

3. Scheme need and alternatives

3.1 Introduction

- 3.1.1 Schedule 4 of the *Town and Country Planning (Environmental Impact Assessment) Regulations 2017*¹ (hereafter referred to as the 'EIA Regulations') requires an Environmental Statement (ES) to consider the reasonable alternatives to the proposed development which '*may include development design, technology, location, size and scale*'. This chapter of the ES considers such alternatives in the context of the wider need and drivers for the Proposed Development.

3.2 Need for the Proposed Development

- 3.2.1 This section describes the need for the Proposed Development, which is influenced by the following factors:
- Demand factors demonstrated by forecast passenger growth and aircraft movements;
 - The economic importance of Bristol Airport and the wider aviation sector to the local and regional economy; and
 - Policy support for airport growth and making the best use of existing airport capacity.

Passenger growth

International and UK airport passenger growth

- 3.2.1 Over the past three decades, the aviation sector has undergone significant expansion providing much greater levels of national and global connectivity. Since the early 1990s, the dominant trend has been one of global growth, with the UK being a significant contributor through its network of national (intercontinental) and regional airports. In 2015, there were 3.3 billion passengers worldwide, an increase of over 2 billion passengers since 1990, with the global demand for seats growing on average by 5.5% annually².
- 3.2.2 In 2017, more than 284 million passengers travelled through UK airports compared to 102 million in 1990; since 2011, the average rate of growth has been circa 4.4% per annum. This increase in demand for air transport is forecast to continue in the period up to 2030 and beyond. With growth constrained by terminal and runway capacities, the Department for Transport (DfT) forecasts³ indicate that national demand will rise to 315 million by 2030 (central scenario) and up to 410 million passengers in 2050. With no such constraints, the DfT forecasts that demand will rise to 355 million by 2030 (central scenario) and up to 495 million passengers in 2050.

¹ The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (SI 2017/571), [online]. Available at: <http://www.legislation.gov.uk/uksi/2017/571/contents/made> [Checked 16/03/2018]

² Parliament UK (2017) Aviation Sector Report, [online]. Available at: <https://www.parliament.uk/documents/commons-committees/Exiting-the-European-Union/17-19/Sectoral%20Analyses/5-Sectoral-Analyses-Aviation-Report.pdf> [Checked 09/11/2018].

³ DfT (2017) UK Aviation Forecasts: Moving Britain Ahead, [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/674749/uk-aviation-forecasts-2017.pdf [Checked 12.11.2018].

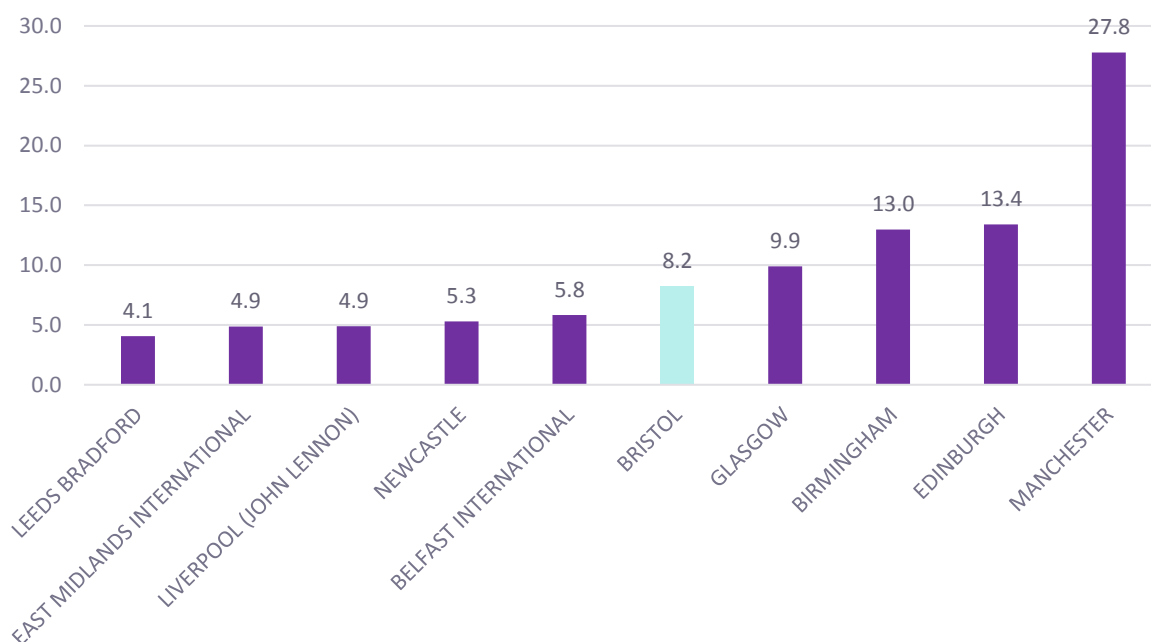
Regional airport passenger growth

- 3.2.3 Like the UK as a whole, regional airports (and particularly larger regional airports such as Bristol Airport) outside of London have grown strongly. Between 2011 and 2017, regional airports in the UK grew by around a third, from circa 85 million to over 113 million passengers with the rate of this growth being greater than that experienced by the six London airports in recent years (collectively, regional airports experienced a growth of 7.8% in the period 2016-2017, compared to London airports which grew by 4.8%).⁴
- 3.2.4 In this context, the Government has supported the recommendation of the Airports Commission stating in *Beyond the horizon: The future of UK aviation*⁵ that, if the UK is to continue to grow its domestic and international connectivity, and before a new runway is built at Heathrow, then there is a need for existing runways throughout the UK to be used more intensively, making best use of existing capacity. Even with a third runway constructed at Heathrow, DfT forecasts indicate that additional regional airport capacity will be required to meet passenger demand and support economic development.

Bristol Airport passenger growth

- 3.2.5 Bristol Airport opened at Lulsgate Bottom in May 1957 on the site of a former World War Two (WWII) experimental fighter station, Royal Air Force (RAF) Lulsgate Bottom. For six decades, the airport has served passengers travelling to and from the South West of England and South Wales, enabled by ongoing investment in infrastructure, services and facilities. Today, the airport handles more than 8 mppa, making it the fifth largest regional airport in the UK and the third largest regional airport⁶ in England (refer to **Figure 3.1**).

Figure 3.1 Top 10 UK regional airports by passengers in 2017 (millions)



Source: CAA Statistics

⁴ CAA (2017) Airport data 2017.

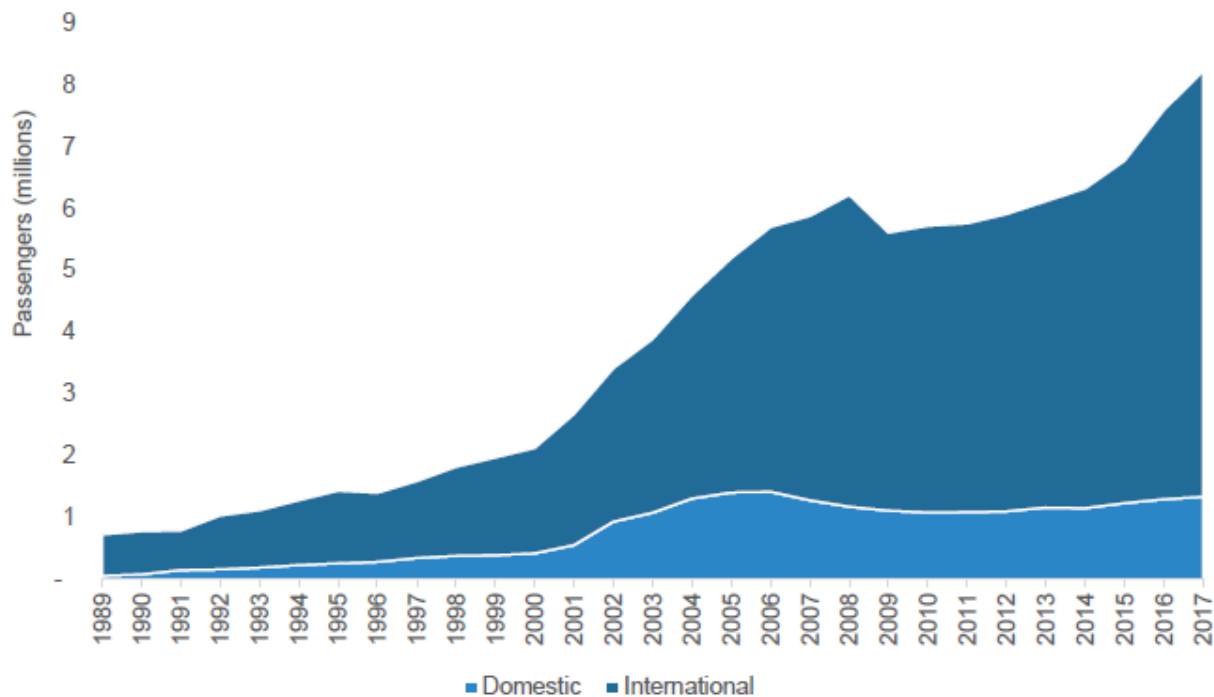
⁵ DfT (2017). Beyond the horizon: The future of UK aviation, [online]. Available at: <https://www.gov.uk/government/consultations/a-new-aviation-strategy-for-the-uk-call-for-evidence> [Checked 27/07/2018].

⁶ Regional airports in the UK include Southampton, Norwich, Southend, Bristol, Cardiff, Bournemouth, Birmingham, East Midlands, Coventry, Manchester, Newcastle, Liverpool, Leeds, Bradford, Durham Tees Valley, Doncaster – Sheffield, Humberside, Blackpool, Glasgow, Edinburgh, Aberdeen, Prestwick, Inverness, Belfast International and Belfast City.

Historic passenger growth

- 3.2.6 Bristol Airport has grown every year except one since 1989 and following a small dip in 2008/9 (reflecting the global financial crisis) is now in its eighth successive year of growth, with passenger numbers increasing by 40% (from 5.8 mppa to 8.2 mppa) between 2011 and 2017 (refer to **Figure 3.2**). This reflects growth in demand within the South West as well as the UK as a whole and has been supported by the continued development of the airport for which investment totalled over £160 million between 2010 and 2017.

Figure 3.2 Bristol Airport passenger traffic 1989-2017



Source: CAA

- 3.2.7 The majority of Bristol Airport passengers travel internationally (over 80% during 2017) and this is a continuation of historical trends observed at Bristol Airport over the last 30 years. International traffic has accounted for over 80% of the total since 1999, growing in recent years at an average of 5.5% per annum (2009-2017) compared to 2.3% for domestic traffic.

