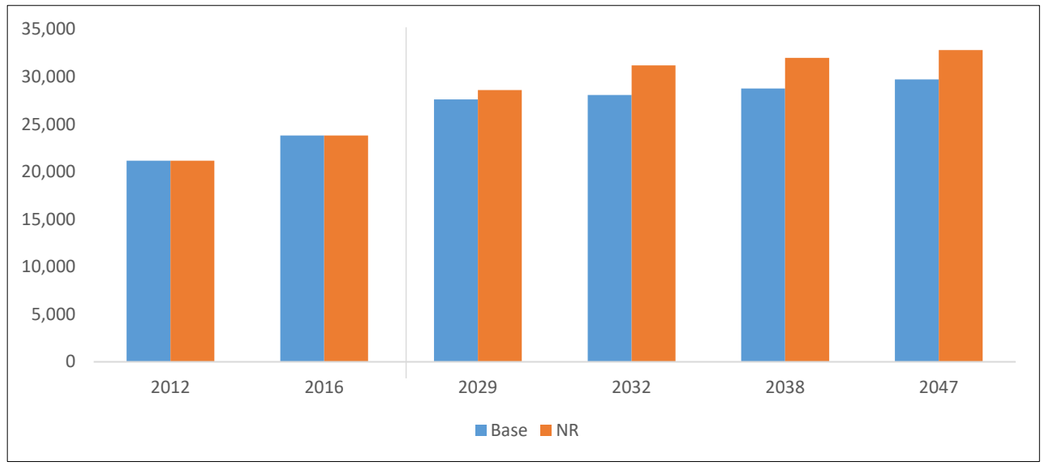
12.1.1 Future on airport employment has been forecast by correlating each employee grouping to an appropriate air traffic metric – for example ground handling staff is most closely linked to ATMs, while cleaning staff is more closely linked to passenger volumes.

12.1.2 Around 24,000 employees worked on site in 2019, of which approximately 3,300 were employed directly by GAL. In 2020 and 2021, the pandemic led to a reduction in airport employees to an estimated 19,400[32] and GAL staff fell to 1,829. Airport employment has since started to return to previous levels with an estimated 20,450 workers in 2022[33], of which 2,192 were GAL employees. On airport employment is expected to return to previous levels in the coming years, and the total number of employees on site is forecast to increase to over 27,000 by 2029 and then grow towards 29,000 under the Baseline Case, and nearly 32,000 under the Northern Runway Case in 2038. Modest growth is assumed in the 2038-2047 period as a further 2-3% employees are added taking the total to approaching 30,000 under the Baseline Case or to over 32,800 under the Northern Runway Project case. This growth takes into account future efficiency gains driven by ongoing automation and new technologies. For example, ground handling technologies such as autonomous vehicles and terminal robots will drive operational efficiencies on the ground. Passenger and baggage processing technologies will continue to make the security and customs/immigration processes for passengers and luggage screening more efficient.

12.1.3 Further gains are achieved through larger aircraft and higher aircraft loadings meaning that on site employment grows at less than half the rate of passengers (1.2% vs 2.6% under the Northern Runway Project Case). Average passengers per employee increase from 1,800 to around 2,450 by 2047 representing an increase in this ratio of 35%. In the Base Case the efficiency gains are slightly less as by 2047 nearly 2,300 passengers per employee is achieved.

12.1.4 For comparison similar efficiency gains have been made since 2002 when average passengers per employee was 1,300, 25% below 2019 levels.

Figure 12.1-1 - On-Airport Employment Forecasts (employees)



Source: GAL Statistics, baseline year of 2016 was most recent year available for analysis

Table 12.1-1 - On Airport Employment

	2016 Employment Survey	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Total	23,807	27,609	28,596	28,077	31,199	28,770	31,985	29,721	32,822

[32] Includes 11,700 furloughed employees.

[33] Based on Gatwick Airport Identification Card passholder data from 3rd Jan 2023

Annex 1

Data Tables

A1.1 Employment

Table A1.1.1: On Airport Employment (by type)

	2016 Employment Survey	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Air Cabin Crew	5,791	7,066	7,378	7,227	8,225	7,464	8,481	7,791	8,775
Airline/Airport Management	671	756	777	767	834	783	851	805	871
Apron, Ramp, Cargo, Baggage Handling and Drivers	2,434	2,549	2,605	2,556	2,744	2,571	2,754	2,588	2,760
Catering, Cleaning and Housekeeping	3,061	3,896	4,101	4,001	4,656	4,157	4,823	4,371	5,016
Customs, Immigration, Police and Fire Staff	1,073	1,383	1,459	1,422	1,665	1,480	1,727	1,559	1,799
Information Technology	234	260	266	263	283	268	288	274	294
Maintenance Tradesmen	1,899	2,227	2,308	2,269	2,526	2,330	2,592	2,414	2,667
Management and Professional – General	1,374	1,480	1,506	1,493	1,577	1,513	1,598	1,541	1,623
Passenger Services/Sales and Clerical Staff	3,915	4,158	4,218	4,189	4,380	4,234	4,429	4,297	4,485
Pilots/Air Traffic Control/Flight Operations	1,533	1,645	1,700	1,652	1,836	1,667	1,846	1,684	1,852
Security, Passenger Search, Security Access Control	1,822	2,189	2,278	2,235	2,522	2,303	2,596	2,397	2,680
Total	23,807	27,609	28,596	28,077	31,199	28,770	31,985	29,721	32,822

A1.2 Noise

A1.2.1 Forecasts have been produced as inputs into other workstreams in order to assess air and ground noise. These forecasts for air and ground noise have been produced on an annual (Lden) basis and for the summer 92 day 'Leq' period (defined as 16 June – 15 September).

A1.2.2 Forecasts for the noise assessments have been disaggregated into the day, evening and night periods. These are defined as follows (all times are local time):

- Day = 0600 – 1759
- Evening = 1800 – 2159
- Night = 2200 – 0559

A1.2.3 The following tables provide the annual outputs relating to the 'Lden' period.

Table A1.2.1: Annual Total Movements (including Non-Commercial Movements), Noise Lden (thousands)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Annual	285	313	333	316	381	321	385	328	389
Day	198	222	238	224	270	229	274	234	277
Evening	56	60	63	61	76	61	76	64	77
Night	31	31	31	30	35	31	35	31	35

A1.2.4 The following tables provide the outputs relating to the 92 day 'Leq' period.

Table A1.2.2: Total Movements (including Non-Commercial Movements), Noise Summer Period Leq (thousands)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Leq Period	82	86	90	87	102	87	103	88	104
Day	55	59	62	59	70	60	71	60	71
Evening	16	16	16	16	20	16	20	17	20
Night	12	12	12	11	13	11	13	11	13

A1.3 Fleet Mix

A1.3.1 Fleet mix assumptions have been made to provide input to the noise and environmental analysis capturing ongoing fleet modernisation programs amongst Gatwick's airlines. Next generation aircraft include those currently entering service and benefiting from the latest engine technologies. Aircraft included in this grouping include narrow bodies such as the A320neo series and Boeing's 737Max[34], widebody aircraft include the Airbus A350 and Boeing 787 series of aircraft.

A1.3.2 In 2019 just over 12% of movements were operated by next generation aircraft with this share forecast to steadily increase. As the 737Max returns to service alongside further deliveries of other next generation aircraft, this share will continue to increase each year.

A1.3.3 Over the forecast period the next generation share is forecast to steadily increase approaching 60% in 2029 and we expect virtually all current generation aircraft to be phased out by 2038.

A1.3.4 **Beyond the mid-2030s there is the potential for future generation aircraft types to enter service (e.g. Neo and MAX replacements) as well as other modes of propulsion (e.g. electric, hydrogen), although there is uncertainty regarding the extent to which fleet mix may be affected. Sensitivity testing has been undertaken in relation to the rate of fleet mix transition in the noise assessment (see Annex 3). A profile of further segmentation was also considered for the greenhouse gas emissions assessment considering the zero emission aircraft. For these purposes a pathway consistent with the Government's latest Jet Zero trajectory for zero emission aircraft was utilised.**

Table A1.3.1: Fleet Generation (Movements & Mix) (including Non-Commercial Movements)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Next Gen	12%	59%	59%	80%	82%	100%	100%	100%	100%
Other	88%	41%	41%	20%	18%	0.4%	0.4%	0.2%	0.2%
Total	285k	313k	333k	316k	381k	321k	385k	328k	389k

Detailed Fleet Tables

Table A1.3.2: Fleet Types (including Non-Commercial Movements (thousands)

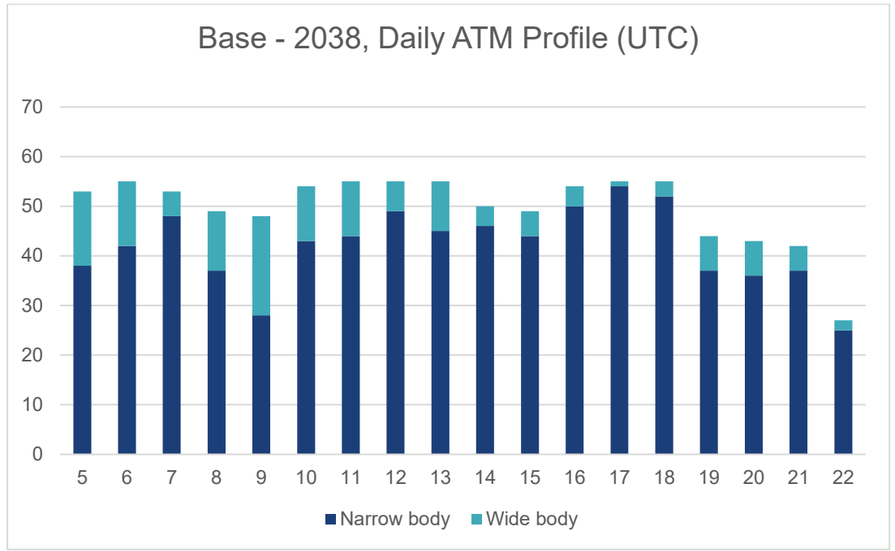
	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Narrow Bodied									
A320s ceo	178	101	107	55	61	0	0	0	0
737 series	42	11	12	2	2	0	0	0	0
Other NB CG	12	1	1	1	1	1	1	1	1
A320s neo	20	113	119	158	192	215	254	215	254
737 Max	0	36	39	46	51	48	52	48	52
C Series	2	8	8	9	15	8	16	8	15
Wide Bodied									
A330 series	5	3	3	1	1	0	0	0	0
777 series	9	9	10	2	2	0	0	0	0
747	2	0	0	0	0	0	0	0	0
A380	2	2	3	2	2	1	1	0	0

[34] In January 2021 EASA (European Union Aviation Safety Agency) gave approval for the return to service

Other WB CG	2	0	0	0	0	0	0	0	0
787 series	12	23	25	33	43	38	49	44	52
A350 series	1	6	6	6	9	8	10	9	11
Other WB NG	0	0	1	1	1	3	3	4	4
All	285	313	333	316	381	321	385	328	389

A1.4 Busy Day Schedules

Figure A1.4.1: Gatwick Runway Profiles for Busy Day, 2038, Core Hours (UTC)



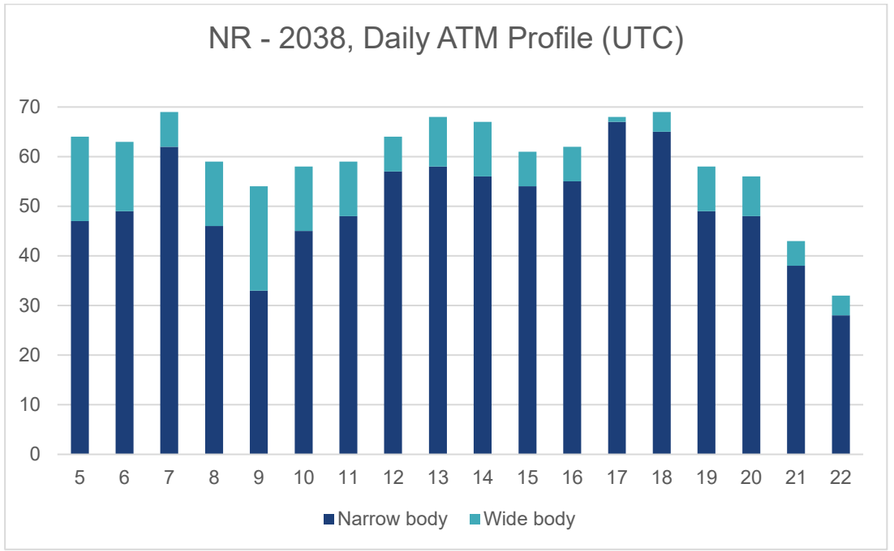
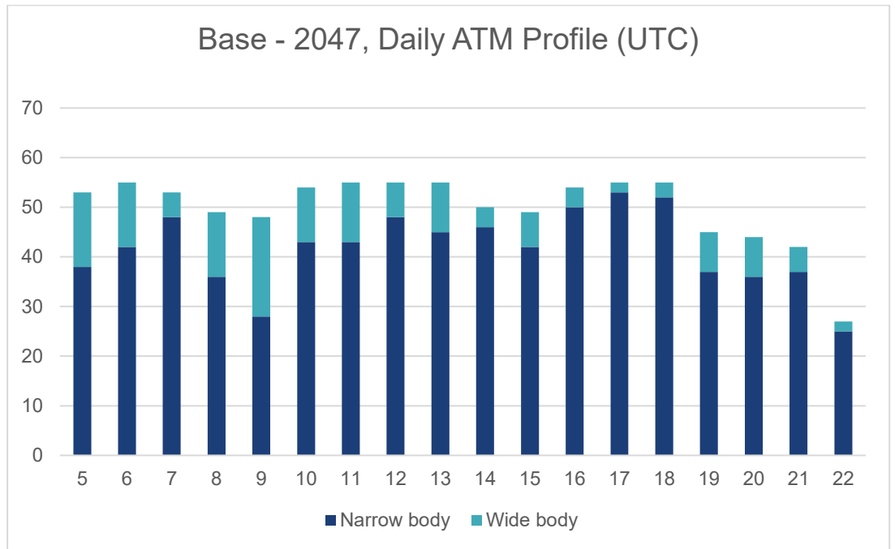
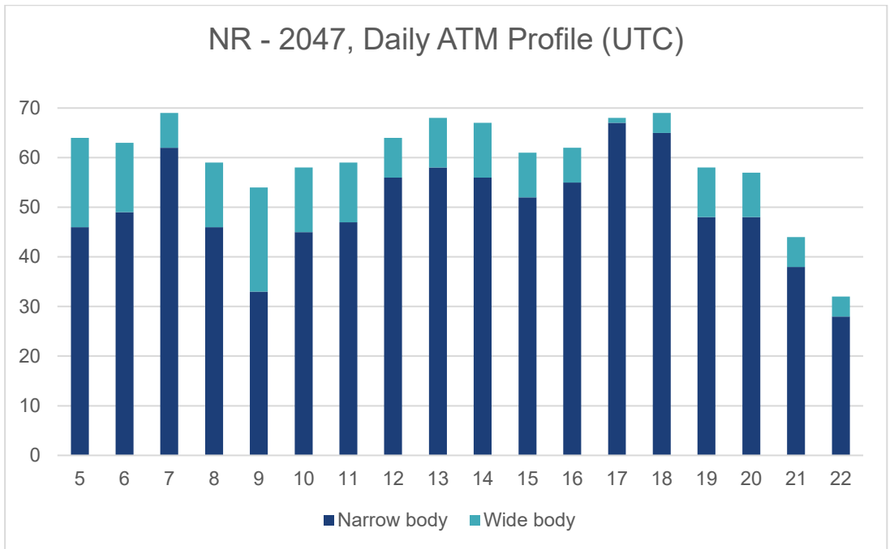


Figure A1.4.2: Gatwick Runway Profiles for Busy Day, 2047, Core Hours (UTC)





Annex 2
Slower Growth Sensitivity Case

A2.1 Introduction

A2.1.1 There is inherent uncertainty in predicting long term aviation growth. As noted in Section 4.1, in preparing the air traffic forecasts regard has been had to the importance of having a realistic view of the level and characteristics of air traffic growth that would occur at Gatwick, whilst also ensuring that the environmental impacts of Gatwick's growth, some of which rely heavily on the forecasts, are not understated. Given the inherent uncertainty, we have also produced a sensitivity forecast based on a more conservative view of growth at Gatwick and tested the impact of such slower-growth on the economic benefits attributable to the Project.

A2.1.2 Compared to the core forecasts, these slower growth sensitivity test forecasts provide a lower growth scenario, including slower growth from Gatwick's airlines through more conservative assumptions in relation to average aircraft size, load factors, and the extent of growth outside the peak seasons.

A2.1.3 Key elements of the slower growth sensitivity test forecasts are:

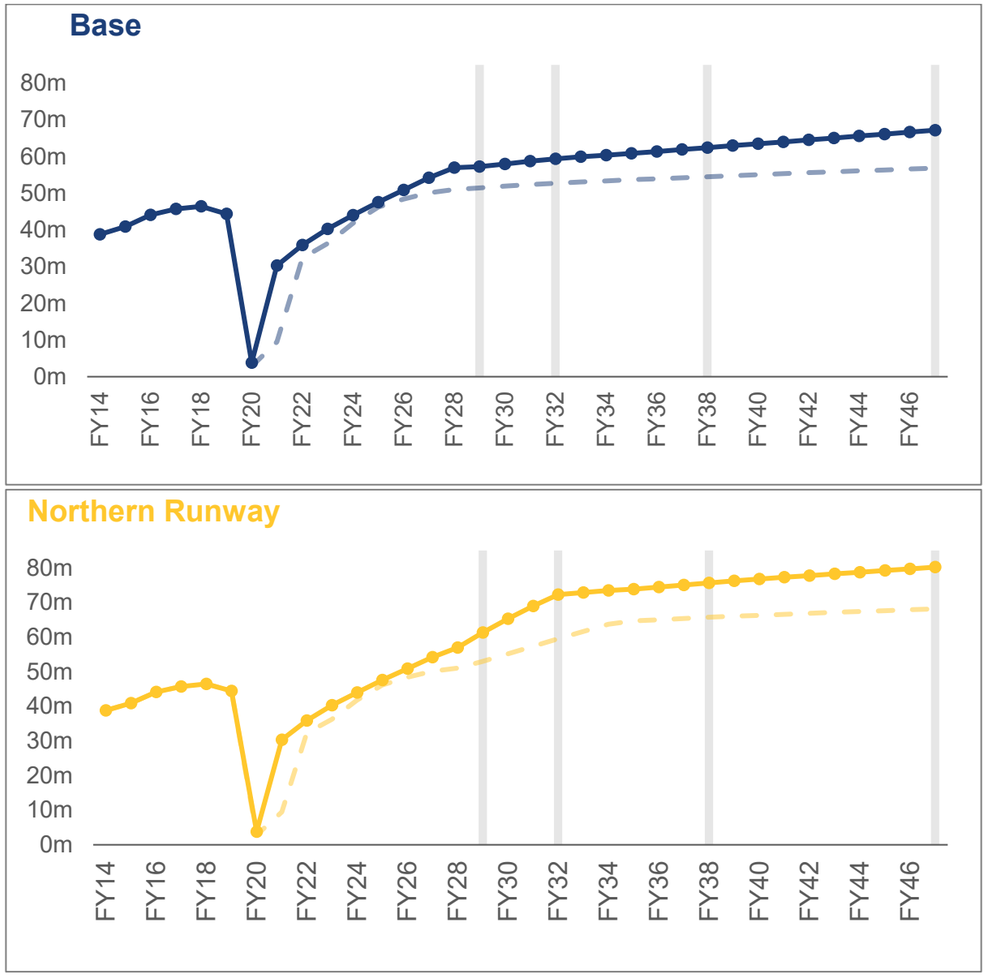
- Slower recovery from COVID-19: Return to 2019 levels delayed until FY26/27 compared to FY25/26 in the core forecasts.
- Northern Runway assumed to be operating at capacity during peak periods some 6 years after opening, double that in the core Northern Runway Project forecasts.
- Long term throughput potential reduced:
  - Whilst peak month activity is maintained, the degree of spreading assumed outside of peak periods is reduced significantly, and busy month ratio stays comparable to base year.
  - Passenger per ATM drivers are reduced and slightly smaller and emptier aircraft assumptions are made.

A2.1.4 These effects and outputs are not related to the Heathrow R3 sensitivity test which is shown in ANNEX 4.

A2.2 Passenger and Aircraft Movements

A2.2.1 A comparison of annual passengers under the core forecasts and the slower growth sensitivty has been made. Under the baseline forecasts (in the absence of the Project), by 2047 air traffic grows to 67m whilst under the slower growth scenario demand is assmed to grow to 57m, some 15% lower. Under both scenarios Gatwick is assumed to remain constrained and the lower throughput achieved is reflective of less efficient use of Gatwick's runway capacity. This scenario highlights the importance of understanding the bottom up supply side assumption around runway capacity and throughput. With the Northern Runway Project demand in the slower growth sensitivity case is forecast at under 70m in the long term – again 15% below the core Northern Runway Case forecasts but still substantially above the baseline capacity.

Figure A2.2.1: Passenger Forecast Comparisons (Slower Growth vs Core Case forecasts)

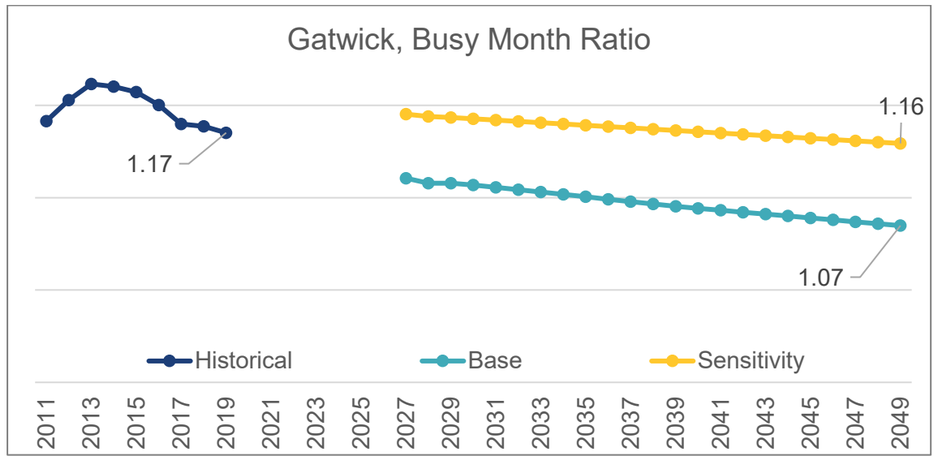


A2.3 Peak Spreading

A2.3.1 Peak spreading is the mechanism through which typically off peak capacity becomes better utliised as airports become fuller. For example, in 2019 Gatwick's runway was 17% busier in the peak summer

months compared to the average day. The slower growth sensitivity assumes a level of seasonality in line with the baseline year of 2019 whilst the core forecasts assume ongoing levels of peak spreading providing higher year round utlisation levels.

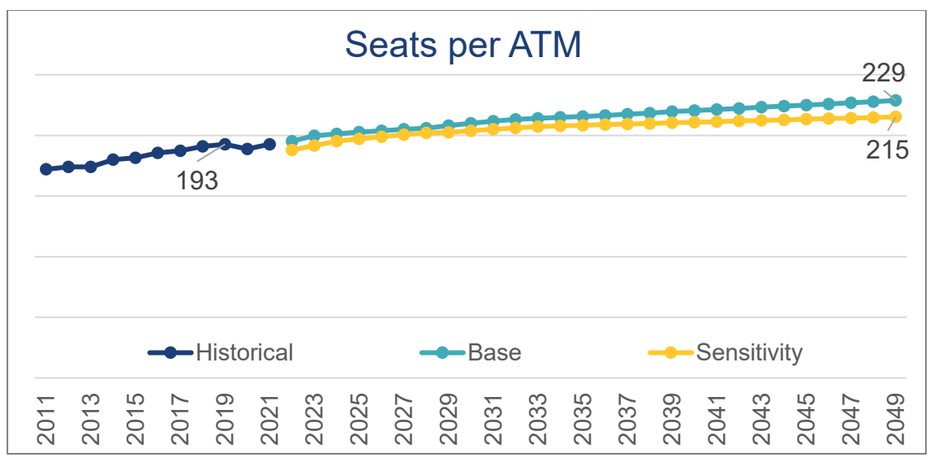
Figure A2.3.1: Busy Month ATM to Average Annual ATM Comparison

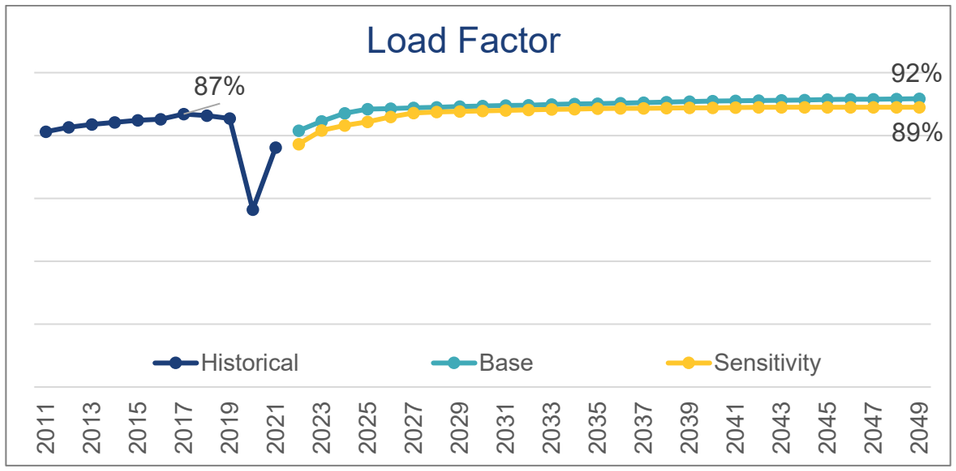


A2.4 Seats and Load Factors

A2.4.1 The slower growth forecast assumes lower passenger throughput. This is driven by smaller aircraft assumptions as well as lower seat occupancy rates. For example seat occupancy rates are only assumed to grow to 89% by the end of the forcast whilst the average aircraft is assumed to be 6% below the core forecasts.

Figure A2.4.1: Gatwick Average Seats per movement and Load Factor comparisons





A2.5 Employment

A2.5.1 As a result of the slower growth prospects, lower expecations for onsite airport employment are also expected. The same growth elasticites for the main job functions were also used for the slower growth forecasts. By 2032 the slower growth employment outputs are 6% lower for the Baseline Case core forecasts and 10% lower for the Northern Runway core forecasts. By 2047 the difference between the core forecasts and the slower growth forecasts is approx 8% in both cases.

Table A2.5.1: Employment Forecasts (Slower Growth Sensitivity Case)

	2016 Employment Survey	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Total	23,807	26,231	26,609	26,524	28,180	26,914	29,678	27,373	30,093

Annex 3
Slow Fleet Transition Sensitivity Case

A3.1 Introduction

A3.1.1 Alongside the Northern Runway and Baseline forecasts, a further set of forecasts has been developed for a scenario that assumes that the rate of transition of Gatwick's airline fleet is slower than in the core forecasts – referred to as the 'Slow Fleet Transition' sensitivity case.

A3.1.2 The purpose of this sensitivity test is to understand how noise, air quality and carbon impacts could be greater if the turnover of aircraft types to next generation aircraft is slower than expected in the core forecasts.

A3.2 Fleet Forecasts

A3.2.1 In the Slow Fleet Transition Baseline and Northern Runway cases the share of next generation aircraft increases more slowly throughout the forecast period. In the Slow Fleet Transition Baseline case the next generation share is assumed to reach 50% in 2032 compared to 80% in the core case, whilst by 2038 the next generation share of nearly 100% in the core forecasts is assumed to decline to 82% in the Slow Fleet Transition case.

A3.2.2 Recent trends saw Gatwick's next generations share peak at over 25% in 2021. However this was driven by airlines favouring the use of next generation fleets during the COVID-19 pandemic. Pre COVID-19, Gatwick's share of next generation aircraft had reached 12%, whilst recent trends show that in 2022 next generation aircraft are likely to make up around 20% of movements. During COVID-19, many airlines delayed aircraft deflieveries whilst the manufacturers also slowed down production rates to adjust for these reduced levels of demand.

A3.2.3 By 2047 it is unlikely that current generation aircraft will be operating in significant numbers, so for 2047 the Slow Fleet Transition sensitivity has assumed a noisier mix of next generation aicraft. Typically some noisier and often slightly larger aicraft are assumed to substitute for a share of the next generation fleet types assumed in the core forecasts.

Table A3.2.1: Fleet Generation, Slower Fleet Transition (Movements & Mix) (including Non-Commercial Movements)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Next Gen	12%	40%	41%	50%	53%	82%	83%	100%	100%
Other	88%	60%	59%	50%	47%	18%	17%	0.2%	0.2%
Total (thousands)	285	312k	332	316	381	321	385	328	389

Detailed Fleet Tables

Table A3.2.2: Fleet Types, Slower Fleet Transition (ATMs and NATMs) (thousands)

	2019 Actual	2029		2032		2038		2047	
		Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case	Base Case	Northern Runway Case
Narrow Bodied									
A320s ceo	178	139	147	114	130	43	49	0	0
737 series	42	23	25	22	24	6	6	0	0
Other NB CG	12	3	3	2	2	1	1	1	1
A320s neo	20	75	79	100	124	171	205	162	190

737 Max	0	23	25	26	29	42	46	105	123
C Series	2	5	5	7	14	8	15	4	8
A330 series	5	5	6	6	9	2	3	0	0
777 series	9	11	12	11	11	4	4	0	0
747	2	1	1	0	0	0	0	0	0
A380	2	3	3	2	2	2	2	0	0
Other WB CG	2	1	1	0	0	0	0	0	0
787 series	12	19	21	22	30	34	43	31	37
A350 series	1	4	5	4	5	7	9	16	19
Other WB NG	0	0	0	0	0	2	2	10	10
All	285	312	332	316	381	321	385	328	389

Annex 4

Heathrow R3 Sensitivity Case

A4.1 Introduction

A4.1.1 As noted in Section 4 of this Forecast Data Book the main impact assessments being carried out are based on forecasts that do not assume a 3rd runway (R3) is built at Heathrow. The reasons for this are set out in Section 4.

