

Bristol International Airport

Master Plan

2006 to 2030



November 2006

Foreword by Andrew Skipp



I am pleased to introduce this Master Plan covering the important next stages of the development of Bristol International Airport, the publication of which marks the culmination of over two years work by myself and my colleagues. During this period we have placed great emphasis on consultation with the local community, the local authorities and other key stakeholders. The October 2005 consultation on the draft Master Plan was an important stage in this process. We were pleased with the great deal of interest shown in our proposals and we have received a wide variety of comments and suggestions. We are grateful to all those who have taken the time and effort to contribute the development of the Master Plan.

The consultation raised a number of challenging issues relating to the future development of our airport. It has forced us to look again at a number of aspects and make difficult decisions on how best to address the matters of most concern relating to Bristol International's future growth. We have made a number of significant changes to our proposals to reflect the comments we have received.

The business community have made it quite clear to us that they see the development of Bristol International as being vital to the South West region's economic growth. At the same time the preparation of the Master Plan has allowed us to appraise and reflect on the environmental impacts of our growth. The Master Plan includes a range of effective mitigation measures which seek to reduce, minimise and pro-actively manage the adverse effects of growth, whilst seeking to realise the social and economic benefits of air travel. In many cases our mitigation plan will achieve positive benefits for those members of the local community that are affected by our operations.

The Government's White Paper, 'The Future of Air Transport', set out the national policy framework for the development of the nation's airports. Bristol International was envisaged to remain the South West's largest airport, with development supported to handle forecast growth to between 10 and 12 million passengers per annum by 2030. The national policy set out a balanced approach to the sustainable development of airport capacity. We have embraced this approach and the Master Plan includes detailed consideration of the social, economic and environmental impacts of development.

We have set out our development proposals in some detail for the period to 2015 when we plan to increase the capacity of the airport from around 6.5 million passengers per annum currently to 9 million passengers per annum. The Master Plan also looks forward to 2030, setting out how the airport might develop in the longer term to meet the projected growth in demand for air travel.

Surface transport has been an overriding issue for many people through the Master Plan consultation. The Greater Bristol Strategic Transport Study has provided greater clarity regarding the potential solutions to the sub-region's transport issues and several schemes are now being actively promoted to address these matters. We are committed to working with the public sector to consider and develop these solutions further and to ensure that benefits in respect of access to Bristol International are realised. Improved accessibility to the Airport is vital if we are to ensure that the benefits of aviation growth are fully realised. The Master Plan sets out challenging targets for increasing the range and use



of public transport by passengers and staff. We will take the lead in delivering the programme of public transport improvements that are required.

Following the publication of the Master Plan we shall bring forward detailed plans for the development to 2015 through the planning system. The first such plans will comprise the extension of the Terminal Building. I look forward to continuing to work with stakeholders to bring these plans to fruition.



Andrew Skipp

Managing Director

Bristol International Airport

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Master Plan summary

Bristol International Airport is currently the United Kingdom's ninth largest airport and the fifth largest outside the South East. The Airport serves a network of 57 non-stop international and domestic scheduled destinations with a further 58 routes operated by charter airlines. 5.2 million passengers passed through the airport in 2005. Around 85% of passengers are estimated to have origins or destinations in the South West region, over half of which are from the Bristol, Bath and North East Somerset, North Somerset and South Gloucestershire administrative areas.

The Airport supports the operations of 52 separate businesses which directly employed 2,650 people in 2005. Future direct airport employment is forecast to rise to 3,802 jobs in 2015 and 5,686 jobs at 2030. Additional jobs are created through the airport supply chain and through the spending of wages earned by employees. The total regional employment impact is estimated to be 3,327 jobs at 2005 rising to 5,714 at 2015 and 8,606 at 2030.

Bristol International Airport's most important contribution to the South West is its role as regional gateway for domestic and international travel. Many air passengers from the South West currently use airports outside the region, mainly in the South East. This 'leakage' of passengers was estimated to be 70% in the Air Transport White Paper, published in 2003. The ongoing growth of Bristol International will reduce the South West's reliance on airports outside the region and reduce the need for long distance surface journeys, to these airports, which are primarily undertaken by road.

The business community have made it quite clear to us that they see the development of Bristol International as being vital to the South West region's economic growth. At the same time the preparation of the Master Plan has allowed us to appraise and reflect on the environmental impacts of our growth. The Master Plan includes a range of effective mitigation measures which seek to reduce, minimise and pro-actively manage the adverse effects of growth, whilst seeking to realise the social and economic benefits of air travel. In many cases our mitigation plan will achieve positive benefits for those members of the local community that are affected by our operations.

In developing air services from Bristol International our vision is to play a leading role in the economic development of the South West region by providing an increasing range of frequent scheduled services to the destinations required by business. We also aim to meet the growing demand for leisure travel by residents within the airport catchment area by widening the choice of services, to act as a gateway for tourists visiting the South West and the UK and to provide connecting services linking Devon and Cornwall into the Bristol International route network. Bristol International is committed to the continued investment in the sustainable development of the Airport delivering world class facilities supporting the economic and social prosperity of the South West Region.

Throughout the development of the Master Plan we have sought to engage with the local community and the key stakeholders that have an interest in the development of Bristol International. We have carefully considered the comments that have been made during the extensive consultation process and significant changes have been made to the Master Plan proposals in response to the views expressed. The Master Plan reflects our strong commitment to sustainable development and environmental management.

The Master Plan considers the development of the Airport in two phases. Development proposed to accommodate growth between now and 2015 has been set out in some detail. This section describes the development that will be needed to increase the capacity of the airport to accommodate 9 million



passengers per annum at 2015. This growth would mean an additional five or six take-offs or landing each hour over the main operating hours. The Master Plan appraises the environmental, economic and social impacts of this growth. The Master Plan also looks forward beyond 2016 and includes indicative land use plans showing how the airport might expand to handle passenger growth to 2030 when up to 12.5 million passengers annum are forecast.

Development requirements to 2015

The current facilities have the capacity to handle up to around 6 million passengers per annum. To accommodate the anticipated growth to 2015 an extension to the east and west of the existing terminal building is proposed which would almost double the size of the building. The extension would be sensitively designed to complement the existing building with an emphasis on sustainable construction objectives. The aircraft parking stands required would increase from 18 to around 30.

The overwhelming view expressed during the consultation was that the intensity of car parking on the north side of the airport should be increased. The Master Plan embraces this approach and proposes the construction of multi-storey and single storey 'decked' car parks throughout most of the north side car park area. The decked car park area will incorporate green roofs to ensure that there is a minimum of disturbance to local residents from car parking operations. This proposal will offer a considerable improvement on the current situation.

An extension to the car parking on the south side of the airfield is still required, although on a lesser scale than was proposed in the draft Master Plan. Much of this is required in order to facilitate the north side car park developments.

Land has been allocated inside the airport boundary for an enlarged fuel depot, relocation of the fire station and a new administration building. Construction of an on-site hotel for passengers, air crew and staff is also proposed.

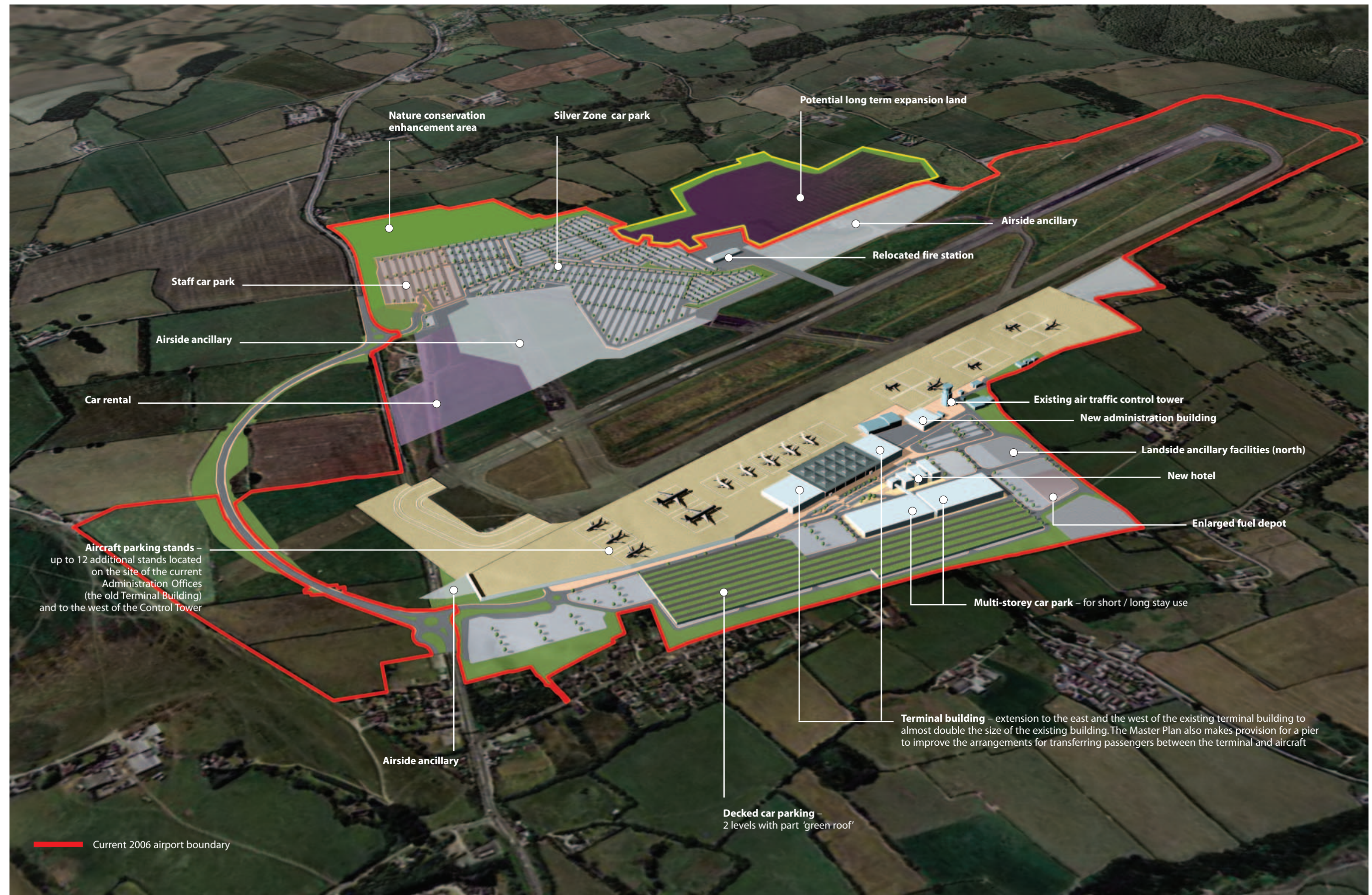
The proposals for the development of the airport to 2015 are shown in Figure 1.