Catchment

- 3.2.8 Bristol Airport is a regional airport, serving a regional catchment including urban and rural areas across the South West. The airport's main catchment area comprises North Somerset, the West of England (which includes North Somerset, City of Bristol, Bath & North East Somerset, and South Gloucestershire), as well as the wider South West region and South Wales.
- 3.2.9 Bristol Airport operates in a competitive market, with a number of other airports drawing passengers from the South West, including nearby Cardiff Airport, but also London Heathrow and Gatwick which results in leakage from the region. According to the latest CAA Passenger Survey

available⁷, in 2015 the airport's market penetration across the South West was relatively strong in domestic and short haul markets (68% and 46% respectively).

- 3.2.10 The Economic Impact Assessment⁸ highlights that around half the business passengers using Bristol Airport begin their journey from the West of England, of which the majority come from the City of Bristol. The 'Near South West' (which includes Wiltshire, parts of Somerset, Dorset, and Devon) accounts for around a third of business passengers using the airport whilst Cornwall and South Wales account for almost 20%, despite the existence of Exeter and Cardiff Airports. This underlines the importance of the greater frequency and breadth of connectivity Bristol Airport provides.

Passenger profile

- 3.2.11 In common with all UK airports, Bristol Airport serves UK originating and overseas originating passengers and those travelling for both business and leisure (including passengers visiting friends and family). As shown in **Table 3.1**, leisure passengers make up the largest of proportion of travellers at Bristol Airport (83.5%), with UK passengers the greater part of this (70.8% of total passengers).

Table 3.1 Types of passengers at Bristol Airport in 2015

		Scheduled Domestic	Scheduled International	Scheduled Total	Charter International	Total
UK	Business	7.4%	5.5%	12.9%	0.0%	12.9%
	Leisure	11.2%	48.7%	60.0%	10.8%	70.8%
	Sub-Total	18.6%	54.2%	72.8%	10.8%	83.7%
Foreign	Business	0.1%	3.5%	3.6%	0.0%	3.6%
	Leisure	0.4%	12.1%	12.5%	0.3%	12.7%
	Sub-Total	0.5%	15.5%	16.1%	0.3%	16.3%
Total		19.2%	69.7%	88.9%	11.1%	100%

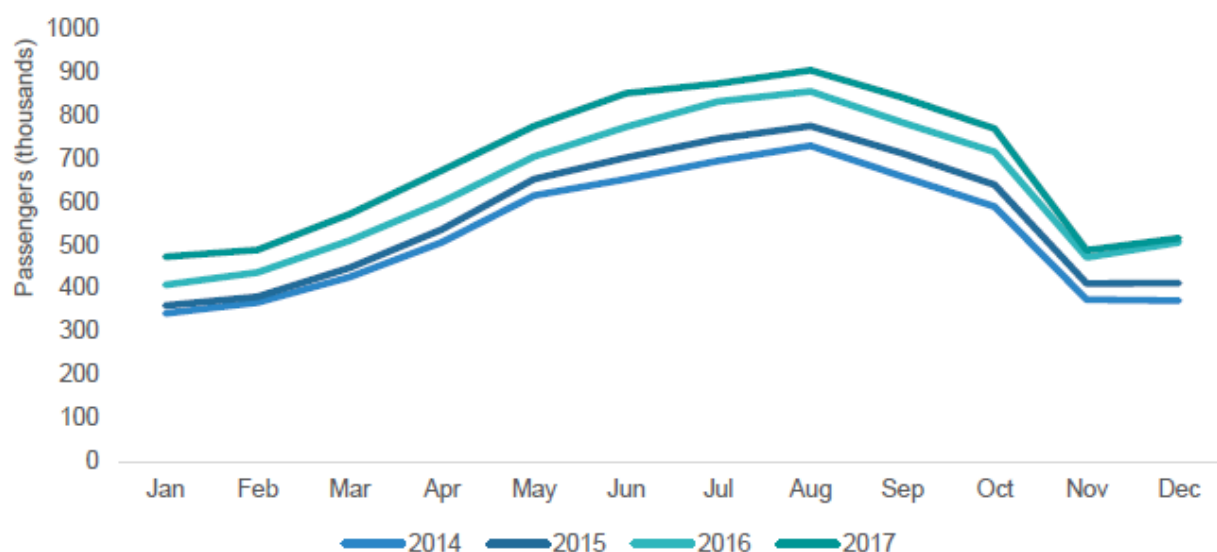
Source: CAA Passenger Survey 2015

- 3.2.12 In this context, and typical of UK airports, Bristol Airport experiences higher passenger flows during the summer season (April-October), as illustrated by **Figure 3.3**. Over the previous four years (2013-2017), approximately 70% of passenger throughput has occurred between these months; however, this share has dropped marginally over the last three years (70.3% in 2015 to 69.1% in 2017) and in the future, BAL is likely to continue exploring ways in which traffic can be grown in the shoulder seasons to make best use of its facilities.

⁷ CAA (undated) CAA Passenger Survey Report 2015. Available from https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Data_and_analysis/Datasets/Passenger_survey/CAA%20Passenger%20survey%20report%202015.pdf [Accessed November 2018].

⁸ York Aviation (2018) Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum: Economic Impact Assessment.

Figure 3.3 Bristol Airport passenger throughput by month 2014-2017



Source: CAA

3.2.13

Whilst the majority of passengers are travelling for leisure, Bristol Airport has built a strong base of business passengers, which now accounts for over a million passengers per annum. It is also a gateway for a significant number of overseas visitors to come to the region. **Table 3.2** shows the composition of business passengers at Bristol Airport in 2015. A significant proportion (around 45%) were UK based business passengers travelling to domestic destinations. Some 571,000 business passengers were travelling on international flights, of which 221,000 were foreign residents. This profile demonstrates how Bristol Airport's international connectivity is serving the business community within the airport's sphere of influence and facilitating inward travel from abroad.

Table 3.2 Bristol Airport Business Passengers Profile 2015

	Domestic	% of Total	International	% of Total	Total Business Passengers	% of Total
UK Business	474,000	45%	351,000	33%	825,000	78%
Foreign Business	8,000	1%	221,000	21%	229,000	22%
Total	482,000	46%	572,000	54%	1,054,000	100%

Source: CAA Passenger Survey 2015

Destinations

3.2.14

Bristol Airport is the principal airport and main international gateway for the South West of England and South Wales. Leading low cost, charter and full-service airlines currently fly from Bristol Airport to over 120 destinations across 34 countries. Most of the airport's route network is to western European destinations (Spain, France, Italy and Ireland being the top four countries). Domestic services are predominantly to airports in Scotland, Northern Ireland and the Channel Islands. Other destinations served by the airport include eastern Europe (e.g. Poland, Hungary, Czech Republic), and Turkey alongside long-haul destinations including haul Cape Verde, Mexico, Caribbean and Orlando-Sanford.

- 3.2.15 In the last two years, Bristol Airport has grown markedly as low-cost carriers have launched new routes and based additional aircraft at the airport. EasyJet is the largest carrier at Bristol Airport in terms of departing scheduled seat capacity, providing services to over 60 destinations across Europe and the UK from Bristol Airport, which is its largest UK base outside the London area (15 aircraft were based at the airport as at October 2018).
- 3.2.16 Bristol Airport offers connections to European hubs such as Amsterdam, Brussels and Frankfurt, which provide business passengers with onward connections to a wide range of global destinations, further improving the ease of doing business overseas and vice versa. **Figure 3.4** shows the proportion of business passengers from Bristol Airport using European hubs for onward flight connections. Across the three hub airports shown, around 40% of business passengers make an onward connection to their final destination, the majority of which are short haul connections. Amsterdam is used predominantly for onward long-haul connections, with very few travelling onwards long haul from Brussels or Frankfurt.

Figure 3.4 Use of European Hub Airports by Business Passengers from Bristol Airport in 2015



Source: CAA Passenger Survey 2015

Aircraft movements

- 3.2.17 There was a total of 76,199 aircraft movements in 2017 (including general aviation), an increase of 10,020 movements (15.1%) since 2011. The average number of passengers per aircraft movement has also increased during this period, from 109.5 in 2011 to 126.6 in 2017.
- 3.2.18 The extant permission for development of Bristol Airport to accommodate 10 mppa limits night flying by condition during the core night period (23:30-06:00) to 4,000 movements per year (3,000 in summer, 1,000 in winter based on British Summer Time) and during the shoulder periods (23:00-23:30 and 06:00-07:00) to 10,500 movements per year.
- 3.2.19 Night flying demand is driven mainly by short haul operations by aircraft based at Bristol Airport. These aircraft are based overnight at the airport with the majority of first departures between 06:00 and 07:30. The aircraft will typically perform two to three return trips before last arrival at Bristol Airport in the late evening. A proportion of these late evening arrivals are after 23:30 in the night

period. There are also a small number of long-haul arrivals in the night period, typically in the early morning before 06:00. This pattern of night flying demand is typical of UK-based European short haul operations. Winter season night flying demand is much lower than in a summer season as airlines operate aircraft with a lower level of utilisation in the off-peak season.

- 3.2.20 Use of available night movements in summer seasons has grown since 2013 as the airport's traffic recovered from the recession of 2008. Summer 2017 use⁹ was 99.7% of the available 3,000-night movements, whereas winter season utilisation was less than 30%; on average in recent years, 90% of annual night flights occur in a summer season. In response to growing night movement demand, and to mitigate the potential risk of breaching the summer limits, Bristol Airport proactively sought designation as a 'slot coordinated' airport under the *EU Slot Regulations*¹⁰ by the DfT for the period 23:00 to 07:00 in summer seasons. This means that all night flights require the prior allocation of a slot before operating at the airport, providing an effective mechanism to control night flying within the planning condition limits.
- 3.2.21 On its own, the change in movements could be deemed impactful with the potential of increased summer night movements. Therefore, to actively manage the noise associated with night flying, such movements are also regulated by a Quota Count (QC) system which limits activities to a QC budget based on aircraft noise. The QC budget, as conditioned under 10 mppa, allows for a QC budget of 1,260 during the summer month (again based on British Summer Time) and 900 during the winter.
- 3.2.22 In summer 2017, the quota count used was 1522.5. As noted, the summer QC allowance is 1,260; however, the night flying restrictions allow for overrun from the season before and after. In this case, 10% of the previous season (89) has been borrowed. Another 10% (90) was borrowed from the season to come (winter 2017/18). This left a shortfall of 83.5 QC points meaning that a further 167 QC points were required from the winter 2017/18 season because to offset 83.5 QC points (at a 1:2 ratio), 167 were required. As a result, the winter season QC budget for 2017/18 has been reduced from 900 to 643.