A4.1.2 However, because Heathrow R3 remains Government policy, forecasts have been prepared for the purposes of understanding the potential for cumulative effects of the Northern Runway Project, alongside possible expansion of Heathrow Airport through the provision of R3.

A4.1.3 These forecasts are summarised in this Annex.

A4.1.4 For the purpose of these forecasts it has been assumed that Heathrow R3 would open in 2032. This is considered to be the very earliest it could now open, and as time passes without Heathrow Airport Holdings Ltd - the promotors of R3 - recommencing work to prepare a development consent order application, any opening date would be delayed.

A4.2 Passenger numbers

A4.2.1 Following the opening of Heathrow R3, Gatwick's traffic projections have been assumed to be impacted resulting in lower passenger and ATM throughput from FY32 onwards.

A4.2.2 Gatwick's long-haul traffic is assumed to be most heavily impacted as services are assumed to switch to Heathrow. In the NRP scenario, the services lost reflect a mix of carriers in Gatwick's baseline as well as carriers and those that were that were assumed to provide growth during the ramp up of the Northern Runway. The baseline traffic scenario is also impacted but without the benefit of the Northern Runway volumes.

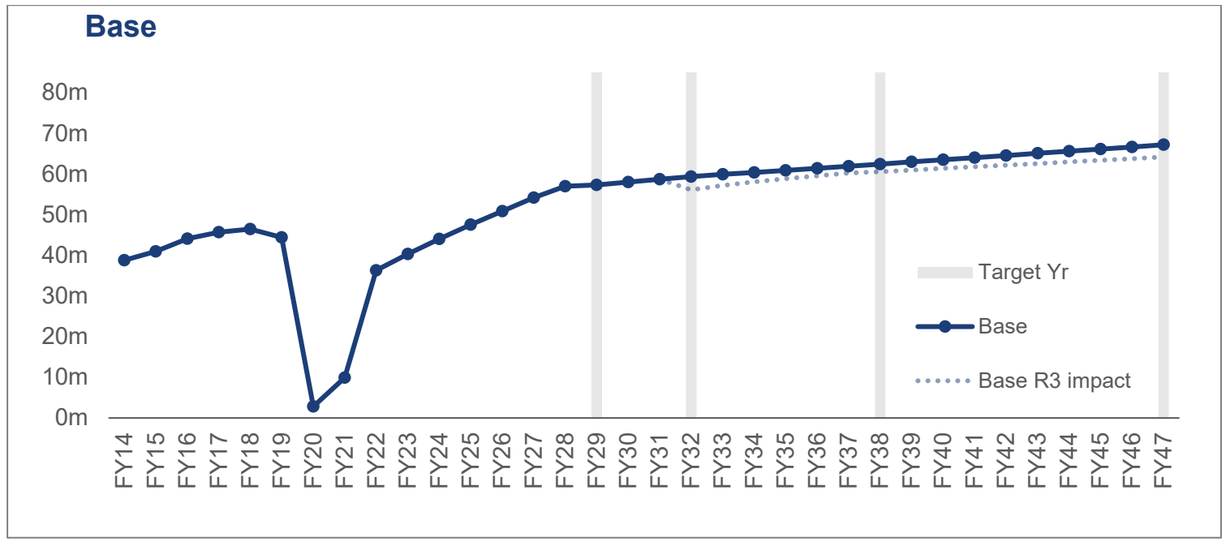
A4.2.3 In both cases, short haul traffic is less impacted reflecting Gatwick's market leading position in the short haul European market and attractiveness to LCCs which account for the majority of demand in this sector. Over time, Gatwick is assumed to back fill some of the lost long-haul traffic with short haul capacity through a combination of ongoing market growth and share gains from other airports.

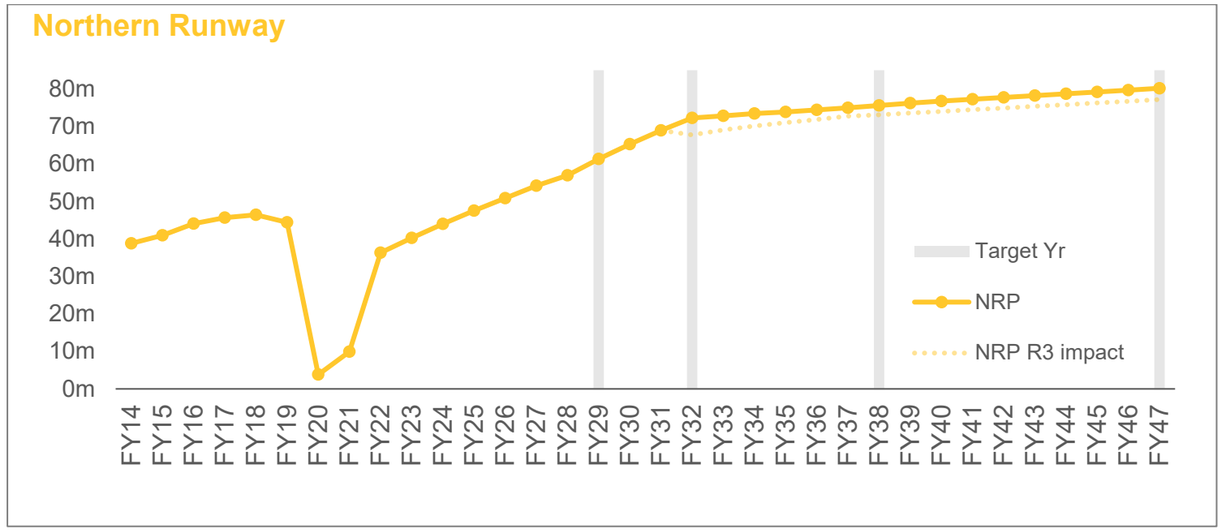
A4.2.4 In the baseline forecasts an initial impact in FY32 of over 2m long haul and 1m short haul annual passengers is assumed resulting in a decrease of 6% versus the core scenario Base case (59m vs 56m). By FY47 total volumes are 3m lower in the R3 scenario reflecting a combination of 3.5m less long haul passengers offset slightly by 0.5m more short haul passengers.

A4.2.5 In the NRP forecasts an initial impact in FY32 of over 3m long haul and 1.6m short haul annual passengers is assumed resulting in a decrease of 6% versus the core scenario Base case (68m vs 72m). By FY47 total volumes are 3m lower in the R3 scenario reflecting a combination of over 3m less long haul passengers offset slightly by 0.1m more short haul passengers. The effects of R3 are relatively limited, especially in the longer term but, even in the medium term, the throughput forecasts for Gatwick substantially exceed the baseline capacity.

A4.2.6 The effect of R3 on forecast passenger numbers for base and Northern Runway Cases is shown on Figure A4.2.1.

Figure A4.2.1 Main and R3 Passenger Forecasts – Base and NRP Cases





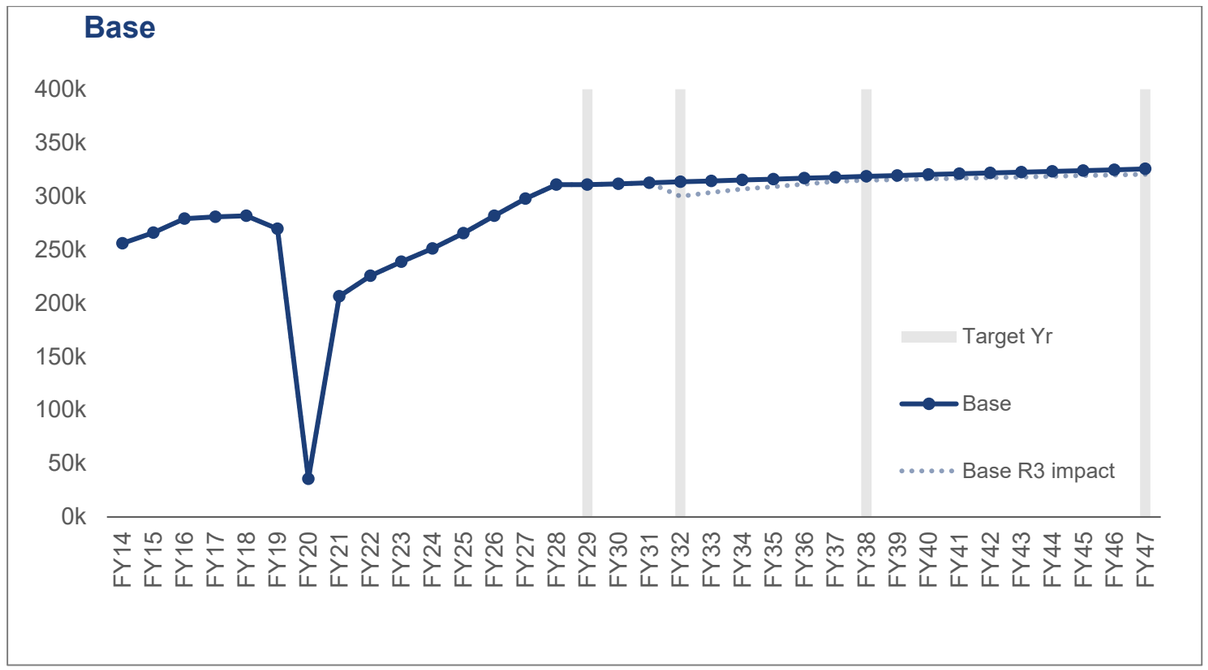
A4.3 Aircraft Movements

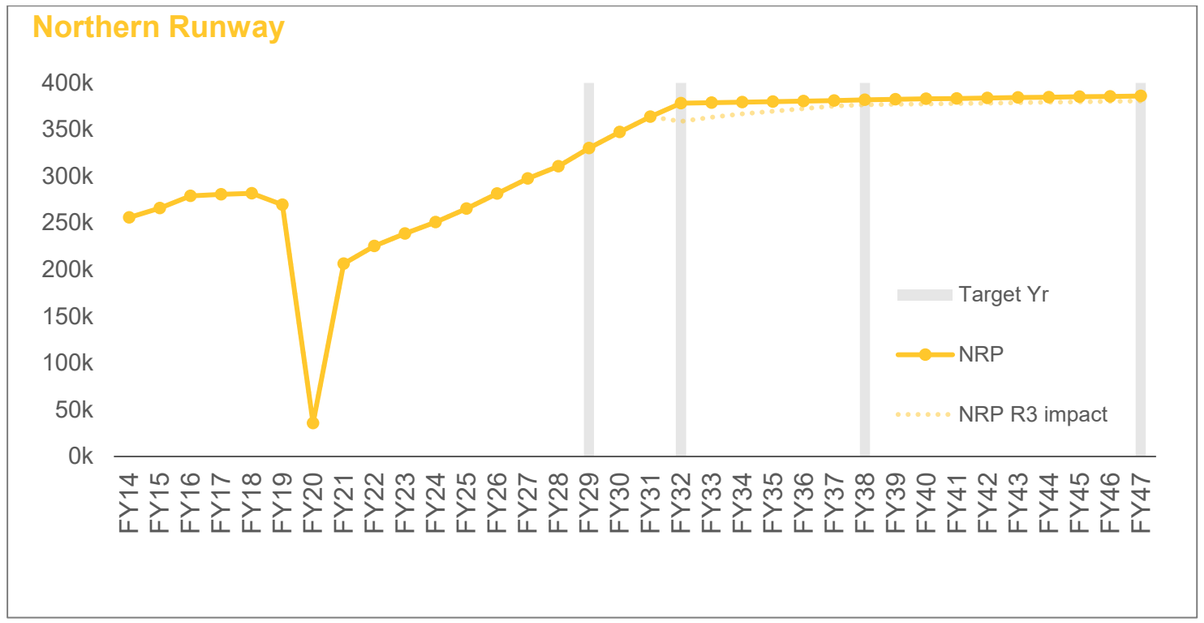
A4.3.1 In both cases, the loss in ATMs is proportionally less since the passengers per movement are higher in the long-haul market compared to short haul.

A4.3.2 In the baseline case, at a total level annual ATMs are assumed to drop 4% before recovering to 1.5 % of the core scenario Baseline forecasts by FY38. This gap remains stable until FY47.

A4.3.3 In the NRP scenario, ATMs are assumed to drop 5% before recovering to within 1.4% of the core scenario NRP forecast in FY38. Again, beyond this year the gap is assumed to remain relatively stable.

Figure A4.3.1 Main and R3 Aircraft Movements Forecasts – Base and NRP Cases





A4.4 On-Airport Employment

A4.4.1 The numbers are identical to the core scenarios until 2032 when Heathrow R3 is assumed to open, resulting in slightly lower levels of on-airport employment beyond this year.

A4.4.2 In line with the other sensitivities, the same growth elasticities for the main job functions were also used for the Heathrow R3 forecasts.

A4.4.3 By 2032 the employment outputs are approximately 3% lower for the Baseline Case core forecasts and the Northern Runway core forecasts. By 2047 the difference between the core forecasts and the slower growth forecasts is approximately 2% in both cases.

Table A4.4.1 Employment Forecasts for base and NRP cases with Heathrow R3

	2016 Employment Survey	2029		2032		2038		2047	
		Base Case – with R3	Northern Runway Case – with R3	Base Case	Northern Runway Case – with R3	Base Case – with R3	Northern Runway Case – with R3	Base Case – with R3	Northern Runway Case – with R3
Total	23,807	27,609	28,596	27,343	30,132	28,347	31,423	29,058	32,155

Annex 5

Luton Sensitivity Case

A5.1 Introduction

A5.1.1 In addition to the Heathrow R3 sensitivity, consideration has also been given to the effects that development currently being planned at Luton Airport would have on Gatwick's traffic forecasts.

A5.1.2 Luton Rising has recently submitted its DCO application for development of Luton Airport. It is seeking consent inter alia. to increases its current passenger cap of 18mppa to 32mppa. Whilst Luton's DCO application assumes modest increases to 19 mppa and then 21.5 mppa over the period 2027 - 2032, for the purposes of this modelling the impact from Luton has been considered from 2037 when the main terminal infrastructure is assumed to open and the throughput is forecast to reach 32 mppa. Estimates of any impact on Gatwick prior to 2037 are considered relatively minor given the limited overlap in catchments between the two airports and the lack of capacity in the wider London market until the early-mid 2030s.

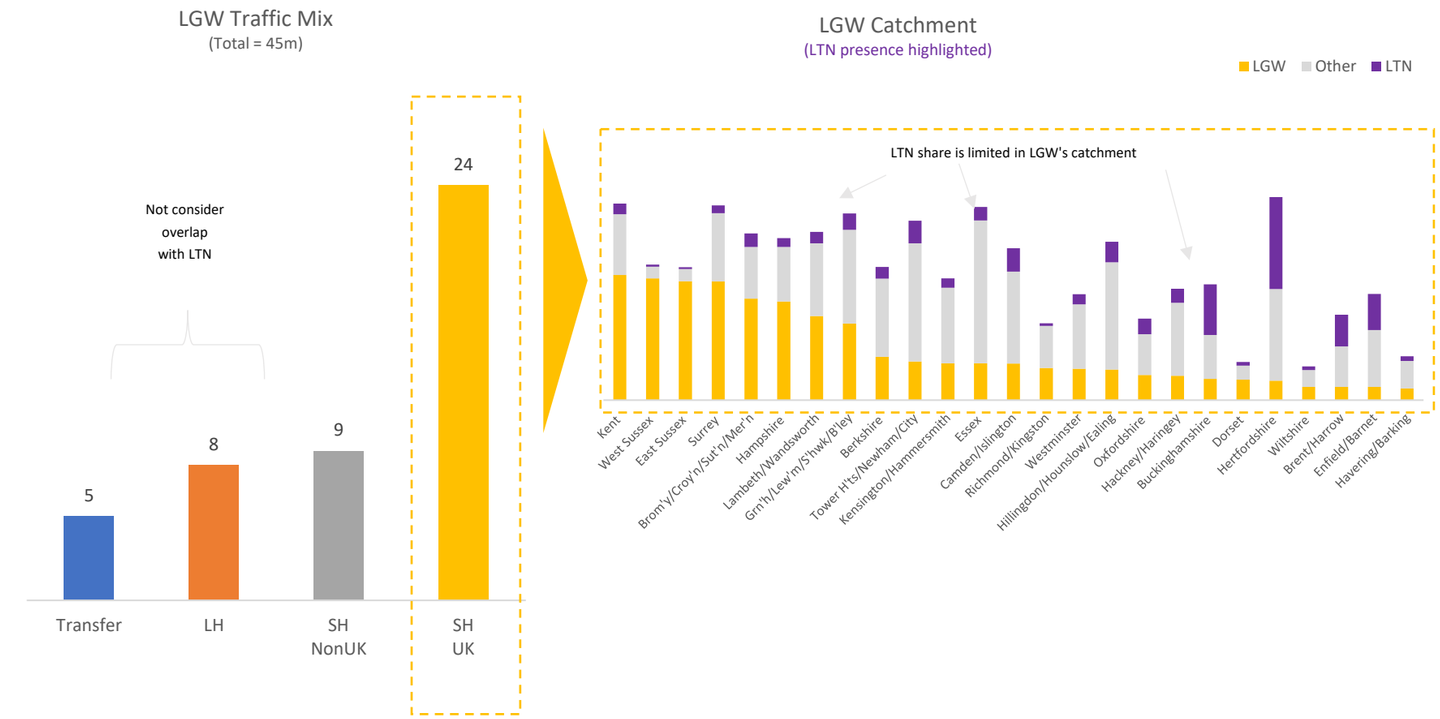
A5.1.3 In order to consider the potential impact on Gatwick's traffic in the late 2030s we have considered the extent to which Gatwick's and Luton's core catchments overlap as well as the overall demand and supply balance expected across the London airport system in the late 2030s.

A5.2 Catchment Overlap

A5.2.1 We considered Gatwick's traffic in the following categories sourced from CAA's 2019 survey, namely; transfers, long haul, short haul foreign resident and short haul UK resident. The latter category is by far Gatwick's largest accounting for 24m passengers in 2019 equivalent to nearly 75% of Gatwick's short haul traffic or 53% of total volumes.

A5.2.2 In terms of overlap with Luton, the segments transfer and long-haul are considered out of scope since Luton does not feature materially in these categories. The following figure highlights Gatwick's core catchment areas and the extent to which they overlap with Luton.

Figure A5.2.1 Gatwick Traffic & Catchment Overlap with Luton (outbound SH), 2019



A5.2.3 For outbound short haul travel, Gatwick's core catchment (areas where Gatwick has the leading market share) generated 20.7m passengers in 2019 of which Gatwick attracted a market share of 71%, equivalent to 15m passengers (>60% of demand in this segment). From the same catchment Luton only attracted 1.3m passengers which is equivalent to just 6% of demand.

A5.2.4 This analysis was repeated for inbound demand where a slightly higher share of overlap was found, in the core catchments for inbound demand Gatwick achieved a 63% share compared to Luton's 9%.

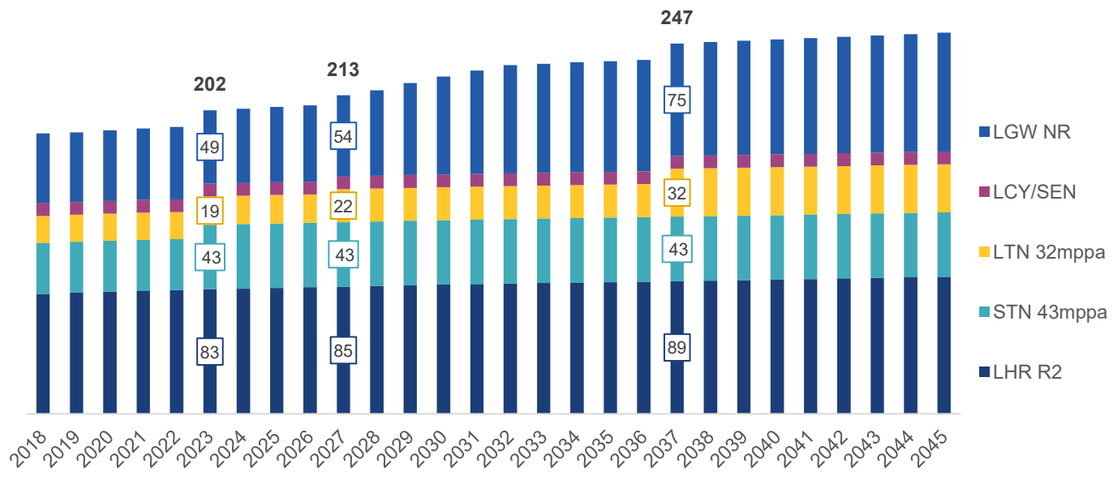
A5.2.5 In summary whilst there is an overlap between Luton and Gatwick's catchments they are relatively limited, Luton's catchment was found to overlap much more widely with Stansted and Heathrow airports.

A5.3 London Demand / Supply

A5.3.1 Under Gatwick's core Northern Runway scenario where Gatwick is the only airport to deliver a 'step-up' in capacity, unconstrained demand would exceed supply over the long term across the London airport system.

A5.3.2 Luton's DCO is predicted to add only modest capacity before 2037 increasing from a planning cap of 18m today to 21.5m by 2027. In 2037 a more material increase of 10.5m is assumed with the introduction of new terminal and related airfield infrastructure. Reflecting the increased terminal capacity offered by Gatwick's Northern Runway, Stansted's approval for 43m passengers the Luton DCO and ongoing growth within Heathrow's planning cap will enable the London market to serve nearly 250m passengers in the late 2030s.

Figure A5.3.1 London Terminal Capacity (Passengers, m)



A5.3.3 In the same period demand is forecast to exceed 250m passengers (by mid 2030s) which will be in excess of the capacity offered resulting in spill from the London market. Reflecting the lack of available system wide capacity Luton is expected to benefit from the constrained London market whilst other airports are expected to remain relatively unimpacted.

A5.3.4 Also, looking at historical trends for when Gatwick was constrained and Luton had capacity to grow, very limited impact (if any) was experienced by Gatwick. In the period 2010-19 Luton grew with limited capacity constraints (compared to Gatwick) as traffic roughly doubled in this period. Most of this growth came from outside Gatwick's catchment as Luton's share of Gatwick's core catchment only increased from 4% to 6% and no measurable impact was experienced by Gatwick's overall traffic volumes.

A5.4 Gatwick Passenger and ATM numbers

A5.4.1 Given the limited overlap in catchment between Gatwick and Luton as well as London passenger demand continuing to exceed supply by the time Luton's DCO is delivered, any potential impacts from Luton on Gatwick are considered to be marginal therefore overall passenger and ATM throughput was assumed to be in line with the core forecasts.

Annex 6

Report on markets and 'pipeline' assumed to support Gatwick's Baseline and Northern Runway Project (NRP)

Response to York Aviation Questions on markets and 'pipeline' assumed to support Gatwick's Baseline and Northern Runway Project (NRP) and Catchment Area

23rd February 2023

Table of Contents

1 Purpose of Document

This document has been prepared by GAL with support from ICF to respond to questions raised by York Aviation relating to GAL's demand forecasts that have been prepared in support of the Northern Runway Project (NRP). These topics include greater detail on the markets assumed to support Gatwick's baseline and Northern Runway Project (NRP) growth, typical thresholds of demand, further detail on peak spreading as well as Gatwick's catchment.

2 Background & Approach

In preparing the forecasts, regard has been had to the importance of having a realistic view of the level and characteristics of air traffic growth that would occur at Gatwick, whilst also ensuring that the environmental impacts of Gatwick's growth, some of which, such as noise, traffic and carbon, rely heavily on the forecasts, are not understated. For this reason, the forecasts are considered to represent a robust and realistic view of the level of air traffic growth but are likely to be towards the upper end of the levels of growth that could occur at Gatwick in the Baseline and Northern Runway cases.

The original demand forecasts were finalized by Gatwick's Air Service Development (ASD) team in early 2019, just over 1 year before Covid impacted the industry and global markets. Since then several modifications have been applied, for example:

- During Covid the opening of the NRP was pushed back to FY29
- A recovery profile was assumed in mid-late 2020 for Gatwick and the wider market's traffic

In order to understand the long-term performance of a constrained airport such as Gatwick, a primarily 'bottom-up' approach to preparing the air traffic forecasts has been adopted to better understand the potential throughput of the airport. This approach has been favoured over a 'top-down' econometric approach as the latter approach is not able to capture the operating characteristics of the airport as well as a bottom-up approach. This is consistent with Gatwick's internal approach to forecasting future throughput for a range of internal requirements.

Bottom-up forecasts were based on a Pipeline of demand which the GAL Commercial team developed on the basis of market intelligence and discussions with airlines about their future growth plans. These forecasts are discussed in section 5 & 6 of this document.

The release of the NRP slot capacity will be the first 'new' runway capacity[1] that has been released in the London market for decades providing opportunity for all markets and airline business models to grow. A key determinant of future growth will also be the slot allocation considerations which need to adhere to UK slot guidelines/rules (administered by ACL, Airport Coordination Limited). These rules will likely play a key determinant in how future demand is allocated based on criteria such as the status of the carrier (e.g. new entrant vs incumbent), the market the airline wishes to serve (e.g. Europe vs rest of world) and a range of secondary criteria relying on more qualitative assessments. GAL have attempted to capture considerations such as these when making future traffic assumptions.

[1] This refers to a new runway rather than operational improvement on a current runway (e.g. Gatwick's move to 55 ATM per hour)

However, considering the wider London unconstrained potential does still help to provide context around the mix of future demand and the assumptions made with respect to key airline and markets in GAL's pipeline. For the purposes of this report, an updated market outlook summary was prepared to compare with the growth assumptions from GAL.

3 Summary of Growth with the NRP

3.1.1 NRP Growth Summary

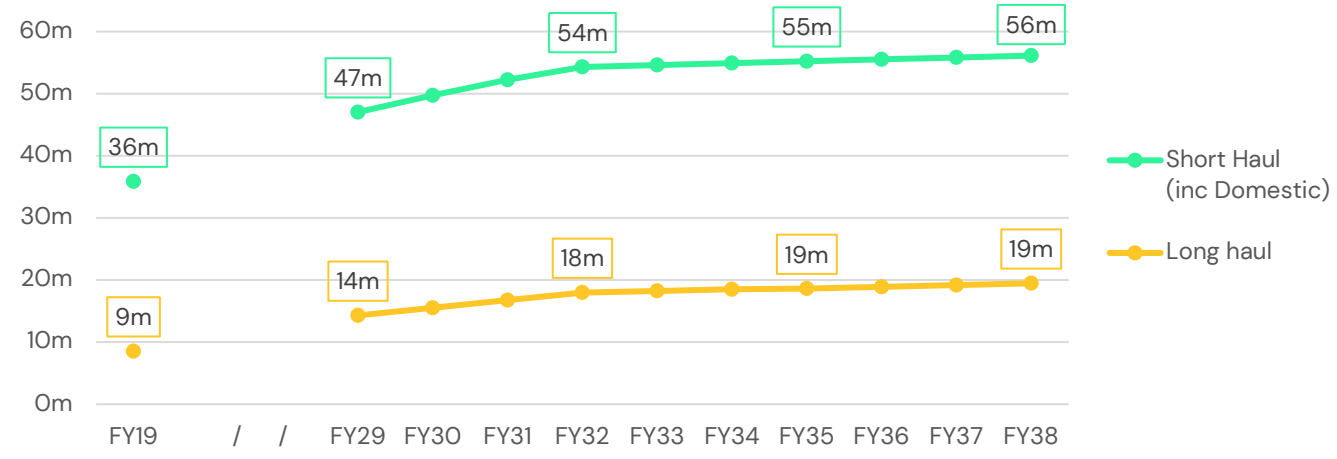
The forecasts for the NRP assume growth across domestic, short-haul, and long-haul market segments. By FY32 Gatwick is assumed to be operating with over 70 million annual passengers, an increase of ~25 million compared to Gatwick's (c. 45 mppa) throughput in 2019.

To analyze and present the requested detail around new routes by geographic region we have focused this analysis on forecast Financial Year 32 (FY32). This is the first assessment year which assumed the NR would be operating close to its capacity during the peak months. Whilst further growth is forecast to materialize beyond FY32 it is assumed to be much more modest.
(Note: GAL's FY naming convention uses FY19 to represent FY19/20 ending March)

In FY32 Gatwick's long-haul volumes are forecast to have roughly doubled from 9 million passengers in FY19 to 18 million in FY32. This growth is forecast to be delivered through a combination of growth before the Northern Runway enters service as well as the incremental capacity offered by the NRP being taken up by long haul markets.

Short haul traffic is forecast to increase from 36 million passengers in FY19 to 54m in FY32.