Environmental impact

The consultation has shown that the issues that are of the most concern are public transport and surface access; noise and night flights; air pollution; climate change; landscape and visual impact and the economic benefits of airport growth. In developing the Master Plan we have commissioned a number of technical studies to look at the impacts of the new facilities, more passengers and more flights on the local economy and environment. These technical studies have paid particular attention to the issues identified as being of most concern. The most significant potential effects are described below. These refer to development at the airport to accommodate 9 million passengers per annum.

Noise

Bristol International is committed to working with the airlines to ensure that the aircraft operating at Bristol International Airport are the quietest and most modern available. The Master Plan includes commitments to eliminate the noisiest aircraft, to improve operational procedures and to monitor noise and flight paths. Penalties will be imposed on aircraft that breach the standards set. Detailed



noise modelling has been carried out to assess the impacts of the forecast increase in air traffic movements on the local community. This work shows that the measures proposed to manage aircraft noise will ensure that the number of people affected will remain broadly as the present day. The construction of a noise barrier on the north side of the aircraft apron will mean that the noise experienced from aircraft on the ground would be reduced from current levels.

Night flights

We will continue to work within the current restrictions on night flights which limit the number of aircraft movements through the use of a night quota system. This will ensure that the number of night flights will not increase in the future.

Air quality

A detailed study of air pollution concentrations has concluded that the proposed development of the airport will not compromise local air quality standards.

Landscape and visual impact

We have carefully considered the landscape and visual impacts of our proposals. The preferred options for development have been chosen to avoid detrimental visual and adverse effects. An effective landscape scheme would be developed to screen and soften any major structures. Development will be concentrated in the north side of the airport where the use of 'green roofs' will ensure that the most visible parts of the car parks will be screened from external view.

Climate change

Bristol International recognises that climate change is a significant issue and we are committed to playing our part in meeting internationally agreed targets for greenhouse gas emission reductions. The Master Plan confirms our commitment to the UK aviation industry's Sustainable Aviation Strategy, which sets out measures for aviation to minimise its impacts through technology and operational improvements, and meet the external costs of its remaining emissions. Aviation's contribution to global warming, relative to other economic sectors is currently small. However this relative contribution is forecast to rise as the demand for air travel grows and other sectors achieve cuts in their greenhouse gas emissions. Emissions from flights from Bristol International Airport amount to 0.4% of the total greenhouse gas emissions from the South West region. This could rise to 0.7% at 9 million passengers per annum if all other emissions remain the same. Climate change is a global issue and action is needed at national and international level. Emissions trading is the most effective market mechanism for achieving improvements in the aviation industry and an important component of Government policy is the inclusion of aircraft emissions in the EU Emissions Trading Scheme. Bristol International supports this approach and will play its own part in minimising greenhouse gas emissions through the use of energy saving measures in the buildings and services within our control; the use of renewable energy and fuel sources; improvements to aircraft operational procedures and increased use of public transport.



Surface access

Public transport

We have reconsidered our public transport strategy and set out in detail how this will be implemented by expanding the existing Bristol International Flyer service and the introduction of new bus routes serving Weston-super-Mare and Bath. We have set ourselves a challenging target which would see the number of passengers using public transport increasing four fold by 2015. The recent introduction of the expanded Flyer route network, serving Bristol City Centre and Clifton, demonstrates our commitment to achieving this target.

Strategic highway infrastructure

Good surface access is important to the future success of Bristol International Airport. The Greater Bristol Strategic Transport Study has now provided greater clarity on the proposed transport strategy for the sub-region and active steps are being taken by local authorities to implement this. Bristol International strongly supports the early delivery of the A38/A370 link road and the South Bristol Ring Road. We will play our part in the delivery of the GBSTS strategy and the resolution of the sub-region's transport problems.

Highways impact of development

A formal transport assessment of our proposals is being published in conjunction with the Master Plan. This sets out a holistic assessment of public transport, car parking and highways impact. The transport assessment identifies mitigation measures that will need to be implemented in order to improve the performance of the A38, the B3130 and the junctions to the immediate north of the airport. Many of these measures would be needed whether or not the Airport develops.

Development 2016 to 2030

Our forecasts indicate that up to 12.5 million passengers could be using Bristol International Airport by 2030. The Master Plan includes a preliminary assessment of how the airport might develop further to meet this anticipated growth. The Government White Paper proposed that a second terminal and a runway extension would be required.

Our assessment is that a runway extension cannot be justified. However a second terminal and further development to the south of the runway would be required. Additional land would be required to accommodate the new facilities.

The Master Plan includes a preliminary assessment of the potential impacts of growth beyond 2015. We will carry out detailed assessments of the environmental and economic impacts of the development when we bring forward detailed proposals in future reviews of the Master Plan. This process will incorporate further public consultation.

Next steps

A detailed planning application for the extension of the Terminal Building and associated developments, supported by an Environmental Statement, Transport Assessment and other technical documents, will be submitted to North Somerset Council in early 2007. Planning applications for other developments proposed in the Master Plan will be prepared as required by the growth in traffic. There will be further opportunities to comment on these proposals as they progress through the statutory planning process. The Master Plan itself will be reviewed every five years.

The Master Plan is now being submitted to North Somerset Council for their formal consideration. They will undertake a consultation on the Master Plan which runs for six weeks until **22 December 2006**. Should you wish to make any comments on the Master Plan, please forward them to the following address:

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Development Control
North Somerset Council
Somerset House
Oxford Street
Weston-super-Mare
BS23 1TG

E-mail: dccomments@n-somerset.gov.uk



Chapter 1

Introduction

1

- 1.1 In the last 30 years the United Kingdom has seen a five fold increase in air travel. Half the population flies at least once a year and many fly far more often than that. We work in a global economy and many of our businesses rely on air travel. This is particularly true in the South West where the economy includes many of the fastest growing business sectors such as finance, professional services, advanced engineering, ICT and pharmaceuticals. Air travel is also vital to UK tourism. Technological advances, cost efficiencies and strengthened competition, together with rising standards of living have brought air travel within the reach of many more people, providing opportunities for foreign travel that simply did not exist a generation ago. The availability of air travel has opened up new destinations, expanded people's horizons and expectations.
- 1.2 The first passenger airport serving Bristol was officially opened at Whitchurch in 1930. The modern airport, seven miles south west of the city in rural North Somerset, began to be used in 1957 when the post war needs of aviation outgrew the Whitchurch airfield. The runway was extended in the 1960's and then, after more than ten years in the planning process a new terminal building was opened in 2000. Since then the route network and passenger numbers have grown rapidly and over the past five years Bristol International Airport (BIA) has been one of the fastest growing airports in the UK in terms of passenger numbers.

Air Transport White Paper and airport master plans

- 1.3 Following an extensive consultation exercise, in December 2003 the Government published 'The Future of Air Transport', a White Paper setting out a strategic framework for the development of airport capacity in the United Kingdom. The demand for air travel is projected to grow to between two and three times current levels by 2030 and failure to allow for increased capacity could have serious economic consequences at national and regional level. The Government set out a balanced approach to the future delivery of air travel which recognises the importance of air travel to economic prosperity but at the same time seeks to reduce and minimise the environmental effects of airports. Within this framework the White Paper supports the development of Bristol International Airport (BIA) – subject to conditions – to meet a forecast demand anticipated to rise to between 10 and 12 million passengers per annum by 2030.
- 1.4 As part of the strategic review of air travel, the White Paper required airport operators to produce master plans to explain how they propose to take forward the Government's strategic framework in the form of airport-specific proposals. The preparation of a master plan provides airport operators an opportunity to



develop a clear and concise vision for the future, communicate their development plans to a wide range of interested parties and consider the environmental, economic and social effects of growth.