Forecast passenger growth

- 3.2.23 BAL has undertaken a forecast study (independently verified by Mott MacDonald¹¹) of expected passenger traffic growth for the period 2018 to 2045, blending a top-down econometric model with a bottom-up, airline by airline, approach¹². The forecast indicates that passenger demand will reach 10 mppa by 2021 and beyond 2021, passenger traffic is projected to rise further to 12 mppa by 2026, 15 mppa by the mid-2030s and circa 20 mppa by 2045 (see **Figure 3.5**). The drivers of this forecast increase in passenger demand are wide-ranging and include:
- Population and economic growth;
 - Growth in the airline activity, traffic and the introduction of new routes;
 - Accommodation of leaked demand from other regions;
 - Growth in the number of aircraft based at Bristol Airport;
 - The introduction of larger aircraft with the possibility for more long-haul routes;
 - Increased tourism; and

⁹ At the time of writing, summer 2018 data was not available.

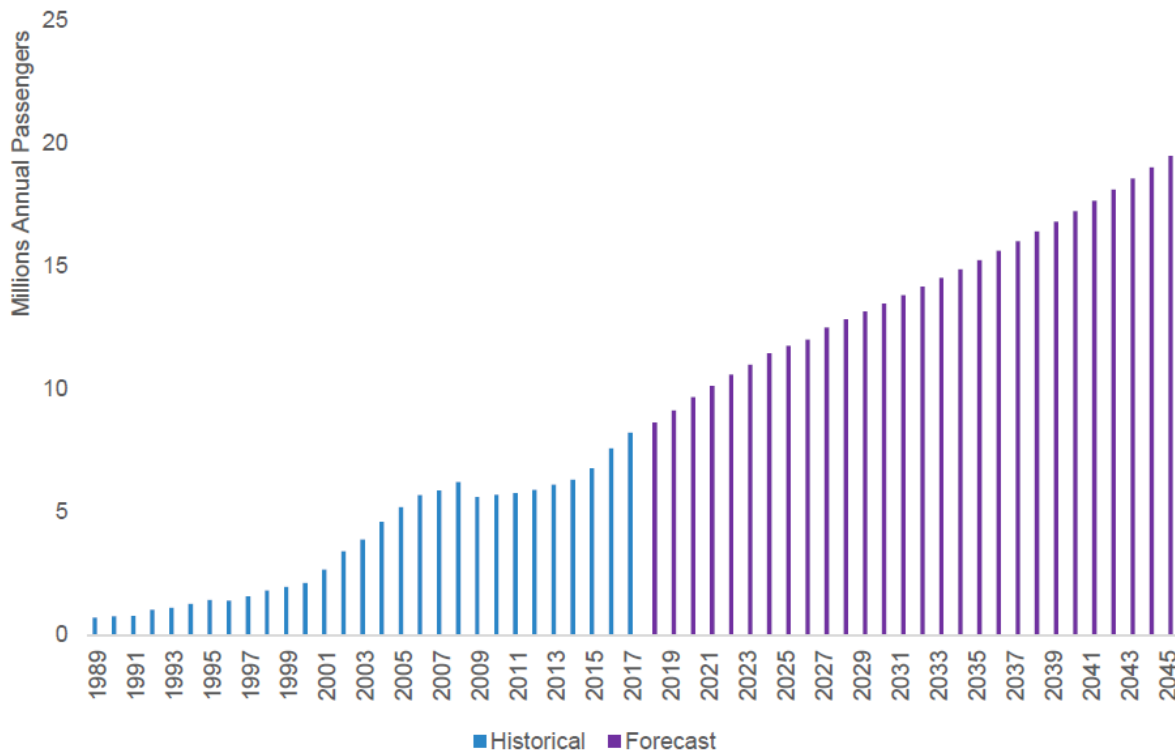
¹⁰ Council Regulation (EEC) 95/93.

¹¹ Mott MacDonald (2018) Bristol Airport – Forecast Validation.

¹² For the period until 2027, BAL has forecast the supply of seat capacity, load factors and based aircraft. This bottom-up approach makes informed assumptions regarding the level of air service that can be expected over the planning period.

- Growth in passenger throughput outside of the summer peak.

Figure 3.5 Bristol Airport passenger forecast



Source: BAL Forecast

- 3.2.24 The DfT forecasts a lower level of growth for Bristol Airport, reaching 10 mppa in 2033 and reflecting the constrained nature of the extant consent at Bristol Airport. The DfT makes clear that its forecasts should not be used as a detailed guide to the short-term performance of individual airports, as commercial and local information is not reflected in its modelling. The DfT forecasts take the current planning restrictions on Bristol Airport into account and therefore do not model growth beyond 10 mppa; this should, therefore, not be considered a cap on future development should planning permission be granted for growth beyond this threshold.
- 3.2.25 The DfT forecasts demand growth in the South West to increase by some 76% to 2050 with overall market share raising from 4% to 5%. This growth represents an increase in passengers originating in the South West of England from 14.3 mppa in 2016 to 25.1 mppa in 2050. Bristol Airport is significantly the greatest regional contributor to catering for this demand with Exeter Airport carrying only 900,000 passengers per annum (ppa) and Cardiff Airport currently limited to 3 mppa (with growth expected to 8mppa by 2030)³. That the DfT cap forecasts according to the constraints of extant consents reflect a conservative approach to demand forecasting rather than a realistic reflection of the need and potential of UK airports. Given that passenger numbers at Bristol Airport are already over 8 mppa, BAL does not consider these forecasts to reflect realistic future growth, a view confirmed in the Forecast Validation Report¹¹ prepared by Mott MacDonald.
- 3.2.26 Notwithstanding this, passenger throughput is limited to 10 mppa by the extant 2011 planning permission and current facilities at Bristol Airport are not capable of accommodating an increase in passenger numbers beyond this cap. In particular, there is no scope for incremental extension of the existing terminal building within BAL's established permitted development rights and a passenger throughput in excess of 10 mppa would require additional car parking as well as surface access improvements. Further airside infrastructure and capacity would also be required including

passenger transportation and aircraft servicing. In this context, a timely increase in the 10 mppa cap alongside the development of associated infrastructure and facilities are therefore required if Bristol Airport's growth is not to be constrained and in order to cater for the latent demand reflected in the BAL and DfT forecasts.

Forecast aircraft movements

- 3.2.27 Commensurate with the increase in passengers, at 12mppa (2026) there will be a total of 97,393 annual aircraft movements, an increase of 10,420 movements compared to forecast movements at 10 mppa (in both 2021 and 2026).
- 3.2.28 Whilst the majority of flights will continue to occur in the day time (06:00 to 23:30), the demand for early morning and late evening movements in the summer period is expected to grow. In response, through the application for the Proposed Development, permission is sought for an annual cap (incorporating two consecutive seasons) of 4,000-night movements. Mott MacDonald's analysis of future night flying requirements contained in its Forecast Validation Report¹¹ indicate that the current limit of 4,000 annual night movements, if expressed as an annual limit with flexible use between summer and winter seasons, is sufficient to accommodate growth to 12 mppa. The use of these slots would continue to be managed independently through the slot allocation process.
- 3.2.29 It should be noted that, under the Proposed Development, no changes to the QC budgets are being sort. Therefore, even though BAL is seeking more flexibility in terms of actual night movements, by retaining the QC budgets as per the extant 10 mppa consent, it will directly incentivise quieter, modern aircraft fleet and enable sustainable growth. Full details of both the night movement and QC schemes can be found in the Forecast Validation Report¹¹.

Bristol Airport as a driver of regional economic growth

- 3.2.30 The UK is a global player in the aviation sector and has the third largest aviation network in the world¹³. Aviation is a significant industrial sector in its own right² with air transport and aerospace contributing approximately £22 billion⁵ to the UK economy annually, while supporting 961,000 jobs¹⁴. Aviation also underpins several other sectors including (inter alia) global business and tourism.
- 3.2.31 In this context, Bristol Airport is a significant economic driver within North Somerset, the West of England, the South West region and South Wales. Around 3,960 people currently work on-site at the airport, which equates to approximately 3,480 full time equivalents (FTEs)⁸. Bristol Airport also has a wider economic role in supporting and facilitating prosperity in other sectors, delivering significant Gross Value Added (GVA). The connectivity provided by the airport enables the flow of trade, investment, people and knowledge that are central to globally successful regions and it plays a vital role in supporting the tourism sector, providing easy access to overseas markets, notably Germany, Spain, the Irish Republic, Italy and France.
- 3.2.32 Further information concerning the importance of Bristol Airport in terms of employment and local/regional economies is provided by York Aviation⁸ and is included as part of this application. The report estimates that, in 2018:

¹³ HM Government (2017) Aviation Sector Report, [online]. Available at <https://www.parliament.uk/documents/commons-committees/Exiting-the-European-Union/17-19/Sectoral%20Analyses/5-Sectoral-Analyses-Aviation-Report.pdf> [Checked 08/11/2018]

¹⁴ Oxford Economics (2014) Economic Benefits from Air Transport in the UK, [online]. Available at: https://d2rpg8wtqka5kg.cloudfront.net/281929/open20141119072800.pdf?Expires=1541682735&Signature=g8REQ37SPpBBrut5hXQbckOVTxcrJPfgekvhR~RoN1y6TLd4zkffaeESXntKK7jgYXEEIq1y5ii03W2Rfe8K5DtZg~Qj79objoM2dYR8dsSneIWQqAkpBwT-DGlbY1-6iQuUDwYknRyw6kvPGsv4gnWfrncOmykUuEUa~AZ3aBe8kOABlrTiaLQjrX6YJ7J0rTzITs~Zbtg3TwTaq1K3HFW0DOGUJv8Ib5XIB0mzxihQxd4LBE7oli8K2XjdMFyFB--OKSytNU6nclGkPWWhjkQJFMBJgz5hEmkLbLnzLbY~ckCtMz8-DFV9ZxOX548HBcknsOfXoo-yyhmJixKA_&Key-Pair-Id=APKAJVGCNMR6FQV6VYIA [Checked 08/11/2018].

- Within North Somerset alone, Bristol Airport's economic footprint supported around 2,025 full time equivalent (FTE) jobs and around £260 million of GVA. When the additional wider benefits resulting from productivity and tourism is included, job creation rises to 2,525 FTE jobs and £355 million of GVA;
- Within the West of England, Bristol Airport's economic footprint supports around 4,900 jobs and around £430 million of GVA. When the additional benefits resulting from productivity and tourism are included, the job creation rises to 7,950 (FTE) jobs and £810 million of GVA; and
- Within the South West region and South Wales, Bristol Airport supports around 8,200 (FTE) jobs and around £610 million of GVA. When the additional benefits resulting from productivity and tourism is included, job creation rises to 18,875 FTEs and £1.7 billion of GVA.