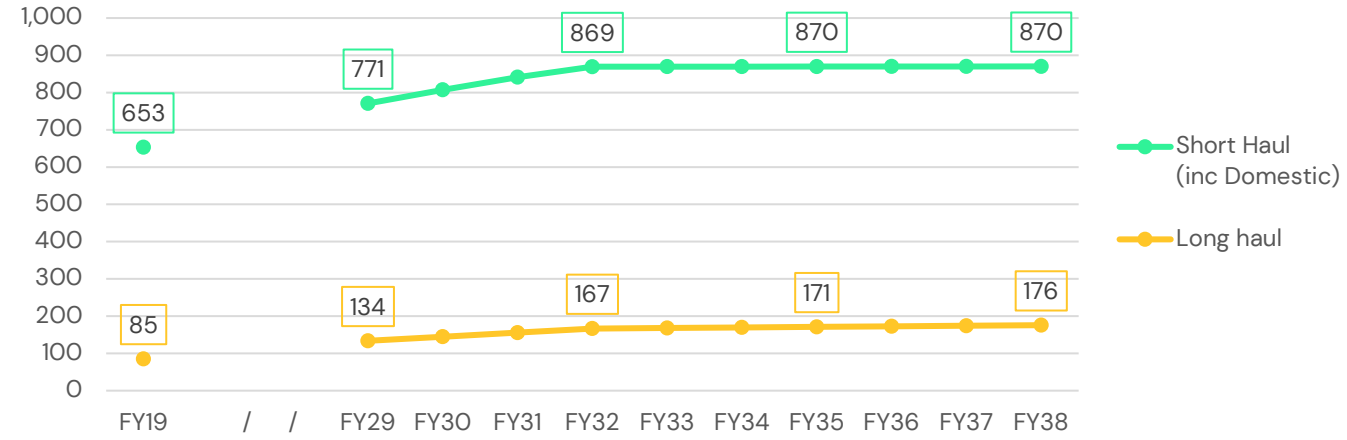
Gatwick NRP Passenger Forecast



Source: GAL/ICF Forecasts

In relation to air transport movements (ATMs), a more moderated growth in movements is expected reflecting the ongoing increases in average aircraft loading per movement. By FY32 passenger volumes are forecast to increase ~60% vs FY19 whilst ATMs are forecast to increase ~40%. Average long-haul ATMs are forecast to increase by approx. 80 per day to 167 (compared to 85 in 2019) whilst short-haul volumes are forecast to increase by ~200 to 869 per day (compared to 653 in 2019). This growth reflects a combination of capacity being released by the Northern Runway as well as greater use of off-peak months.

Gatwick NR Avg. Daily ATM Forecast



Source: GAL/ICF Forecasts

3.1.2 Market Summary

Whilst much of the work discussed to date focuses on the annual throughput of demand broken down by domestic, short-haul and long-haul volumes, GAL have also produced more detailed bottom-up region/country level assumptions around the future traffic mix. These assumptions also form the basis for the schedules, and in both the baseline and NRP cases they capture demand patterns across the day arising from the different market segments.

Whilst it is recognised there could be many iterations or variations around the future traffic mix (e.g. more growth in Asia, less in N. America) the following breakdown of traffic aligns with Gatwick's future busy day schedules and seasonal profiles already shared with York Aviation.

The increases shown in the following table(s) represent the **peak period growth in daily** ATMs and are slightly lower than the annual averages as the peak months are not forecast to grow as much as the quieter off peak periods[2], also FY19 was impacted by Covid in the last month of the financial year. It should be noted that these forecasts were prepared pre-Covid and the numbers are rounded to provide guidance on the geographic regions assumed to dominate future growth.

Long-haul

GAL's long-haul forecasts include 7 market segments primarily focused on geographic splits whilst one category (Beach inc. Florida) is intended to focus on the outbound leisure market from the UK.

Overall, with NRP approx. 75 new daily long-haul ATMs are assumed by FY32 compared to 2019. The breakdown by market is provided in the following table.

[2] due to binding capacity constraints

Long Haul: Avg. Daily ATMs in 2019 (Aug) & Growth Forecast with NRP (Peak)

	2019	Growth 19-32	Comment
Asia	3	~20	All Asian markets excluding China
Beach inc. Florida	40	<5	Outbound UK focused (mainly Caribbean/Florida)
China	1	~10	China considered separately due to growth potential
N. America	34	~25	Dominated by USA but significant Canada presence
C. & S. America	5	<10	Fast developing market with wide range of markets
Africa	0	<5	Potential for new market segment at Gatwick
Middle East	13	5-10	High growth market dominated by Gulf carriers
Long Haul	**97**	**+75**	**n/a**

Note: Figures approximate for guide of growth

The largest contributors to LGW's future growth include Asia (~20ATM/day), N. America (~25ATM/day) as well as other markets such as China/C&S America/Middle East each providing up to 10 incremental daily ATMs. The growth on these markets is discussed in more detail in the long-haul market summary section.

Short-haul

Gatwick's short-haul markets are also forecast to grow into the new NRP capacity. In the NRP forecast by FY32 GAL forecast that approx. 115 new daily flights operate on short haul markets during the peak. The market breakdown for short-haul is less granular, some interpolation has been used as incremental short-haul demand was in some cases classified in categories such as away based LCC, away based Leisure, etc.

At a high level, the growth being forecast is comparable to the mix achieved today but with a slight weighting away from domestic and EU markets which currently account for 85% of short-haul ATM activity

Short Haul: Avg. Daily ATMs in 2019 (Aug) & Growth Forecast (Peak)

	2019	FY32	Comment
Domestic	70	~5	Modest growth on mature UK market
Europe - EU	620	~90	By far the biggest market for London passengers
Europe – Non EU	100	~20	Markets including E. Europe and markets outside EU
Africa (Northern)	20	~5	Segment served by SH carriers (e.g. Tunisia, Egypt)
Short Haul	**810**	**+115**	

Note: Figures approximate for guide of growth

Post Covid, growth at Gatwick from airlines such as Wizz, Vueling, Euroflyer and Lufthansa has added some greater diversity to the range of markets served. These carriers will operate their slots on a year-round basis supporting ongoing de-peaking at Gatwick in the short-medium term.

3.1.3 Gatwick Pipeline

The above market mix assumed for growth was derived from GAL's pipeline of future demand reflecting an even wider range of markets/airlines with target airlines/routes associated with different probabilities of likelihood.

Gatwick's commercial team has good visibility and intel available to them around airline plans. Many recent (new) airline launches have been years in the making involving extensive negotiations and co-ordination. For example, recent (or upcoming) Gatwick new entrants include JetBlue, Delta Airlines, Bamboo, Lufthansa, and Air India amongst others. Other announcements are also expected in the upcoming months.

Gatwick's pipeline reflects a combination of current airline plans as well as new entrant airline plans. Gatwick has routine and frequent discussions with their current user base around their own expansion plans, these discussions often relate to new based aircraft as well as up-gauging their fleet, opening new routes, slot discussions and other matters. Gatwick has confidence that significant growth will be delivered by Gatwick's incumbent carriers.

Many of the carriers that Gatwick are currently engaged with continue to express a strong preference to grow at Gatwick. If capacity was available at Gatwick today then significant capacity would be taken up, many years before the NR becomes operational. Carriers such as easyJet & Wizz Air continue to increase their slot holding via the secondary market paying significant sums for slot capacity.

Carriers already operating at Gatwick, such as Norse and Wizz Air have ambitions to grow far more than their current slot holding but are currently limited due to a lack of available capacity.

Gatwick has had a wait list for slots for the last decade and even had a wait list of carriers seeking entry during Covid but were still not able to enter the market. Recent slot filings from ACL show how pre Covid applications for Summer '20 meant that 21airlines got less than 40% of their requested demand. This mean that they could not operate an intended service, for example they may have got an unworkable schedule or slots at commercially unviable times of the day. This included a selection of American/Chinese/European carriers reflecting demand from regional airlines, LCCs and full-service carriers.

ACL Report: Carriers with >40% of slot requests unmet

	S'18	S'19	S'20	S'21	S'22
# Airlines	18	16	24	21	19
# Slots	22k	12k	17k	25k	53k

Source: ACL

With the additional peak capacity offered by the NRP, many of these airlines would be expected to apply to make use of the incremental capacity as well as other new entrants and incumbent carriers.

4 Summary of Growth in the Baseline (without the NRP)

4.1.1 Baseline Growth Summary

Whilst this document focuses on the volumes achieved under the NRP we have also provided context for the growth assumed under the base case forecasts. Naturally the growth without the NRP is markedly less and a comparison is provided below for FY32:

- By FY32 the Baseline scenario adds ~33k ATMs vs a 2019 base. For comparison the NRP Scenario forecasts a further +98k annual movements. i.e. the base adds one third of ATM growth compared to the NRP.
- Long haul volumes are assumed to continue growing their overall share of LGW movements, by FY32 LH growth is assumed to account for 47% of total growth (+15k). This is approximately half of the LH growth assumed under the NRP forecasts.

- Short haul volumes are assumed to grow by 18k ATMs in FY32, this is just a quarter of the growth assumed under the NRP and is equivalent to ~48 movements per day.

In line with the NRP scenario, the growth assumed during the peak periods is less than the year-round averages reflecting a flatter year-round schedule. A comparison between the two scenarios is provided below. Of note is the relatively limited peak period growth across the short haul markets since much of the annual growth is forecast to come from better year-round utilisation in this market.

Long & Short Haul summary: ATM Growth Forecast (Peak), vs 2019

	NR Growth 19-32	Baseline Growth 19-32
Asia	~20	~10
Beach inc. Florida	<5	<5
China	~10	~6
N. America	~25	~12
C. & S. America	<10	<5
Africa	~5	<5
Middle East	~10	~5
Long Haul	**+75**	**+37**

	NR Growth 19-32	Baseline Growth 19-32
Domestic	~5	0
Europe - EU	~90	<5
Europe – Non EU	~20	<5
Africa (Northern)	~5	<5
Short Haul	**115**	**<10**

5 London Long Haul Market

The following section(s) explore in more detail the growth assumed within each market segment in the context of the London aviation market. The intention is to test the bottom-up forecasts against some high-level top-down forecasts in the context of the capacity assumptions at other London airports[3]. For context, the total long-haul growth assumed by 2032 is equivalent to a CAGR of <2.0% (2019-32). The growth assumed across the UK under the latest Jet Zero forecasts assumes a CAGR of 1.9% over the same period providing a comparison of the high-level growth expectations for the total market (including domestic, short-haul and long-haul).

5.1.1 London Long Haul Market Growth (2010-19)

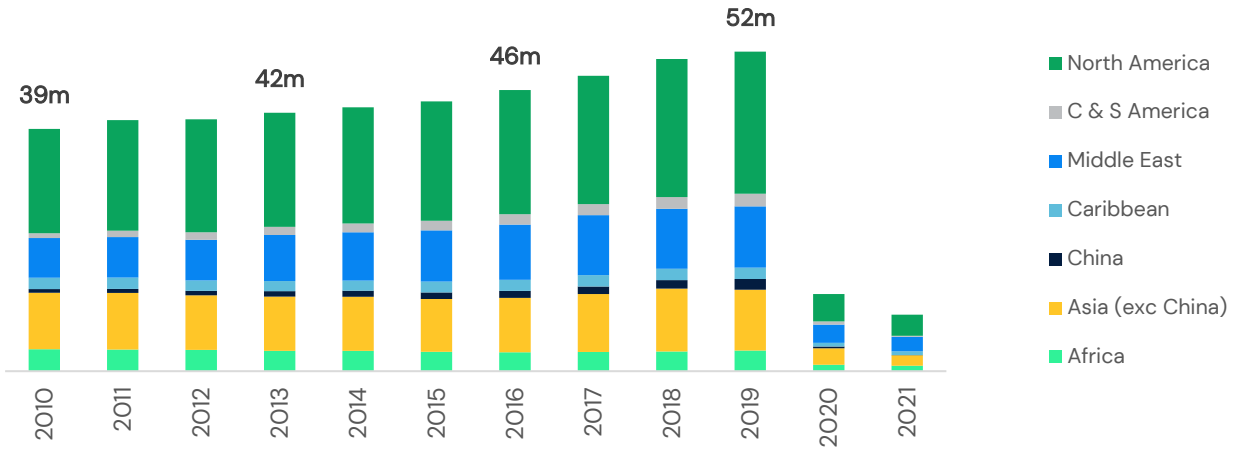
The London long haul market reached 52 million passengers in 2019 accounting for 29% of total London airport passengers (181 million in 2019). Demand has grown 32% since 2010 when long haul accounted for 39m passengers.

North America is by far the largest segment accounting for nearly 23m passengers in 2019, equivalent to 45% of total. The second largest market segment was the Middle East which accounted for 10m passengers, this has been one of the key drivers of growth adding over 3.5m passengers since 2010. Asia (when combined with China) accounted for 22% of total demand, equivalent to 11.6m passengers. Whilst recent growth in this

[3] LHR assumed to operate with x2 runway, LGW NRP assumed fully operational by 2032, STN operating within 43mppa planning cap, LTN not assumed to gain a material share of long haul market.

market has been relatively limited it consists of a wide range of countries including those with fast growing economies (e.g. India, Vietnam, etc.) and more mature markets (e.g. Japan, South Korea, etc.).

London LH Market (Onboard), 2010-2021



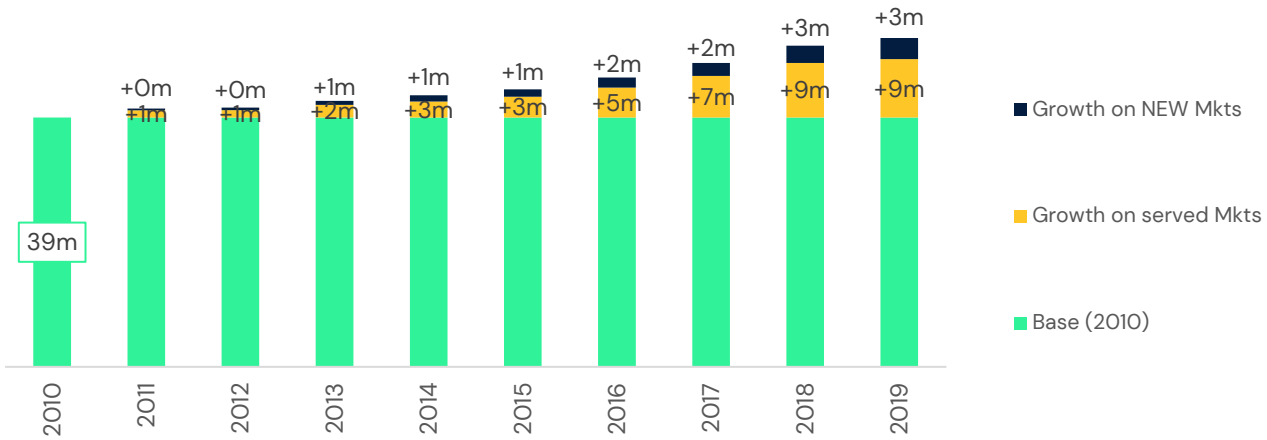
Note: Long haul has been defined by Gatwick and is focused on non-European markets whilst also excluding North African markets which have significant levels of LCC service (e.g. Morocco, Egypt,) Source: CAA Statistics

Market Growth Trends

In the 2010-19 period the London long-haul market grew by approx. 13 million passengers. Whilst the addition of new routes attracts significant interest the vast majority of growth in demand is on already well-established routes. This is often through the addition of new frequencies, or larger aircraft by incumbents, or new entrants on current routes and therefore providing more choice. Approx 75% of the growth leading up to 2019 arose on routes already established in 2010.

These trends are expected to continue and may become even more pronounced as the number of new routes being added each year may decrease in a capacity constrained scenario, as airlines tend to focus on densifying established markets. Gatwick is equally expecting significant growth on markets already served in the London market. That could be new capacity to markets such as New York, Orlando or Hong Kong which were served in 2019 or further growth on new markets (to LGW) like those added in the years leading up to Covid (e.g. Shanghai, Doha, etc)

Cumulative Growth Trends, London Long-haul (m)

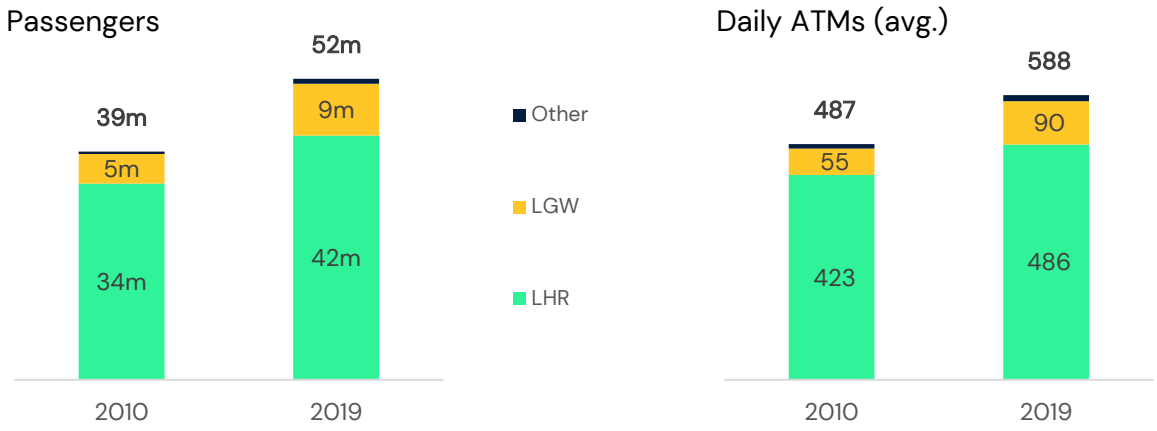


London Long Haul Market Allocation

In 2019 Heathrow dominated long-haul passenger and ATM activity handling 42 million long haul passengers and 177k movements in this segment.

Runway capacity constraints will only present modest growth opportunity at the other London airports. Heathrow has added an average of <7 new daily LH ATMs each year since 2010, this has typically arisen through optimization of current capacity as well as airlines switching short haul slots to long haul (e.g. slot swaps or transactions).

London Long Haul Passengers and ATM demand



Looking ahead, over the long-term binding constraints will remain at Heathrow, supporting growth of long-haul services across the other London airports. In the 2010-19 period Gatwick long haul passengers and ATMs grew 75% and 64% respectively, well in excess of the wider London average.

Market Sizes and Route Size Thresholds

Recent analysis of the long-haul markets (O&D) provides input on the levels of non-stop service, market sizes and typical thresholds for non-stop services.

The following table highlights how larger markets attract non-stop services. For example, all markets (exc. Australia/NZ) with a market size over 100k passenger per year (one/way) are served non-stop*. Relatively few markets between 25-100k annual (o/w) passengers are un-served. Some of the largest un-served markets from London include Kathmandu (KTM), Cochin (COK), Entebbe (EBB), Calcutta (CCU), Harare (HRE) and Ko Samui with market sizes around 40-60k o/w passengers per year.

Compared to other markets London is very well served with such levels of non-stop connectivity and it also helps to highlight how new Gatwick services are likely to provide greater levels of frequency on already served markets.

London LH Market O&D Analysis (one/way sizes, 2019)

	Market Size, million (o/w avg.)				# Market s			
Mkt Size	Total	Non-Stop	Indirect	% Non-St.	Total	Non-Stop	Un-served	%Served
0-5k	0.7	0.0	0.7	2%	n/a	n/a	n/a	n/a
5-25k	1.5	0.3	1.2	21%	134	37	97	28%
25-50k	1.5	0.9	0.6	59%	40	34	6	85%
50-100k	2.5	1.4	1.1	56%	36	34	2	94%
100-250k	6.8	4.6	2.1	68%	44	41	3***	93%
250-500k	5.8	4.7	1.1	80%	16	15	1**	94%
500+k	4.0	3.8	0.3	93%	5	5	0	100%
Total	**22.9**	**15.7**	**7.1**	**69%**	**275**	**166**	**109**	**60%**

*All these large markets have non-stop service (where aircraft capabilities permit)

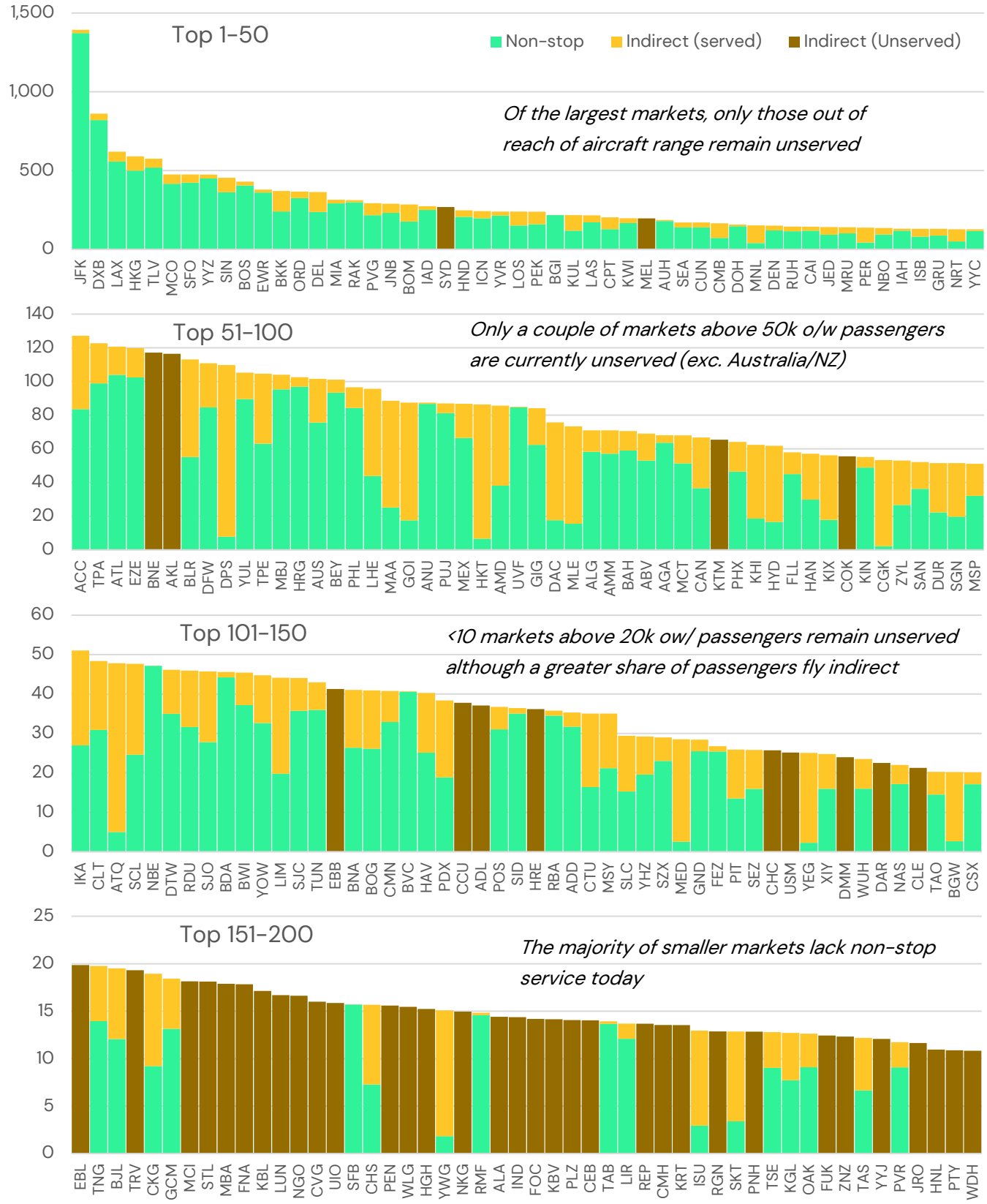
** Includes Sydney which is not able to be served non-stop. *** Includes Melbourne, Auckland & Brisbane

Source: IATA AirportIS

Larger markets naturally attract greater levels of connectivity meaning lower shares of passengers will typically have to connect. For example, just 7% of passengers flying on the largest O&Ds (>500k o/w per year) currently connect via a hub outside London to reach their destination. For smaller market sizes, (say 100-250k) some 32% of demand is currently connecting whilst market sizes between 25-50k show more than 4 in 10 passengers having to connect. Naturally, smaller markets provide less capacity, frequency (often < daily), limited choice/competition meaning higher shares of passengers will connect.

The following charts present a graphical view of the above summary table. The first chart displays the top 50 long haul ODs from LON in 2019, followed by subsequent groupings of markets. The largest markets without non-stop service are those situated too far from London, namely markets in Australia and New Zealand.

London Long - haul o/w Passenger Demand (Non - stop / Indirect), 2019 (thousands)



Source: GAL/ICF Forecasts

6 Gatwick LH Growth & Pipeline Discussion

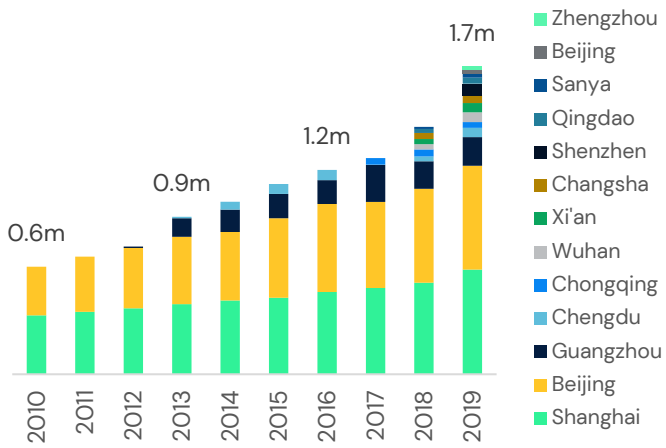
This section provides an overview of several key regions of growth assumed to underpin Gatwick's growth under the NRP.

6.1.1.1 Long Haul Example - China

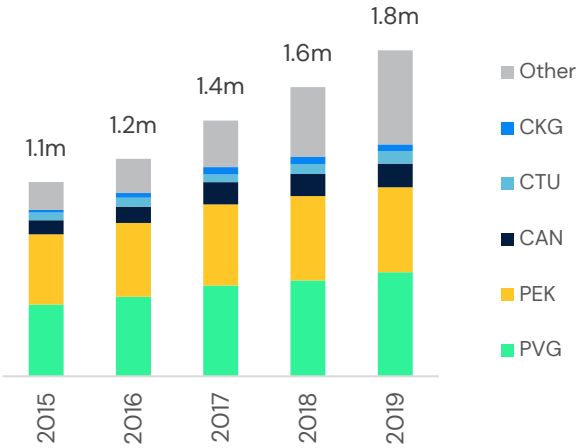
LON Background

In the context of total long haul volumes China is a relatively small market accounting for just 3% of long-haul passengers in 2019. However, it is a fast-growing market as since 2010 the demand has roughly trebled growing at a CAGR of over 12%. In 2019 17m passengers flew to/from China which was dominated by routes to Shanghai and Beijing accounting for over 1.2m passengers or 70% of total demand.

London - China Onboard Market



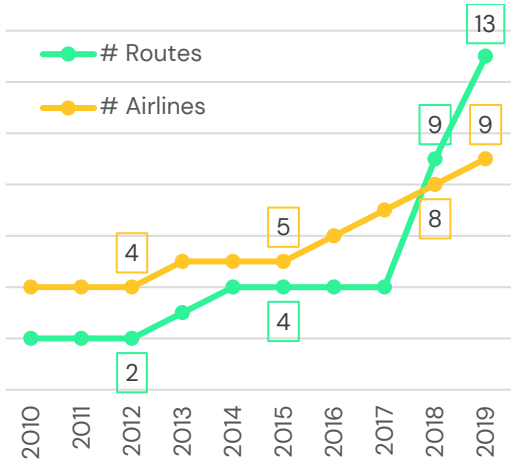
London - China OD Market



Source: CAA Statistics, IATA AirportIS Statistics (OD = True origin and destination demand)

In the 2010-19 period the number of routes between London and China increased from just 2 to 13 whilst the number of airlines serving China directly more than doubled from 4 to 9. In 2019 there was an average of 24 flights a day (12 each way) reflecting growth of 16 flights a day in the 2010-2019 period.

London - China Service Levels



Source: GAL/ICF Forecasts

London - China Market Summary

	2010-19	*2019-32*
UK GDP	2.0%	1.2%
China GDP	7.3%	4.5%
Onboard, CAGR	12.4%	3.9%
Traffic, #s	0.6->1.7m	*1.7>2.8m**
Growth	+1.1m	*+1.1m**
Flights/Day	8-24	*24-39*
Growth	16	*15*

Although current market conditions limit the connectivity between China and the UK (& other markets), once Covid related travel restrictions are removed and the Chinese market opens up, growth is expected to once again return to this market.

Outlook

**For this market overview a high-level market assessment has been used to inform Gatwick's long haul growth aspirations assumed in the NRP forecasts in the context of the wider London market.*

Looking ahead, future GDP growth is expected to mature, for example China's GDP grew at a CAGR of 7.3% leading up to 2019 whilst growth between 2019-32 is assumed to average under 5%[4]. Taking a relatively conservative view of future traffic growth of under 4% would imply a further 1.1m passengers being added by the time Gatwick is assumed to be operating close to capacity limits in 2032 with the Northern Runway.

Gatwick's NRP Forecast

GAL view the Chinese market as offering significant long term growth potential and expect new services to support the filling of the new Northern Runway capacity. In the NRP forecasts approx. 10 new flights per day (5 each way) are assumed by FY32. With limited growth opportunity at other London airports Gatwick view this as reasonable and achievable. This growth is assumed to materialize on a combination of routes including those already served at Gatwick, routes only served at Heathrow and potential new markets.

Gatwick continues to have extensive dialogue with several Chinese carriers looking to enter the London market as well as those that served Gatwick pre-Covid. This will be through a combination of airline head quarter visits and, continuing route development discussions at industry conferences later this year.

Following the initial relaxation of Covid travel restrictions to China the first Chinese carrier to return to Gatwick is set to be announced with further positive developments anticipated this year.

Gatwick's Baseline Forecast

By FY32 GAL have assumed 6 new daily Chinese ATMs which is just over half that assumed under the NRP.