- 1.5 The purpose of the Master Plan, as outlined by the Government, is:
- *To provide an indication of BIA's plans for infrastructure development in the light of the high-level strategic policy framework for the airport in the White Paper, and therefore bring greater clarity and certainty for all those affected or with an interest;*
 - *To inform long-term resource planning for local and regional players, particularly in the preparation of strategies and plans;*
 - *To provide a useful tool for communicating to a range of stakeholders, including airlines, funding institutions, local authorities and other local interests, to allow them to make well informed investment decisions;*
 - *To help BIA to make clear at an early stage the key milestones of airport development such as the submission of planning applications, construction and operational opening;*
 - *To provide a consistent and publicly recognised vehicle for the Government, Devolved Administrations and their agencies to assess progress being made in delivering the White Paper at BIA;*
 - *To demonstrate the range of costs and benefits of airport growth; and*
 - *To enable BIA and others to assess local social and environmental impacts and provide an opportunity to develop preliminary proposals on how those impacts could be mitigated.*
- 1.6 The Master Plan's primary purpose is to consider the growth of BIA between now and 2015, the implications of which are considered in some detail. The Plan also looks forward to 2030 and considers the development issues that might be faced between 2016 and 2030 in a lesser level of detail.

The BIA Master Plan and the planning system

- 1.7 The Master Plan is not an application for planning permission for development of the Airport. It describes the way the Airport is expected to develop over the period to 2015 and beyond but this development will remain subject to the planning system, unless it comprises development that is already permitted by virtue of the Town and Country Planning (General Permitted Development) Order 1995. The Master Plan provides a guide for the development of facilities at the Airport. It establishes the priorities and anticipated phasing of development and identifies the possible location and scale of facilities needed. It does not include detailed designs for new facilities or a full Environmental Statement. However technical studies have been completed in sufficient detail to enable the scale and location of development to be determined with confidence and to allow the key mitigation issues to be considered. Particular attention has been paid to impacts relating to noise, air quality, traffic and effects on the landscape. We have also taken careful note of the views expressed through the consultation process.
- 1.8 Designs for new or improved facilities will be prepared, as proposals for development are brought forward. Actual construction of the facilities identified in the Plan will be

undertaken only when traffic volumes and economics indicate that such facilities are needed to meet demand. The planning system requires that projects meeting certain criteria, in terms of scale and impact, are assessed to determine the impact that the development will have on the environment. The assessment, known as the Environmental Impact Assessment (EIA), is an important consideration when the local planning authority decides whether or not to grant planning permission. The development proposed in this Master Plan will require an EIA. BIA is developing the initial environmental appraisal in this Master Plan into a full EIA for submission with the forthcoming planning applications for development. The EIA will be an over-arching assessment of all impacts relating to the proposed development in the period to 2015.

- 1.9 Proposals for developments with a significant impact on travel patterns need to be accompanied by a Transport Assessment. This will include details of proposed measures to improve access to the airport, proposals for car parking and measures to mitigate transport impacts. Transport and surface access were a priority issue for many of the people we consulted during the preparation of this Master Plan. Accordingly we have carried out the formal Transport Assessment of our proposals in advance of any formal application for planning permission so that this can accompany and inform the Master Plan.
- 1.10 The Master Plan itself, once completed, will not have statutory status. It will however provide an overarching framework and context within which future planning applications for development can be considered. North Somerset Council had previously indicated an intention to develop an Area Action Plan for BIA. However it is now envisaged that this will be deferred until after 2009, when a review of the Master Plan will have provided firmer indications of what might be required for the longer term development between 2016 and 2030.
- 1.11 We have been working closely with North Somerset Council and other interested authorities to ensure that the Master Plan provides a sound framework for development at the Airport. A Steering Group has been formed comprising senior officers from the planning and transportation teams at North Somerset, Bristol City, Bath and North East Somerset and South Gloucestershire Councils together with representatives from the Government Office of the South West, the South West Regional Development Agency and Bristol International Airport. The Steering Group has provided an informal forum with the planning authorities, providing guidance to BIA as the Master Plan has developed.

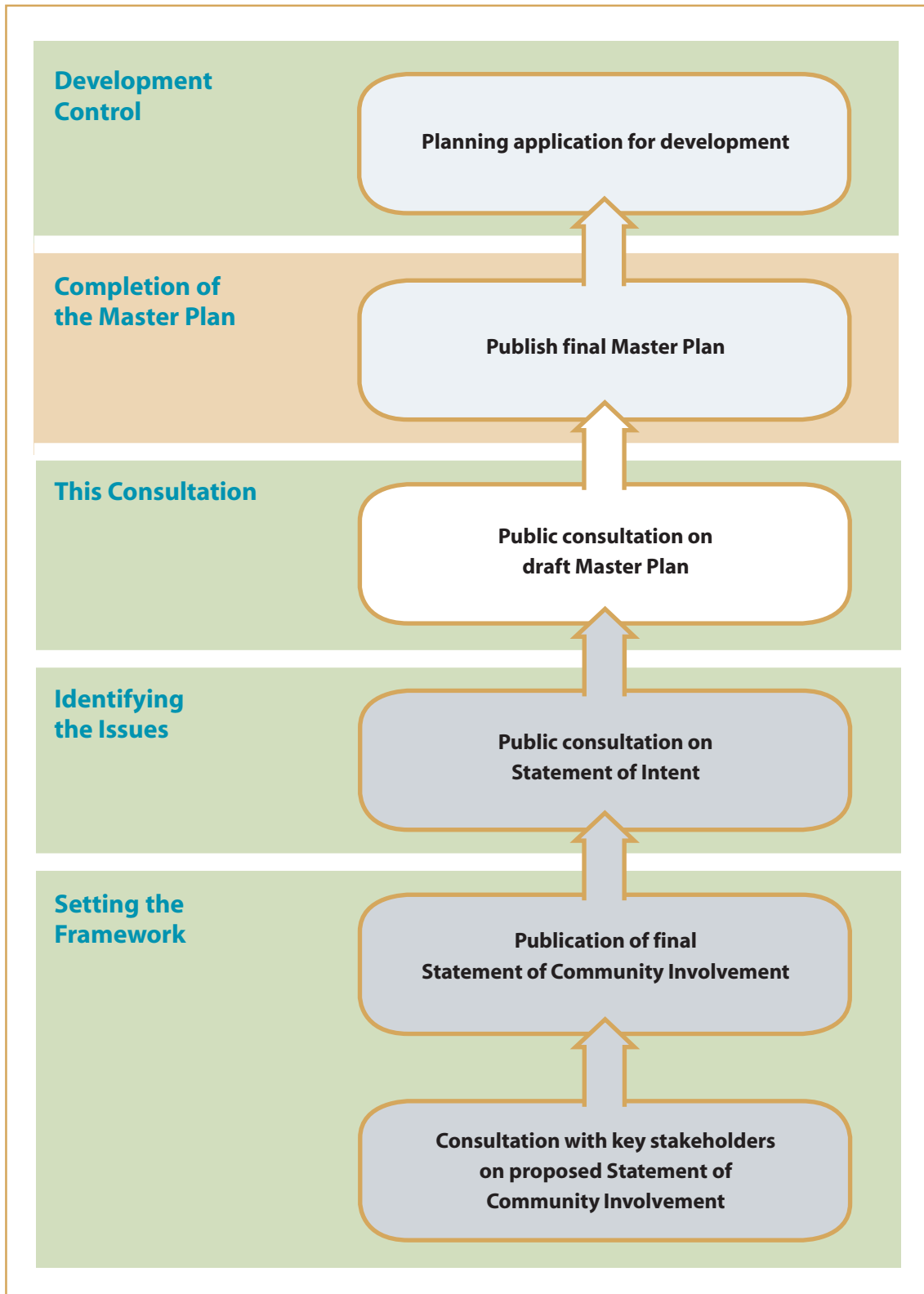
The process for delivering the Master Plan

- 1.12 In line with the Government's expectation for public participation in the planning process BIA has undertaken a full public consultation during the course of preparing the Master Plan. This started with the preparation of a Statement of Community Involvement (SCI) setting out how BIA intends to involve the community and key stakeholders. This was initially prepared in September 2004 and circulated to 58 key consultees representing the interests of the local community, statutory consultees, non Governmental organisations and the local unitary authorities. The draft invited views, ideas and suggestions on how BIA might involve the local community in the preparation of the Master Plan. The SCI was finalised and published in February 2005 following the consideration of comments received on the draft.



- 1.13 The formal public consultation has been carried out in two phases. The first phase took place between March and May 2005, inviting comments regarding issues and concerns about airport expansion. This consultation was initiated by the publication of BIA's Master Plan Statement of Intent and a summary leaflet describing the future plans of Bristol International Airport. The Statement of Intent set out an early indication of the likely implications of the Air Transport White Paper for development at BIA and provided a broad overview of the potential options and the issues that might arise. The issues that were raised by consultees were used to inform the preparation of the draft Master Plan published in October 2005.
- 1.14 The second phase of consultation was concerned with the draft detailed Master Plan, inviting comments on the development options and proposals, and the potential impacts, effects and mitigation. A non-technical summary leaflet and the draft Master Plan was available through the BIA website, www.bristolairport.co.uk and local libraries. The non-technical summary was also distributed door to door amongst the communities immediately surrounding the airport in line with the approach described in the SCI. In response to requests received in the first phase consultation the distribution area was extended to include Chew Magna and Congresbury. The leaflets were supplemented by a series of exhibitions and a key stakeholder workshop.
- 1.15 Full details of the phase two consultation are provided in the report 'Draft Master Plan Public Consultation – consultation outcomes and analysis', prepared by environmental consultants, Entec, and published in March 2006. Individual responses to all the comments from key consultees are provided in a separate report published alongside the Master Plan.
- 1.16 The Bristol International Airport Consultative Committee is established as a forum for consultation with the local authority, local interest groups and users of the Airport. BIA management have kept the Committee fully informed on progress with the development of the Master Plan and sought their views at key stages in the process.
- 1.17 Shortly after the publication of this Master Plan we plan to submit a detailed planning application for an extension of the terminal building and associated development. This will be accompanied by a full Environmental Statement. Our assessment is that this development needs to be in place from 2009 onwards.
- 1.18 We will review the Master Plan on a regular basis. The Government Guidance leaves airport operators to agree with key agencies and stakeholders a process for future liaison on the monitoring and review of their Master Plans. We would expect such reviews to take place at a frequency of every five years or more, depending on the circumstances at the time.
- 1.19 The process for delivering the BIA Master Plan is illustrated in Figure 2.