3.2.33

The growth of Bristol Airport to 12 mppa would provide significant economic and regeneration benefits to the local economy, West of England sub-region and the wider South West region. The findings of the Economic Impact Assessment⁸ indicate that the development of Bristol Airport to accommodate 12 mppa will, by 2026, result in an increase in the total number of people employed on site to 5,215 jobs (4,575 FTEs) in 2026 in addition to wider benefits associated with enhanced productivity (for example, improved access to international markets and supply chains, increased business exposure to competition and knowledge). The assessment forecasts that by 2026:

- The economic footprint of Bristol Airport within North Somerset increasing by £70 million (in GVA terms), supporting approximately 525 additional jobs (450 FTEs). When wider benefits are also included, this is likely to increase to £90 million (in GVA terms) and around 650 additional jobs (550 FTEs);
- The economic footprint of Bristol Airport within the West of England increasing by £110 million (in GVA terms) and supporting around 1,200 additional jobs (1,050 FTEs). When wider benefits are also included, this is anticipated to increase to £210 million (in GVA terms) and around 2,050 additional jobs (1,725 FTEs); and
- The economic footprint of Bristol Airport within the South West region and South Wales increasing by £140 million (in GVA terms) and supporting circa 2,125 additional jobs (1,750 FTEs). When wider benefits are also included, this will likely increase to £390 million (in GVA terms) and around 5,150 additional jobs (4,125 FTEs).

3.2.1

Ensuring that Bristol Airport is able to meet current and forecast passenger demand is therefore essential if it is to continue to fully support local, regional and national economic growth.

Policy support for airport growth and making the best use of existing capacity

3.2.2

National aviation policy, as set out in the Aviation Policy Framework (APF)¹⁵ provides support for the growth of regional airports and making the best use of existing airport capacity including at Bristol Airport. The APF¹⁵ establishes the Government's high-level objectives and policy on aviation. The APF recognises that *"airports in Northern Ireland, Scotland, Wales and English airports outside of London play an important role in UK connectivity"* and there is general support for the growth of regional airports, with the APF highlighting that *"new or more frequent international connections attract business activity, boosting the economy of the region and providing new opportunities and better access to new markets for existing businesses"*.

3.2.3

It is identified that, beyond their regional importance, airports outside of the South East of England also have an important role in helping to accommodate wider forecast growth in demand for aviation in the UK and that the availability of direct air services locally from these airports can

¹⁵ Department for Transport (2013) Aviation Policy Framework, [online]. Available at: <https://www.gov.uk/government/publications/aviation-policy-framework> [Checked 8/11/2018].

reduce the need for air passengers and freight to travel long distances to reach larger UK airports. The APF¹⁵ also states that the *"Government wants to see the best use of existing airport capacity"* and that in the short-term, a key priority for Government is to continue to work with the aviation industry and other stakeholders to make better use of existing runways at all UK airports to improve performance, resilience and the passenger experience. The APF forecast that the ongoing development of Bristol Airport would contribute between £1.9 and £2 billion to the national economy.

- 3.2.4 The Government is currently preparing an Aviation Strategy that will set out the long-term direction for aviation policy to 2050 and beyond. The call for evidence¹⁶ published in July 2017 affirms the Government's support for the growth of airports outside the South East of England and for making the best use of existing infrastructure. In this regard, the Government states that they:

"are aware that a number of airports have plans to invest further, allowing them to accommodate passenger growth over the next decade using their existing runways, which may need to be accompanied by applications to increase existing caps. The government agrees with the Airports Commission's recommendation that there is a requirement for more intensive use of existing airport capacity and is minded to be supportive of all airports who wish to make best use of their existing runways".

- 3.2.5 It is currently anticipated that the Government will publish its Aviation Strategy Green Paper in December 2018. The Green Paper will set out, for public consultation, detailed policy proposals in respect of the Aviation Strategy before publication of the Government's final Aviation Strategy in 2019.
- 3.2.6 This Government commitment to the growth of regional airports was recently reaffirmed in the Secretary of State for Transport's June 2018 statement concerning the proposed expansion of Heathrow¹⁷. Recognising that a new operational runway at Heathrow is still a number of years away, and consistent with the Airports Commission's recommendations, the Secretary of State for Transport states that *"the government is supportive of airports beyond Heathrow making best use of their existing runways"*.
- 3.2.7 With specific regard to Bristol Airport, the APF¹⁵ recognises the vital role the airport plays in the economic success of the South West region and there is also strong sub-regional and local policy support for expansion. In particular, the emerging West of England Joint Spatial Plan (JSP)¹⁸ (Policy 4) identifies Bristol Airport as a key strategic infrastructure employment location, recognising the employment growth potential of Bristol Airport. The supporting text to Policy 4 states: *"Growth at Bristol Airport has the potential to create a range of new employment opportunities"*.
- 3.2.8 Reflecting national aviation policy, which seeks to make best use of existing airport capacity, and sub-regional and local policy support for growth, BAL has determined that optimising the current airport site can deliver an airport capable of accommodating a passenger throughput of 12 mppa.
- 3.2.9 In this context, the Proposed Development is both supported by, and in itself supports, national policy in as much as it helps to deliver against the national need for additional airport capacity and the ever-present policy imperative that supports growth of regional airports alongside the planned expansion of Heathrow Airport.

¹⁶ Department for Transport, 2017. Beyond the Horizon – the Future of UK Aviation: a Call for Evidence on a New Aviation Strategy. Available online <https://www.gov.uk/government/consultations/a-new-aviation-strategy-for-the-uk-call-for-evidence> [Checked 19/03/2018]

¹⁷ Secretary of State for Transport, 2018. Statement by the Secretary of State for Transport about the proposed expansion of Heathrow airport. Oral statement to Parliament. Available online <https://www.gov.uk/government/speeches/proposed-heathrow-expansion> [Checked 14.06.18].

¹⁸ West of England Partnership (2017). West of England Joint Spatial Plan Publication Document, [online]. Available at: <https://www.jointplanningwofe.org.uk/consult/ti/JSPPublication/consultationHome> [Checked 01/08/2018].

- 3.2.10 Further information relating to the policy context for the Proposed Development is contained in **Chapter 5: Legislative and Policy Overview**.

3.3 Consideration of alternatives

Overview

- 3.3.1 Schedule 4, paragraph 2 of the EIA Regulations¹ states that an ES should include:
- "A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."*
- 3.3.2 This section details the reasonable alternatives identified and considered by BAL in developing its proposals for the Proposed Development, providing a comparison of environmental effects and the rationale for the selection of preferred options.
- 3.3.3 In identifying reasonable alternatives, the following option types have been considered:
- 'Do Nothing' alternative, where the Proposed Development is not progressed;
 - Strategic alternatives; and
 - Alternative design/layout in the context of the design evolution.

'Do Nothing' alternative

- 3.3.4 Under a 'Do Nothing' alternative, the growth of Bristol Airport would be capped at 10 mppa, in accordance with the extant planning consent. As a result, there would be no further growth beyond this number of passengers (which is forecast to be reached in 2021).
- 3.3.5 BAL has forecast that passenger demand will reach 12 mppa by 2026 (refer to **Section 3.2**). The 'Do Nothing' option would not reflect this projection and passenger demand would therefore not be met. In this regard, the need case above describes a latent demand growing to some 25 mppa in the South West by 2050; inevitably, without the provision of further capacity at Bristol Airport, some of this demand would simply reallocate (leak) to other regional airports as well as the larger London hubs with an associated loss of employment and GVA for the local area and the wider South West region. Such leakage would not be in accordance with the Government's support for the growth of regional airports as set out in the APF and the emerging aviation strategy.
- 3.3.6 From a commercial and operational perspective, BAL has set out a vision of the future through its Master Plan and as part of the phased approach set out in that document, the Proposed Development will enable Bristol Airport to grow beyond 10 mppa to 12 mppa, in-line with forecasted passenger demand up to at least the mid-2020s. This will ensure that Bristol Airport continues to support the economic development of the South West region.
- 3.3.7 The 'Do Nothing' alternative would constrain both operations and investment at the airport, limit improvements to passenger experience and, importantly, would not deliver the economic benefits to the local and wider region associated with airport expansion to 12 mppa (as described in **Section 3.2**).
- 3.3.8 In consequence, the 'Do Nothing' alternative has not been considered further.

Strategic alternatives

3.3.9 When considering 'reasonable alternatives' to the Proposed Development, it is necessary to explore whether there are alternative solutions to meeting the demand for airport growth. The strategic level alternatives identified by BAL in this regard relate to:

- The level or quantum of passenger growth to be accommodated (i.e. growth above or below a passenger throughput of 12 mppa); and
- Alternative locations for the delivery of additional airport capacity.

The level of passenger growth to be accommodated at Bristol Airport

3.3.10 BAL currently forecasts that passenger demand will reach 10 mppa by 2021, beyond which passenger traffic is projected to rise further to 15 mppa by the mid-2030s and 20 mppa by the mid-2040s. To ensure that Bristol Airport can continue to meet passenger demand both now and into the future, BAL is currently preparing the new Master Plan that will set out a strategy for phased growth to meet the forecast level of passenger demand by the mid-2040s.

3.3.11 In the context of the Master Plan and reflecting national aviation policy which seeks to make best use of existing airport capacity and sub-regional and local policy support for growth, BAL has determined that the optimum capacity for the Proposed Development is 12mppa, for the following reasons:

- Policy – BAL has sought to make best use of the existing airport, in line with Government policy and to maximise development within the Green Belt, where possible. This has shaped the overall capacity that is contained within the Proposed Development;
- On-site capacity – a number of the on-site facilities will be operating at their optimum capacity at 12mppa, based on IATA design criteria (e.g. security/departures);
- Off-site capacity – the optimum design for the A38/Downside Road improvements which forms part of the Proposed Development, has a design capacity suitable for 12 mppa;
- Airspace – analysis undertaken on behalf of BAL indicates that airspace capacity is sufficient to support growth to circa 12 mppa. Beyond this it is anticipated that an airspace change process would be required; and
- Demand – a passenger cap of 12 mppa will allow Bristol Airport to grow until at least 2026. This will provide the confidence airlines require to invest in the airport as well as certainty to other stakeholders. It also fully aligns with the Master Plan and will justify investment in associated services and facilities including surface access improvements. Additionally, it also allows BAL the opportunity to take advantage of emerging cleaner, quieter aircraft fleets (as airline aircraft renewals often have a five to eight year cycle).

3.3.12 A passenger cap lower than 12 mppa would not reflect current passenger forecasts (refer to **Section 3.2**). Like the 'Do Nothing' option, this alternative would also unduly constrain investment in airport infrastructure, limit improvements to passenger experience and, importantly, would not deliver the same economic benefits to the local area and wider region. Additionally, selecting a smaller scale development would only allow for growth over a very short time period such that BAL would be required to bring forward a further planning application shortly after consent was granted for a lower throughput, based on the demand profile (for example, it is currently forecast that a passenger throughput of circa 11 mppa will be reached by around 2023). This is not preferred because of the resource implications, the potential to create consultation fatigue for local communities and stakeholders and the uncertainty it would create amongst airlines and other

investors. It would also introduce significant construction inefficiencies whilst the timeline for lower growth would be too short to incentivise aircraft modernisation.