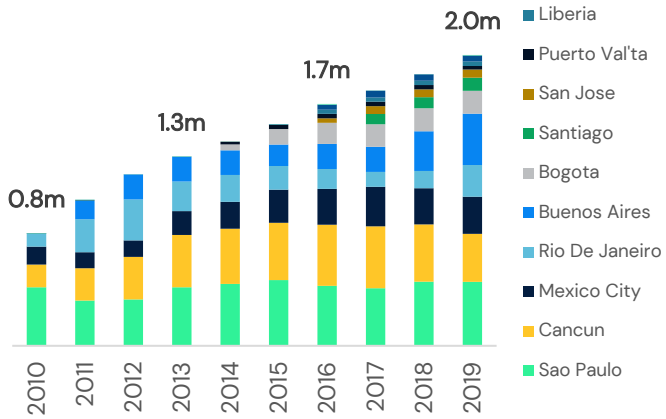
6.1.1.2 Long Haul Example – Central & South America

LON Background

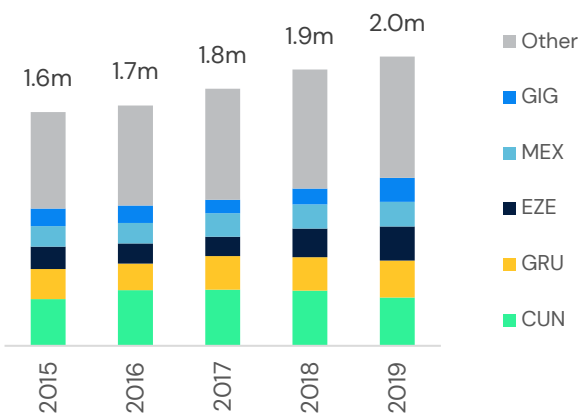
In the context of total long haul volumes C&S America is also a relatively small market accounting for just 4% of long-haul passengers in 2019. However, it is a fast-growing market as since 2010 the demand has more than doubled growing at a CAGR of over 11%. In 2019 over 2m passengers flew directly to/from C&S America which was dominated by routes to Cancun and Sao Paulo accounting for over 800k passengers or nearly 40% of total demand. New routes to Bogota, Puerto Vallarta, Santiago (Chile), San Jose and Lima have been introduced since 2015.

[4] IMF, October 2022 release

London - C&S. America Onboard Market



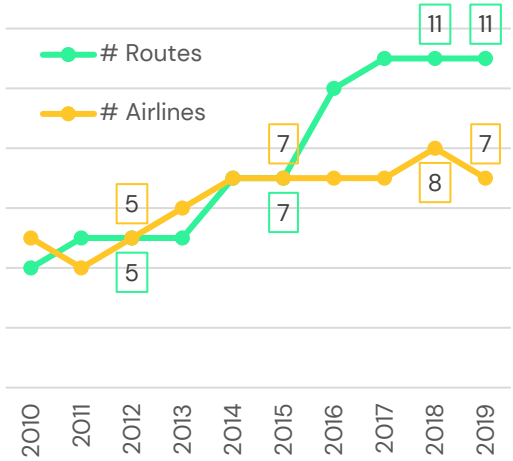
London - C&S America OD Market



Source: CAA Statistics, IATA AirportIS Statistics (OD = True origin and destination demand)

In the 2010-19 period the number of routes between London and C&S America increased from just 4 to 11 whilst the number of airlines serving C&S America directly increased more modestly from 5 to 7. In 2019 there was an average of 23 flights a day reflecting growth of 14 flights a day in 2010-2019 period.

London - C&S. America Service Levels



Source: GAL/ICF Forecasts

London - C&S. America Market Summary

	2010-19	*2019-32*
UK GDP	2.0%	1.2%
Latin Am. GDP	1.6%	2.0%
Onboard , CAGR	11.1%	3.2%
Traffic, #s	0.8->2.0m	*2.0->3.0m**
Growth	+1.3m	+0.9m
Flights/Day	8-23	*23-33*
Growth	14	*10*

Outlook

**For this market overview a high-level market assessment has been used to inform Gatwick's long haul growth aspirations assumed in the NRP forecasts in the context of the wider London market.*

Looking ahead, future UK and Latin America GDP growth is expected at levels comparable to recent years, for example Latin America's GDP grew at a CAGR of 1.6% leading up to 2019 whilst growth between 2019-32 is forecast to average around 2%[5]. Taking a relatively conservative view of future traffic growth of around 3%

[5] IMF, October 2022 release

would imply up to 1m passengers being added by the time Gatwick is assumed to be operating at capacity during peak periods with the new NR in 2032.

Gatwick's NRP Forecast

Gatwick view the Latin American market as offering modest long term growth potential and expect new services to support the filling of the NR 's capacity. The NRP forecasts assume approx. 10 new flights per day (5 each way) are added by the time the NR is operating at capacity in the peak months in 2032.

Gatwick has had recent and extensive dialogue with several Central/South American carriers – all of them have the current capability to fly to Gatwick and are either looking to enter the London market or to grow their presence in the London airport system. Current plans include continuing to meet prospective airlines at conferences such has Routes Americas, World Routes with specific headquarter visits planned with the top targets later this year.

Gatwick's Baseline Forecast

By FY 32 GAL have assumed approx. 5 new daily Latin American ATMs which is approx. half that assumed under the NRP.

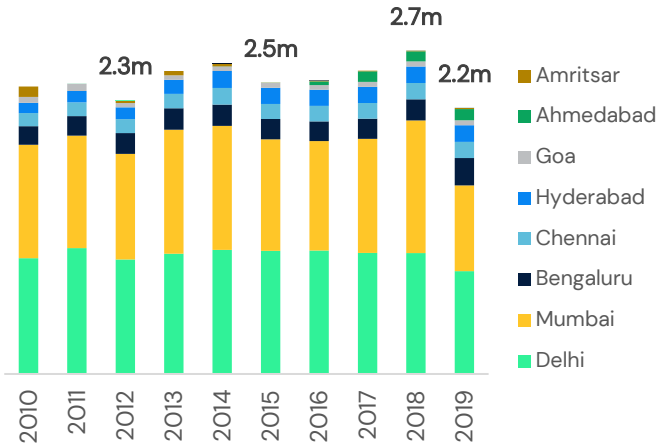
6.1.1.3 Long Haul Example – India (within Asia category)

LON Background

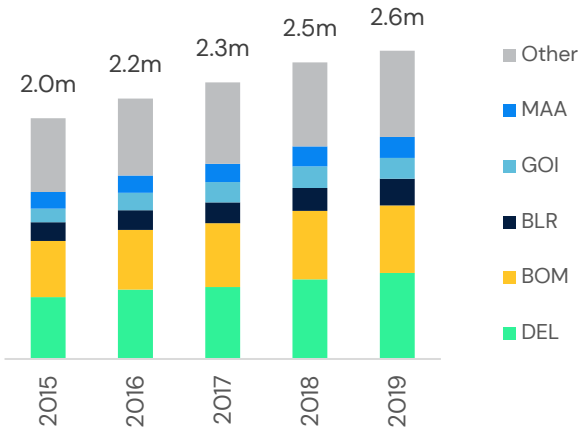
In the context of total long haul volumes India accounted for 4% of onboard demand and is the 4th largest onboard country market from London. It is a market that has seen significant growth, much to the benefit of Middle Eastern hub carriers as the O&D market has shown steady growth whilst the onboard market has been limited due to capacity constraints as well as carrier exits (e.g. Jet Airways, Kingfisher) in the last decade.

The local London-Indian O&D market has been growing >6% since 2015 and given the growth prospects for the Indian economy/market, further growth is naturally expected. Many Indian markets are considered under-served, for example relatively high shares of passengers currently connect (2019) on markets such as Mumbai (38%) Delhi (35%) and Bangalore (>50%). Such high shares of passengers transiting other hubs is often considered a good guide for under-served markets.

London - India Onboard Market



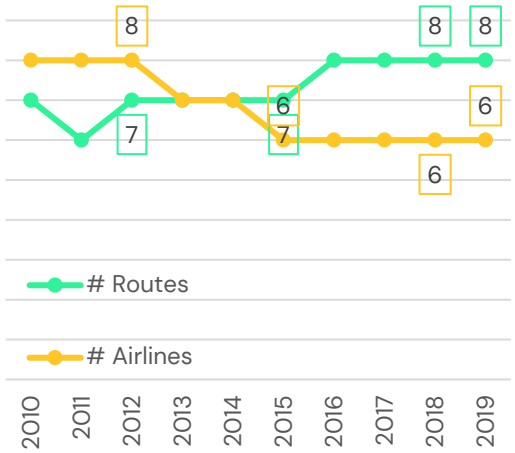
London - India OD Market



Note: 2019 was impacted by carrier exits (e.g. Jet Airways)
Source: CAA Statistics, IATA AirportIS Statistics (OD = True origin and destination demand)

In the 2010-18 period the number of routes between London and India increased from 7 to 8 whilst the number of airlines serving India decreased from 8 to 6. In 2018 there was an average of 35 flights a day (17.5 each way).

London - India Service Levels



Source: GAL/ICF Forecasts

London - India Market Summary

	2010-18	*2019-32*
UK GDP	2.0%	1.2%
India GDP	6.6%	5.4%
Onboard, CAGR	1.5%	3.3%
Traffic, #s	2.4->2.7m	*2.2->3.4m**
Growth	+0.3m	*+1.2m**
Flights/Day	31-32	*27-42*
Growth	+1	*14*

Outlook

**For this market overview a high-level market assessment has been used to inform Gatwick's long haul growth aspirations assumed in the NRP forecasts in the context of the wider London market.*

Looking ahead, future UK and Indian GDP growth is expected to mature, for example India's GDP grew at a CAGR of 6.6% leading up to 2019 whilst growth between 2019-32 is forecast to average 5.4%. Taking a relatively conservative view of future traffic growth of <4% would imply a further 1.2m passengers being added by the time Gatwick is assumed to be operating at capacity during peak periods with the new NR in 2032.

Gatwick's NR Forecast

GAL view the Indian market as offering significant long term growth potential and expect new services to support the filling of the new NR capacity. In the NRP forecasts approx. 10 new flights per day (5 each way) are assumed by FY32. In January 2023 Air India announced significant growth at LGW in the coming seasons with current capacity constraints preventing further capacity deployment. Initial plans will see them serve Ahmedabad, Amritsar, Goa, and Kochi. With significant growth ambitions domestically and internationally, Air India are expected to grow their presence further at Gatwick once capacity becomes available.

In addition to Air India, other sizeable Indian carriers are already in discussion with Gatwick around future expansion plans. These will likely feature a combination of wide bodies and narrow bodies (e.g. Airbus XLR) serving a wide range of markets. Gatwick will continue these discussions with Indian carriers at Routes Asia, conferences in the region as well as head quarter meetings later this year.

Gatwick's Baseline Forecast

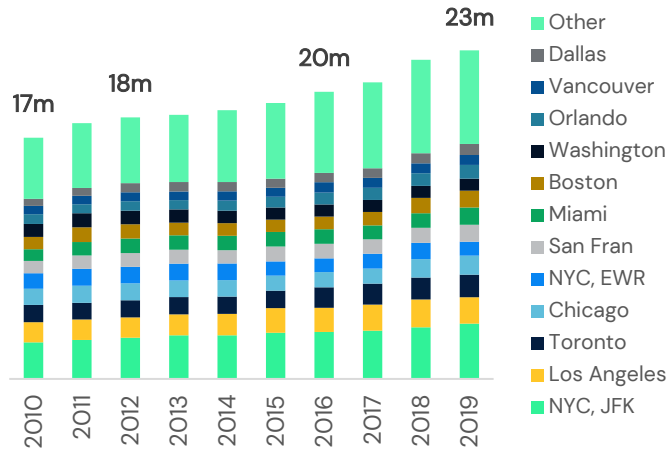
By FY 32 GAL have assumed <10 new daily Indian ATMs, given the recent Air India expansion at LGW and future fleet orders, Gatwick view there being potential to surpass these assumptions.

6.1.1.4 Long Haul Example – N. America

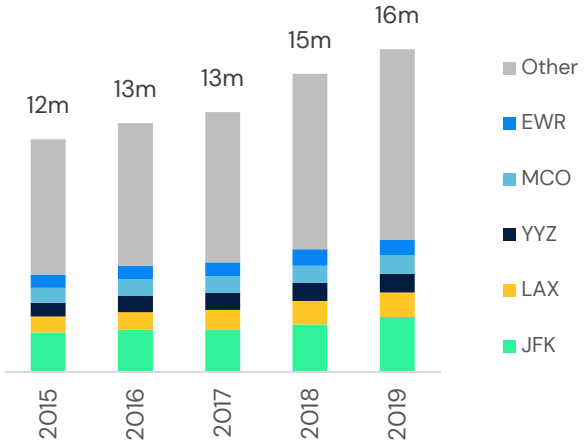
LON Background

The North American market accounted for 23m onboard passengers in 2019 - by far the largest market segment for long-haul travel. In 2019 41destinations were served non-stop ranging from New York (JFK) with nearly 4m passengers to Charleston with 20k passengers.

London - N. America Onboard Market



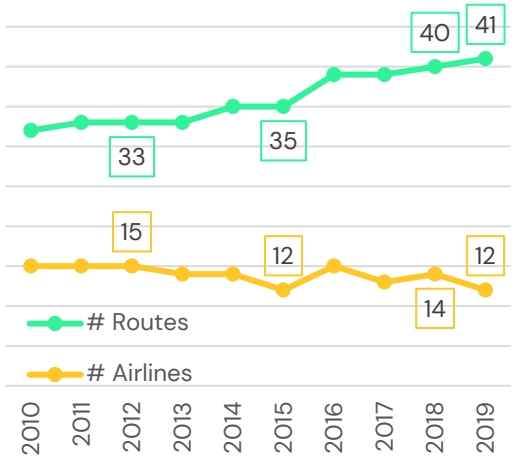
London - N. America OD Market



Source: CAA Statistics, IATA AirportIS Statistics (OD = True origin and destination demand)

Since 2010 the number of non-stop routes has increased from 32 to 41 although the number of airlines has been decreasing as a result of mergers and exits from the market .

London - N. America Service Levels



Source: GAL/ICF Forecasts

London - N. America Market Summary

	2010-19	*2019-32*
UK GDP	2.0%	1.2%
N. Am GDP	2.2%	1.6%
Onboard, CAGR	3.5%	1.3%
Traffic, #s	17m-23m	*23m-28m**
Growth	+6m	+4m
Flights/Day	219-276	*276-328*
Growth	56	*52*

Outlook

Whilst considered a relatively mature market, even modest growth expectations of over 1% represent significant growth in absolute terms. For example, assuming an income elasticity (Traffic : GDP) of below 1 will still yield a further 4m passengers by the time the NRP enters service.

Gatwick's NRP Forecast

GAL view the North American market as offering significant potential and expect new services to support the filling of the new NR capacity. In the NR P forecasts approx. 25 new flights per day are assumed by FY32.

Gatwick's pipeline for North America is strong with carriers based on both sides of the Atlantic seeking to increase their capacity. Norse and BA have already shown their intent to expand the North American market from Gatwick serving a range of destinations , These services are in the short term expected to back - fill much of Norwegian Airlines' capacity from pre Covid . Recent expansion for JetBlue is being supported by growing frequencies on current markets (e.g. Boston, New York) with further capacity expected in future years as they grow their fleet capable of such ro utes. Delta is an airline scheduled to enter the market following Covid with further growth ambitions expected in partnership with Virgin Atlantic.

Other carriers in Gatwi ck's pipeline reflect a combination of full service and low- cost carriers. These carriers are considered strong targets for growth and include other carriers expected to operate with a narrow - body model.

Gatwick's Baseline Forecast

By FY 32 GAL have assumed ~12 new daily American ATMs which is approx. half that assumed under the NRP.

6.1.1.5 Long Haul: Other Regions

In addition to the focus regions discussed above, further growth is anticipated in other markets including the Middle East, other parts of Asia and Africa. For the purposes of this document a summary of these markets is provided.

Asia (exc. India)

In addition to India, Gatwick is assumed to generate new services to Asia. Recent Gatwick growth has seen new capacity being added to emerging markets such as Vietnam, whilst capacity is expected to return over time to more mature markets including Hong Kong. Gatwick is in active discussions with a range of carriers and like the challenges recently experienced by Air India, current slot availability remains a key challenge, but would be relieved with the NRP.

Middle East

The Middle East has been a strong provider of growth in the London and Gatwick market over the decade leading up to 2019. In this period total London passenger volumes grew over 3.5m (+55%) whilst Gatwick increased >600k (+80%) with demand currently focused on Dubai and Doha. Today the London market has approximately 108 daily flights to/from this region. Even with modest growth expectations, a significant increase in demand for flights should still be expected by 2032.

By FY32 Gatwick have assumed up to a further 10 flights per day. Flights to this region are expected to benefit from the growth of the local market (e.g. LON- Mid East) as well as flows beyond (e.g. LON- Asia via the Middle East).

Gatwick continues to have extensive dialogue with current carriers (e.g. Emirates, Qatar) as well as carriers from the region in markets such as Saudi Arabi, Kuwait and the UAE. These carriers represent a range of airline business models (LCC/FSC) each with a different focus and growth aspirations.

Again, like other regions, Gatwick will continue to engage with many carriers as part of their pipeline.

Africa

Although Gatwick has historically had more links to cities in countries such as South Africa, Namibia, Zimbabwe and others it is only assumed to generate a few services (<5 daily ATMs) by the 2030s.

6.1.1.6 Summary

These high-level market forecasts help to provide detail and context to the potential breakdown of future traffic growth. With limited growth options in the London market, the level of overall long haul growth assumed by Gatwick in the NRP (or baseline) will be less than the levels of demand being projected by the 2030s.

7 London Short Haul Market

Gatwick has a strong position in the London short-haul market. In 2019 Gatwick accounted for the largest share of LON O&D passengers at 31%, some 7% points above Heathrow and 16% points above Luton. This share has, however, been in decline since 2015 when growth in this market became heavily limited due to constraints at Gatwick.

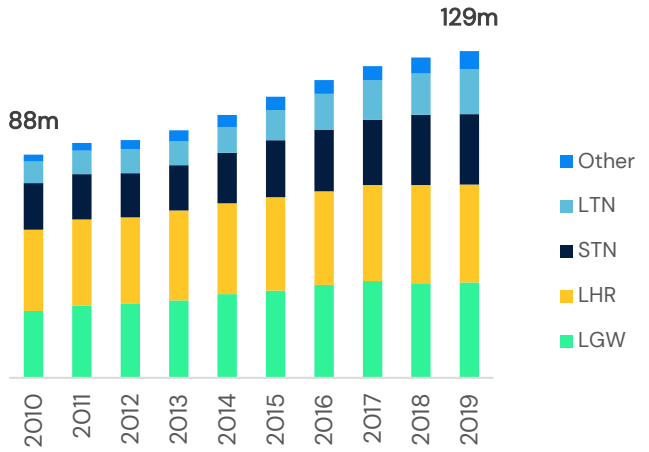
The onboard[6] performance is similar with Gatwick outperforming Stansted and Luton although Heathrow has a higher share as onboard volumes also include transfer flows (e.g. Paris to New York via London), at a total level Heathrow's transfers account for approx. 23% of total onboard volumes (2019).

Airlines continue to demonstrate a strong preference to grow at Gatwick:

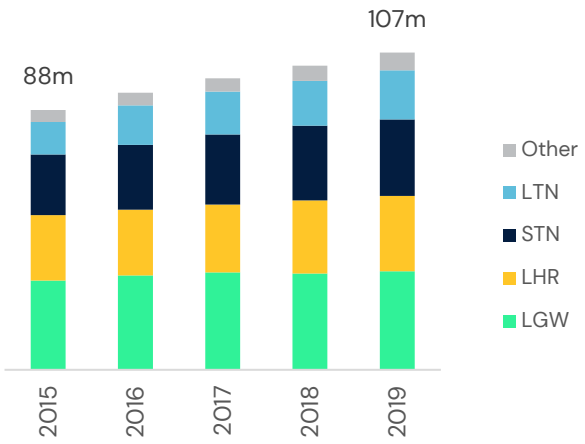
- Slot subscriptions: As per the previous discussion in the long-haul market section, many carriers have sought entry into LGW without any or limited success, even during Covid new entrants were not able to get access due to slot regulations.
- Slot transactions: Before Covid a significant market for slot transactions had emerged at Gatwick with airlines paying between £2-3m per daily slot pair. Many airlines have chosen to secure growth at Gatwick when slots have become available rather than deploying capacity at other London airports where they would not need to pay such a premium
- Many airlines have favoured the deployment of capacity at Gatwick over other airports, for example in the 2005-2019 period easyJet deployed 90% of their growth in London to the Gatwick market (vs Luton or Stansted or Southend)

[6] total passengers on aircraft including transfers

London - Short Haul Onboard Market



London - Short Haul OD Market



Source: CAA Statistics, IATA AirportIS Statistics (OD = True origin and destination demand)

Gatwick's NRP Forecast

By 2032 only Stansted has the potential to materially grow their traffic in this market segment since Luton and Heathrow are operating at their planning caps[7]. Significant spill is therefore expected in this category across the wider London market creating even more pent-up demand for Gatwick.

Gatwick have assumed another 100+ short haul movements by FY32. Given LGW's market leading position in this market segment, this is viewed as achievable and would be fulfilled through a combination of market growth and the potential to attract demand from other airports.

The future growth in short haul market mix was assumed in GAL's forecast to be comparable to today but with a slight weighting away from mature segments such as the domestic market. In terms of further geographic breakdowns, no significant changes are expected and were not explicitly forecast.

For example, in the period 2010-19 Gatwick's European ATM services increased by 58k movements (+37%, equivalent to 159 flights per day). This growth in ATM terms is comparable to that assumed under the NRP for the short haul market.

During this period only very modest mix change was seen between the main European market region (North/South/West/East).

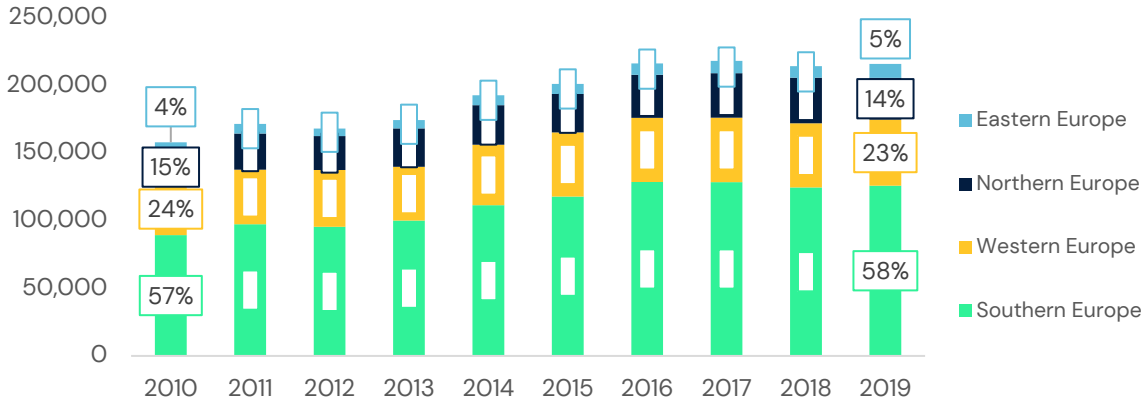
Flights in this category are dominated by Southern Europe (e.g. Spain, Italy, Greece) which accounted for 57% of demand in 2010 and they only increased to 58% of flights in this category by 2019. Similar modest changes were seen across the other European categories.

Gatwick's Baseline Forecast

As discussed earlier, much of the growth in short haul markets is assumed to come outside the peak periods reflecting further de-peaking from Gatwick's carrier base. During peak periods <10 daily additional ATMs are assumed under the baseline forecast.

[7] Luton is not expected to offer any significant expansion opportunity before 2037

Gatwick – Europe, ATM Mix



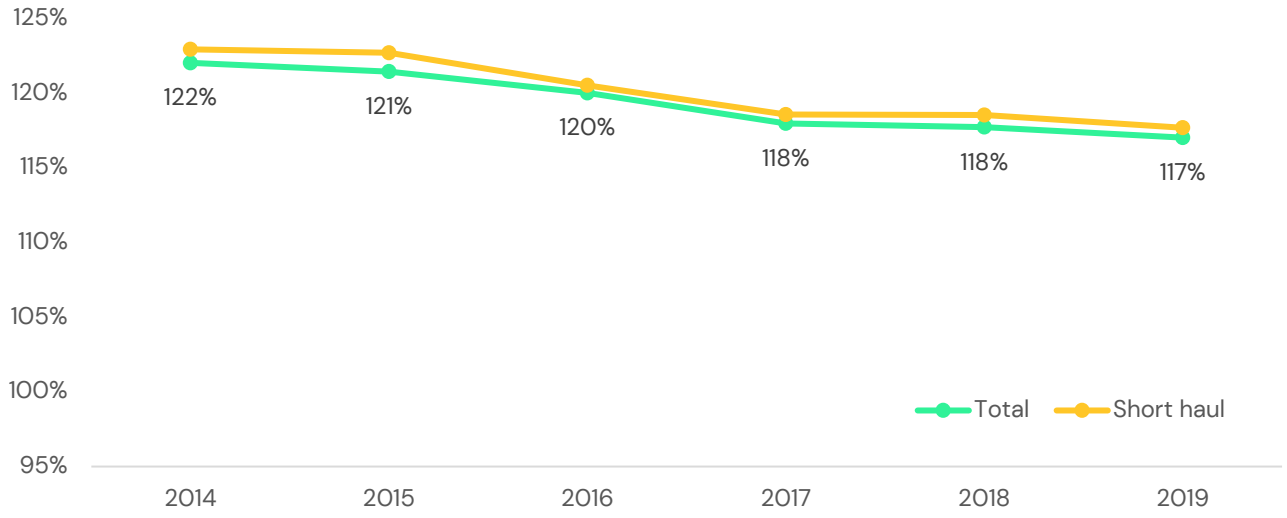
Source: CAA Statistics

8 De peaking

Gatwick's traffic is seasonal reflecting higher runway activity during the summer months. In 2019 the busy month (August) was approx. 17% busier than the average day across the year (900 daily ATMs on average in August vs 770 daily ATMs on average across the year). One of the drivers of growth in the NRP forecasts reflects ongoing de-peaking as the less utilised periods become busier.

Between 2014 and 2019 Gatwick's traffic profile de-peaked through a combination of airline and market mix change as well as growth. For example, less charter traffic (which is typically highly seasonal), more long-haul traffic (which is typically year-round) as well as growth being added by airlines operating more consistent year round schedules. These factors contributed to Gatwick's schedule de-peaking from 22% to 17% busier than average during the peak month.

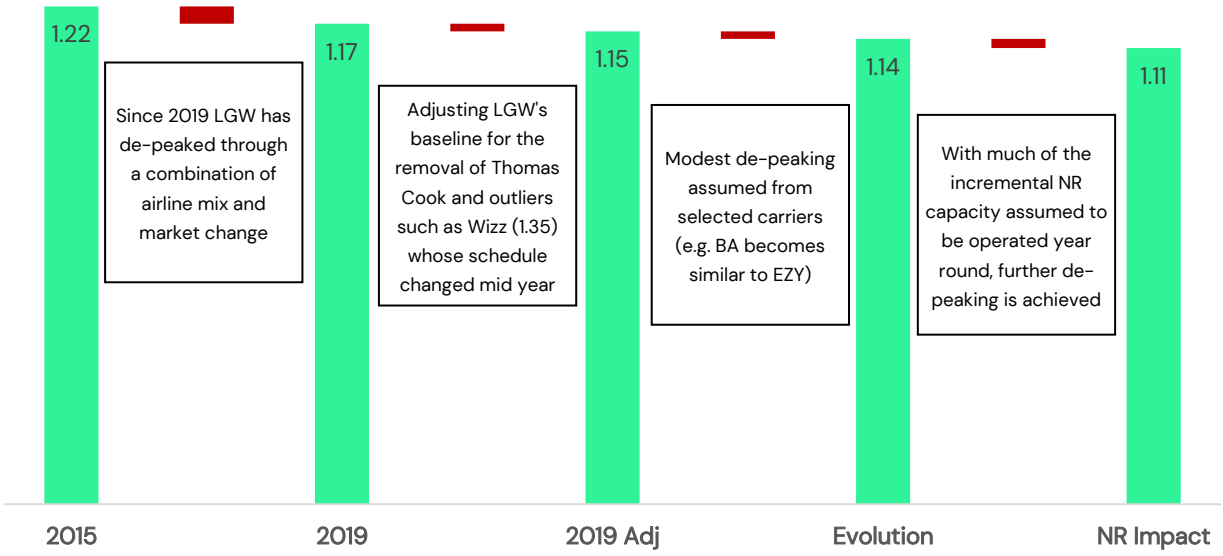
Gatwick De-peaking, 2014-19 (Ratio = Aug : Annual ATMs)



Given historical trends, recent market developments and longer term capacity constraints, it is clear that there is still potential for Gatwick to de-peak beyond 2019's levels. Building on the de-peaking seen leading up to 2019 further de-peaking has been assumed as likely reflecting a combination of:

- 2019's baseline included Thomas Cook, one of the airports peakiest carriers. They have since exited the market. Other carriers e.g. Wizz increased operations midyear resulting in relatively peaky performance but not representative of a steady state operation[8]. Once adjusted for these impacts, this implies a busy month ratio of approx. 1.15

Gatwick De-peaking Example Pathway to FY32 (Ratio = Aug : Annual ATMs)



- Whilst not every year is explicitly forecast, further de-peaking is assumed to material ise through:
  - De-peaking of LGW's carriers: For example, carriers such as BA have been assumed to operate with a schedule more aligned with that of easyJet in the long term. BA have also previously operated a more consistent year-round long haul schedule and that is also assumed to return.
  - The NRP provides an opportunity for growth as well as de-peaking. Similarly, to how recent new entrants are utilising Gatwick's capacity on a year-round basis, a large majority of the new capacity offered by the NR P is assumed to be operated on a year-round basis.

Combined, these assumptions result in the busy month ratio approaching 1.11 and is intended to represent a pathway to the level of de-peaking assumed by GAL in the early 2030s. Beyond 2030 further de-peaking is expected to arise from a combination of further mix change (short haul swaps to long haul) and binding constraints in the LGW/LON market supporting peak spreading.