Figure 2 – Process for delivery of the Master Plan



Structure of the Master Plan

- 1.20 The Master Plan starts by setting out the key issues raised by the Phase Two consultation. It then sets out a general overview of the history of the airport, its current business and the statutory and regulatory context within which the airport operates.
- 1.21 The Master Plan has been informed by a number of technical studies by specialist consultants and work by BIA management. The technical studies include assessments of passenger forecasts, appraisals of environmental and economic effects of airport growth, and transport studies. The Master Plan sets out our conclusions regarding development and impacts in the following order:
- *Forecasts;*
 - *Economic and social considerations;*
 - *Development requirements to 2015;*
 - *Environmental impacts and mitigation;*
 - *Transport and surface access;*
 - *Climate change; and*
 - *Development 2016 to 2030.*

Summary and key points

- The BIA Master Plan has been prepared in response to the Government's 'Future of Air Transport' White Paper which supported the development of the Airport to meet a forecast demand of between 10 and 12 million passengers per annum by 2030.
- The Master Plan provides a framework and context for the consideration of future planning applications for development. It is not an application for planning permissions for development.
- A full Environmental Statement will accompany future planning applications.
- A formal Transport Assessment accompanies and informs this Master Plan.
- A full public consultation has been undertaken as part of the process to prepare the Master Plan.
- The Master Plan will be regularly reviewed.

Chapter 2

Key issues from the second phase consultation

2

- 2.1 This chapter sets out the key issues raised by the second phase consultation on the draft Master Plan.
- 2.2 Between October and December 2005 Bristol International Airport (BIA) were supported by Entec in carrying out community consultation regarding the development of a Master Plan for the expansion of Bristol Airport. The focus of the consultation was the draft Master Plan that described proposals for development, outlined the key milestones and assessed the economic, social and environmental impacts of expansion. The draft plan considered proposals for expansion until 2015 in some detail, based on developing the airport to handle nine million passengers per annum, and a high level overview of potential developments between 2016 and 2030.
- 2.3 The consultation process provided a wide range of mechanisms enabling comment and feedback, including making available a series of documents of varying complexity and detail, running two-day exhibitions in Bristol city centre, Chew Magna, Cleve, Winford and Wrington together with a key stakeholder workshop. The key issues raised during the consultation and our responses to these issues are set out below. Full responses to all comments from key consultees are set out in the report, 'Draft Master Plan Consultation - Response to Comments from Consultees: August 2006', available from www.bristolairport.co.uk. Analysis of the consultation and outcomes is provided in Entec's report, 'Draft Master Plan Public Consultation: Consultation outcomes and analysis: March 2006', also available from www.bristolairport.co.uk.

Public transport and surface access

Issues

Public transport and surface access were the most significant issues arising in both the consultation responses and key stakeholder workshop. There were extensive concerns that transport infrastructure and public transport services were not adequate to service the airport at present and that proposals are not adequately addressed in the draft Master Plan to resolve such issues for future expansion.

BIA response

As a result of these concerns the scope of the Highway Capacity Study that accompanied the draft Master Plan has been extended and developed into a formal Transport Assessment for the development envisaged by the Master Plan to 2015. The public transport strategy has been comprehensively reviewed as part of this process and the Master Plan provides further details of the proposed public transport network that will serve the airport in the future.



Car parking

Issues

Arrangements for the development of car parking are linked with issues regarding expansion of the airport's footprint within the Green Belt and landscape and visual impact. There was considerable concern regarding increasing the footprint of the airport and development of greenfield land.

BIA response

A detailed reassessment of car parking options, taking into account views expressed through the consultation, has therefore been undertaken as part of the formal Transport Assessment. The car parking proposals have been revised and the Master Plan now proposes a greater intensification of car parking on the northern side of the airfield, with the use of green roofs to minimise disturbance to neighbours.

Noise and night flights

Issues

Information within the draft Master Plan documents indicated that noise would increase only slightly at each end of the runway and that overall there will be little change to noise levels. That noise remained a concern, cited by 70% of respondents, indicates that either information was not trusted or was not communicated effectively. A linked issue raised by stakeholders was night flights. Again there was concern that night flights would increase even though the draft Master Plan documents state that there are no plans to change the existing night flight quota.

BIA response

The BIA commitments in respect of noise have been clarified and emphasised in the final Master Plan.

Air pollution

Issues

Air pollution concerns from responses were mainly related to that arising from transport and increased traffic. Mitigating such impacts is linked to development of surface access and public transport noted above. Regarding air pollution from aircraft, as with noise impacts, it appears that stakeholders have either disregarded or were unaware of information in the draft Master Plan that states air pollution concentrations in residential areas around the airport are predicted to remain within national and EU air quality limits.

BIA response

The information in respect of air quality and the effects of future airport growth have been clarified in response to the comments made by consultees.

Climate change

Issues

Issues raised regarding climate change were generally of a fundamental nature – that is, should airport expansion resulting in increased greenhouse gas releases through aircraft emissions occur at all. There were also a range of suggestions regarding how BIA could mitigate climate change impacts in future development.

BIA response

As a result of these concerns the Master Plan now includes an assessment of the greenhouse gas emissions generated by flights from the airport, setting this in a local, regional and national context. Commitments to address climate change impacts are also set out and confirmed.

Economy

Issues

The debate around economic impacts of the airport development was wide ranging. Issues covered included the security of future demand for air travel, expenditure by tourists being exported and the quality of employment created.

BIA response

The counter claims in respect of economic impact have been fully investigated and are addressed in the Master Plan.

Landscape and visual effects

Issues

Besides the impact of car parking, of key concern was light pollution from the airport.

BIA response

The Master Plan has explored this further and sets out proposals to limit its effect.



Summary and key points

Key issues arising from the public consultation are:

- Public transport and surface access;
- Car parking;
- Noise and night flights;
- Air pollution;
- Climate change;
- Economy; and
- Landscape and visual effects.

These issues have been further investigated and addressed in the Master Plan.

Chapter 3

General background

3

- 3.1 This chapter sets out the history of Bristol International Airport and its development, a brief description of facilities, the characteristics of the current traffic and our objectives for growing the Airport.

History of the airport

- 3.2 The origins of the current airport go back to the immediate post war years. In the 1940's it was realised that the then Bristol Airport, located at Whitchurch, was no longer suitable for post war civil use. In 1955 Bristol Corporation finally resolved to develop a new airport on the site of the former RAF Lulsgate Bottom, to the south of the city, and the airfield was purchased for £55,000. The airfield was renamed Bristol (Lulsgate) Airport and opened for operations in 1957. The passenger facilities, including the Terminal building were located in the north east corner of the airfield adjacent to the A38.
- 3.3 Steady expansion of the airport took place during the 1960s, and developments included an extension to the runway, expansion of the terminal building and construction of a transit shed. Passenger numbers peaked in 1973 and then fell in the wake of the oil crisis and the collapse of the package holiday business, Court Line. The 1980s saw renewed growth in passenger numbers with the expansion of the inclusive tour and charter airline market. During this period a new aviation fuel storage facility and flight catering building were developed to the north of the runway. The passenger terminal building and car parks were also the subject of major expansion.
- 3.4 By the end of the 1980s the growth in passenger numbers was forecast to outstrip the capacity of the terminal building. Following studies by consultants it was concluded that further expansion of the terminal building was not feasible and plans were drawn up for a new terminal building, located 400 metres to the west. A planning application was submitted to Woodspring District Council in 1991 and subsequently this was 'called in' by the Secretary of State in 1992. The proposal was considered at a public inquiry in 1993 and planning permission was granted in a decision letter from the Secretary of State in March 1995.
- 3.5 The operation and assets of Bristol Airport were transferred from Bristol City Council to a new company, Bristol Airport plc in 1987, following the 1985 and 1986 Airports Acts. At the outset all the shares were in the ownership of Bristol City Council.
- 3.6 The implementation of the planning consent for the new terminal building was delayed whilst issues of project finance and uncertainties relating to the potential use of Filton Airport for civil aviation were resolved. Moves to organise passenger services from Filton were considered and rejected by Government in the mid 1990s in the face of concerns about noise nuisance within a predominantly urban residential area. This decision created a secure future for Bristol Airport and in 1997 funding for the much needed development



of the Terminal building was realised through the privatisation of the airport company with 51% of the shares acquired by FirstGroup. The airport was renamed Bristol International Airport the same year.