- 3.3.13 There is an immediate need to ensure that shorter term passenger demand can be met. As highlighted above, through review of existing infrastructure, facilities and capacity, BAL has determined that the existing airport can accommodate 12 mppa without the need to expand significantly beyond the current site boundary. A level of growth greater than 12 mppa would require significant changes to the airport's facilities and layout; the strategy for this longer-term growth is the subject of the Master Plan. As a result, it is not appropriate to consider passenger growth beyond 12 mppa in the context of the Proposed Development.
- 3.3.14 Overall, by developing the necessary infrastructure almost entirely within the current airport boundary, BAL will be able to deliver an airport with a capacity of 12 mppa, securing a viable operation until the mid to late 2020s whilst retaining the flexibility to allow a variety of future options to be implemented at a later date. Taking into account the overarching objective of BAL's proposals for 12 mppa to make the best use of the existing airport site, the Master Plan, passenger forecasts and national aviation policy, BAL's preferred option is for growth to 12 mppa.

Alternative locations for the delivery of additional airport capacity

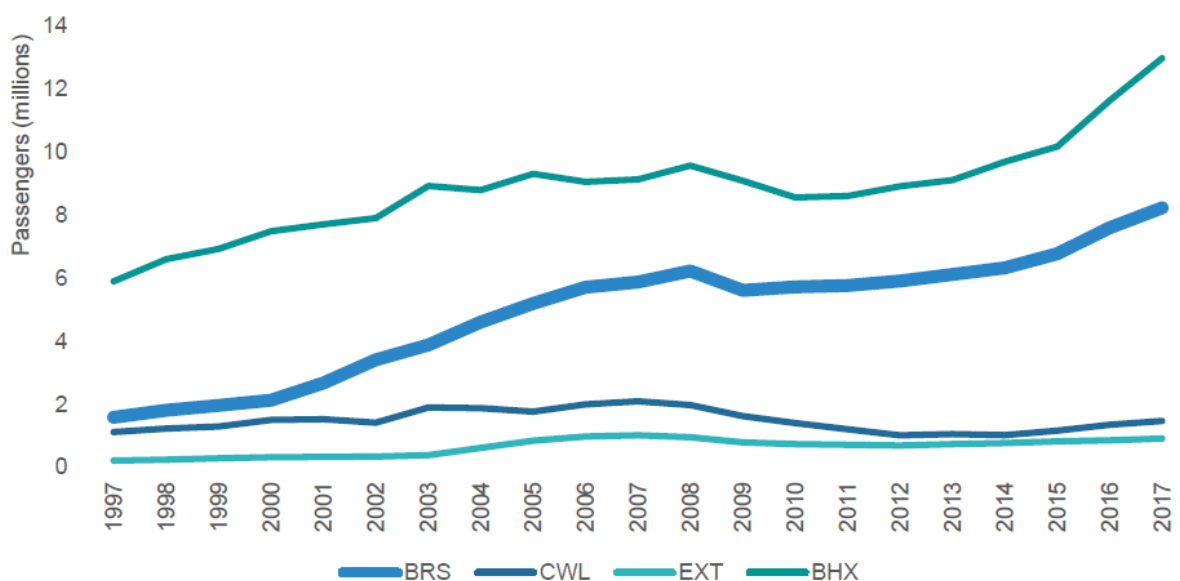
- 3.3.15 As part of its independent verification of BAL's passenger forecasts, Mott MacDonald has considered the relationship between Bristol Airport and competing airports including Cardiff, Exeter, Birmingham, London Gatwick (LGW) and London Heathrow (LHR).
- 3.3.16 The Forecast Validation Report¹¹ sets out that LHR handled 78 million passengers in 2017 (around 58 million terminating and 20 million transfer passengers) and that, according to CAA survey data, nearly 4 mppa of all terminating passengers at the airport had an origin or destination in the South West of England. LHR offers a wide range of destinations as well as high frequencies on many short-haul and long-haul routes, which makes it an attractive airport to fly from and it can be reached via the M4 motorway from Bristol in approximately two hours. However, the Forecast Validation Report¹¹ highlights that LHR is operating close to its capacity of 480,000 air traffic movements (ATMs) per year which in turn means that it is more likely that traffic will 'spill over' to other UK airports. While the addition of a third runway at LHR may attract some services away from UK regional airports, such as Bristol Airport, the runway is unlikely to be operational before 2026. It is also likely that capacity will remain at a premium at LHR even with a third runway, which is likely to encourage airlines to continue developing services at other UK airports, especially on shorter-haul and leisure-focussed routes.
- 3.3.17 LGW offers those living in the South West of England an airport with a well-developed route network. However, the capacity of LGW combined with its distance from the Bristol Airport area and relatively limited accessibility from some parts of the South West suggest that this would not present a viable alternative. Further, it should be noted that the Gatwick Airport Draft Master Plan¹⁹ does not envisage a significant increase in capacity being implemented until 2025 at the earliest which does not align with forecast passenger demand for Bristol Airport.
- 3.3.18 Birmingham Airport handled almost 13 million passengers in 2017 and it is one of the busiest UK airports outside the London area. The CAA 2017 passenger survey indicated that nearly 4% of the airport's terminating passengers had an origin or destination in the South West, which suggests that it provides more limited competition for the region's traffic than LHR. This is likely to be due to the more limited range of destinations served from the airport relative to LHR and the fact that the drive-time to Birmingham Airport from the Bristol Airport area is comparatively long which might

¹⁹ Gatwick Airport (2018) Gatwick Airport Draft Master Plan 2018, [online]. Available at: <https://www.gatwickairport.com/globalassets/business--community/growing-gatwick/gatwick-draft-master-plan-final.pdf> [Checked 03.12.2018].

limit the airport's attractiveness to passengers residing in the South West. As a result of these factors, this alternative is not considered to be viable.

- 3.3.19 Cardiff Airport is the closest airport to Bristol and is therefore arguably one of the more likely to provide direct competition. It is owned by the Welsh Government and handled 1.5 million passengers in 2017, which makes it considerably smaller than Bristol Airport at 8.2 million. Circa 20% of Bristol Airport's passengers originate from the Cardiff catchment and they have been consciously choosing the airport due to the route network. Whilst the Welsh Government has invested in terminal improvements and route development at Cardiff Airport, it is not anticipated that this growth will provide a significant alternative for absorbing the circa 2 mppa of demand to 2026.
- 3.3.20 Exeter Airport handled approximately 900,000 passengers in 2017 with traffic being largely outbound leisure. The last CAA passenger survey (occurring in 2012) reported that the majority of its passengers are from Devon which appears to suggest that Exeter Airport is used predominantly by local residents; less than 0.5% of its passengers were reported as travelling to or from the City of Bristol or North East Somerset. Due to its size and catchment, Exeter is not considered to be a viable alternative to meeting passenger demand at Bristol Airport.
- 3.3.21 **Figure 3.6** compares passenger traffic growth at Bristol Airport relative to Birmingham, Cardiff and Exeter for the period 1997-2017. Bristol Airport handles considerably more passengers than its closest neighbours, Cardiff and Exeter, but it has also enjoyed stronger traffic growth in recent years; for the period 1997-2017, Bristol Airport traffic grew at a compound annual growth rate (CAGR) of 8.6% (compared to 1.4% for Cardiff and 7.6% for Exeter), but between 2010-2017, Bristol Airport grew at a CAGR of 5.3% while Cardiff and Exeter experienced growth of 0.7% and 3.0% respectively. Birmingham Airport traffic growth has been comparable to that of Bristol Airport (6.1% per annum between 2010-2017), although as shown by the CAA passenger survey data, this airport attracts relatively few passengers from the South West region. Bristol Airport also serves more destinations than either Cardiff or Exeter (over 100 compared to approximately 50 and 30 respectively) and, with capacity likely to remain an issue at LHR and Birmingham attracting relatively few passengers from the region, the Forecast Validation Report¹¹ concludes that Bristol Airport is in a strong position to remain the South West region's main airport in the coming years.

Figure 3.4 Passenger traffic at Bristol Airport and competing airports 1997-2017



Source: CAA statistics in Mott MacDonald (2018)

- 3.3.22 Taking into account the analysis of competing airports in the Forecast Validation Report¹¹, combined with the policy support for the development of Bristol Airport already outlined above, displacing the growth proposed at Bristol Airport to competing airports is not considered to be a viable alternative and has therefore not been considered further.

Consideration of on-site alternatives

- 3.3.23 Through the emerging Master Plan, BAL has analysed and consulted upon options relating to where future development required to grow Bristol Airport to 20 mppa should be located. Three example scenarios were set out in *'Your Airport, your views'*²⁰, allowing BAL to explore the respective merits of focussing future development to the north of the runway (scenarios A and B) or south of it (scenario C).
- 3.3.24 Taking into account the consultation responses received and detailed consideration of environmental constraints, BAL has determined that its preferred approach is to focus development to the north of the runway in order to:
- Minimise impacts on the Green Belt and wider landscape including the Mendip Hills Area of Outstanding Natural Beauty (AONB);
 - Deliver the best passenger experience; and
 - Maximise operational efficiencies.
- 3.3.25 BAL's proposals for 12 mppa reflect, and are consistent with, this preferred approach and have been designed in such a way so as to not prejudice the longer-term development of Bristol Airport. By making the best use of the existing airport site and minimising development within the Green Belt, the proposals also accord with national aviation and planning policy. In consequence, alternatives relating to the broad direction of future development are not considered further here.
- 3.3.26 In developing proposals for the development of Bristol Airport to accommodate 12 mppa, consideration has been given to on-site alternatives for individual elements and components of the Proposed Development. This has been undertaken as part of the on-going project evolution and project design process, which is documented in the Design and Access Statement that accompanies the planning application. The design evolution has accounted for a wide range of factors, including:
- The objectives for the Proposed Development as set out in the Design and Access Statement, including safety and security, passenger experience, demand, value for money, sustainability and policy;
 - The need to ensure an additional 2 mppa are able to pass safely and efficiently through the airport with a full range of world-class facilities available to them on arrival and departure;
 - BAL's overarching objective to make best use of the existing airport site in the short to medium term;
 - The Master Plan and the need to ensure that development does not prejudice the longer-term development of Bristol Airport;
 - National and local planning policy including, in particular, policy relating to the Green Belt;
 - Capacity requirements;

²⁰ BAL (2018). Your airport: your views. Towards 2050: Master Plan Consultation – Stage II Development Proposals and Options [online]. Available from <https://www.bristolairportfuture.com/> [Accessed 11.11.18].