[8] For Example, Wizz had relatively limited operations in Q1 2019 compared to the rest of the year, therefore a comparison of the August throughput to the year round average is distorted

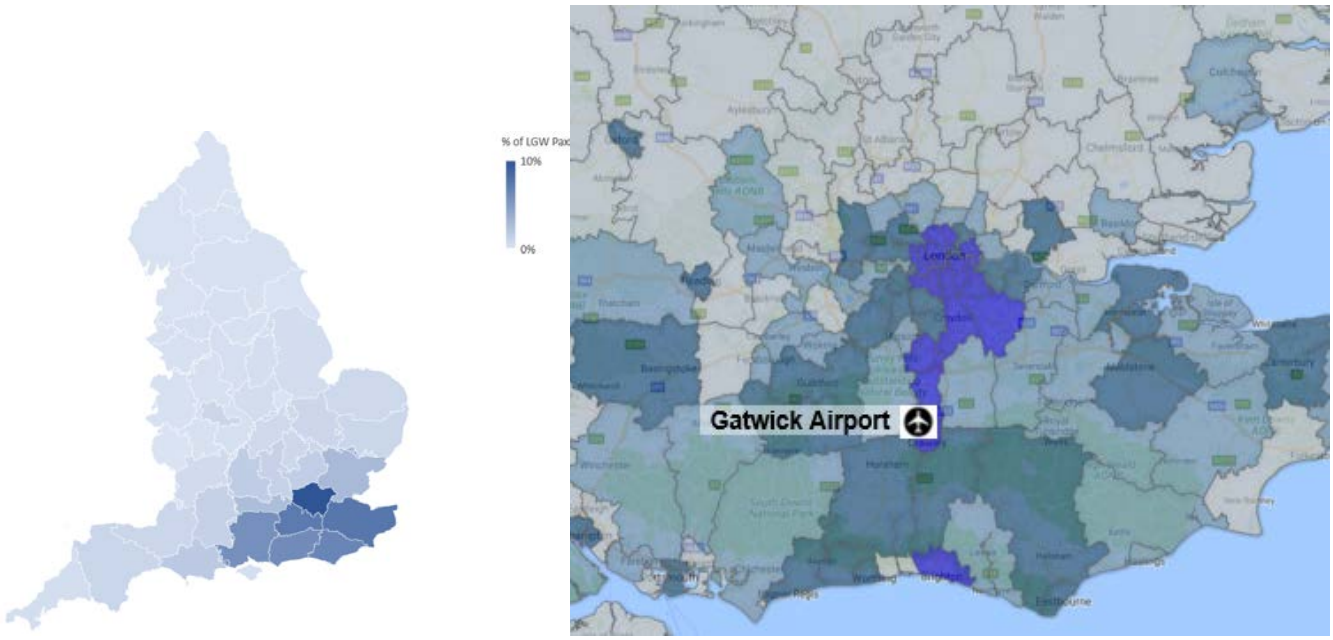
Leading up to 2019, Gatwick had started to incentivize airlines to de-peak their schedules. For example, tailored aeronautical charging structures and airline deals are a means to support this ambition. These methods are assumed to continue to support further de-peaking in the future.

Recent growth/new entrants are aligned with this ambition as their intentions are to operate relatively consistent year-round schedules. For example, Air India, Lufthansa, Norse, Wizz, JetBlue, Delta amongst others are some of the 'new' carriers to enter/grow the Gatwick market and all of them are seeking to operate a consistent year round schedule.

9 Gatwick Catchment

Gatwick's proximity to London and surface access links to the wider South East provide a wide catchment area. It is estimated that 17m people live within 90 minutes of the airport. The latest pre-covid full year of 2019 CAA survey has been used to inform the following analysis regarding LGW's catchment when >80% of Gatwick's terminating passengers were travelling to/from destinations in London or the South East.

Gatwick Catchment



Source: CAA Survey

A summary of the main traffic segments and catchment findings is presented below for **2019**.

- **Transfers (LGW, 4m):**
  - Not considered, since not part of LGW's 'local market'
- **Inbound demand (LGW, 10.9m):**
  - Over 60% of this market is travelling to Greater London typically relying on public transport options (i.e. Gatwick Express / National railways). Gatwick provides a very competitive offering to the inbound

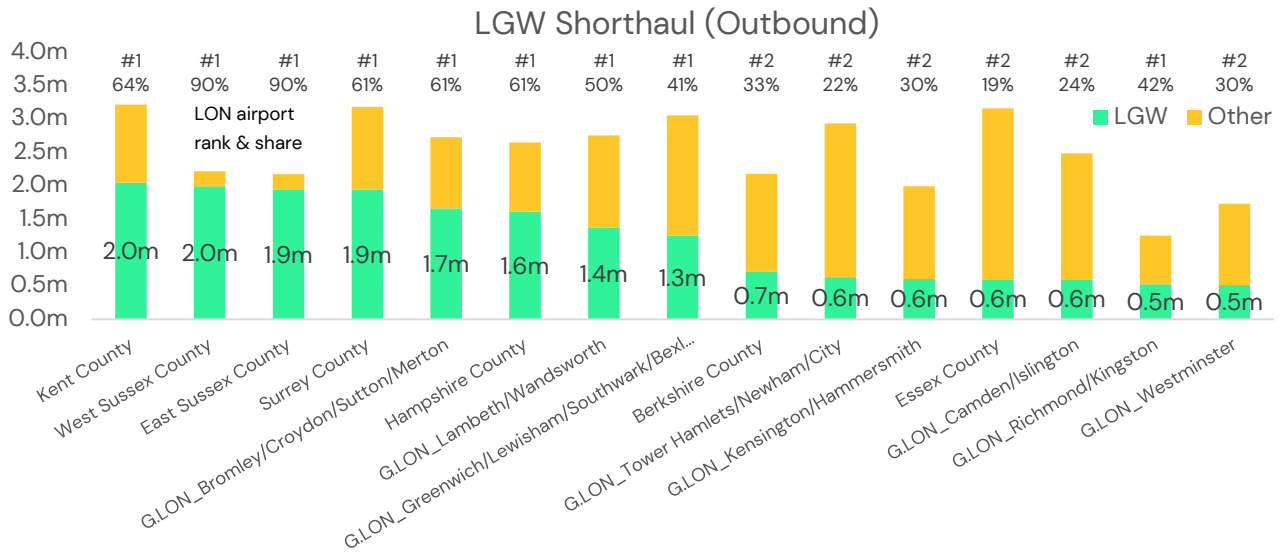
traveler since for many parts of Greater London (and areas around Gatwick including West/East Sussex, Kent, etc.), Gatwick offers the fastest or second fastest surface access option.

- *A summary of GAL's surface access rankings prepared in 2022/23 for public transport is provided below:*

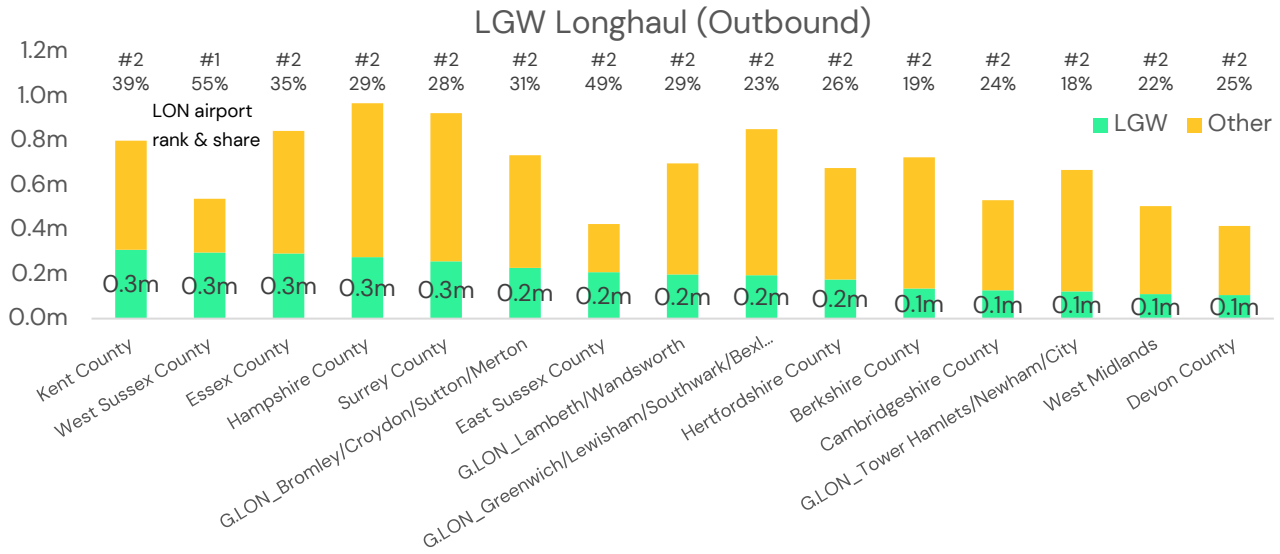
Region	Districts
Greater London: Gatwick public transport option ranked #1	Southwark, Lambeth, Wandsworth, Croydon, Lewisham, Bromley, Greenwich, Sutton Bexley
Greater London: Inner London shared with Heathrow/Others	City of Westminster, City of London *(where LGW ranks #2)*
Greater London Gatwick/Heathrow core where Gatwick ranked #2	Ealing, Hammersmith, Heathrow, Hillingdon, Hounslow, Kensington & Chelsea
Outside London Gatwick core catchment *(top region examples)*	East Sussex (Brighton & hove, Wealden, Lewes, etc.) West Sussex (Gatwick, Horsham, Mid Sussex, Crawley, etc.) Surrey (Guildford, Reigate/Banstead, Mole Valley, Tandridge, etc.)

- Over time, no significant changes to surface access options have been assumed meaning that relative to other airports Gatwick will maintain its advantage in its core catchment and likewise for other airports and their own core catchments.

- **Outbound demand (LGW, 29.3m):**
  - By far Gatwick's largest segment in 2019 accounting for 65% of total passenger volumes
  - Whilst not explicitly considered, population growth will continue to support further demand growth across the UK aviation market. A range of forecasts with varying outputs have been produced in the last few years, current forecasts (from ONS) are for England's population to grow at a CAGR of 0.3% in the 2020-30 period. Forecasts for London and surrounding areas do vary, so whilst there will be some variation it is reasonable to assume modest levels of ongoing growth across the catchments of the various London airports.
  - Gatwick's top catchment areas include counties in the South East (Kent, Sussex, etc.) as well as the more southerly located London districts (Bromley, Corydon, Lambeth, etc.).
  - For the **short haul** market, Gatwick is ranked the number 1 airport for share in Gatwick's top 8 volume producing regions shown below. For counties where Gatwick is by far the closest airport (e.g. Sussex drive times typically half that of other airports) Gatwick achieves a 90% share of demand. For districts with greater overlap (e.g. South London boroughs) Gatwick typically achieves a market share of around 60%.



- For the **long-haul** market, Gatwick is ranked the number 2 airport for share in 9 out of Gatwick's top 10 volume producing regions shown below. Gatwick's current market share across the top regions is notably lower than the short haul segment reflecting the more limited long-haul schedules available at Gatwick (compared to Heathrow). As services become available at Gatwick it is common for Gatwick to quickly achieve material shares, for example in 2010 Gatwick lacked any non-stop New York service whilst in 2019 Gatwick's non-stop services were achieving a ~30% share to New York reflecting a significant gain.
- Over time as Gatwick's long haul route network develops there is significant potential to recapture further long haul market share and fulfil a significant share of the future long haul growth in the London market. For example, if Gatwick was to achieve market shares comparable to the short haul market it would provide a significant boost to traffic volumes.



- **Surface Access Changes**
  - No significant future rail/road upgrades are assumed to materially impact Gatwick's main catchments either adding to or taking away from the underlying catchment drive/rail times assumed by Gatwick today.

10 Conclusion

This document has addressed requests to provide greater clarity around LGW's market level assumptions detailing the breakdown by geographic region assumed to underpin the primary forecasts of Gatwick under the baseline and NRP scenarios.

- Long haul demand is expected to grow across many market regions, larger mature markets such as N. America and faster growing regions in Asia and the Middle East are assumed to provide the majority of Gatwick's growth in this segment. Given the limited growth options across the London airport system GAL have assumed that Gatwick will continue to attract a growing range of airlines serving an expanded network.
- Short haul demand will still underpin Gatwick's traffic reflecting the airport's market leading performance in this segment today. Previous growth phases have seen limited mix change across the main European market geographies and repeating similar levels of growth under the NR is again not expected to exhibit significant market shifts at the total level.

In terms of de-peaking, Gatwick was demonstrating material improvements leading up until Covid. Once traffic has fully recovered, we have assumed that further mix change, growth and constraints across the London market will support further de-peaking. By FY32 a similar amount of de-peaking has been assumed as occurred in the 2015-2019 period.

Gatwick has an extensive catchment with over 17m living within 90 minutes of the airport. Gatwick performs strongly in its core catchment though it has seen modest share loss to other regions reflecting the binding constraints at the airport. By FY32 no significant surface access changes are assumed which would impact LGW's underlying performance today.

Annex 7

Response to Capacity Questions and Issues Raised in York Aviation Report

2nd August 2022

Response to Capacity Questions and Issues Raised in York Aviation Report

Key Matters and Related Questions:

The issues below are those questions and matters raised in the York Report:

1. Baseline Case – Baseline Development Assumptions
2. Baseline Case – Maximum Hourly Throughput and Technology needed to support this (York Questions 9 and 10)
3. NRP Case - Technologies needed for safe introduction of dual runway operations (at assumed 70 movements per hour) - including update on safety case support of CAA (York Questions 11 and 16)
4. NRP Case - Airspace Capacity for dual runway operation: explain how 70mph works including line up times, interweaving operations on both runways and SID usage / time separation between movements (York Question 12, 14 and 15 and York Page 25).
5. NRP Case - Holding between runways: risk of an a/c holding between the runways being an obstacle preventing arrivals and departures – York Page 26-27
6. NRP Case - End Around Taxiways: risk of aircraft using EATS being an obstacle infringing departures on northern runway – York Page 27
7. NRP Case - Departure Holding Delays – will departures holding times be increased – York Questions 12 and 13 and Page 27
8. NRP Case - Taxiway Layout – Acceptability of varying Codes of Juliet Taxiway – York page 28
9. NRP Case - Airline and Passenger Service Levels - Assertion that airfield layout is not operationally efficient – York Question 18 and York Page 30
10. NRP Case - Simulations – Is there anything we can offer to support the above through simulations – York Questions 18 and 19.
11. NRP Case - Passenger Service Levels for Pier 7 - Viability and plausibility of remote Autonomous Vehicle operation to serve Pier 7 – York Question 20 and York page 30 – 31

Responses to these matters and related questions are addressed in this note and in two separate supporting notes:

- A note on the detailed simulation modelling that has been carried out for NRP
- A note providing responses to obstacle and safety points, covering points 4,5 and 8 above.

In addition, an Excel spreadsheet containing busy day schedules for Baseline and NRP cases in 2032, 2038 and 2047 and the assumed split of daytime SID usage in these forecasts has been provided.

Matter 1: Baseline Case – Baseline Development Assumptions

York: "… the Future Baseline Masterplan shows clearly a number of works which are intended to support an increase in runway movement rate ….the planning status of these works is unclear.... we are concerned that GAL has put forward a Baseline Case that may be undeliverable ….it is not clear why these initial required infrastructure improvements are not part of the DCO..." **(page 21)**

These matters have been addressed in the Planning Topic Working Group Meeting 1.

The 10 projects assumed in a future without the NRP are detailed in our Consultation Overview at para. 2.5.5-7.

The various baseline development fall into three categories:

Category 1: ***Developments that are under construction, or on which a material start has been made***

Category 2: ***Developments which although not under construction have a planning permission including a permission granted by the Town and Country Planning (General Permitted Development) Order 2015***

Category 3: ***Developments which don't yet have planning permission but are reasonably expected to gain permission, including a permission granted by the Town and Country Planning (General Permitted Development) Order 2015***

Category 1	Category 2	Category 3
• Rail Station • PIER 6 Western Extension • Rapid Exit Taxiway to Runway 23	• BLOC Hotel Extension • Hilton Hotel Extension and MSCP	• MSCP7 (North Terminal)* • MSCP4 (South Terminal)* • Robotic Car Parking • South Terminal and North Terminal Roundabout minor improvement works within the highway boundary

*Both MSCP4 and MSCP7 have been subject to formal EIA screening, confirming these are not 'EIA development'

At the time the baseline developments were defined all were reasonably expected to come forward in support of the development of the airport.

As explained to Planning Topic Working Groups recent decisions mean the baseline is currently being updated:

- BLOC Hotel and MSCP4 are now no longer expected to come forward – these will be removed
- South Terminal Hilton Hotel MSCP (consented in 2021) and Electric Vehicle Charging Forecourt at South Terminal (permitted development in 2021) will be added to future baseline.

These changes do not affect the throughput capacity of the airport.

The future baseline developments are either under construction, have consent or can reasonably be expected to be progressed under permitted development rights. They do not need to be applied for within the DCO. They are planned to come forward irrespective of NRP.

Matter 2: Baseline Case – Baseline Hourly Runway Movements

***York"… we are concerned that GAL has put forward a Baseline Case that may be undeliverable, particularly in relation to the assumed increase in runway movement rate on a single runway, and this potentially undermines the validity of the assessment of the effects of the development if the Baseline is set too high...it is not clear to us how the runway utilisation could be substantially increased above 55 movements per hour for the bulk of the day...."* (pages 3, 21-24)**

Question 9: Please set out the measures intended to increase capacity of the existing runway and what is the expected maximum hourly throughput

Question 10: What New technologies are required to deliver this throughput?

Question 14: Please provide the breakdown of movements by SID/NPR for today, the baseline and with the NPR

Our Future Baseline case forecasts use a maximum hourly runway movement rate of 55 movements per hour. They do not rely on an increase in the maximum hourly throughput of the runway.

Busy day schedules that underpin the forecasts for 2032, 2038 and 2047 have been provided and set out below.

BASE - 2032

		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Total	NB	38	42	48	37	28	44	45	49	45	46	44	50	54	52	37	36	37	25
	WB	15	13	5	11	20	9	10	6	10	4	4	3	1	3	7	7	5	2
	Total	**53**	**55**	**53**	**48**	**48**	**53**	**55**	**55**	**55**	**50**	**48**	**53**	**55**	**55**	**44**	**43**	**42**	**27**
Arr	NB	2	11	19	11	17	24	24	27	19	21	22	23	25	25	17	23	34	25
	WB	11	10	5	4	7	4	4	2	3	0	1	3	0	2	6	0	1	1
	Total	**13**	**21**	**24**	**15**	**24**	**28**	**28**	**29**	**22**	**21**	**23**	**26**	**25**	**27**	**23**	**23**	**35**	**26**
Dep	NB	36	31	29	26	11	20	21	22	26	25	22	27	29	27	20	13	3	0
	WB	4	3	0	7	13	5	6	4	7	4	3	0	1	1	1	7	4	1
	Total	**40**	**34**	**29**	**33**	**24**	**25**	**27**	**26**	**33**	**29**	**25**	**27**	**30**	**28**	**21**	**20**	**7**	**1**

BASE - 2038

		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Total	NB	38	42	48	37	28	43	44	49	45	46	44	50	54	52	37	36	37	25
	WB	15	13	5	12	20	11	11	6	10	4	5	4	1	3	7	7	5	2
	Total	**53**	**55**	**53**	**49**	**48**	**54**	**55**	**55**	**55**	**50**	**49**	**54**	**55**	**55**	**44**	**43**	**42**	**27**
Arr	NB	2	11	19	11	17	23	24	27	19	21	22	23	25	25	17	23	34	25
	WB	11	10	5	5	7	5	4	2	3	0	2	3	0	2	6	0	1	1
	Total	**13**	**21**	**24**	**16**	**24**	**28**	**28**	**29**	**22**	**21**	**24**	**26**	**25**	**27**	**23**	**23**	**35**	**26**
Dep	NB	36	31	29	26	11	20	20	22	26	25	22	27	29	27	20	13	3	0
	WB	4	3	0	7	13	6	7	4	7	4	3	1	1	1	1	7	4	1
	Total	**40**	**34**	**29**	**33**	**24**	**26**	**27**	**26**	**33**	**29**	**25**	**28**	**30**	**28**	**21**	**20**	**7**	**1**

BASE - 2047

		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Total	NB	38	42	48	36	28	43	43	48	45	46	42	50	53	52	37	36	37	25
	WB	15	13	5	13	20	11	12	7	10	4	7	4	2	3	8	8	5	2
	Total	**53**	**55**	**53**	**49**	**48**	**54**	**55**	**55**	**55**	**50**	**49**	**54**	**55**	**55**	**45**	**44**	**42**	**27**
Arr	NB	2	11	19	10	17	23	23	27	19	21	21	23	25	25	17	23	34	25
	WB	11	10	5	6	7	5	5	2	3	0	3	3	0	2	7	0	1	1
	Total	**13**	**21**	**24**	**16**	**24**	**28**	**28**	**29**	**22**	**21**	**24**	**26**	**25**	**27**	**24**	**23**	**35**	**26**
Dep	NB	36	31	29	26	11	20	20	21	26	25	21	27	28	27	20	13	3	0
	WB	4	3	0	7	13	6	7	5	7	4	4	1	2	1	1	8	4	1
	Total	**40**	**34**	**29**	**33**	**24**	**26**	**27**	**26**	**33**	**29**	**25**	**28**	**30**	**28**	**21**	**21**	**7**	**1**

Improved operational procedures may increase resilience but our forecasts have not assumed or relied upon an increase in runway capacity above 55 mph. Gatwick is already the busiest single daytime runway in the world. These matters have been addressed in the Forecast Working Group.

There is no doubt that the 55 mph can be achieved consistent with Gatwick's fleet mix and schedule. The 55 movements per hour rate has been achieved at Gatwick since 2016. In the summer 2020 declaration 3 consecutive hours were declared at 55 (1000 – 1200) followed by 2 consecutive hours (1600 & 1700). Summer 2021 and 22 have also declared 0600 at 55.

Declared Totals Limit

Start of UTC Hour	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
S20	29	53	54	52	50	51	**55**	**55**	**55**	53	51	52	**55**	**55**	54	48	46	39	29	30
S22	29	53	**55**	52	50	51	**55**	54	**55**	54	52	52	**55**	**55**	54	49	46	40	29	30

For these reasons no further measures are needed to increase capacity of the existing runway and no new technologies are required to deliver this throughput.

Matters 3 and 4: NRP Case: Northern Runway Project Operations

Technologies needed for safe introduction of dual runway operations (at assumed 70 movements per hour) (York Question 11)

Airspace Capacity for dual runway operation: explain how 70mph works including line up times, interweaving operations on both runways and SID usage / time separation between movements (York Question 12, 14 and 15 and York Page 25).

York:

"… GAL has not demonstrated that 70 movements per hour is attainable through using the Northern Runway, which has implications for the validity of the forecasts With Development." **(Pages 3 and 25)**

Question 11: What new technologies are required to enable simultaneous departures on the two runways?

Question 12: What assumptions have been made regarding line-up times on the northern runway and behind a landing aircraft on the southern runway?

Question 14: please provide the breakdown of movements by SID/NPR for today, the baseline and with the NPR

Question 15: What is the time separation assumed for aircraft departing from each pair of SIDs/NPRs for westerly and easterly operations.

Question 16: Please provide further details of the interdependency between the operations on the two runways.

Explanation of Dual Runway Operations

Para. 3.3.5 of our Consultation Overview Document explains how the two runways would operate dependently together:

- dependent semi-mixed mode
- All arrivals will use the southern runway
- Code D and larger departures will use the southern runway
- Code C and smaller departures are able to use either runway

Further information is provided in the separate note on the Detailed Simulation Report.

Busy Day Schedules

Busy day schedules for NRP cases in 2032, 2038 and 2047 have been provided in a separate Excel spreadsheet (and are set out below).

The spreadsheet also sets out the assumed split of daytime SID usage in these forecasts.

It can be seen that our forecasts have a maximum hourly runway movement rate of 69 movements per hour in the NRP case. In the 0700 hour this is achieved with a mix of 21 departures on 26R and 15 departures and 33 arrivals on 26L. In the 1800 hour we have 31 departures on 26R, 2 departures and 36 arrivals on 26L.

NRP - 2032

		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Total	NB	47	49	62	46	33	45	48	56	57	56	54	55	67	65	49	48	38	28
	WB	17	13	7	13	20	12	10	7	10	11	7	7	1	4	9	8	5	4
	Total	**64**	**62**	**69**	**59**	**53**	**57**	**58**	**63**	**67**	**67**	**61**	**62**	**68**	**69**	**58**	**56**	**43**	**32**
Arr	NB	2	12	26	14	17	25	28	29	28	25	27	25	33	34	21	33	35	27
	WB	14	11	7	5	6	3	4	3	4	5	2	2	1	2	8	1	1	1
	Total	**16**	**23**	**33**	**19**	**23**	**28**	**32**	**32**	**32**	**30**	**29**	**27**	**34**	**36**	**29**	**34**	**36**	**28**
Dep	NB	45	37	36	32	16	20	20	27	29	31	27	30	34	31	28	15	3	1
	WB	3	2	0	8	14	9	6	4	6	6	5	5	0	2	1	7	4	3
	Total	**48**	**39**	**36**	**40**	**30**	**29**	**26**	**31**	**35**	**37**	**32**	**35**	**34**	**33**	**29**	**22**	**7**	**4**

NRP - 2038

		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Total	NB	47	49	62	46	33	45	48	57	58	56	54	55	67	65	49	48	38	28
	WB	17	14	7	13	21	13	11	7	10	11	7	7	1	4	9	8	5	4
	Total	**64**	**63**	**69**	**59**	**54**	**58**	**59**	**64**	**68**	**67**	**61**	**62**	**68**	**69**	**58**	**56**	**43**	**32**
Arr	NB	2	12	26	14	17	25	28	30	28	25	27	25	33	34	21	33	35	27
	WB	14	12	7	5	6	4	4	3	4	5	2	2	1	2	8	1	1	1
	Total	**16**	**24**	**33**	**19**	**23**	**29**	**32**	**33**	**32**	**30**	**29**	**27**	**34**	**36**	**29**	**34**	**36**	**28**
Dep	NB	45	37	36	32	16	20	20	27	30	31	27	30	34	31	28	15	3	1
	WB	3	2	0	8	15	9	7	4	6	6	5	5	0	2	1	7	4	3
	Total	**48**	**39**	**36**	**40**	**31**	**29**	**27**	**31**	**36**	**37**	**32**	**35**	**34**	**33**	**29**	**22**	**7**	**4**

NRP - 2047

		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Total	NB	46	49	62	46	33	45	47	56	58	56	52	55	67	65	48	48	38	28
	WB	18	14	7	13	21	13	12	8	10	11	9	7	1	4	10	9	6	4
	Total	**64**	**63**	**69**	**59**	**54**	**58**	**59**	**64**	**68**	**67**	**61**	**62**	**68**	**69**	**58**	**57**	**44**	**32**
Arr	NB	1	12	26	14	17	25	27	30	28	25	26	25	33	34	21	33	35	27
	WB	15	12	7	5	6	4	5	3	4	5	3	2	1	2	8	2	1	1
	Total	**16**	**24**	**33**	**19**	**23**	**29**	**32**	**33**	**32**	**30**	**29**	**27**	**34**	**36**	**29**	**35**	**36**	**28**
Dep	NB	45	37	36	32	16	20	20	26	30	31	26	30	34	31	27	15	3	1
	WB	3	2	0	8	15	9	7	5	6	6	6	5	0	2	2	7	5	3
	Total	**48**	**39**	**36**	**40**	**31**	**29**	**27**	**31**	**36**	**37**	**32**	**35**	**34**	**33**	**29**	**22**	**8**	**4**

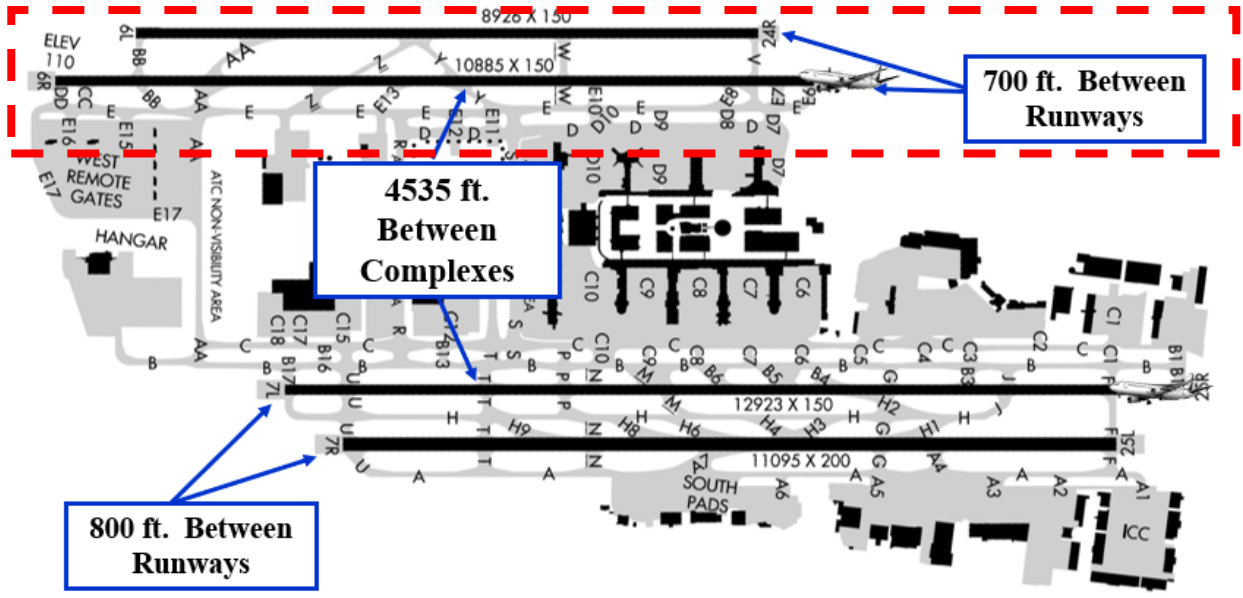
Comparison with LAX Northern Complex

Real life comparison of similar operations e.g. Los Angeles International Airport Northern Complex (LAX NC) and Fast Time Simulation we have used (details of which are provided in a separate note on the Simulations Report) support 70+ ATMs / hr and demonstrate the proposed busy day schedules are achievable with the proposed infrastructure.