- 3.7 The striking new terminal building was opened in March 2000 by the Princess Royal. It included 31 check in desks, a landside shopping and catering area, security search, combined domestic and international departure lounge, airline lounges, immigration area, separate international and domestic baggage reclaim, customs and arrivals concourse. The landside road system was realigned and extended to serve the new building, and the short and long stay car parks were redeveloped. The old terminal was converted into administration offices for airport and airline staff.
- 3.8 At the same time the A38 was diverted away from the eastern end of the runway, allowing an all-weather Category III landing system to be installed on runway 27. Bristol then became the only airport in the South West and Wales with such a capability. The diverted road also provided new roundabout junctions on the A38 providing access into the north and south sides of the airfield. A new long stay car park was developed on the south side, now known as the Silver Zone car park.
- 3.9 As part of the continuing drive to modernise and upgrade the airport facilities a new air traffic control tower was constructed on the north side of the airfield in 2001. This completed this phase of major airport development.
- 3.10 When the new terminal building opened Bristol International Airport was handling just over 2 million passengers per annum. The new facilities stimulated interest in the airport from airlines and in May 2001 the low fares airline GO commenced operations with over 750,000 passengers using their services in the first year of operation. These operations have now been absorbed into the easyJet airline and the route network has continued to expand rapidly. The first long haul scheduled service from the Airport began in 2005 with Continental Airlines' daily service to New York. The airport handled 5.2 million passengers in 2005.
- 3.11 Since its opening in 2000, the check in and baggage reclaim facilities in the new terminal building have been enhanced and developed to meet the growing demand. Incremental expansion of the aircraft passenger apron and car parking facilities has also taken place.
- 3.12 In 2000 FirstGroup announced their intention to sell their interest in BIA. At the same time Bristol City Council took the opportunity to sell their 49% shareholding. In January 2001 Macquarie Bank, an international bank specialising in infrastructure acquisition, funding and management and Ferrovial Aeropuertos, a subsidiary of Grupo Ferrovial, one of Spain's foremost construction companies, acquired the Airport for £198m. Bristol International Airport is now a Private Limited Company, 100% owned by a joint venture holding company, South West Airports Limited. South West Airports Limited is owned on an equal basis by Macquarie Airports (UK) Limited, a subsidiary of Macquarie Bank Ltd, and Ferrovial Aeropuertos S.A. Ferrovial has announced its intention to sell its 50% share in South West Airports Limited to Macquarie. This transaction is expected to be completed in early 2007.

Physical description

- 3.13 The Airport is located approximately seven miles to the south west of the main conurbation of Bristol, within North Somerset, in a rural part of the city region dominated by the city of Bristol. The airport's main road access is by the A38. Bus connections from the city centre are provided at Temple Meads Station and the Marlborough Street Bus Station. There is no rail link at the airport.
- 3.14 The area of land within the current operational boundary at BIA covers 176 hectares. The airport company also owns a further 10 hectares of land immediately to the south of the airport (Cornerpool Farm). The airport operation takes place on an efficient, compact site and the land-take is one of the lowest of any UK regional airport¹. The runway is aligned in an east/west direction and is 2011m long. The majority of the airport facilities are located on the north side of the runway, with car parks and general aviation facilities located to the south. The airport facilities comprise:
- *Passenger terminal building;*
 - *Runway and taxiway system;*
 - *Main passenger aircraft parking apron;*
 - *Short and long term car parks. The main long term car park is located with the north side passenger facilities. The Silver Zone car park for pre-book customers is located to the south of the runway;*
 - *Air traffic control tower;*
 - *Fire station;*
 - *Administration and operational offices in the Administration (Old Terminal) Building; and*
 - *Ancillary facilities such as the fuel farm, flight catering, general aviation facilities, aircraft hangars and car hire.*
- 3.15 The current layout of airport facilities is illustrated by Drawing 1 (overleaf).
- 3.16 1.2 million people live within a one hour drive of Bristol International Airport, with 7.3 million living within a two hour drive².

¹ Land-take at Glasgow Airport is 329ha, Edinburgh Airport, 375ha, Newcastle Airport 494ha - source BIA research.

² Source: the Regional Air Services Co-ordination (RASCO) Study undertaken by the Government as part of the preparation for the Air Transport White Paper.



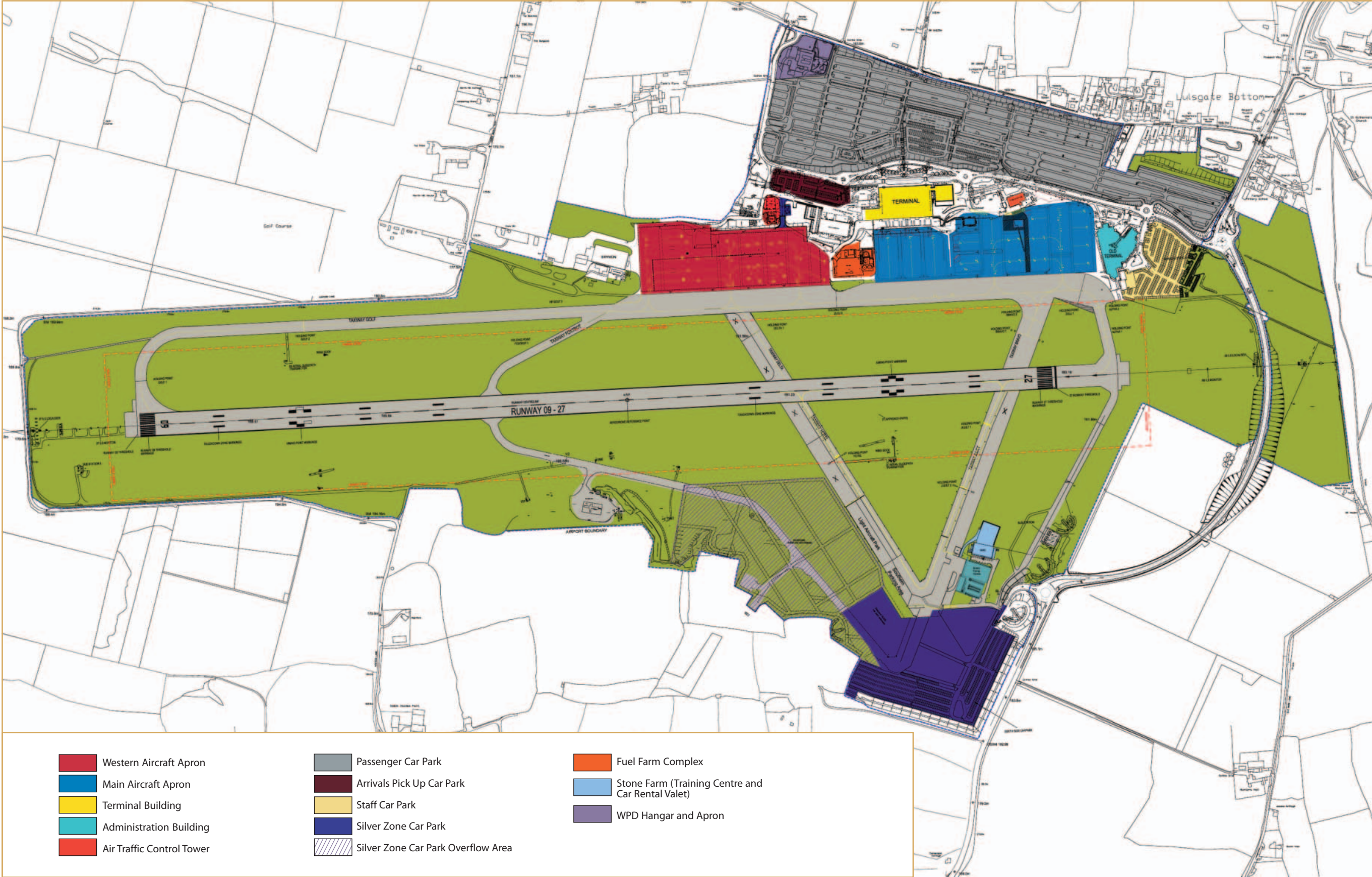
Traffic characteristics

- 3.17 BIA is currently the United Kingdom's ninth largest airport and the fifth largest airport outside the South East³. The Airport serves a network of 57 non-stop international and domestic scheduled destinations with a further 58 routes operated by charter airlines.
- 3.18 The CAA undertakes regular surveys of airport passengers, the last of which took place at Bristol in the 12 months ending March 2004. The survey results provide a good assessment of the origin/destination of terminating BIA passengers which is shown in Table 1 below.

Table 1 – **BIA catchment area**

Administrative Area	Proportion of Passengers (%)
South West Region	
Bristol	24.9
North Somerset	7.4
Bath and North East Somerset	7.3
South Gloucestershire	5.5
Somerset	10.5
Devon	12.8
Cornwall	3.7
Dorset	1.5
Gloucestershire	5.0
Wiltshire	6.7
Total South West	85.3
Other English Regions	
West Midlands	1.1
South East	0.8
Eastern	0.1
Wales	10.6
Other areas	2.1

³ Source CAA Airport Statistics 2005.



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- 3.19 Passenger numbers and aircraft movements for 2005⁴ are summarised in Table 2 below. Figures for 2004 are shown in brackets.