- Detailed consideration of environmental constraints, particularly in respect of landscape and visual impacts; and
- Operational changes and regulatory and security requirements necessary to ensure the safe and efficient operation of the airport.

3.3.27 As with all operational airports, planned improvements are inevitably constrained by the existing site layout, with factors such as the position of the runway, taxiways and existing airport buildings being fixed even before the exploration of alternatives begins. In the context of the Proposed Development, alternative options have therefore focused on the following components:

- The terminal building extensions;
- Passenger car parking; and
- Highways improvements to the A38.

3.3.28 Whilst all the above components are driven by the need to provide sufficient capacity to meet the demands of future passenger forecasts and to allow for the continuation of the safe operation of Bristol Airport, opportunities to incorporate environmental measures into the design of the Proposed Development were considered and integrated where possible throughout the design process during the preparation of the ES.

3.3.29 The alternative options considered, alongside the rationale for their selection or rejection, are provided in the sections below.

Terminal building

3.3.30 Without increased capacity in the existing terminal, proposals to grow the passenger throughput towards 12 mppa will increasingly result in congestion, most noticeably at peak times of operation. Capacity modelling has been undertaken by BAL and this has been independently verified. From this modelling, it has been demonstrated that the terminal building will have operational processing capacity constraints, specifically with the check in facilities, security search, baggage reclaim, immigration operations and departure lounge sub-systems. These constraints in an increasingly busy terminal will ultimately have an adverse effect on airline punctuality and could compromise the success of the operation as a whole.

3.3.31 The 10 mppa planning approval continues to be developed in a phased manner in line with passenger growth, including the first phases of both the east and west terminal extensions. Following recent completion of various developments, the existing facilities accommodated 8.2 mppa in 2017. Future phases are reflected (and revised) in the proposals for development of the terminal to accommodate 12 mppa.

3.3.32 The current terminal building is bounded on all four sides by existing buildings, airside operations, landside operations and future planned buildings. These site parameters along with the internal building layout and associated passenger processes constrain the opportunities for terminal building extensions.

3.3.33 In this context, the design progression for this element of the Proposed Development has necessitated an analysis of alternative options for the required extensions to the terminal building to account for an additional 2 mppa. The alternative options considered included:

- Option 1: East Terminal Extension;
- Option 2: South Terminal Extension;
- Option 3a: West Terminal Extension (10 mppa design); and

- Option 3b: West Terminal Extension with a revised design.

3.3.34 It should be noted that the option of not extending the terminal was discounted as this would not meet the capacity whilst the option for a new terminal was not considered as necessary for 12 mppa, although this is a consideration in the Master Plan beyond 12 mppa.

Option 1: East Terminal Extension

3.3.35 As part of the extant consent for expansion of Bristol Airport to accommodate 10 mppa, planning permission was granted for an east terminal extension. The first phase of this extension was completed in 2015.

3.3.36 The second phase, which has not been completed, has been reviewed in detail to determine its ability to accommodate a passenger throughput of 12 mppa. The existing consented east terminal extension phased proposal focused on extending the existing terminal building eastwards across levels 00, 10 and 20. To complete this extension as per the 10 mppa approval, the second phase would extend these levels eastwards by another three structural bays resulting in an increase to the check in hall (additional check-in desks), expansion of the baggage make-up area on level 00 and an increase to the departures concourse and associated facilities on floor levels 10 and 20.

3.3.37 Upon review, it was identified that the 12 mppa design does not require the amount of additional check in desks that the 10 mppa initially offered. The 10 mppa approval sought to increase the number of check-in desks to 67 from an original 50. Following recent works to the Hold Baggage Screening (HBS) in 2017/18, the number of check-in desks has now reduced to 49. These 49 desks are currently deemed sufficient because BAL has commenced a transition to automated bag drop operations. With this new automated operation, each check-in desk can process bags quicker and subsequently the baggage capacity of each check-in desk has increased. Fundamentally, this reduces the demand for traditional check-in desk facilities; however, the success or failure of self-bag drop will depend on the ability of airlines adopting this technology. This increase in baggage processing has an obvious consequence for the back of house baggage handling operations in that it will require additional space to handle the increased baggage amount and frequency of baggage throughput.

3.3.38 Also, on the upper levels, the second phase of the East Terminal Extension extended the passenger route eastward on floor level 10. This provided an opportunity to expand the passenger facilities; however, it did result in directing the passengers eastwards, only for them to have to return westward on floor level 20. From a passenger experience perspective and considering the expansion to 12 mppa, this elongated circulation is not ideal.

3.3.39 With due consideration of these fundamental operational and passenger experience issues, a design review was prompted to determine a better solution. This review took the form of a stakeholder Red Amber and Green (RAG) analysis. This informed the optioneering process and qualified the decision to consider alternatives to the development of the east terminal extension floor levels 10 and 20. Instead of extending eastwards on floor levels 10 and 20, the concept of extending southwards became the preferred option for the 12 mppa proposal.

Option 2: South terminal extension

3.3.40 The concept of extending the terminal southwards on floor levels 10 and 20 has been considered as a more suitable alternative to the second phase (floor levels 10 and 20) of the consented east terminal extension.

3.3.41 This option provides a more focused facility from a passenger perspective by centralising the food and beverage offers whilst generating better defined and much shorter passenger circulation routes on floor level 20. Furthermore, passenger access to all gates will be from this centralised

zone on level 20 so this rationalisation is essential to simplify the passenger passage through the terminal.

- 3.3.42 The subsequent additional space on level 10 provides the opportunity to improve both passenger facilities and terminal operations. This opportunity is further enhanced due to the relocation of existing coaching gates in this area to the east walkway coaching gates (planning application reference 18/P/3536/AIN). At peak times the queuing to these existing coaching gates spill out onto the concourse causing major passenger congestion. This issue would be exacerbated if these gates remained as the capacity increases to 12 mppa. Therefore, the east walkway coaching gates development can best be described as an operational enablement project for the 12 mppa and associated south terminal extension. With the passenger in mind, these improvements will include expanded retail offers, additional seating, better circulation, covered arrivals routes and bespoke facilities for passengers with reduced mobility (PRM).
- 3.3.43 In comparison to the original east terminal extension, the location of this south terminal extension between the existing terminal and central walkway means that there is no landscape and visual impact and better corresponds with the overall 12 mppa internal and external proposals.

Option 3a: West terminal extension (10 mppa design)

- 3.3.44 The West Terminal Extension phased proposal focused on extending the existing terminal building westwards across levels (-10, 00, 10 and 20) to accommodate several functions including goods yard, storage, staff security, waste out, arrivals hall, customs, baggage reclaim, central search, office facilities and circulation. For levels 10 and 20, there was also an element extending southwards and this was to accommodate the immigration hall and associated vertical circulation. The first phase of this west terminal extension was completed in 2017; to complete this extension as per the 10 mppa approval, the second phase would extend these levels westwards by another four structural bays and this would primarily accommodate an enlarged immigration hall along with additional international baggage belts on floor level 00 and additional search lanes on level 10.
- 3.3.45 For the reasons explained in the description of Option 3b, this original design is no longer suitable.

Option 3b: West terminal extension with a revised design

- 3.3.46 The second phase of the West Terminal Extension is necessary to expand the primary operational systems of the terminal and is being taken forward as part of the 12 mppa proposals. However, the design has been revised to account for operational developments since the 10 mppa approval.
- 3.3.47 Due to security policy changes and subsequent requirements to improve efficiency and passenger throughput, the requirement for the central search facility since the 10 mppa approval was granted has changed; specifically, the length of the search lanes have increased to 22 metres (the 10 mppa design had lane lengths of 11 metres). This significant internal design change causes displacement and relocation of several building operations. For levels -10, 00 and 20, the original 10 mppa scheme was still mostly applicable. However, for level 10, this central search lane operational change has a fundamental impact on the original design.
- 3.3.48 In consequence, a new concept was required and due to the restricted site parameters, viable options were limited. The redesign process for this revised west terminal extension incorporated input from key stakeholders within BAL. The final proposal simply repositioned the new immigration hall westwards to allow for the longer search lanes and associated queuing, divest and redress areas. The opportunity to utilise the existing western walkway for access to the hall, albeit with some adaptation, has also been incorporated.

Summary

- 3.3.49 Extensions to the existing terminal building are required to accommodate a throughput of 12 mppa. In developing its proposals, BAL has considered the extent to which the remaining phases of the east and west terminal extensions permitted under the extant 10 mppa consent would meet capacity requirements at 12 mppa. Taking into account an additional 2 mppa, ongoing development at Bristol Airport and changing operational requirements since that consent was granted; it has also considered an alternative south terminal extension.
- 3.3.50 Following detailed analysis of the four terminal options outlined above, BAL considers that Option 2 (south terminal extension) and Option 3b, involving a revised west terminal extension, will best accommodate passenger growth, support an efficient airport and enhance passenger experience. As a result, phase 2 of the consented east terminal extension will no longer be implemented,

Passenger car parking

- 3.3.51 An additional 2 mppa will increase the demand for passenger car parking at Bristol Airport. An assessment of parking demand²¹ (the Parking Demand Study) has identified that the expansion of Bristol Airport to 12 mppa will (assuming a stable 12.5% public transport mode share) generate a car parking requirement of 4,600 additional spaces.
- 3.3.52 In order to address the requirement for car parking associated with an additional 2 mppa, an important first step is the consideration of public transport, which influences the level car parking demand. BAL is proposing a modal share target of at least 15% of passengers arriving at the airport by sustainable travel that will be secured through a Section 106 Agreement and delivered via a new Airport Surface Access Strategy (ASAS). This target has been carefully calculated taking into account the current modal share of 12.5% and the limited period of time for investment in public transport before 12 mppa is reached and is considered to be realistic and achievable given BAL's ability to influence passenger travel choice.
- 3.3.53 Taking into account public transport usage of 15% for passengers, the Parking Demand Study estimates that a total of 3,900 additional spaces will be required. This requirement forms the basis for the Parking Strategy²² which has assessed car parking options to accommodate future demand associated with an additional 2 mppa.
- 3.3.54 The Parking Strategy has adopted a sequential approach to the identification of possible siting options which has in-turn informed BAL's preferred parking solution. The approach is as follows:
1. Sites within the Green Belt inset;
 2. Strategic park and ride locations remote from the airport including land outside the Green Belt;
 3. Sites within the airport site but outside the Green Belt inset; and
 4. Sites in Green Belt locations adjacent to the airport site.
- 3.3.55 The aim of the sequential approach outlined above is to ensure that all potential development options are appraised before moving onto the next area of search in the sequence. The approach ensures that BAL's operational land within the Green Belt inset is maximised (within operational requirements).
- 3.3.56 Through the application of the framework provided by the sequential approach outlined above, a number of possible options to deliver the 3,900 car parking spaces required for an additional 2

²¹ Teneo Consulting (2018) *Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum: Parking Demand Study*.