The two runways would operate similar to other airports such as (LAX NC) which has virtually the same runway spacing (700ft = 213m) as proposed at Gatwick (210m), but can utilise both of their closely separated runways for arrivals and departures. Despite this, LAX prefer to operate with the 'inner' runway (RWY 24L/06R) as a departure runway for all aircraft types and the outer runway as an arrival runway, which is broadly aligned with Gatwick's proposed concept of operation (CONOPS). In this arrangement, LAX delivers 74 ATMs / hr on its northern complex in visual metrological conditions.

LAX utilise holding between the runways, having secured wavers to published FAA standards (10-T-02 to FAA Order 7210.3) and having operated these safely for more than 25 years. Under this arrangement, LAX have placed holds (holding pens) at 85.6m (281ft) and 76.5m (251ft) from the outer runway, providing sufficient holding space for Code E aircraft in visual runway conditions at 50.9m, with different holding position tables produced for visual, CAT I and CAT II/III runway operations.

LAX Northern Compound



In contrast to Gatwick's proposed concept, LAX operation allows simultaneous departure and arrival operations on both runways, but this is not the predominant way of operating, with preference being given to spreading arrivals and departures across both runways.

We are not expecting the same utilisation at Gatwick as LAX NT (as per our busy day schedules our forecasts have a maximum hourly runway movement rate of 69 mph).

Dual Runway Operations – Line Up Times and Separation Times

The addition of the northern runway brings significant additional capacity.

The hourly, daily and annual throughput is dependent on the traffic mix onto the runways.

Forecast hourly movements, as shown in busy day schedules, have a range of types of aircraft and mix of departures and arrivals.

The simulation modelling we have carried out assumes a minimum departure-departure (DD) separation of 60 seconds for medium aircraft. No additional separation is applied on aircraft travelling on the same SID (or route). In addition, wake turbulence separation requirements are taken into consideration as described in the separate note on the detailed simulations that have been undertaken.

Currently, average DD separation times of about 70 seconds are achieved with 80% on a 60 second alternate route DD separation and 20% on 109 second same route DD separation. All same route DD separations can be viewed as a sequencing failure and the longer term objective would be for these to occur only by exception.

There are various initiatives and procedures which can help deliver 60 second DD separations:

- ACDM & departure sequencer which can help ATC to optimise the sequence of aircraft to the runway
- Use of the route 4 SID offload enabled through Airport Collaborative Decision Making (ACDM) data sharing which (on westerly operations) provides an alternative Easterly route to southern Europe to the predominant Westerly route
- Improved schedule sequencing to avoid bunching of same route departures.

However, by 2029 it is conservatively assumed that the number of same route departures may only be reduced by half to 10% but in addition, improvements in ATC procedures are expected to deliver a reduction in same route DD separations to between 85 and 90 seconds and alternate route separations may be reduced to between 55 and 58 seconds.

A combination of 10% same route DD separations of circa 88 seconds and 90% alternate route DD separations of 57 seconds would yield average DD separations of 60 seconds although the ambition would be to reduce this still further.

Enhanced radar separation, enabling flights to be vertically separated while flying in the same direction has the potential to eliminate the need for same route departures to be separated by more than 60 seconds. It is not certain that this technology will be implemented at Gatwick by 2029 but if implemented, it would remove the requirement for any additional measures to be pursued.

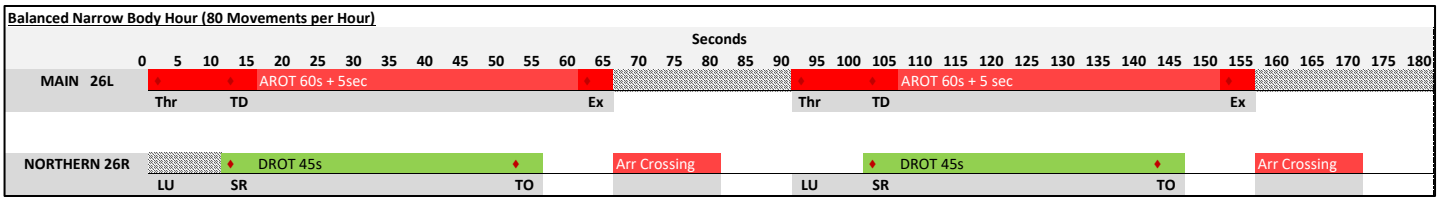
Set out below are a number of different runway sequencing charts as examples to show how the hourly utilisation of the runways could be affected by different types of aircraft and operations - narrow and wide-bodied aircraft departures and arrivals.

The first sequencing chart – Chart 1 below - shows a proposed sequence in a theoretically perfectly balanced hour with narrow body aircraft only. This shows the theoretical highest throughput capability which can be achieved in the dual runway operations.

As an arrival touches down on the main runway the departure aircraft on the Northern will be given permission to take-off, making use of the time the arrival is occupying the main runway. The arrival then has time to taxi to an exit and cross the Northern runway behind the departing aircraft, which will be airborne beyond the exit location, before the next arrival touches down.

In a balanced hour (50/50 arrivals and departures / all code C) it is theoretically possible to achieve 80 movements per hour (an arrival and a departure every 90 seconds) (based on Aug 2019 Actual Data for 26L: Arrival Runway Occupancy Time = 57 seconds, Departure Runway Occupancy Time = 44 seconds) this also allows for an additional 5 seconds AROT based on changes to exit design and location.

Chart 1: Runway Sequencing for Theoretical Narrow Bodied Only Hour

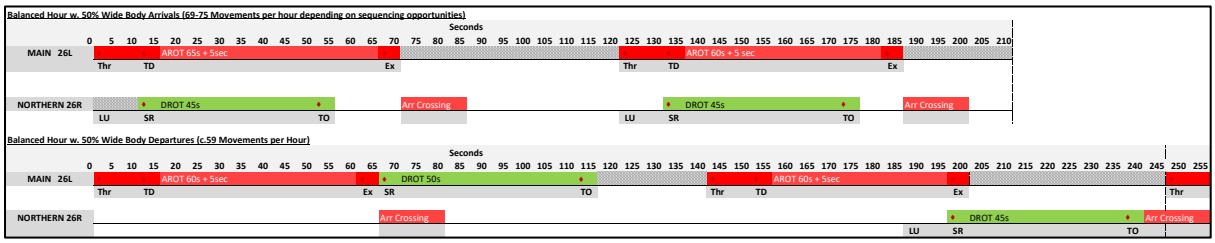


Abbreviation	Description
AROT	Arrival Runway Occupancy
DROT	Departure Runway Occupancy
Thr	Threshold
TD	Touch Down
Ex	Exit
LU	Line up
SR	Start of Roll for Departure
TO	Take-Off

Charts 2 and 3 - show examples of sequences where, consistent with our forecasts, there is a mix of narrow and wide-bodied departures and arrivals.

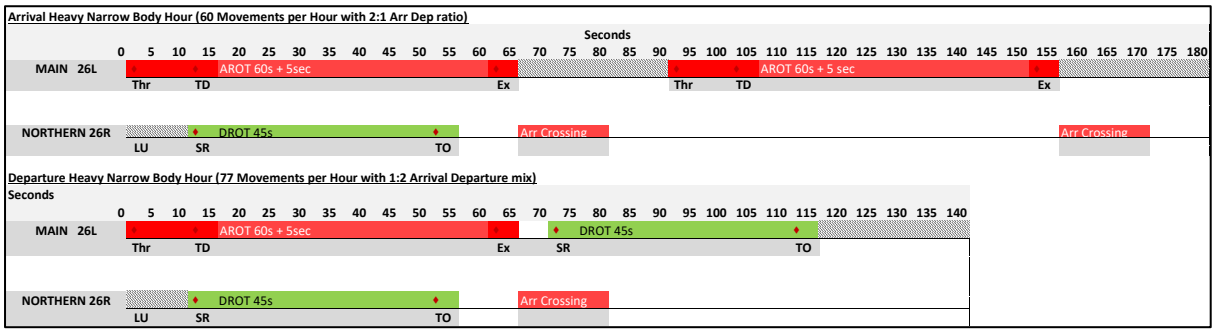
The sequences show how different mixes of aircraft sizes could be sequenced for an arriving aircraft to cross the northern runway behind a departing aircraft, how this affects separation times and the utilisation of runways, and the impact different mixes of aircraft / traffic have on hourly operations.

Chart 2: Widebody Runway Sequencing



In these examples, the impact wide bodied aircraft have on hourly runway capacity can be seen. The wide bodied departures have a more significant impact on capability due to them utilising the main runway whilst also stopping other departures on the Northern runway. Efficiency will be gained through clustering of wide bodies, to reduce wake-turbulence gap requirements, which is normal practice.

Chart 3: Widebody Runway Sequencing for Unbalanced Arrival/Departure Sequences



In a heavy arrival hour, there is less opportunity to gain throughput efficiency as the time arrivals are occupying the main runway the Northern will remain idle if there are no departures to utilise it. Although any Code C departure which would have interrupted arrival flow would operate from the Northern gaining efficiency relative to the Baseline capability.

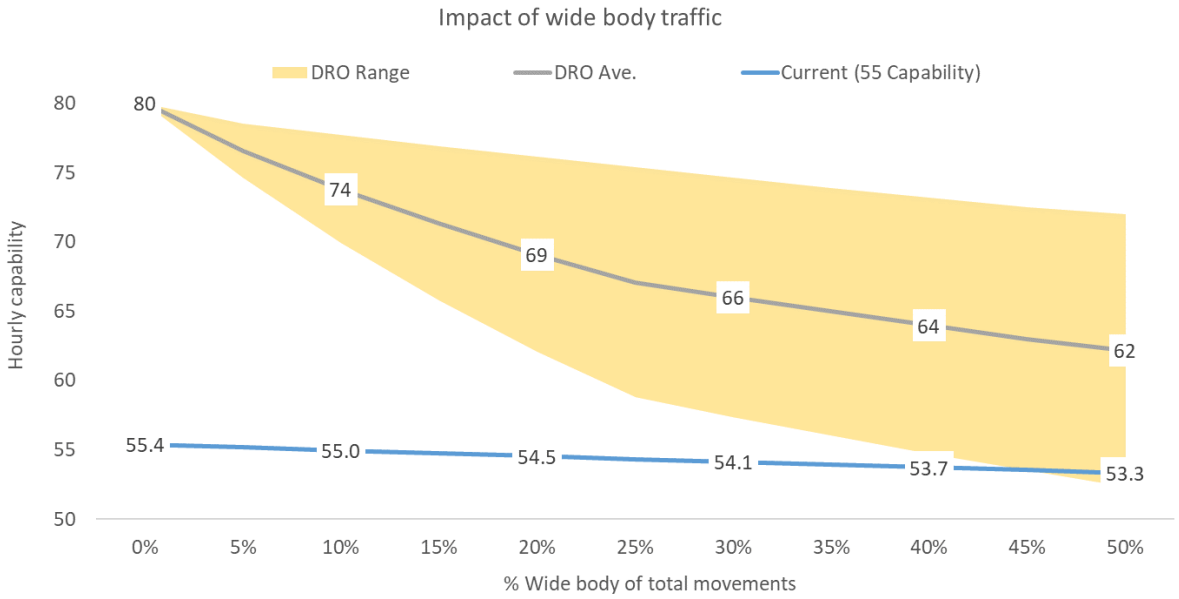
In departure heavy hours both runways can be utilised for departures to optimise sequencing, although departure departure separation rules are the same as if both were utilising the main runway. A higher proportion of departures will operate from the Northern runway to create arrival gaps where required.

The arrival/departure and widebody mix of traffic has been used to constrain demand to within the runway capability.

The graph below shows an indicative view of the significant range of capability which can be achieved from a dual runway operation compared to the baseline operation, with a balanced arrival departure mix and varying levels of widebody aircraft.

The highest point in the range is based on only arrival wide bodies and optimal sequencing through clustering of wide bodies, the lowest point in the range shows the capacity if all the wide bodies are departures. Runway capability is assessed based on the mix of traffic presenting to the runway.

Chart 4: Impact of wide body movements on runway capacity



Simulations we have run, as described in our separate note on simulations, demonstrate that the busy hour schedules in our forecasts are deliverable and it is anticipated that 90-95% of landing aircraft (all Codes) will land and cross the northern runway – without needing to hold between the runways.

Technologies for Dual Runway Operations

A range of different technologies and procedures will of course be required to transition from single runway operations to dual runway operations. The technologies that we expect will be required include the following:

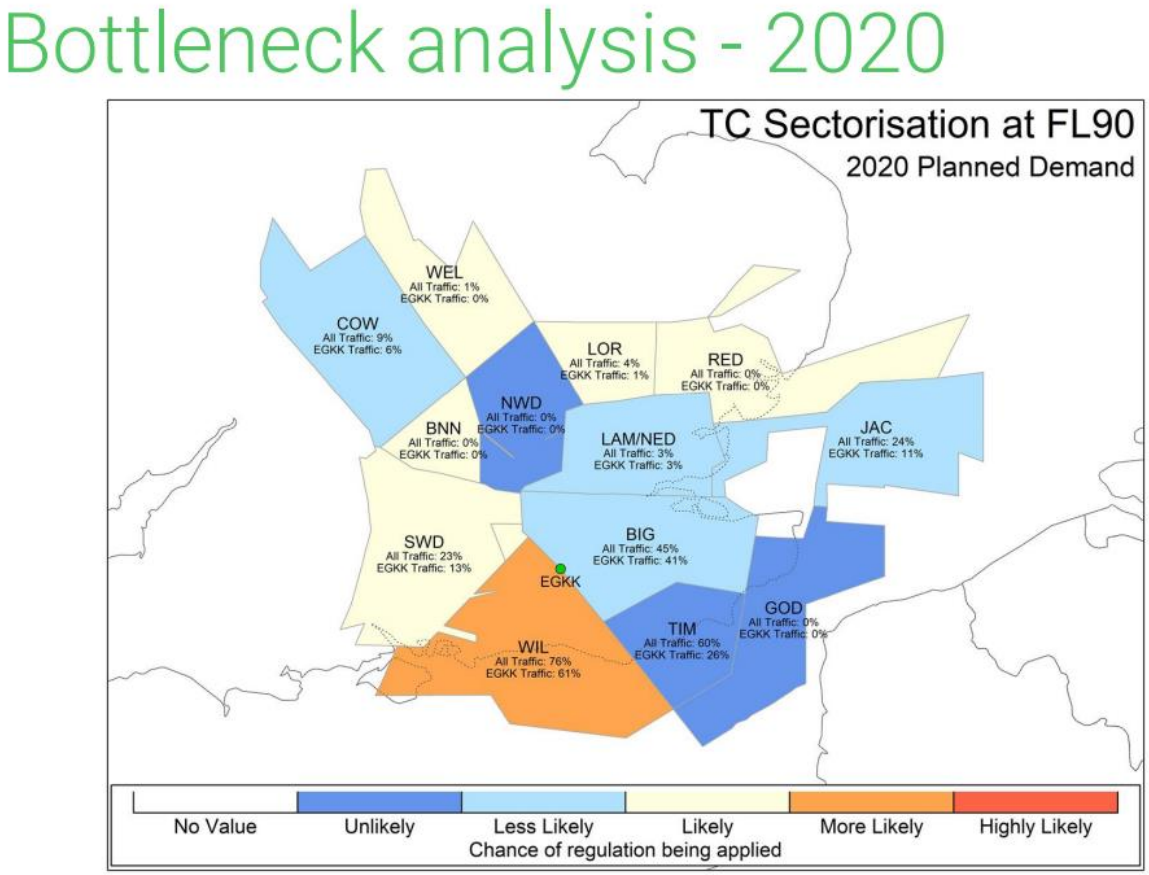
- Autonomous Runway Incursion Warning System (ARIWS) ensures separation between traffic crossing the live runway and the arrivals / departures:
    - Runway entry lights (REL)
    - Take-off hold lights (THL)
- Aeronautical Ground Lighting
- Pilot/driver lateral visual detection
- Lead on lights / follow the greens
- ATC Clearance conformance monitoring alerts and conflict detection
- Signage e.g. variable message signs

These are well understood, and mostly standard and commonly used technologies. We would be happy to provide more information on any of these if required. Details of these are subject to our ongoing engagement with CAA.

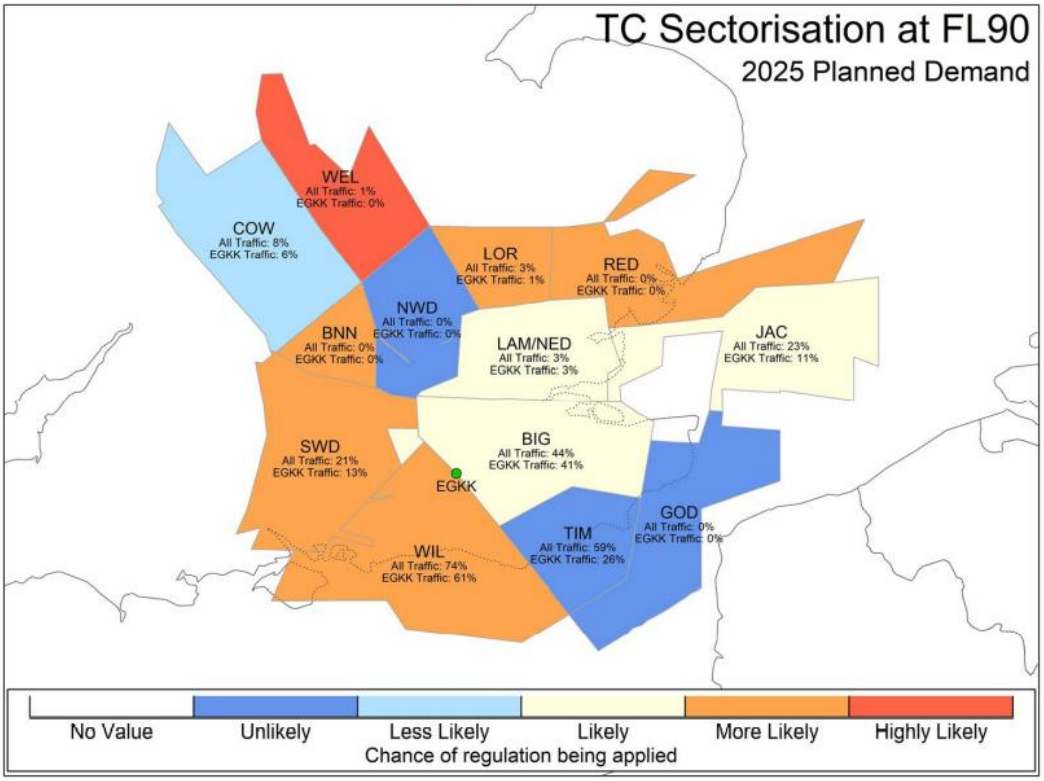
Airspace Capacity

The London Terminal Manoeuvring Area (TMA) is facing an area wide capacity problem, driven by the outdated airspace design combined with ever increasing traffic demand. However, airspace capacity around Gatwick, including the current structure / separation of SIDS, does not constrain the capacity of the Dual Runway Operation and the NRP is not dependent on airspace change.

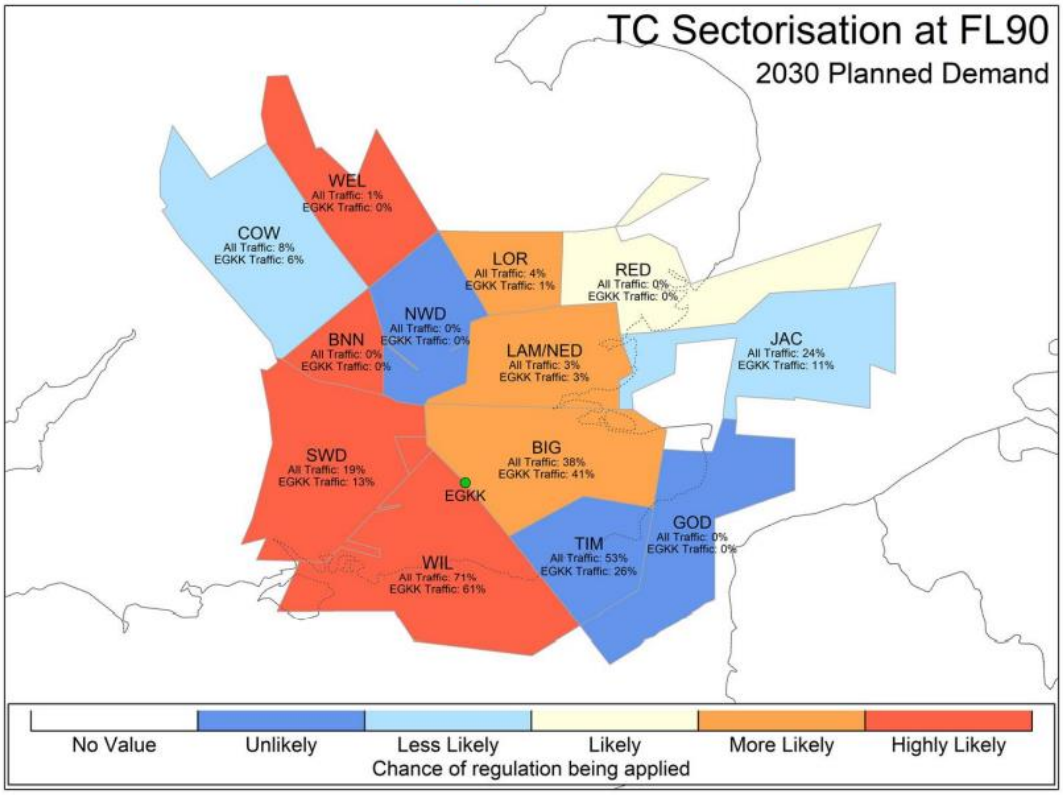
Based on pre-COVID forecast traffic growth across all of the London airports out to 2030, without airspace modernisation, the LTMA airspace sectors will increasingly be subject to flow management measures to ensure the sector/airspace loading remains within safe operational parameters, although following the impacts from COVID this impact is now expected to materialise later.



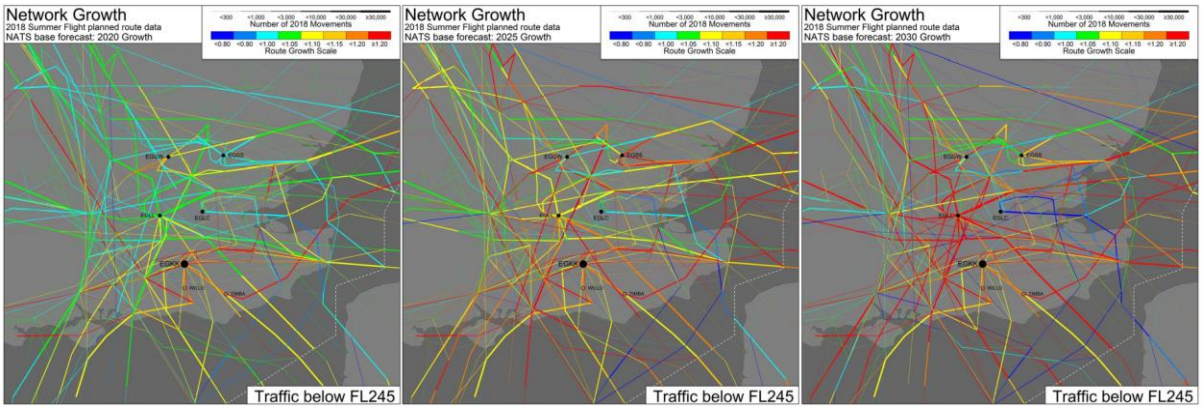
Bottleneck analysis - 2025



Bottleneck analysis - 2030



The images below show the projected comparison of congestion by relevant TMA sector between 2020 and 2030 (these images were prepared at the time NRP was assumed to become operational in 2026). As shown the traffic in the immediate sectors around Gatwick will remain relatively standard, but the likelihood of regulation is due to increase in 2030.



When the above is broken down into individual route demand, it can be seen that the main contributors to the congestion are identified to be to the north of Gatwick and the actual impact felt at the Gatwick airspace to be the result of congestion in adjacent sectors, more than the increased traffic as result of NRP.

In conclusion, NRP does not significantly impact the immediate airspace around the airport.

Matter 5: NRP Case - Holding between runways: risk of an aircraft holding between the runways being an obstacle preventing arrivals and departures – York Page 26-27

York: ***"It is not completely clear if GAL expects the main runway to continue to be used for arriving aircraft (or departing aircraft) while an aircraft is holding between the runways. We have assessed the implications of holding a code C aircraft between the runways and consider that, given the limited distance between the two runway centrelines, it would give rise to a high risk of aircraft being considered an obstacle and so preventing the and so preventing the following arrival from landing or even impeding an aircraft taking off from the southern runway." (Page 26).***

As explained above, it is anticipated that 90-95% of landing aircraft (all Codes) will land and cross the northern runway – without needing to hold between the runways.

A response to this particular point, about the spacing between the runways for holding Code C aircraft is provided in a separate note called "Note on York Obstacles and Safety points".

Matter 6: NRP Case - End Around Taxiways: risk of aircraft using EATS being an obstacle infringing departures on northern runway

York: ***"Larger aircraft would…have to use the end around taxiways but the end around taxiway is not spaced sufficiently from the runway threshold to allow independent taxiway and runway operations.… It has not been possible to fully assess the implications but we anticipate that, even in a best case scenario, none of the main commercial aircraft size categories would be able to taxi under the take-off climb surface of the Obstacle Limitation Surface (OLS) without their tail infringing the surface. This would mean that aircraft would have to be held and sequenced in between runway departures by Air Traffic Control (ATC), thereby increasing taxi times for arriving aircraft and adding workload onto ATC.." (Page 27).***

A response to this particular point, is provided in the separate note called "Note on York Obstacles and Safety points".

Matter 7: NRP Case - Departure Holding Delays – will departures holding times be increased?

York:

"We note that the same table* [PEIR AQ Appendix 13.4.1 (Table 3.7.2)] *suggests that departure holding delays are expected to reduce substantially with the development. Based on our analysis of departures, discussed earlier, we are not clear how this could be so and, indeed, reduced departure holding is not consistent with the stated requirement for the 15 hectare 'Charlie Box' for holding aircraft prior to departure for holding aircraft prior to departure." (Page 27).

Question 12: What assumptions have been made regarding line-up times on the northern runway and behind a landing aircraft on the southern runway?

Question 13: Where would aircraft departing from the northern runway be held (the departure queue) in easterly operations?

Holding times

As explained in the PEIR Consultation Overview Document (para 6.5.7) departure holding times will reduce compared to 2018 as a result of the NRP.

Based on the sequences illustrated in Matter 5, an optimal sequence can deliver up to 80 aircraft per hour from the two runways. The forecast busy hour rates are for up to 69 movements. In 2018, the maximum capability was 55 movements per hour and 55 were declared. The NRP schedule has a higher level of resilience planned (i.e. greater gap between 69 and 80, which is the actual anticipated capacity)

In simulations we have run for the northern runway project the maximum usage seen on the main runway was 48 movements - adding further to the resilience.

In single runway operations, departing aircraft are not cleared for take-off until an arriving aircraft has landed and departed the runway. In proposed dual runway operations departing aircraft on the northern runway will be cleared for take-off as soon as an arriving aircraft has touched down. Utilising the time arrival aircraft are taxiing on the main runway immediately following touchdown means that in dual runway operations departing aircraft don't have to wait for an arrival aircraft to clear the runway – reducing delays, and arrival aircraft separations can be reduced.

The results of the simulation modelling, including departure holding times, are provided in the separate note on the detailed simulation modelling.

Charlie Box

The proposed 'Charlie Box' holding area is a multi-functional area which can hold up to 16 Code C aircraft independent from live taxiways and close to the runway.

As well as holding for Northern runway it can be used to park aircraft and hold aircraft which are delayed due to external factors such as Air Traffic Flow Management (ATFM) delays.

The proposed configuration allows for accessibility of multiple aircraft, including those with a calculated take-off time (CTOT), in close proximity to both runways leading to optimal runway sequencing. This offers a significant improvement compared to current operations where holding occurs on taxiways. Currently departures from Northern Runway (in contingency use) must hold on live taxiways outside of safety zones in order not to infringe Northern Runway Obstacle Clearances,

blocking inbound and outbound traffic and limiting the ability to stage onto the runway. As result, emergency Northern Runway operations deliver much reduced ATM capacity.

Charlie Box will provide a multi-purpose manoeuvring area, which delivers several benefits compared to the existing configuration:

1. runway holding facility adjacent to Northern Runway, with aircraft placement and access bellmouths enables recommended holding geometry and minimises infringement of runway strip and obstacle clearances
2. adjacent taxiways are clear from aircraft holding in Charlie box, allowing unimpeded traffic flow around the box.
3. Enough space to reconfigure adjacent taxiways to allow inbound / outbound Code F routing from either runway direction.
4. Whole area (or parts) can be repurposed for 'Push and Hold', pass-through taxiway (max Code E) or overnight parking as required.

Assumptions on line-up times on the northern runway and behind a landing aircraft on the southern runway

Northern runway departures can line-up independently of arrivals on the main runway. In departure mode only one departure would be lined up at a time.

This happens at a number of other airports with closely spaced parallel runways e.g. LAX NC / Berlin Tegel / San Francisco.