Table 2 – **BIA passengers and aircraft movements 2005 (2004)**

Total number of terminal passengers (arriving and departing)	5.2m	(4.6m)
Number of passengers on scheduled services:		
• Domestic passengers	1.4m	(1.3m)
• International passengers	2.5m	(2.0m)
Number of passengers on charter services	1.3m	(1.3m)
Total number of aircraft movements	84,249	(77,956)
Number of air transport movements:		
• Scheduled	53,148	(46,524)
• Charter	8,163	(8,269)
• Air taxi	2,701	(1,286)
Of which		
• Royal Mail	1,023	(1,102)
Non-commercial and other movements:		
• General aviation	17,731	(18,745)
• Other (military, positioning flights and local flights)	2,546	(3,132)

- 3.20 The amount of air cargo handled by the airport is insignificant in terms of overall tonnage. The amount of mail is more significant and in 2005, 4,922 tonnes passed through the Airport (5,050 tonnes in 2004).
- 3.21 BIA aims to provide services by a wide range of airlines with a balanced mix of routes by traditional full service scheduled airlines, low cost 'no frills' airlines and charter airlines. In this way the Airport can provide competitively priced services for a wide range of business and leisure passengers, with a healthy mix of airline operators. In 2005 14% of passengers were carried by 'full service' scheduled airlines, 25% on charter (primarily leisure) services and 61% on low cost 'no frills' carriers (e.g. easyJet and Ryanair).

⁴ All figures derived from CAA Airport Statistics. Minor adjustments have been made to figures included in the draft Master Plan to remove minor inconsistencies between BIA and CAA reporting methods.



- 3.22 BIA is a base for aircraft operated by airlines such as BA Connect (British Airways) and easyJet. In addition a number of airlines base their aircraft overnight at Bristol to allow early morning departures the next day. Airlines seek to maximise the use of their based aircraft through the day by operating between three and four return flights in the core operating hours of 06:00 to 23:00. This generates a number of peaks in the operating schedule and it is these peaks that drive the demand for new facilities.
- 3.23 The CAA survey shows that BIA has a higher proportion of passengers flying for business purposes than many other airports in the United Kingdom, including Gatwick, Stansted, Nottingham East Midlands and Cardiff. This underlines the importance of the airport to the regional economy.
- 3.24 The general characteristics of the BIA passenger traffic as described in the CAA Survey of 2003/04 are as follows:
- 20% of passengers using Bristol were travelling for business purposes;
 - 80% of passengers were travelling for leisure purposes (this includes inbound and outbound international and domestic passengers);
 - 6% of passengers were foreign leisure passengers, and 2.6% of passengers were foreign business passengers. Therefore around 22% of passengers on scheduled international flights were foreign inbound passengers; and
 - Data on the proportion of passengers on domestic flights with Bristol as a destination (rather than origin) is not available from the CAA survey. BIA estimates from airline data sources that the BIA inbound proportion is between 40% and 50% for the most popular UK routes.
 - BIA captured around 35% of the South West air passenger market. 64% of passengers from the South West used airports outside the South West Region, mainly in the South East.
- 3.25 The ten most popular routes in 2005 were:

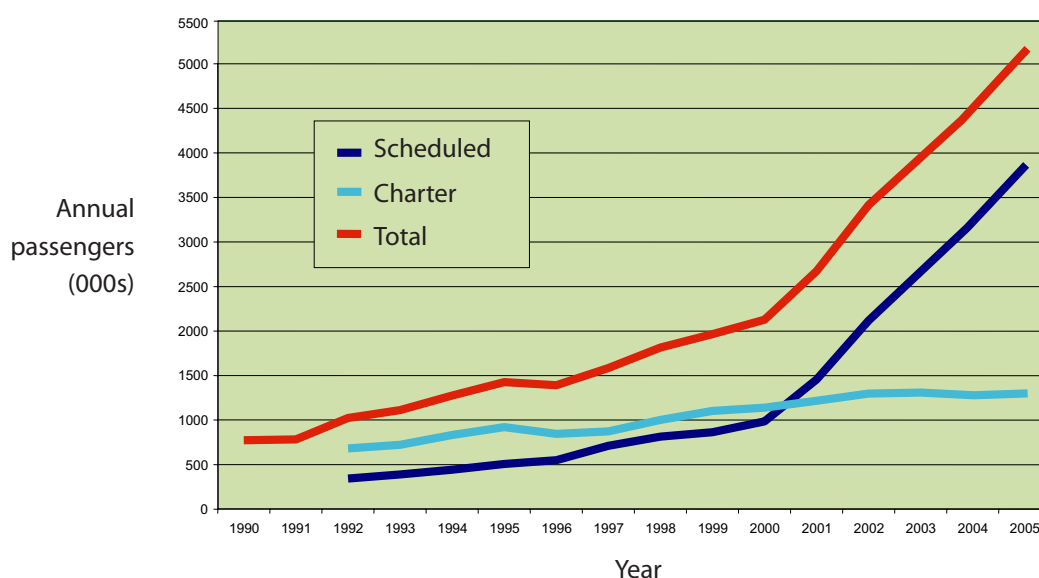
Table 3 – BIA's most popular routes

Destination	Passenger Numbers
Edinburgh	327,000
Glasgow	296,000
Belfast	292,000
Dublin	280,000
Amsterdam	263,000
Newcastle	251,000
Malaga	227,000
Palma	204,000
Alicante	199,000
Faro	141,000

It can be seen that the most popular routes reflect a strong use of the Airport for UK flights with a high level of business use. There is no prospect of development of the regional rail network to provide an attractive alternative to this use of air travel.

- 3.26 The airport has enjoyed significant growth over the last ten years (averaging 13.8%⁵ passenger growth per annum). This compares with a UK average growth rate of 5.8%⁶ over the same period. The new facilities, and in particular the new terminal building, have served to stimulate interest in the airport. Between 2000 and 2005 passenger growth has been particularly strong, primarily as a result of the development by GO (later taken over by easyJet) of a base at the airport. In this period the number of passengers using the airport more than doubled from just under 2 million passengers per annum (mppa) in 2000 to 5.2 million passengers in 2005. Historical passenger growth is shown in Figure 3. The chart shows the steady growth in charter and scheduled passengers through the 1990's followed by a sharp rise in scheduled passengers from 2000 onwards resulting from the easyJet/GO operations. Growth is not expected to continue at the levels that have been experienced recently (see Chapter 5 for further details).

Figure 3 – **Passenger growth at Bristol 1990 to 2005**



Objectives for growth

- 3.27 The Air Transport White Paper confirmed that Bristol would remain the South West region's largest airport. It identified a significant potential for growth at the existing airports in the South West and that this growth will generate substantial economic benefits to the region. The South West region is characterised by a high proportion of air passengers using airports in adjacent regions, mainly the South East. This 'leakage' of passengers is one of the highest of any English region. The development of new services and improved service frequency was considered by the White Paper to enable the proportion of South West air passengers that need to rely on the use of airports outside the region to be significantly reduced. This will reduce the need for long distance surface journeys, which are primarily undertaken by road, and make better use of existing airport capacity.

⁵ Source CAA Airport statistics. Calculated by BIA from data on www.caa.co.uk.

⁶ Source CAA Airport statistics – as above.



- 3.28 The main role of BIA is to meet the needs for air travel within the South West region, serving as the main airport for the region. The Airport also plays a role in providing air services for travellers whose journey origins or destinations are in Wales, for routes not supported at Cardiff. In developing air services from Bristol BIA seeks to meet the following objectives:
- *To play a leading role in the economic development of the South West Region by providing an increasing range of frequent scheduled services to the destinations required by business;*
 - *To provide increasing choice and opportunities for leisure travel by residents within the airport catchment area, reducing the need for passengers from the South West to make surface journeys to airports outside the region;*
 - *To act a gateway for tourists visiting the South West region and the UK in general; and*
 - *To provide connecting services linking the far South West (Devon and Cornwall) to the BIA route network, providing both business and leisure travel opportunities and reducing the effects of peripherality.*
- 3.29 The other airports of the South West and South Wales have complementary roles to play in the provision of air services for their local catchment areas.

Summary and key points

- New terminal building opened in 2000.
- 5.2m passengers in 2005.
- 84,289 aircraft movements in 2005, of which 65,035 were commercial air transport movements.
- Strong growth in passenger numbers over the past ten years.
- 20% of passengers are business passengers, 80% are travelling for leisure purposes.
- BIA is the main airport for the South West Region.

Chapter 4

Regulatory and policy context

4

- 4.1 As an airport BIA's operations are subject to control and regulation through aviation related and environmental legislation and national, regional and local planning policy. This chapter outlines the principal controls that apply to BIA's operation and development.