²² Wood (2018) *Parking Strategy: Final Report*.

mppa were identified and considered by BAL in developing its preferred parking solution. These options are outlined below.

Option 1: Sites within the Green Belt inset

- 3.3.57 Reflecting Green Belt policy, the starting point for the sequential assessment of parking locations was to consider land within the Green Belt inset, subject to normal development constraints. In this context, two options were identified; a single multi-storey car park (Option 1a) and further additional multi-storey and/or decked car parking (Option 1b).
- 3.3.58 It should be noted that an option of underground car parking was suggested by respondents to the Master Plan consultation. However, this was not taken forward by BAL for further consideration due to:
- The cost associated with delivering of an underground facility, taking into account the nature of car parking demand and the trend towards lower-cost car parking of a similar nature to that provided in the Silver Zone;
 - The fact that BAL is already using the current topography and MSCPs to develop a public transport interchange at the same level as the terminal to facilitate easy transfer and encourage public transport use; and
 - The need to minimise ground intrusion and associated environmental effects.

Option 1a: Multi-storey car parking northside

- 3.3.59 The adopted car parking solution includes further multi-storey capacity in the northside of Bristol Airport providing circa 2,150 spaces, the delivery of which will result in a more land-efficient and high-density form of parking in the Green Belt inset. The capacity of the proposed MSCP Phase 3 takes into account existing and consented multi-storey car parking provision at Bristol Airport and a careful analysis of the demand for premium long stay car parking. However, the proposed MSCP Phase 3 will not meet the total car parking requirement of 3,900 spaces (there would be a residual unmet need of 1,750 spaces) and in consequence, further additional multi-storey/decked car parking on the northside of the airport and within the Green Belt inset was considered; this forms Option 1b.

Option 1b: Further multi-storey/decked car parking northside

- 3.3.60 Further additional multi-storey/decked car parking on the northside of Bristol Airport and within the Green Belt inset was considered. However, consented and proposed multi-storey car parking already covers a substantial proportion of the inset area and additional multi-storey/decked car parking beyond that associated with MSCP Phase 3 would result in the overdevelopment of the northside of Bristol Airport. This would have significant visual impacts on residential receptors along Downside Road, particularly taking into account the topography of this area and the requirement for a gyratory to improve traffic flows within the airport site which significantly limits siting options.
- 3.3.61 Further multi-storey or decked car parking to the north of the airport site would also result in an overprovision of premium spaces (the Parking Demand Study provides more detail on demographics, economic context and customer preferences to assess the demand for premium and low-cost spaces). In these circumstances, the business case for such an investment based on the level of charging required would not be commercially acceptable. UK airports operate in a highly competitive environment across all facets of their business; building infrastructure that is not required by customers has a negative impact on the overall business and ultimately on current and future passengers since the airport would not have the financial resources to invest in facilities

necessary to maintain a modern, efficient airport nor the ability to compete with other airports to attract airlines and expand connectivity. Further, a parking solution that does not accurately reflect passenger demand is likely to encourage further unauthorised off-site provision and on-street parking to meet the demand for low-cost parking that cannot be met on the airport site.

- 3.3.62 For these reasons, further multi-storey/decked car parking beyond the proposed MSCP Phase 3 (Option 1a) was rejected.

Option 2: Strategic park and ride locations

- 3.3.63 In order to accommodate the residual requirement for 1,750 spaces, potential locations for off-site car parking (park and ride) at strategic locations remote to Bristol Airport including brownfield land and sites outside of the Green Belt were considered in accordance with the sequential approach.
- 3.3.64 A total of 25 potential sites were initially identified through the Parking Strategy and assessed against a wide range of criteria to identify possible options for accommodating demand off site. The initial assessment determined that certain locations could not be progressed further for reasons including:
- Proximity to dense residential development;
 - Poor quality interchanges required to access the airport, for example having to catch a bus/train to then catch another bus would be simply not viable for passengers with large suitcases/heavy bags;
 - Existing or proposed planning applications for the area;
 - Detrimental impacts to the local community if current land use was changed to parking;
 - Sites located far from the airport - being too far from the airport would result in capital expenditure and operating costs being too high and unattractive to passengers; and
 - Sites that could only support a low number of spaces.
- 3.3.65 By discounting sites that the initial sifting stage highlighted as not being suitable, a refined shortlist of 12 sites was developed and taken forward for more detailed consideration in the Parking Strategy. The analysis of these 12 shortlisted sites revealed that a number of constraints affect their deliverability including (inter alia) distance from the airport (which would affect passenger experience and may undermine uptake), the rural nature of the local road transport network (which means that the operational viability of these locations is marginal), high land prices, availability and the need for remediation. In consequence, the Parking Strategy concludes that a remote, offsite option is unlikely to be achievable at 12 mppa (it should also be noted that three of the 12 sites are within the Green Belt in any case).
- 3.3.66 As there are presently no suitable off-site park and ride sites outside the Green Belt, Option 2 has not been taken forward as part of the adopted parking solution. Notwithstanding this, the Parking Strategy recommends that BAL continues to review and monitor the availability of strategic offsite locations in considering car parking options for the growth of Bristol Airport beyond 12 mppa.

Option 3: Sites within the airport site, outside of the Green Belt inset

- 3.3.67 As no suitable, remote offsite car parking options were identified, land within the current airport site, but also within the Green Belt, was examined. It should be noted that options within the existing airport site are limited due to land already being in use for essential airport operations or possible sites materially lacking sufficient capacity. Two options were, however, identified by BAL;

decked car parking southside (Option 3a) and year-round use of the existing seasonal Silver Zone car park (Phase 1) extension (Option 3b).

Option 3a: Decked car parking southside

- 3.3.68 Decked car parking in the southside of the airport would be located over the existing Silver Zone car park and be within the Green Belt. Due to the nature and scale of development in this location, landscape impacts and harm to the openness of the Green Belt would be greater than a solution involving surface level car parking. Further, the construction costs involved would require the car park to be charged at a premium; BAL's experience, and that of other airports, suggests that premium parking is only viable if customers can then walk to the terminal, something that is not possible from the Silver Zone. In consequence, this sub-option was rejected.

Option 3b: Year-round use of the Silver Zone Car Park Extension (Phase 1)

- 3.3.69 As an alternative to decked car parking, the adopted parking solution includes the year round use of the existing seasonal Silver Zone Car Park Extension (Phase 1). The use of this car park is currently restricted by condition to between May and October each year in order to meet seasonal demand²³.
- 3.3.70 Seasonal restrictions on use of the Silver Zone Car Park Extension delivers an inefficient use of space and resource. There is a need to allow a period of several weeks at the start and end of the usage period to set up the facility in terms of temporary lighting, security checks and to ensure there is adequate time before the closure of the area for it to empty of vehicles (if the area does not empty of its own accord, cars need to be moved earlier than needed, occupying self-parking bays and reducing the overall capacity of the car park). Temporary facilities are required to manage the area, including diesel powered, mobile lighting rigs.
- 3.3.71 Year round use of the area will be determined by demand. Restriction of lower priced capacity in winter months limits the ability of BAL to reduce the impact of unauthorised offsite parking; there are occasions, especially around school holidays, where demand may need to be suppressed through price to ensure the capacity is not exceeded.
- 3.3.72 In this context, the year round use of the car park would help cater for the increased year-round demand for low cost parking associated with an additional 2 mppa whilst making best use of the existing airport facilities in accordance with national aviation policy. It is important to note that, as this is an existing facility that already caters for peak car parking demand during the summer months, it would not affect the residual requirement for spaces identified in the Parking Demand Study (3,900 spaces). Instead, it would ensure that BAL is better able to serve demand outside the summer peaks and, further, will also help to ensure that Bristol Airport is better positioned to offer an attractive alternative low-cost product to unauthorised offsite providers. In this way, it remains an important component of the overall car parking solution.
- 3.3.73 Importantly, the principle of car parking in this exact location has already been established and accepted in the granting of consent, by NSC, for the extension to the Silver Zone car park and measures have been successfully implemented to mitigate associated environmental impacts including, in particular, a landscape bund to the south of this area which successfully screens the car park, minimising landscape and visual impacts whilst providing important ecological habitat.

²³ Consent was granted in October 2018 for the temporary use of the car park over the Winter 2018/19 period (application reference 18/P/4007/FUL).

Option 4: Sites adjacent to the Bristol Airport site

- 3.3.74 As it was not possible to accommodate all of the required car parking spaces within the Green Belt inset, at sites remote to Bristol Airport or within the existing airport site outside of the inset, in accordance with the sequential approach it was necessary to consider land contiguous to the existing airport site, within BAL's ownership.
- 3.3.75 Four potential sites in this area of search were initially identified by BAL:
1. Land to the east of the A38;
 2. Land to the west of the A38;
 3. Land to the south of the existing Silver Zone car park (known as 'Gruffy Field'); and
 4. Land to the south of the existing seasonal Silver Zone car park extension (on land known as 'Cogloop 2').
- 3.3.76 Land to the east and west of the A38 would be highly visible and screening would be unlikely to fully remove potential landscape and visual effects due to the local topography. Additionally, these sites would require the creation of a new access on to the A38 and would not link/integrate well with the existing passenger facilities provided in the Silver Zone car park (including the reception facility) meaning that additional facilities and infrastructure would be required. Land to the east of the A38 is also within a Public Safety Zone and the instrument landing system in this area would need to be safeguarded.
- 3.3.77 Land to the east of the A38 is adjacent to Felton Common Local Nature Reserve (LNR), Oval barrow on Felton Hill 100m east of The Round House Scheduled Monument and Windmill House Grade II Listed Building such that development of car parking in this location could affect these designated assets. It is also important to note that land to the east of the A38, as well as Gruffy Field, are existing nature conservation areas that have formed the basis for ecological mitigation and enhancement in connection with the expansion of Bristol Airport to accommodate 10 mppa.
- 3.3.78 On the basis of the constraints outlined above, sites 1 to 3 above were discounted from further consideration.
- 3.3.79 The remaining site, land to the south of the existing seasonal Silver Zone car park extension, was taken forward for assessment as part of the Parking Strategy. This site is within BAL's ownership (and is therefore available) and has capacity to provide circa 2,700 spaces.
- 3.3.80 The Parking Strategy highlights that this site:
- Is well-located from an operational perspective, allowing car parking to the south of the airport site to be consolidated in one location;
 - Benefits from existing services and facilities associated with the Silver Zone car park including the Silver Zone car park reception building and associated shuttle bus services that transfer passengers to/from the terminal;
 - Is well-suited to block parking, where public access is not required, and car parking spaces can be maximised thereby making the best use of the land without the need for significant additional built development and minimising the need for lighting;
 - Has good access to the A38 and terminal via the existing southern access road;
 - Can be readily integrated with wider surface access proposals and improvements associated with development of Bristol Airport to 12 mppa; and
 - Is not within/adjacent to national or local designated sites.