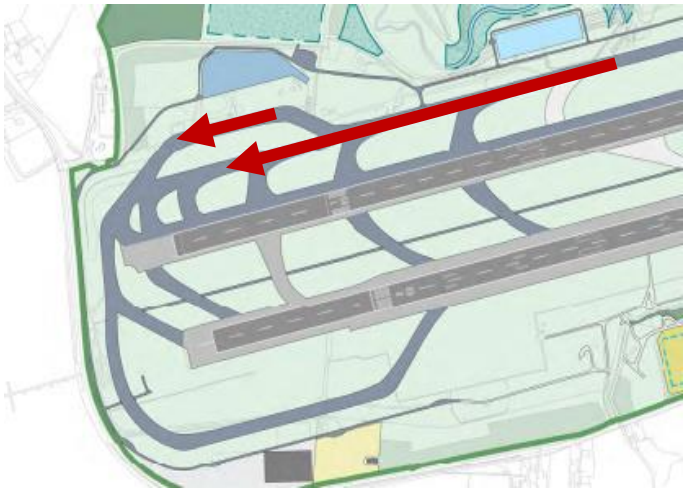
This leads to an optimised sequence where a departure can be given permission to take-off on the Northern Runway as soon as an arrival has touched down on the main runway, as per the sequences illustrated in Matter 5. The arrival then crosses behind the northern runway departing aircraft after it has taken off. Further information is provided in the simulation report.

Aircraft will be drawn forward from Charlie Box, prior to lining up, so that line up times are broadly equivalent to current operations on the main runway c. 20 seconds.

Where would aircraft departing from the northern runway be held (the departure queue) in easterly operations?

In easterly operations aircraft departing the northern runway would be held on Juliet Taxiway.

PEIR Volume One: Chapter 5 paragraph 5.2.16 refers to a new spur (known as the Taxiway Juliet West Spur) which would be provided to the north of the taxiway to provide a passing lane and allow ATC to effectively sequence aircraft for departure on the main and northern runways during easterly operations.



Matter 8: NRP Case - Taxiway Layout – Acceptability of varying Codes of Juliet Taxiway

York:

" … the parallel [Juliet] taxiway would be staggered …the westernmost section would cater for all aircraft sizes up to the largest code F …. The middle section would … allow for aircraft up to code E size, but the eastern section would only … allow for code C aircraft. While this approach is technically compliant, it is not in line with industry best practice for design of taxiway systems. The introduction of aircraft size constraint from one section to another along a straight length of taxiway effectively builds in risk of pilot error which can lead to taxiway delays and possibly aircraft accidents. The acceptability of this would need to be verified with the CAA" (Page 28).

A response to this particular point, is provided in the separate note called "Note on York Obstacles and Safety points".

Matter 9 and 10: NRP Case - Airline and Passenger Service Levels - Assertion that airfield layout is not operationally efficient

York:

" … Overall, the general layout of the Airport and its terminal and pier configuration, whilst commendable for fitting largely within the existing airport footprint, looks contorted and not operationally efficient. ... It is far from clear that the proposed layout would meet the requirements of [low fare] airlines and this could act as a deterrent to delivering the growth forecast. The views of the airlines will be important." (Page 30).

Q.18 ***Please provide further detail of the simulation modelling used to assess the capacity of the two runways in simultaneous use. What modelling tool was used? What were the rates of delay estimated for westerly and easterly operations?***

Q.19 Can a detailed report on the simulation modelling of runway capacity be provided?

Northern Runway Operations have been extensively tested using Simulation Software: AirTOP by Transoft Solutions.

We have fully modelled the airfield (on westerly and easterly operations in dual runway configuration).

A separate note is provided on the simulation modelling that has been undertaken both to assess the performance of the airfield and to inform proposed changes to its layout and configuration.

Whilst we are unable to provide the full simulation because it contains confidential information, we will be able to provide extracts from the fast time simulation modelling.

GAL do not accept that the layout of the airfield is operationally inefficient.

The design offers operational benefits:

- Lima extension provides dual taxi routings between Uniform and Lima
- Charlie Box provides an additional holding area accessible from multiple directions on the airfield and keeps departures away from the arrival taxi routes.
- Juliet bypass maintains sequencing capability for Easterly operations
- Additional Pier (Pier 7) located on Westerly side of the core airfield, away from traffic from other central piers.

The simulation results demonstrate the proposed airfield configuration performs better for departures in 2029 and 2038 than it does currently (2018 base). Whilst, as would be expected, as dual runway operations increase some of the benefits reduce, still there are reductions in departures taxi times and holding in 2038 compared to 2018.

Matter 11: NRP Case - Passenger Service Levels for Pier 7 - Viability and plausibility of remote Autonomous Vehicle operation to serve Pier 7

York:

"In relation to the terminals, our principal area of concern is with the proposed use of autonomous vehicles as the means of transport between both the South and North terminals and Pier 7… The distance of the illustrated route … appears to be c.350m and c.200m respectively, with a transit time of 10-15 minutes from the terminals to the Pier at an assumed speed of 20 mph. Furthermore, our understanding is that current AV technology vehicles carry only around 10 passengers. Hence, assuming average passengers per movement of around 190-200 on new generation Code C aircraft and 14 such aircraft all departing in the morning, would require well over 250 trips to service those flights … This does not seem plausible…"(Page 31).

Q.20 ***What type of AV vehicle is assumed to operate between the North and South terminals and Pier 7? What is the passenger capacity of each vehicle? What is the assumed journey time from each terminal to the pier?***

Terminal and Pier 7 Options

As reported in the PEIR Chapter 3, a range of options have been considered in relation to terminal and pier capacity, including the movement of passengers between the terminals and the piers,

The preferred option involving the proposed extensions to both the North and South terminals ensures the fewest consequential requirements for additional pier infrastructure and displaced areas requiring relocation.

The expansion of the North and South terminals includes the provision of passenger transition space to connect to an autonomous vehicle (AV) facility to access new Pier 7, assumed to be operational in 2034.

12 options were considered for providing additional pier capacity including alterations/extensions to existing piers and the creation of new piers, including remote piers. The location of these options is shown on Figure 3.3.5 (PEIR), reproduced below.

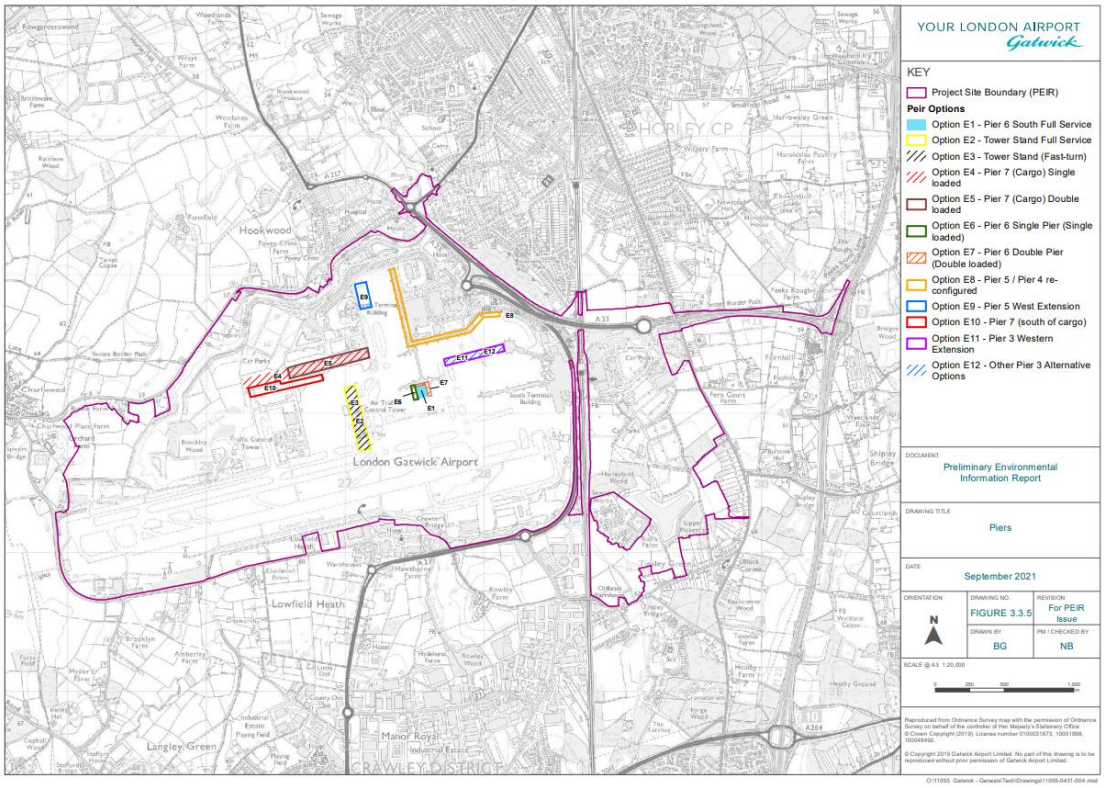
In relation to accessing remote piers (such as Pier 7), consideration was given to AV, "traditional" coaching, tunnel and bridge options to provide the necessary connection with existing airport passenger infrastructure. Tunnel and bridge options were dismissed. The volume of spoil created would cause significant environmental impact and the high water table at Gatwick presented major concerns. A bridge across two taxiways would be longer and higher than the current Pier 6 bridge (which is too low for the A380 to pass under). Any option would cause significant airfield disruption during construction, expensive, and visually impactful. Both bridge and tunnel options also offered poor passenger experience in terms of walking distances.

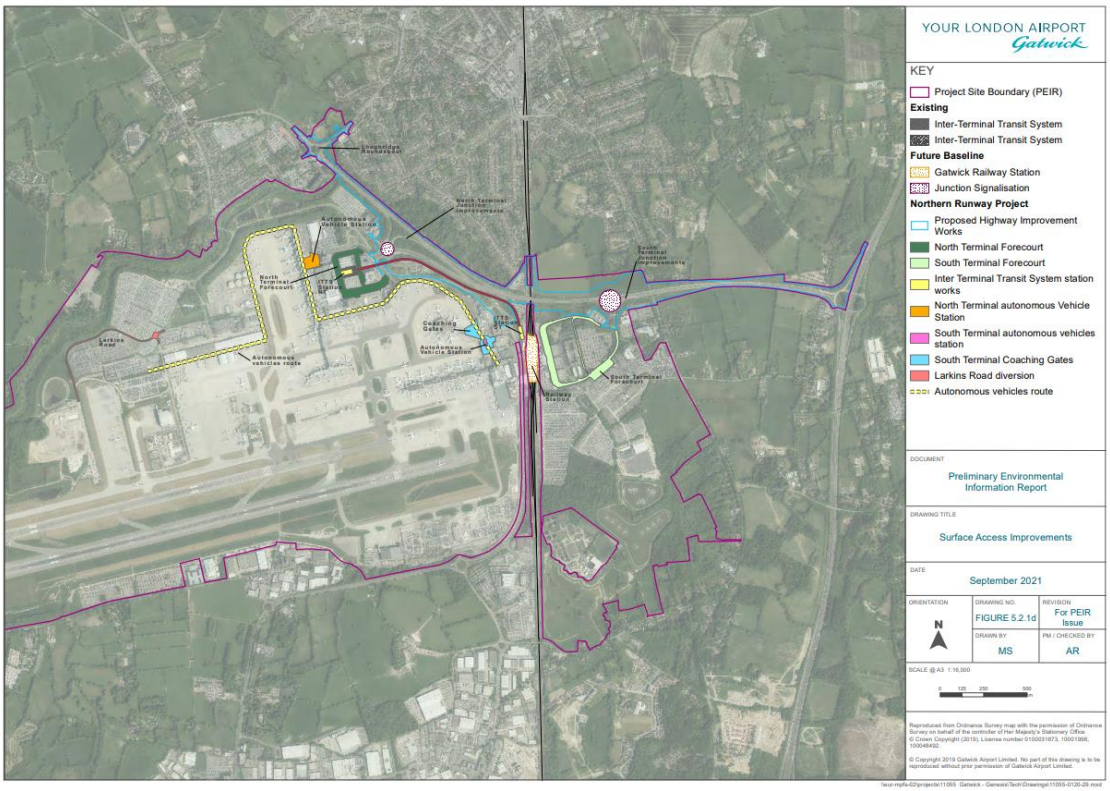
Option E10 (Pier 7 connected by AV) was selected as it performed best overall in terms of the selected assessment criteria namely, the operational and business case, planning, environmental and land use considerations.

This option benefits from proximity to the proposed Taxiway Lima extension. The linking of a newly constructed pier and associated stands in this location would provide for the optimum free-flow of aircraft on the taxiway system and avoid the risk of delays caused by congestion. The loss of car parking spaces can be re-provided in other parts of the airport.

The indicative airside route for the AV is shown on Figure 5.2.1d of the PEIR (reproduced below), which in part follows existing airside transit routes, ensuring that there is no crossover of taxiways etc which could otherwise cause congestion and delay and raise potential safety concerns.

Figure 5.2.1d also shows the location of the autonomous vehicle stations at the North and South terminals and the position of coaching gates at the South Terminal.





As regards the specific point raised by York about the plausibility of serving a remote Pier by AVs, the type of AV vehicle is assumed to operate and the assumed journey time from each terminal to the pier.

1. Automated vehicle technology is developing rapidly, and trials have already taken place in several UK location including London, Manchester, and Cambridge. In April 2022 Edinburgh started trials of the first full size driverless bus, which can carry 36 people. In May 2022 the Government launched a £40m competition to fund projects to help bring to market the latest developments in autonomous commercial vehicles with the aim of having vehicles in service by 2025. Given the developments to date and ongoing initiatives we consider it reasonable to assume that full size autonomous buses will be operational at the airport by the end of the decade.
2. Pier 7 is envisaged to operate as a satellite Pier – like Heathrow's Terminal 5 satellite piers, for example. Passengers would be called to the pier ahead of a specific gate. Once at the pier, they will be directed to their gate and board their aircraft via an airbridge.
3. The estimate AV journey times from North and South Terminals to Pier 7 are 3.5 minutes and 6 minutes, with a round trip taking 15 mins and 18 mins respectively, allowing for loading and unloading of passengers.
4. At this stage, we have not carried out detailed modelling of the shuttle operation but have made some high-level assessments based on an assumed level of operation. In the 2038 forecast the busiest hour is 07:00 with 69 ATMs, of which 36 would be departing ATMs. Assuming approximately 18 flights per terminal and 7 piers, Pier 7 might reasonably be expected to handle 5-6 of those departures. Assuming 36 passengers per AV, this gives a headline requirement for a shuttle leaving each of South and North Terminals every 4 minutes (a departing shuttle every 2 minutes). The 2038 forecast shows the 05:00 hour has fewer total ATMs but 48 departing aircraft. This would increase the number of aircraft potentially departing from Pier 7 to 8 and increase the frequency of shuttles from each terminal to one every 3 minutes for that hour.

	North Terminal	South Terminal
Peak ATMs per hour	69 ATMs	
Departures in the peak hour	36 departing ATMs	
Terminal split of the departing ATMs	18 ATMs	18 ATMs
Pier 7 departures	6 departures	
Passengers per aircraft	196 pax	
Total departing passengers per hour to Pier 7	588 pax	588 pax
Passenger per AV	36 pax	36 pax
No of trips	16 trips	16 trips
Distance from NT to Pier 7	1,800m	3,300m
Speed of vehicle	32 kph (20 mph)	32 kph (20 mph)
Journey time	3.5 mins	6 mins
Round trip (including 3 min load/unload)	15 mins	18 mins
No of AVs required	4	5
Departure frequency	Every 4 mins	Every 4 mins

Annex 8

Note on Simulation Report on Proposed Dual Runway Operations at London Gatwick Airport

2nd August 2022

Note on Simulation Report on Proposed Dual Runway Operations at London Gatwick Airport

1 Introduction

The purpose of this document is to provide details on the fast time simulations carried out on the proposed Northern Runway Operations at Gatwick airport. These simulations were undertaken by GAL and ThinkAero to test the capacity and throughput of the airport in dual runway operations and to inform the layout and configuration of proposed changes to the airfield.

This report summarises the fast time simulations. This report lays out the modelling baseline, key changes made to the configuration and operation, and significant outputs.

Real time simulations are also being carried out together with Air Navigation Solutions Limited (ANSL), which will continue with NATS under CAP670 / CAP760 guidance up to implementation. These simulations aim to confirm the concept as defined and Fast Time Simulation results in 'as real as possible' scenario, assess radio traffic and air traffic controller workload and will identify any enhancements that are needed to configure the Visual Control Room (VCR) and deliver optimum traffic flow in and out of the runways.

2 Modelling Software

Software: AirTOP by Transoft Solutions

Software capability:

- Stand/gate allocation and constraints
- Push/pull procedures
- Taxi flow control
- Runway entry and exit selection
- Runway sequencing
- Runway crossing
- SIDS and STARS routing and dependencies.

3 Calibration model

Before building dual runway simulation the current (Summer 2018) airfield design was modelled in AirTOP to provide a calibrated replica of the Gatwick operation as a basis for modelling the impact of dual runway operations. The calibration model was based on observations made at Gatwick in Summer 2018 peak months, reflective of the varying performance between different airlines, aircraft types and time of day. Both 26L (westerly) and 08R (easterly) operations were modelled in the calibration process. 26R and 08L (westerly and easterly use of the northern emergency runway) operations were not modelled as part of the calibration exercise as they are rarely in use in busy periods under current operations so there is a lack data and there are significant changes to how they will be operated under dual runway operation.

4 Dual runway model

The calibrated models for 26L and 08R were used as a basis to build the dual runway models for 26 and 08 operations. In the process of modelling the dual runway operation modifications were made to the airfield configuration, operation and schedule based on the simulation results. Changes such

as the design of the remote hold and exit usage were based on simulation results to improve the operational efficiency of the infrastructure. Further detail can be found in 6.3.

An overview on the final layout modelled and how this differs from the Baseline is provided in this section. The final design was informed by fast time simulation. There is a brief description of the iterations modelled in the results section.

4.1 Airfield configuration

The diagram in Figure 1 shows a still image of the airfield design used for modelling in AirTOP. Please note that some taxiway segments have been excluded from the simulation due to them being non-standard routes and therefore shouldn't be applied to normal operations.

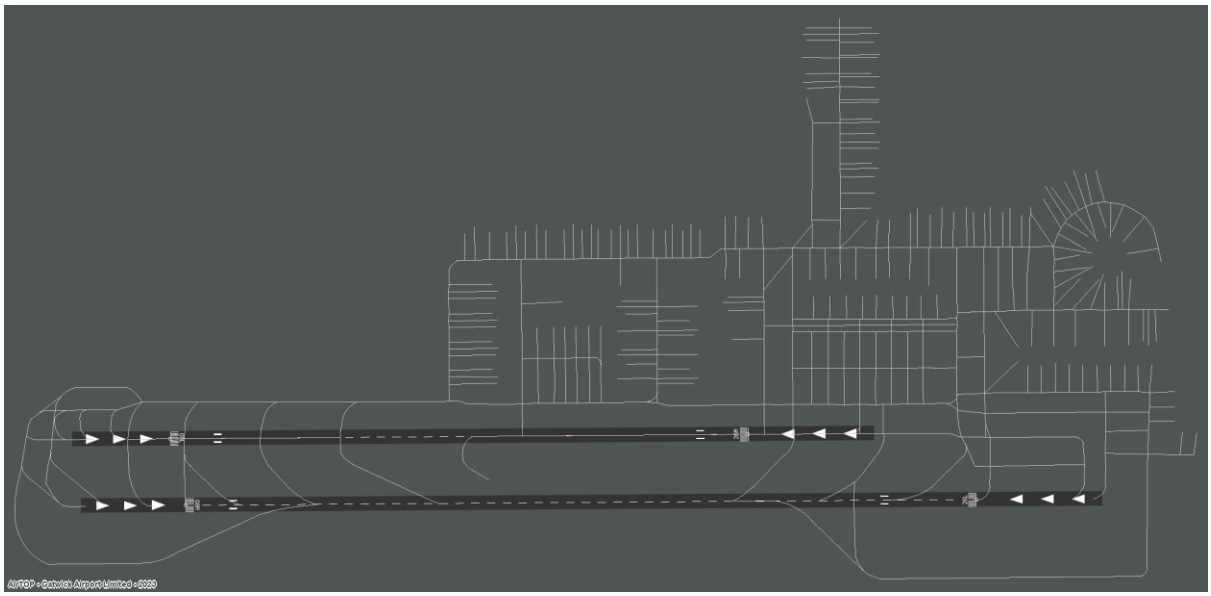


Figure 1. Gatwick Dual Runway operation airfield configuration from AirTOP

The key configuration changes compared to the baseline design are as follows:

- Northern runway centreline repositioned 12m further North
- The exit taxiways have been repositioned and all exits have been connected to Juliet.
- Each end of the runway has an end around taxiway
- Juliet has been re-aligned
- Stands previously known as 130's and 140's reconfigured into Charlie Box
- Kilo is now dual code C or single Code D to F
- Lima has been extended between Sierra and Uniform and linked to Tango
- Taxiways Whiskey, Victor and Zulu are reconfigured to accommodate Code E aircraft
- Centrelines:
  - Pier 6 extension completed & A380 stand moved to Pier 5, planned ahead of the NRP;
  - Pier 7 providing 23 centrelines (14 Code C / 9 Code E) north of taxiway Lima;
  - Provision of a new area of remote stands to be known as Oscar stands in the area to the north of Taxiway Juliet, between Taxiways Tango and Sierra;
  - Reconfiguration of existing areas of remote stands to allow for the reconfigured Taxiway Lima while retaining stands suitable for Code C aircraft;
  - Conversion of existing stands located to the west of Pier 3 to eight Code C fully serviced stands;
  - Removal and reduction of existing stands to allow for relocation of Taxiway Juliet East.

4.2 Airfield Operation

Simulation set up to run as per the CONOPs set out for dual runway operations, some of the key operational assumptions are listed here.

4.2.1 Mode of operation

The dual runway operation runs from 0500 to 2159 UTC, operations between 2200 to 0500 UTC are run as a single runway operation on the main runway.

During dual runway operations the main runway (26L/08R) is used for both arrivals and departures, the Northern Runway (26R/08L) is used only for departures which are Code C or smaller. As Code C departures can go on either runway they are allocated to a runway based on optimising the sequencing/reducing holding times.

4.2.2 Runway dependencies

Departure Departure separations

Minimum departure separation of 60 seconds is applied to all departing aircraft. No additional separation is applied on aircraft travelling on the same SID as this is assumed to be through means explained in Matters 3 and 4 of our main response. On top of this the Departure Wake Turbulence separations are also followed:

Table 1. Departure wake turbulence separations

		Trailing aircraft					
		Super Heavy	**Heavy**	**Upper Medium**	**Lower Medium**	**Small**	**Light**
Leading aircraft	**Super Heavy**	N/A	2min	3min	3min	3min	3min
	Heavy	N/A	90sec	2min	2min	2min	2min
	Upper medium	N/A	N/A	N/A	N/A	2min	2min
	Lower Medium	N/A	N/A	N/A	N/A	N/A	2min
	Small	N/A	N/A	N/A	N/A	N/A	2min
	Light	N/A	N/A	N/A	N/A	N/A	N/A

Departure before arrival separation – Whether departing from the main or northern runway

Arriving aircraft must be 2NM away from the threshold.

Departure after arrival

- Same runway: Arrival aircraft must have vacated the runway before departure start of roll
- Arrival main runway & Departure northern runway: as the arrival aircraft touches down on main runway the departing aircraft starts rolling, see Figure 2.

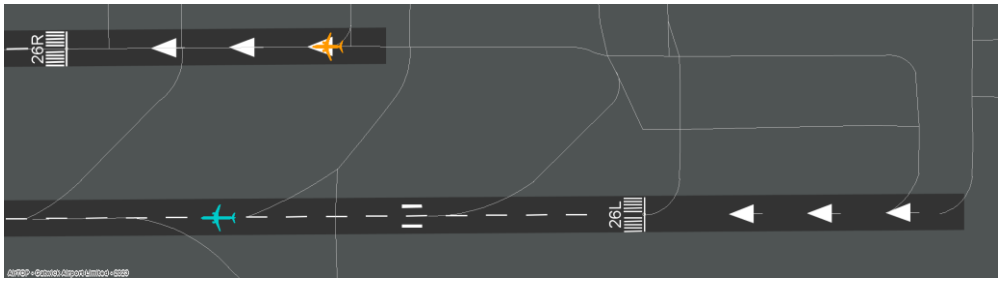


Figure 2. Arrival position when departure starts roll in Westerly operations

Permission will not be given for a departure on the northern runway if:

1. An airborne arrival is less than 2NM from the threshold
2. There is an arrival crossing Northern runway
3. There is a Code E on an exit taxiway or in close proximity to exit (second half of the runway).
4. There is a departure lined-up on the main runway.

- Other configurations not possible.

Arrival wake turbulence separations:

3NM applied as a minimum between any arriving aircraft, the maximum between 3NM and the value in the table below for the specific aircraft pairing is then applied.

Table 2. Arrival wake turbulence separation minima

		Trailing Aircraft					
		Super Heavy	**Heavy**	**Upper Medium**	**Lower Medium**	**Small**	**Light**
Leading aircraft	**Super Heavy**	4NM	6NM	7NM	7NM	7NM	8NM
	Heavy	4NM	4NM	5NM	5NM	6NM	7NM
	Upper medium	N/A	N/A	3NM	4NM	4NM	6NM
	Lower Medium	N/A	N/A	N/A	N/A	3NM	5NM
	Small	N/A	N/A	N/A	N/A	3NM	4NM
	Light	N/A	N/A	N/A	N/A	N/A	N/A

4.2.3 Stand/Gate allocation

Existing stand size and adjacency rules as per current airfield design (June 2019), Pier 6 extension provides additional Code C stands which are all independent, overnight parking can be seen in Figure 3.

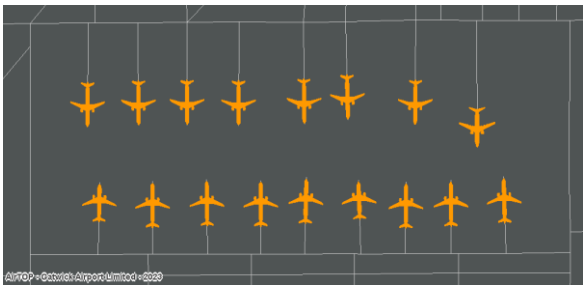


Figure 3. Pier 6, including finished extension, with 17 Code C aircraft

Pier 7 provides multi criteria apron (MCA) allowing for parking of up to 14 code Cs or up to 9 Es or a combination. Figure 4 shows Pier 7 occupied overnight by 14 Code C aircraft, please note layout of stands is indicative rather than the exact locations.

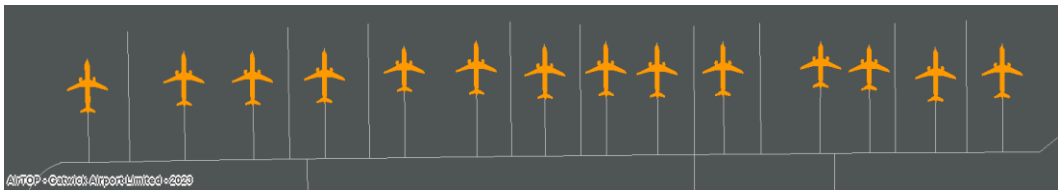


Figure 4. Pier 7 occupied by 14 Code C aircraft overnight.

Towing

Where applicable towing is simulated to maximise use of pier served stands and reflect the operational difficulties of targeting 95% pier service level on traffic flow of towing adding to complexity of traffic flow.

4.2.4 Taxiway Dependencies

The new taxiway dependencies created through the changes in procedure are as follows:

- Code F aircraft must use the Juliet bypass to be independent from Northern runway Code C departure operations
- Code E aircraft cannot travel on Juliet between Sierra and Whiskey when an aircraft is departing on the Northern runway
- The dual aircraft section on Kilo can only accommodate a single code D/E/F or dual code Cs.
- In 08 operations sections of Zulu, Mike and the Alpha box are in the Northern runway safety zone. This area was previously impacted when on 08L & 26R operations although this is now routinely the case and the area impacted has changed due to the repositioning of the centreline. As a mitigation the Charlie Box can be used as an arrival route.

Removal of dependencies due to works:

- Code Es can now travel on Juliet, between the Westerly end of the runway and Sierra, independent from Code C departures on Northern. Code F's can use Juliet until Uniform, when using the Juliet bypass independent on Northern runway operations.

4.2.5 Taxi speeds

Taxiing speed limit of 30kts is applied other than on runway exits. On top of this performance parameters of each aircraft are set which require aircraft to reduce speed whilst cornering and performance on acceleration and deceleration.

Maximum taxing speed are also applied by airline, direction of travel and aircraft type, based on observed behaviours in 2018. These range from 15kts to 22kts on arrival and 10 to 15kt on departure for 26 operations. On 08 the observed maximum speeds vary due to the standard taxiways travelled to reach the runway/stands. Finally, a variation of ±3kts is applied to the maximum possible taxi speeds of each aircraft during the simulation.

Table 3. Maximum taxi speed set in AirTOP

Airline	Aircraft type	Maximum speed 26 operations	
		Arrival	Departure
A*	Medium	15	15
B	Medium	17	11
	Heavy	15	10
C	Medium	17	15
D	Heavy	18	12
E	Medium	17	14
	Heavy	15	14
F	Medium	22	15
G	Medium	16	15
H	Medium	16	15
I	A380	17	15
J		16	15

*Airlines redacted

Towing speed: 10kts

4.2.6 Runway Exits

In dual runway operations there are 5 runway exits available from the main runway plus end around taxiways. There will be no rapid exit taxiways (RETs) in use during dual runway operations.

The main mode of operation will be for arrival aircraft on the main runway to cross the northern runway without holding. The arriving aircraft will taxi to an exit and cross straight over behind a Northern runway departing aircraft. This is possible as departing aircraft on Northern runway should have cleared all the exits by the point the arrival aircraft is looking to cross (see Figure 2 above and Figure 5). If the departure hasn't cleared the exits the arriving aircraft can still wait on an exit taxiway as per the holding on exit taxiway criteria listed below.

Arriving Code F aircraft are still assumed to use the end of the runway to exit, a gap will be created on the Northern runway for any Code F aircraft to cross straight over the Northern runway safety zone. In the forecast this happens three times a day and capacity lost due to this movement is accounted for in the results.