Air Transport White Paper

- 4.2 The National Policy on Aviation is set out in the Government's White Paper, 'The Future of Air Transport', published in December 2003, which sets out a strategic framework for the development of airport capacity over the next 30 years, against the background of wider developments in air transport. The Government's approach to airport expansion is to follow a balanced approach which:

- *Recognises the importance of air travel to our national and regional economic prosperity, and that not providing additional capacity where it is needed would significantly damage the economy and national prosperity;*
- *Reflects people's desire to travel further and more often by air, and to take advantage of the affordability of air travel and the opportunities this brings;*
- *Seeks to reduce and minimise the impacts of airports on those who live nearby, and on the natural environment;*
- *Ensures that, over time, aviation pays the external costs its activities impose on society at large;*
- *Minimises the need for airport development in new locations by making best use of existing capacity where possible;*
- *Respects the rights and interests of those affected by airport development; and*
- *Provides greater certainty for all concerned in the planning of future airport capacity, but at the same time is sufficiently flexible to recognise and adapt to the uncertainties in long-term planning.*

- 4.3 In respect of regional airports the White Paper encourages growth to serve local and regional demand, subject to environmental constraints, with the following potential benefits:

- *Support for the growth of the regional economies;*
- *Relief for congestion at more overcrowded airports, particularly in the South East, and therefore making better use of existing capacity;*
- *Reducing the need for long-distance travel to and from airports; and*
- *Giving passengers greater choice.*



4.4 The main conclusions of the Government in respect of the South West of England and Bristol in particular are:

- *There is significant potential for growth at existing airports in the South West and this will generate substantial economic benefits to the region.*
- *The development of new services and improved service frequency will, over the lifetime of the White Paper, enable the proportion of air passengers from the South West that need to rely on the use of airports outside the region (currently around 70%) to be significantly reduced. This is one of the highest leakages of any English region and stemming this leakage is consistent with the key principle of reducing surface traffic by making better use of regional airports and BIA in particular. The growth of the region's airports should reduce the proportion of passengers using airports outside the region to 50-55% by 2030.*
- *The main potential for growth in the South West will be at Bristol Airport. Having due regard to the environmental impacts that would accompany its expansion Government supports development to around 12 mppa, to include a runway extension and new terminal when these are required.*
- *The option of a new airport to the north of Bristol is not supported.*

4.5 The specific White Paper policy conclusions for Bristol International Airport are quoted in full below:

10.9 *"Bristol International Airport is by far the largest airport in the South West of England. Like several other regional airports in the UK, it has seen substantial growth recently, with passenger throughput nearly doubling between 2000 and 2003. The airport is now handling almost 4mppa. The forecasts suggest that by 2030 it could attract between 10mppa and 12mppa, taking into account our proposals in Chapter 11 for new runways in the South East.*

10.10 *The airport faces some complex constraints. The existing terminal site should be able to cope with up to 8mppa, provided additional aircraft stands can be accommodated. Beyond about 8mppa, a second terminal south of the runway would be required, together with a runway extension to the east and extended parallel taxiway.*

10.11 *The number of people living within the 57dBA noise contour in 1999 was only about 1,000 and we expect only a very small increase in this number by 2015, even at the higher end of our growth forecasts. With a runway extension, and our highest level of forecast throughput, estimates suggest that by 2030 there would be no more than around 3,500 people within the 57dBA noise contour. The airport operator is invited to bring forward as soon as possible a long term master plan setting out these proposals, to be accompanied by a voluntary purchase scheme for any properties that would be adversely affected.*

10.12 *The runway extension would require some common land to be taken, and we would expect this to be replaced elsewhere. There would also be some loss of green belt as a result of a runway extension and new terminal development. However we do not believe this would fundamentally affect the integrity of the green belt within the area and*

consider that it would, on balance, be justified by the importance of the airport's growth to the region's economy.

- 10.13 *Subject to the conditions above, we therefore support the proposed development of the airport.*
- 10.14 *Strategic surface access links are not as good as at many other airports of a similar size in the UK. Links to the motorway network, which is some distance away, are via 'A' and 'B' roads that pass through villages and other built up areas. These are not heavily congested, except to the north of the airport where the A38 enters Bristol itself. Away from the immediate vicinity of the airport, the proportion of airport related traffic is small. The express bus service from Bristol Temple Meads to the airport, which is the main public transport link is proving increasingly successful; but public transport mode share is low at four per cent and the provision of a direct rail service is not a realistic prospect.*
- 10.15 *The Greater Bristol Strategic Transport Study will consider what might be done to improve both road and public transport access to Bristol Airport, and we encourage the airport operator to participate fully in this process. Access to the airport could be improved by routing traffic away from congested urban areas within Bristol and by bringing forward bus priority measures which would help provide speedy and reliable journey times for the airport express coach service operating from Bristol Temple Meads."*

- 4.6 The Policy identifies those conditions which the Government would expect to accompany an extension of the runway at BIA. The more limited expansion proposed by this Master Plan would not trigger a need for those particular conditions, but BIA nonetheless expects to consider and agree with the Local Planning Authority appropriate conditions for the development required to 2015.
- 4.7 Government expects airport operators to produce Master Plans or, where appropriate update existing Master Plans to take account of the conclusions on future development set out in the White Paper. The Master Plans should set out proposals for development to 2015 in some detail. They should include detailed proposals for surface access, environmental controls and mitigation and, where appropriate, measures to address blight. Indicative land use plans should be included for the period from 2016 to 2030. Master Plans should take account of the Regional Spatial Strategy (and the Regional Transport Strategy incorporated within it) and local transport plans in England. These documents should in turn take account of airport master plans when they are revised.



Regional Planning Guidance

- 4.8 The South West Regional Assembly was designated the South West's Regional Planning Body (RPB) in September 2004. The existing Regional Planning Guidance, first published in 2001 as RPG10, was then designated as the Regional Spatial Strategy for the South West (RSS). The RSS now forms part of the Development Plan with a current timescale to 2016. The RSS is underpinned by the following objectives:
- *Protection of the environment;*
 - *Prosperity for communities and the regional economy;*
 - *Progress in meeting society's needs and aspirations; and*
 - *Prudence in the use and management of resources.*
- 4.9 The RSS (Policy TRAN 9) states that BIA (among other airports), local authorities and transport operators should work together and support existing airports 'to encourage the sustainable development of the region's airports and their associated facilities' and in particular, 'to develop their respective roles to serve air travel needs'. Policy SS8 addresses the Bristol area and the need to achieve 'the most effective use of Bristol International Airport as an important airport for both the local area and the wider region including employment spin off'. Policy SS4 deals with Green Belt and the need to critically review Green Belt boundaries and remove land from the Green Belt if it represents the most sustainable option for accommodating development.
- 4.10 The RSS incorporates the Regional Transport Strategy, subsequently developed in an update paper published in September 2004. The updates, in respect of airports in the region, reflect the Air Transport White Paper and identify the delivery of improvements to the access of Bristol International Airport as a regional priority. The overall aim of the air strategy is to meet more of the region's demand for air services within the region to reduce leakage to the South East and congestion on the M4 corridor.
- 4.11 Consultation on a new Draft RSS for the South West 2006 to 2026 began in June 2006. The timetable for completion of the new RSS envisages an Examination in Public in Spring 2007 and the final RSS being published in early 2008.

Local planning context

- 4.12 North Somerset Council is the local planning authority for Bristol International Airport. Government policy is for the plan-led approach. Planned development should be sustainable. Planning decisions should be made in accordance with the Development Plan, unless material considerations indicate otherwise.
- 4.13 The overall strategic framework for the area was set out in the Joint Replacement Structure Plan 2002-2011 (JRSP). When the new RSS is finally published countywide Structure Plans will be superseded, and their policies replaced by the RSS. In the meantime the JRSP policies will be 'saved' until September 2007, with some policies possibly being saved beyond that date to avoid a policy void before the RSS is finalised. The JRSP was based on forecasts of air passenger growth that pre-date its publication by at least three years and which are now

well out of date. Consequently the JRSP has been superseded by the RSS where it is in conflict with it. In accordance with the JRSP the airport and its surroundings are located in Green Belt.

- 4.14 The adopted North Somerset Local Plan was published in 2000. The adopted Local Plan includes policies that permit severely limited development at Bristol International Airport subject to conditions relating to environmental impact. The airport site lies within the Green Belt and therefore the effect on the functions of the Green Belt is a key consideration in the assessment of any major proposals for airport development. The Local Plan identifies a part of the site in the vicinity of the Terminal building as a Major Developed Site, within which a restricted level of redevelopment and infilling may be permitted. Outside these limitations any proposals for development in the rest of the airport's operational land would be categorised as 'inappropriate development', which would only be permitted in very special circumstances.
- 4.15 North Somerset Council expect to adopt a replacement Local Plan towards the end of 2006, subject to the outcome of consultation on proposed modifications to the Plan published in June 2006 following the Public Local Inquiry. The proposed modifications define a Green Belt inset that excludes the operational area of BIA that lies north of the northern taxiway and east of Cooks Bridle Path from the Green Belt. The proposed replacement Local Plan therefore includes a policy that supports development in this area subject to conditions relating to environmental impact. Any development outside this inset that requires express planning permission would constitute inappropriate development and the promoter would need to demonstrate the existence of very special circumstances that would clearly outweigh the harm to the Green Belt and any other harm.

Greater Bristol Strategic Transport Study

- 4.16 The Greater Bristol Strategic Transport Study (GBSTS) was commissioned in 2003 by the Department for Transport and the Government Office for the South West. The principal objective of the study was to address the current and long-term future strategic transport needs within the Greater Bristol area up to the year 2031. The area covered by the study included the four unitary authorities (Bristol, North Somerset, Bath and North East Somerset and South Gloucestershire) together with parts of Wiltshire, Somerset and Gloucestershire. The study was also supported by the Unitary Authorities, the South West Regional Development Agency and the Highways Agency.
- 4.17 The study has considered the effects of future spatial development options on the transport networks and transport strategies and made recommendations regarding additional infrastructure requirements. This includes the effect on the strategic networks of increased travel demand brought about by expansion of air services at Bristol International Airport. BIA has liaised with the GBSTS team to ensure that the emerging output from the Master Plan studies has informed the GBSTS considerations.