- 3.3.81 Importantly, the nature of the car parking that could be provided in this location (i.e. long-stay, block parking) would help to meet the demand for low-cost car parking.
- 3.3.82 Expansion of the Silver Zone car park in this location will inevitably result in some encroachment into the countryside. However, this encroachment has been minimised and mitigated through careful design and sensitive landscape and boundary treatments (including a landscape bund) such that impacts on the openness of the Green Belt would be minor. Importantly, by helping to meet demand for low-cost car parking, this option could also lessen the opportunity for unauthorised car parks which can have adverse impacts on, in particular, local amenity, landscape character and the road network.
- 3.3.83 In light of the above considerations, Option 4 was taken forward as part of the preferred car parking solution.

Summary

- 3.3.84 An additional 2 mppa will increase the demand for passenger car parking; the Parking Demand Study estimates that a total of 4,600 additional spaces will be required to meet forecast demand. As a first step to addressing this demand, BAL is proposing a modal share target of at least 15% for sustainable travel; taking this into account, the Parking Demand Study estimates that a total of 3,900 additional spaces will be required.
- 3.3.85 To meet the demand for car parking associated with an additional 2 mppa, BAL has followed a sequential approach to the provision of car parking, maximising the amount of spaces provided outside of the Green Belt and making best use of existing car parking facilities within it. This has taken into account landscape and visual impacts, the nature of car parking demand (which indicates that there is an immediate need for low-cost provision ahead of further multi-storey car parking).
- 3.3.86 Following the application of this sequential approach and assessment of potential options, the preferred parking strategy has been determined as comprising:
- Option 1a: Further MSCP provision to the northside of Bristol Airport, in the Green Belt inset providing circa 2,150 spaces;
 - Option 3b: The year-round use of the existing seasonal Silver Zone car park extension which has an existing capacity of 3,650 spaces; and
 - Option 4: A further extension to the Silver Zone car park located to the south of the existing seasonal Silver Zone car park extension, providing circa 2,700 spaces.
- 3.3.87 This solution maximises development in the Green Belt inset and makes the best use of existing facilities whilst ensuring that passenger demand is met as part of a holistic approach to sustainable travel.
- 3.3.88 Whilst the proposed car parking solution provides a total of circa 4,850 spaces against a requirement for 3,900 spaces, this additional capacity will provide the flexibility required to respond to the displacement of spaces during ongoing construction activity associated with the Proposed Development. Importantly, it will also help to ensure that the airport is better positioned to offer an attractive alternative low-cost product to unauthorised offsite providers.

Highways improvements

- 3.3.89 At an early stage in developing proposals for the expansion of Bristol Airport to accommodate 12 mppa, the need for significant improvements to the A38 between the main Bristol Airport access roundabout and West Lane to accommodate additional traffic generated by the Proposed Development was identified. The development of proposals for the improvements to the A38

comprised of two stages: first, an appraisal of preliminary options; and second, a review of detailed options. In total, 16 possible options were considered which are described in-turn below.

Preliminary options

3.3.90

A total of six preliminary options were identified as part of the early design process and were subject to discussion with North Somerset Council (NSC). The options identified include:

- Options A and B sought to generate capacity increases by providing two lanes in both directions from Potters Hill to the main Bristol Airport roundabout by removing traffic islands and carriageway widening north of West Lane. However, implementing this change resulted in the absence of a right hand turn into West Lane; following this design, it remained as a priority junction. Downside Road remained unwidened and as such the scheme had insufficient capacity for the demand flows;
- Option C introduced improvements to the Downside Road area with an enhanced left turn facility. While this improved the capacity, the lack of a right turn into West Lane (which is a current and notable movement) and traffic islands was not considered to be appropriate;
- Option D reintroduced the traffic islands and the right turn into West Lane. However, this proposal required Common Land;
- Option E introduced a roundabout at the Downside Road junction as an alternative to traffic signal control. Analysis revealed that this proposal had a significant impact on existing properties, including the loss of an existing building with limited long-term capacity; and
- Option F introduced traffic signal control to both junctions, with carriageway widening proposed further west, away from the Common. It also introduced a right turn from the A38 into Downside Road. While this provided significant improvements, the impact of additional third-party land was unachievable.

Detailed options

3.3.91

Owing to numerous issues outlined above, namely insufficient capacity and significant impacts on third party properties, as discussed in paragraph 3.3.88, the six preliminary options were discounted and a further 10 options subsequently developed. These further, detailed options sought to minimise land take but increase capacity and safety. They were again subject to discussion with NSC. The detailed options identified were as follows:

- Option 1 provided an all movement junction at Downside Road, tying it back to a priority junction at West Lane. While the Downside Road junction had sufficient capacity, the West Lane junction in this format was unable to provide the capacity needed whilst the two lanes northbound on the A38 had to merge earlier thus affecting the junction operation;
- Option 2 pushed the Downside Road junction further south to increase the length of two lanes northbound, before tapering down to West Lane. While this offered some improvement, it was minimal and not considered to be sufficient to meet forecast demand;
- Option 3 introduced traffic signals at West Lane, but limited impact on third party / Common Land by only providing one lane northbound. However, the narrowing from two lanes to one remained an issue;
- Option 4 moved the Downside Road junction further south to increase the distance over which the lanes narrowed. This again was unsatisfactory as the distance over which the two-lane merge occurred caused issues with the junction modelling and affected the overall capacity;

- Option 5 increased the number of left turning lanes from Downside Road and relocated the bus stop, both of which resulted in the loss of a third-party property;
- Option 6 amended the alignment of the A38 and sought to increase taper lengths, again impacting a third-party property;
- Option 7 amended the Downside Junction to tie up with the Forge Hotel access, which produced limited capacity improvements and made other access points more challenging;
- Option 8 adjusted the West Lane junction to provide two full lanes in both directions of the A38, plus a right turn facility at the signals. The Downside Road junction also had a right turn and was also diverted. While this provided capacity, it had significant adverse impacts on third party land and properties;
- Option 9 kept Downside Road off line but removed the right turning lane from the A38, requiring users to U turn as they do currently at the main Bristol Airport roundabout. While this junction reduced impacts on third party land and provided capacity, construction costs were higher than an online improvement and the alignment produced a sterilised parcel of land which would not have been useful. Further improvements were therefore made in developing Option 10 (the preferred option); and
- Option 10 involved an online improvement to Downside Road, with widening only on its southside. While a new junction was provided into the Airport Tavern, the building is retained. This option provides the capacity and safety required but minimises the impact on third party land. The Transport Assessment (**Appendix 6A**) has demonstrated that this option is predicted to operate within capacity.

Summary

- 3.3.92 Overall, Option 10 has been selected as the preferred option for the proposed highway improvements. BAL considers that this option represents a significant improvement to the A38 that will provide the necessary capacity to accommodate an additional 2 mppa, improving traffic movements, way finding legibility and road safety on the local road network surrounding Bristol Airport whilst minimising the impact on the adjacent land use.

3.4 Summary

- 3.4.1 Schedule 4 of the EIA Regulations¹ requires an ES to consider the reasonable alternatives to the proposed development which '*may include development design, technology, location, size and scale*', This chapter of the ES has considered such alternatives in the context of the wider need and drivers for the Proposed Development.

Need for the Proposed Development

- 3.4.2 The need for the Proposed Development is influenced by the following factors:
- Demand factors demonstrated by forecast passenger growth and aircraft movements;
 - The economic importance of Bristol Airport and the wider aviation sector to the local and regional economy; and
 - Policy support for airport growth and making the best use of existing airport capacity.

- 3.4.3 Bristol Airport has experienced significant growth since planning permission was granted for expansion of the airport to 10 mppa; this has been supported by substantial investment in airport infrastructure, facilities and surface access. Reflecting projected international, national and regional trends for the aviation sector, this growth is forecast to continue up to 20 mppa by the mid-2040s.
- 3.4.4 As part of the phased approach to the continuing sustainable development of Bristol Airport set out in the emerging Master Plan, the Proposed Development will enable Bristol Airport to grow beyond 10 mppa to 12 mppa by making the best use of the existing airport site. This will accommodate forecasted passenger demand up to around 2026 and will ensure that Bristol Airport continues and enhances its role as the principal international gateway for the South West region and a significant economic driver, in accordance with national aviation policy, the emerging JSP and local policy.

Alternatives

- 3.4.5 In identifying reasonable alternatives to meeting the identified need for the Proposed Development, the following option types have been considered:
- 'Do Nothing' alternative, where the Proposed Development is not progressed;
 - Strategic alternatives; and
 - Alternative design/layout in the context of the design evolution.
- 3.4.6 The 'Do Nothing' alternative would constrain both operations and investment at the airport, limit improvements to passenger experience and, importantly, would not deliver the significant economic benefits to the local and wider region associated with airport expansion to 12 mppa. In consequence, this alternative was rejected.
- 3.4.7 In terms of strategic alternatives to meeting the identified need for the Proposed Development, growth above or below 12 mppa would not reflect current passenger forecasts which has been independently validated; by developing the necessary infrastructure almost entirely within the current site boundary, BAL will be able to deliver an airport with a capacity of 12 mppa, securing a viable operation until the mid to late 2020s whilst retaining the flexibility to allow a variety of future options to be implemented at a later date. As a result, an alternative involving different passenger throughput caps was rejected. Taking into account the analysis of competing airports combined with the policy support for the development of Bristol Airport, displacing the growth proposed at Bristol Airport to competing airports was also not considered to be a viable alternative.
- 3.4.8 In developing proposals for the development of Bristol Airport to accommodate 12 mppa, consideration has been given to on-site alternatives for individual elements and components of the Proposed Development. This has been undertaken as part of the on-going project evolution and project design process, which is documented in the Design and Access Statement that accompanies the planning application.
- 3.4.9 Reflecting existing constraints, the consideration of alternatives has focused on options relating to the terminal building extensions, passenger car parking and highways improvements to the A38. The review of these options has taken into account a wide range of factors including deliverability, suitability and environmental constraints within the context of the design objectives set out in the Design and Access Statement. On this basis, the following preferred options have been taken forward as part of the Proposed Development:
- Terminal extension: West terminal extension (Phase 2) and south terminal extension;
 - Passenger car parking: a preferred car parking solution comprising of further MSCP provision to the northside of the airport (MSCP Phase 3), the year-round use of the existing seasonal Silver

Zone Car Park Extension (Phase 1) and further extension to the Silver Zone Car Park Extension (Phase 2);

- Highway improvements: an online improvement to Downside Road, with widening only on its southside.