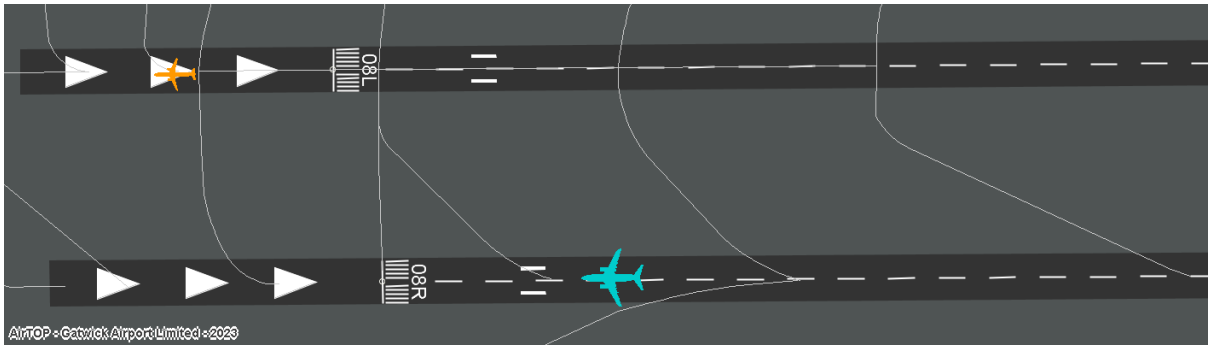


Figure 5. Position of departure when arrival is crossing

Holding on the Exit Taxiways:

- All aircraft can hold on the exit taxiways between main and northern runways although if an aircraft larger than a Code C holds the main runway cannot be utilised, hence any aircraft above a Code C is given priority to cross the Northern runway before a departure from the northern runway so as to prevent go arounds from occurring.
- Only a single aircraft can hold on each runway exit.
- Aircraft will cross the Northern runway at the earliest opportunity, i.e. runway is clear or once departure aircraft has cleared the exit.
- The end around taxiways are only used as a safety measure hence were not simulated in the final results.

Speed:

- Exit speeds are reduced due to the reconfiguration of the exits. The maximum possible exit speed ranges from 30 to 36kts depending on the exit.
- This in turn increases the runway occupancy times for arrivals on average by 5 seconds.

4.3 Schedule

Two spot years were selected for simulation 2029 and 2038. As per the summer capacity declaration process a busy day in August was selected to assess the impact of the proposed changes. The busy day schedule covers a 24-hour period along with any movements linked to the movements on that day but arriving the day before or departing the day after. The breakdown of the 2038 schedule is shown in Figure 6.

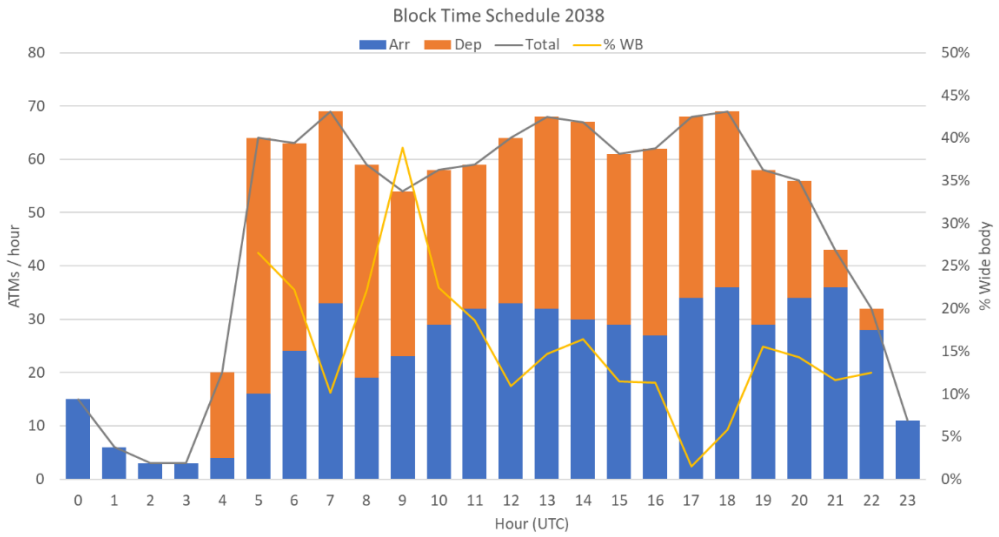


Figure 6. NRP 2038 simulation schedule

Flights in the baseline schedule have been linked to the associated arrival flown in 2018 where possible. Any new flights added to the schedule have either been assigned another new flight to be linked to or have caused re-linking of the Baseline schedule.

5 Simulation Parameters

Iterations: 10

Simulation period: Core simulation period was a 24-hour busy day period, in addition the flights linked to this busy day, i.e. overnight aircraft from the day before and into the day after, were also simulated. The results were extracted from the Busy Day only.

Conditions: Clear weather was assumed

6 Results

The simulation modelling demonstrates that the busy day schedule in 2029 and 2038 is viable in both westerly and easterly operations with the proposed infrastructure. The results also show there is a benefit to departure operations from the dual runway operation.

6.1 Westerly Operations

As shown in the simulation results table (see Table 4), between 2018 and 2029 there is a 43% decrease in runway holding time and 33% decrease in overall taxi time (including runway holding). There has been an increase in arrival taxi times of 2% - due to the decrease in arrival holding the overall impact is low.

As the forecasted schedule increases the benefits reduce, although still providing a better performance than 2018. The schedule in 2038 shows a 11% decrease in runway holding and 17%

decrease in overall departure taxi time. In this case the arrival taxi time has increase by 7% - this impact is mitigated by the slight reduction in arrival holding and greater reduction in departure taxi-time.

Table 4. Simulation results for Westerly operations

Performance Indicator	Measure	26 Direction			Change	
		Peak Summer 2018	2029	2038	2029 v 2018	2038 v 2018
Taxi Time - Departures	Average (mean)	**19.19**	**12.95**	**15.95**	**-6.24**	**-3.24**
Taxi Time - Arrivals	Average (mean)	**8.78**	**8.97**	**9.37**	**+ 0.19**	**+ 0.59**
Runway Holding	Average (mean)	**7.15**	**4.04**	**6.37**	**-3.11**	**-0.78**
Airborne Holding	Average (mean)	**3.93**	**2.95**	**3.66**	**-0.98**	**-0.27**

The throughput by time of day based on the schedule modelled is shown in Figure 7, the runway throughput is a factor of the demand presented as well as the capability.

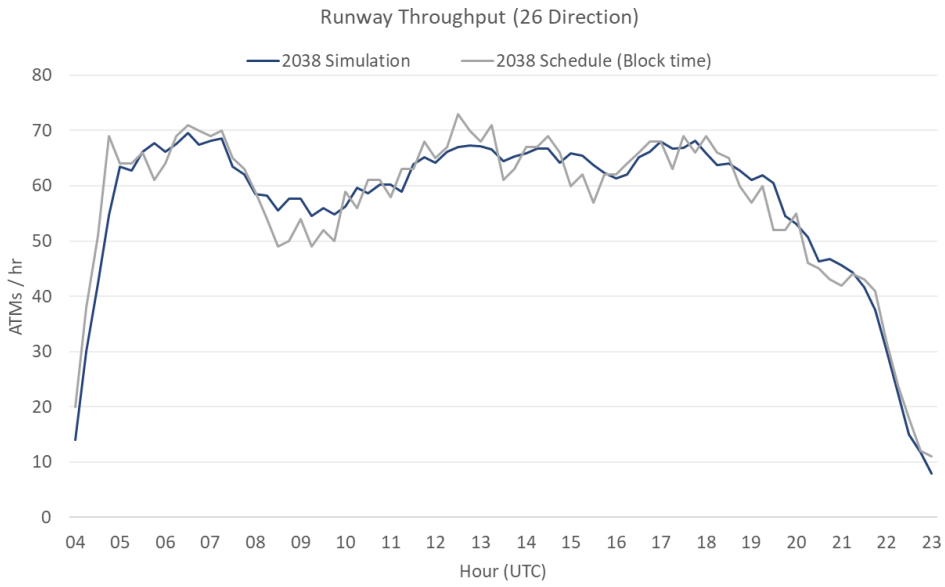


Figure 7. Runway throughput achieved in 2038 NRP simulation vs. scheduled demand

Figure 8 below shows the departure taxi times by time of day for the dual runway operation compared to the August 2018 performance. Through much of the day departure taxi times remained lower than 2018. The end of the day spike is due to a low number of aircraft and this spike is cut off as it was the last departure to go.

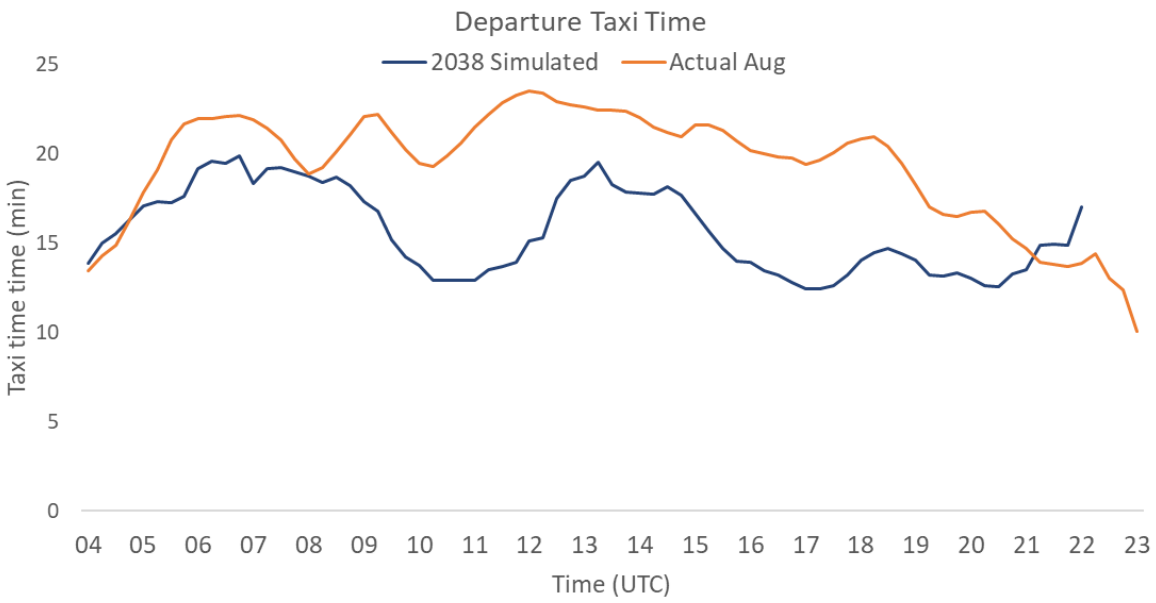


Figure 8. Departure taxi time delay profile compared to 2018

Figure 9 shows the arrival taxi-times by time of day for dual runway operation compared to the August 2018 performance. It can be seen the increase in arrival taxi time is across the full day although less severe in the arrival heavy periods at the end of the day. The peak in the morning is based on a very low number of arriving aircraft which are impacted by departures, this is true of both 2018 actuals and 2038 simulated results.

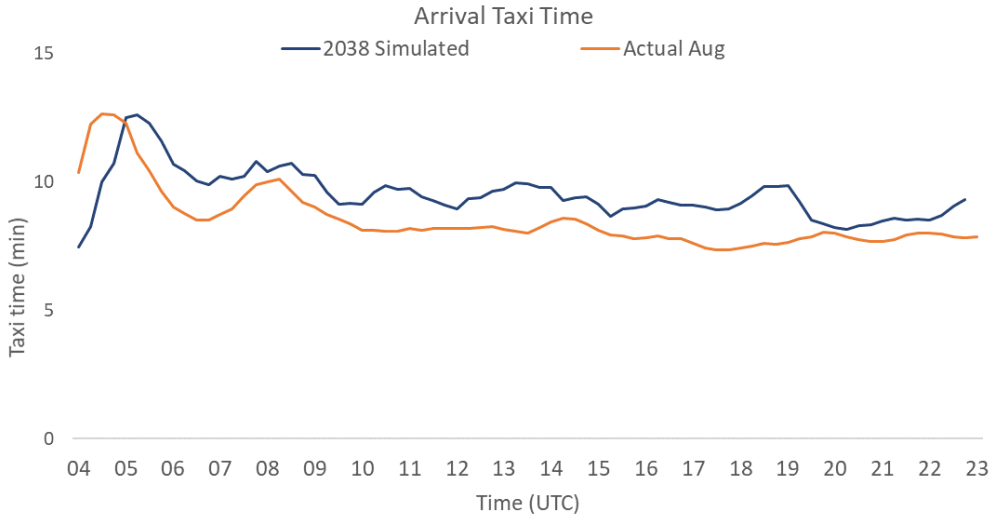


Figure 9. Arrival Taxi times comparison

Based on the decisions made through the simulation, the runway usage for each runway is shown in Figure 8. The average number of movements using the main runway in an hour reached a maximum of 48 in 0700. In the higher arrival hours, the proportion of departures using the northern runway increased to optimise holding times.

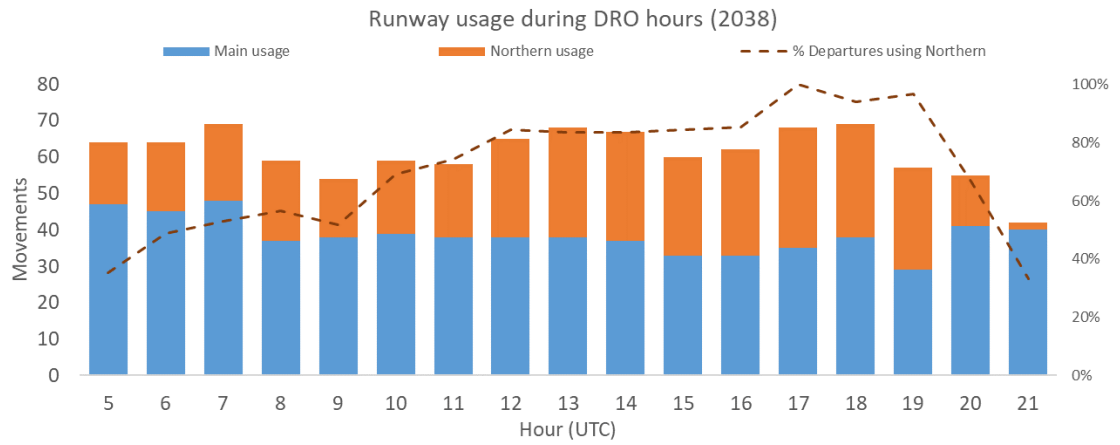


Figure 8. Runway usage 26 direction

6.2 Easterly Operations

In August and September, when the schedule number of movements peaks, the main mode of operation is in Westerly (26) direction, as shown in 2019 data in Figure 9. This means the data available for Easterly operations on peaks days is limited and less weighting is given to the performance on these days.

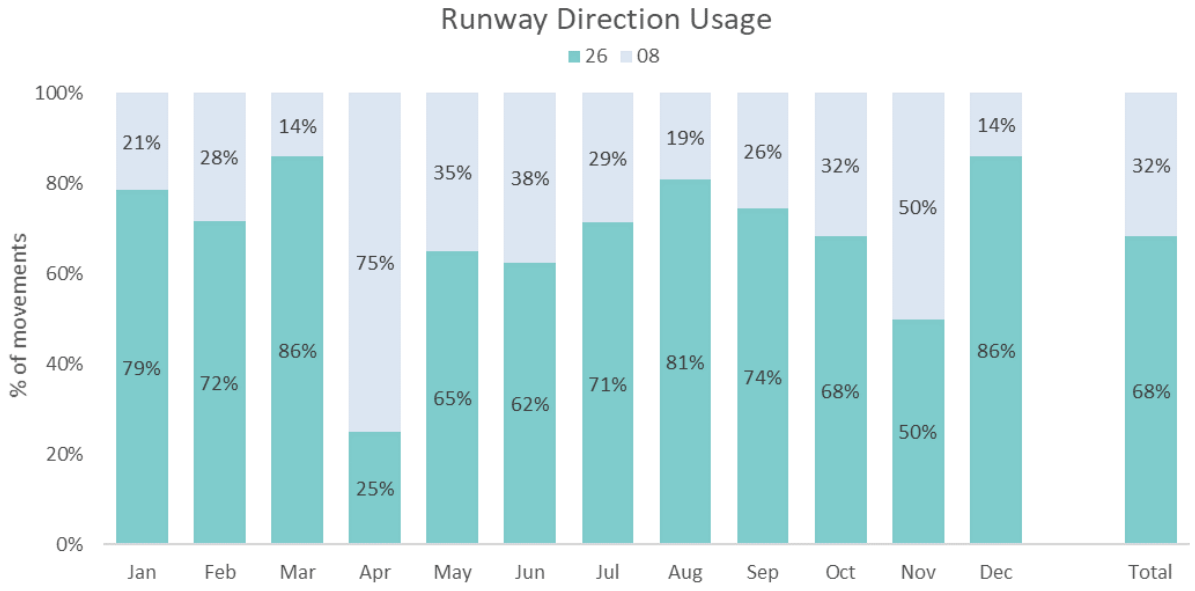


Figure 9. Runway direction utilisation

There will still be a proportion of days which will need to operate in Easterly (08) configuration. The summary simulation results for 08 operations are shown in Table 5.

Table 5. Simulation results for Easterly Operations

Performance Indicator	Measure	08 Direction			Change	
		Peak Summer 2018	2029	2038	2029 v 2018	2038 v 2018
Taxi Time - Departures	Average (mean)	20.68	17.70	20.11	-2.98	-0.57
Taxi Time - Arrivals	Average (mean)	5.76	5.92	6.19	+0.16	+0.43
Runway Holding	Average (mean)	Not accurate*	4.86	6.89	n/a	n/a
Airborne Holding	Average (mean)	5.09	3.87	5.43	-1.22	+0.34

Actual runway holding is measure through virtual gates set up on the airfield which measure the time aircraft remain in the classified holding areas. The 08 holding operation result in holding times not being accurately measured in actuals. The best data point for comparison is the overall taxi time which includes holding time.

The simulations demonstrate the proposed busy day schedules are achievable with the proposed infrastructure. There are significant holding time benefits when operating in westerly direction, the main operation mode during peak months.

6.3 Other Simulation Outputs

Optioneering on the airfield design has been carried out for key elements of the airfield such as the location of Pier 7, the design of the runway hold discussed in 6.3.2, lima extension, and Juliet aircraft size capability although not with the finalised busy day schedule. The final airfield configuration was modelled with the stated busy day schedule in both easterly and westerly operations.

6.3.1 End around taxiways

Initial simulations utilised the end around taxiways for Code E aircraft rather than crossing Northern Runway. This resulted in Code E aircraft waiting for significant periods of time c. 20 minutes for a natural gap in operations to provide clearance to cross the safety zone at the end of each runway. ATC would be able to create gaps, although this would impact capacity and holding times. Based on the simulation outputs the decision was made to change the concept of operation to allow wide body aircrafts to use the standard exit and cross the Northern runway after the departure had cleared the exit location. All subsequent simulations used Code E land and cross via. the exit taxiways as standard operation rather than the end around taxiway.

6.3.2 Runway holds

Westerly mode of operation was tested with varying holding designs:

Charlie Box configuration

- 16 Code C hold points away from live taxiways
- Kilo: suitable for Code E & Code F
- Independent Pier 6 south pushbacks and hold access via Kilo dual taxiway configuration.

Beta Box configuration

- 16 Code C hold points away from live taxiways
- Kilo single aircraft taxiway up to Code E
- Code F departure taxi via northern runway
- Code E departure taxi via Lima due to congestion on and around Kilo.

Juliet Box

- Juliet dual Code C between Quebec and Papa with 8 hold points
- Arrivals rerouted to Kilo or Lima during heavy departure period.
- Low cost, as it maintained centrelines on the 130's and 140's it was ruled out based on ATC workload requirements.

The result of this comparison was that ground controller workload would be prioritised over cost which led to selection of Charlie Box as it alleviated congestion on Kilo and Juliet and allowed holding away from live taxiways.

7 Conclusion

Detailed simulation modelling has been carried out for NRP. This report summarises the fast time simulation modelling and results. The modelling, carried out using AirTOP, has considered the proposed design, operating concept and constraints proposed for the dual runway operation to optimise the layout and determine the impact.

The simulation results demonstrate the proposed airfield configuration performs better for departures in 2029 and 2038 than it does currently (2018 base). Whilst, as would be expected, as dual runway operations increase some of the benefits reduce, but reductions in departures taxi times and holding in 2038 compared to 2018 remain.

*Please note pictures of simulation are not to scale

Annex 9

Response to Issues Raised in York Aviation Report related to obstacles and Safety

2nd August 2022

YOUR LONDON AIRPORT Gatwick

Response to Issues Raised in York Report related to Obstacles and Safety

Introduction

In section 4 of the York report, in the section called 'With Development - Other Airfield Considerations' (pages 26 and 27), York raise three matters that question compliance of the proposed airfield layout with CAA requirements with implications for operations:

1. Acceptability and space for Code C aircraft to hold between the runways
2. End Around Taxiways not being sufficiently distant from the main and northern runway thresholds to allow independent taxiway and runway operations
3. Multi coding of reconfigured Juliet taxiway.

Each of these points are considered in turn below.

It is also firstly important to be aware, as would be expected, that GAL's proposals have been informed by engagement with the CAA since 2018 and are continuing on a range of matters related to the design and configuration of the airfield against EASA standards and regulatory requirements[1] and operational planning, with a view to reaching a Statement of Common Ground with CAA.

Based on those discussions, we fully expect that the DCO submission will include a letter from the CAA confirming 'No Obvious Impediments' to the proposals in support our DCO submission.

As regards the three points raised by York:

1. Acceptability and space for Code C aircraft to hold between the runways

York comment as follows

> *"It is not completely clear if GAL expects the main runway to continue to be used for arriving aircraft (or departing aircraft) while an aircraft is holding between the runways. We have assessed the implications of holding a code C aircraft between the runways and consider that, given the limited distance between the two runway centrelines, it would give rise to a high risk of aircraft being considered an obstacle and so preventing the following arrival from landing or even impeding an aircraft taking off from the southern runway." (Page 26).*

York are correct in their assertion that, to accommodate the largest Code C aircraft clear of the runway strips, particular attention is needed to infrastructure design and to airfield operations. Standard stop bar arrangements (10m ahead of the nose of a narrow body aircraft i.e. Code C or smaller) would not be appropriate.

We are not proposing conventional stop bar configurations on the runway exits. Rather we anticipate the use of offset stop bars with related airfield signage which would be visible to pilots enabling them to position different types of Code C aircraft clear of both runway strips a minimum of 90m clear of the southern runway centreline and 75m clear of the northern runway centreline. The detail of these arrangements is being worked up with the CAA and they may be reinforced with

[1] Following the transition of EASA regulations into UK law, regulatory references are now in accordance with 'Regulation (EU) No 139/2014 as retained (and amended in UK domestic law) under European Union (Withdrawal) Act 2018'. References to rules are currently contained in UK's CAP2032A00 and Acceptable Means of Compliance (AMC) and Guidance Material (GM) are contained in UK's CAP2032A.

other measures such as autonomous runway incursion warning system (ARIWS) which would ensure separation between aircraft crossing the live runway and the arrivals or departures.

We are confident of obtaining CAA's agreement to non-standard stop bar arrangements to enable holding of Code C aircraft between the runways when required.

2. End Around Taxiways not being sufficiently distant from the main and northern runway thresholds to allow independent taxiway and runway operations

York comment as follows:

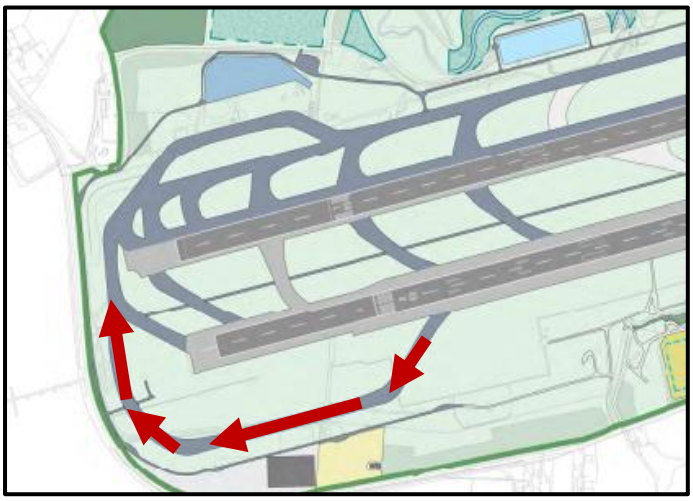
> *"Larger aircraft would…have to use the end around taxiways but the end around taxiway is not spaced sufficiently from the runway threshold to allow independent taxiway and runway operations…. It has not been possible to fully assess the implications but we anticipate that, even in a best case scenario, none of the main commercial aircraft size categories would be able to taxi under the take-off climb surface of the Obstacle Limitation Surface (OLS) without their tail infringing the surface. This would mean that aircraft would have to be held and sequenced in between runway departures by Air Traffic Control (ATC), thereby increasing taxi times for arriving aircraft and adding workload onto ATC.." (Page 27).*

York are correct that the End Around Taxiways (EATs) are within the runway safety zones, hence aircraft using them would require clearance to cross the ends of the runways.

However, as explained elsewhere in our response it is anticipated that 90-95% of landing aircraft (all Codes) will land and cross the northern runway – without needing to hold between the runways – 'End and Cross Behind'.

The end around taxiways do, however, provide a safety measure for aircraft larger than Code C to use when runway crossing is not available, in a similar way that holding between runways will provide for Code C aircraft.

EAT at Western End of Airfield



We are not convinced that they are strictly necessary, but the CAA have requested their inclusion because they would offer an additional outlet / safety measure in all situations where the arrival is not clear to cross the northern runway whilst being required to vacate the southern runway. They

would also offer additional resilience in planned emergencies, where the emergency can be directed away from the live runway onto the EAT.

The use of the EATs would (if used) increase arrival taxiing time for those flights due to the increased distance and waiting for clearance to cross the runway ends, which is further reason to believe that they will not be routinely used.

3. Multi coding of reconfigured Juliet taxiway.

York comment as follows

> *" … the parallel [Juliet] taxiway would be staggered …the westernmost section would cater for all aircraft sizes up to the largest code F …. The middle section would … allow for aircraft up to code E size, but the eastern section would only … allow for code C aircraft. While this approach is technically compliant, it is not in line with industry best practice for design of taxiway systems. The introduction of aircraft size constraint from one section to another along a straight length of taxiway effectively builds in risk of pilot error which can lead to taxiway delays and possibly aircraft accidents. The acceptability of this would need to be verified with the CAA" (Page 28).*

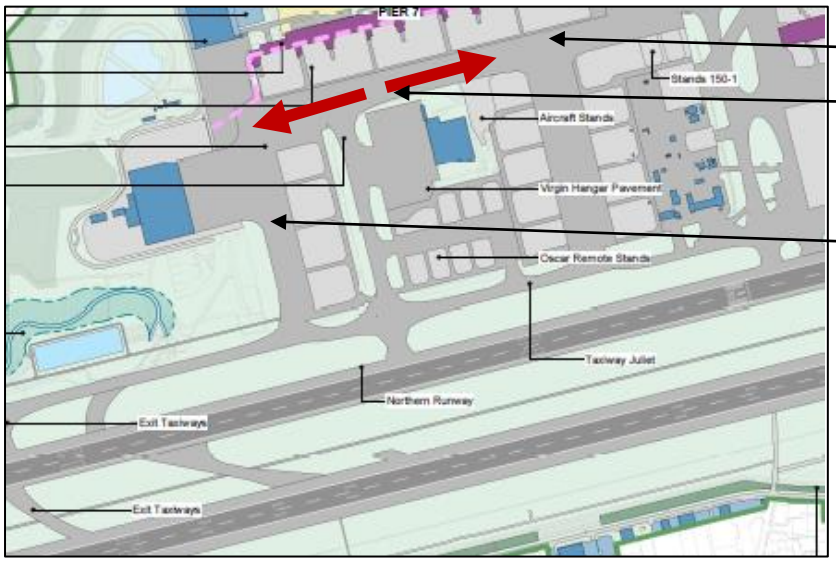
As noted, Juliet taxiway has been designed as a Code F taxiway west of Uniform, Code E taxiway between Uniform and Sierra and Code C taxiway east to Sierra.

The proposed arrangement is in fact not dissimilar from the current multi code taxiway arrangements of Juliet (which is configured for Code 'C' aircraft between Whiskey and November and Code 'F' aircraft from November westward).

The proposed configuration has been assessed and evaluated by the CAA. The taxiway will have clear standard signage designating all of the taxiways, and guidance will be provided by the ATCO (Air Traffic Controller – Ground Movement Controller) e.g. they will instruct aircraft to taxi until Uniform, turn left into Uniform; this can be enhanced with the provision of dynamic taxiway lighting i.e. 'follow-the-greens' system, whereby the correct centreline for the aircraft to follow is lit up and others are suppressed. Furthermore, we will install and utilise stop bars at appropriate points to clearly notify and prevent aircraft from using the wrong taxiway, directing larger aircraft types to turn off Juliet taxiway as required. The CAA have not raised any concerns about the proposed safety, design or concept of operation on Juliet taxiway. We are confident that the proposed arrangement, as with the current arrangement, will be agreed by the CAA.

It is acknowledged that the configuration does have implications for Code E and F aircraft not being able to use the full length of Juliet taxiway. Larger aircraft will taxi to and from the western end of the airfield via the proposed new 'Lima' link between 'Uniform' and 'Lima'. This link would also provide dual taxi routings between Uniform taxiway and the rest of the main apron area to the east.

Proposed 'Lima' Taxiway Link



Existing Lima Taxiway

Proposed Lima Taxiway Link

Existing Uniform Taxiway