4.18 The final GBSTS report was published in June 2006. The report outlines a series of transport measures designed to cater for and accommodate the projected growth in demand for travel including:

- *encouraging the use of alternative modes of travel;*
- *management of travel demand;*
- *public transport improvements; and*
- *highway measures.*

The study conclusions are considered further in Chapter 9.

Joint Local Transport Plan

4.19 The four local authorities that make up the Greater Bristol area (i.e. Bristol, North Somerset, South Gloucestershire and Bath and North East Somerset) have joined forces to prepare the Joint Local Transport Plan (JLTP). The final JLTP, published in March 2006, outlines the transport objectives and measures proposed to address transport issues for the period 2006-2011 and also sets out the vision for the next 20-30 year period. This replaces the individual Local Transport Plans prepared by each authority for the period 2000/01 to 2005/06. The JLTP identifies eight major schemes for which funding has been identified in the South West's Regional Funding Allocations for transport. This includes investment in the Greater Bristol Bus Network, phases 1 and 2 of the South Bristol Ring Road, the Weston-super-Mare package and a three phase development of Bus Rapid Transit.

4.20 BIA is required to set up an Airport Transport Forum and prepare an Airport Surface Access Strategy. The strategy should set out short and long term targets for decreasing the proportion of journeys to the airport by car and increasing the proportion by public transport, for both air passengers and airport workers. Bristol International Airport (BIA) prepared an Airport Surface Access Strategy in 2000 which was included in the Local Transport Plans of Bristol City Council and North Somerset Council. A revised strategy has been prepared for publication in conjunction with the JLTP. This is discussed further in Chapters 7 and 9, and a copy of the Strategy can be found at Appendix A.

Permitted development

4.21 BIA is able to carry out certain developments, as set out in Part 18 of the Town and Country Planning (General Permitted Development) Order 1995, without the need to seek planning permission. Such developments must be on operational land and be connected with the provision of services and facilities at the airport. Developments such as an extension of the runway, construction of a new terminal, any further extension of the existing terminal, the provision of a hotel or development outside the existing operational boundary are not permitted development.

4.22 The proposed modifications to the replacement North Somerset Local Plan state that much of the development at the airport that will be required to provide for the capacity envisaged can be undertaken using 'permitted development' powers.

Planning history

- 4.23 Certain aspects of Bristol International Airport's operations are controlled and regulated through conditions attached to previous planning consents for the Terminal Building and the diversion of the A38, the key aspects of which are as follows:

Access (*Terminal building Condition 6*)

The link to and from the Downside Road access via the internal road network shall be for operational and emergency traffic only.

Night Flying (*Terminal building Conditions 20, 21 and 22*)

Night flying is restricted through the application of a night noise quota. Aircraft count against the noise quota according to their quota count (QC) classification. The quota count is related to the noise classification of aircraft as set out in a formal notice published by the CAA on a regular basis. The current annual quota is 2160 points, with 1260 points for the summer season and 900 points for the winter season. The issue of night flying is discussed further in Chapter 8.

Noise Insulation Grant Scheme (*Terminal building Condition 23 and A38 diversion condition 13*)

Noise insulation grant scheme based on the 90 SEL dB(A) departure and arrival footprints for the B737-300 and B757 aircraft.

Noise and air quality monitoring (*A38 Diversion Condition 14*)

Implementation of an approved noise and air quality monitoring programme.

General Permitted Development Order (*A38 Diversion Condition 16*)

Permitted development rights shall not apply to the area enclosed by the former and proposed A38.

Noise climate (*A38 Diversion Condition 17*)

The noise insulation grant scheme to be reassessed if the noise climate significantly alters (an increase of 3dB on 16 hour LAeq measured over a summer season).

- 4.24 The proposals set out in this Master Plan do not require any of these conditions to be amended.

Airport design criteria

- 4.25 The Air Navigation Order 2000 requires that, in the UK, flights for the public transport of passengers, or for the purpose of flying instruction, take place at a licensed aerodrome, a government aerodrome or at an aerodrome managed by the Civil Aviation Authority (CAA). BIA falls into the first category.



- 4.26 The CAA is a public body, set up by Parliament, to carry out functions associated with the regulation of civil aviation. This includes the licensing of aerodromes and overseeing the safety of aviation activities at licensed aerodromes. Safety-related standards for the design of airports are set out in a CAA publication, CAP168, which reflects the UK's adoption of internationally agreed criteria as a signatory to the 1944 Chicago Convention.
- 4.27 BIA operates in accordance with a licence issued by the CAA. BIA's current facilities and any future development need to comply with the CAA's requirements which cover such matters as:
- *Configuration of the runway and taxiways;*
 - *Layout of aircraft apron;*
 - *Airport fire service facilities;*
 - *Planning and design of airspace; and*
 - *Height and design of buildings and structures.*

Airport security

- 4.28 Regulation of transport security, including airport security, is the responsibility of the Department for Transport, who set out security measures to be applied at BIA to ensure that the travelling public are protected from acts of violence or unlawful interference.

Aerodrome safeguarding

- 4.29 BIA is officially safeguarded to ensure that its operation and development is not inhibited by buildings, structures, erections or works which infringe protected surfaces, obscure runway approach lights or have the potential to impair the performance of aerodrome navigation aids, radio aids or telecommunication systems; by lighting which has the potential to distract pilots; or by developments which have the potential to increase the number of birds or the risk to aircraft of bird strikes.
- 4.30 BIA must be consulted by the Local Planning Authorities on planning applications that meet certain criteria as shown on the aerodrome safeguarding map.
- 4.31 This Master Plan does not require any of the current safeguarding requirements to be changed.

Public Safety Zones

- 4.32 Public Safety Zones (PSZ) are areas of land at the ends of the runways at the busiest airports, within which development is restricted in order to control the number of people on the ground at risk of death or injury in the event of an aircraft accident on take-off or landing. The basic policy objective governing the restriction on development near civil airports is that there should be no increase in the number of people living, working or congregating in Public Safety Zones and that, over time, the number should be reduced as circumstances allow.

- 4.33 The implementation of Public Safety Zone (PSZ) policy at civil airports is based on Government work to determine the level of risk to people on the ground around airports. The area of the Public Safety Zone represents a simplified version of the 1 in 100,000 risk contour, based on the numbers and types of aircraft movements in 2015. They take the shape of an isosceles triangle, centred on the extended runway centreline, decreasing in width with distance from the end of the runway. The dimensions of the BIA PSZ's are as follows:

Table 4 – **BIA Public Safety Zone dimensions**

Location	Length (metres)	Initial Width (metres)	Area of PSZ (hectares)
East end of runway	1950	250	24.4
West end of runway	1970	250	24.6

- 4.34 There is a general presumption against new development or replacement development in the PSZ's with certain exceptions⁷. In addition the Secretary of State wishes to see the emptying of all occupied residential properties, and of all commercial and industrial properties occupied as normal all-day work places, within the 1 in 10,000 individual risk contour. There are no such properties at BIA. At the more populated Felton end of the runway the 1 in 10,000 risk contour is wholly within airport land. At the other end there is a small encroachment onto adjacent agricultural land. As part of the work to prepare this Master Plan, BIA has commissioned National Air Traffic Services Limited to rerun the risk model used to determine the likely extent of the future PSZ's based on the latest growth forecasts. The results confirm that the 1 in 10,000 risk contour is expected to remain within airport land until at least 2030. A small increase in the length of the 1 in 100,000 risk contour is predicted in the medium term (i.e. to 2020) but this is in areas that are not populated. In the longer term (i.e. to 2030) the area of the PSZ will tend to reduce, compared with 2020, as turbo-prop aircraft are replaced by jet aircraft. Overall the effect of PSZ policy on households located near the end of the runway will not change during the course of the Master Plan period. The risk contours are included at Appendix B.

Environmental regulation

- 4.35 BIA's operations and development is the subject of European and national policy and legislation relating to wide range of environmental topics. These include Regulations and Acts of Parliament relating to air quality, water resources and quality, hedgerows and trees, waste management, biodiversity, designated Sites of Special Scientific Interest (SSSI), Scheduled Monuments and Listed Buildings, transport, noise, soil quality and contamination, landscape and visual amenity and recreation.
- 4.36 BIA is committed to meeting or exceeding all the requirements of environmental legislation through the use of environmental management systems.

⁷ See DfT Circular 1/2002 - Control of development in airport Public Safety Zones.



Summary and key points

- The Government's White Paper, 'The Future of Air Transport', sets out the strategic framework for the development of airport capacity over the next 30 years. Growth at BIA is supported, subject to conditions.
- The local and regional planning context is set out in the Regional Spatial Strategy, the Joint Replacement Structure Plan, the North Somerset Local Plan and the draft Replacement Local Plan. They include policies that support the sustainable development of the Airport subject to environmental impact.
- Airport development and operation is also controlled and regulated through conditions to previous planning applications and national safety, security and environmental regulations.

Chapter 5

Forecasts

5

- 5.1 The growth in the popularity and importance of air travel is expected to continue over the next 30 years. The demand for air travel is growing for many reasons. More people are flying than before as increased competition has brought down the cost of air travel. More people are also choosing to fly more often. These factors are associated with a rising standard of living, increasing disposable income and a rising regional gross domestic product⁸ (GDP). As the availability of services increases and route networks develop, more people are choosing to fly from their local airport, rather than the main airports in the south east of the country. Business travel is increasing as international and domestic trade expands. New aircraft technology is now making routes from regional airports more viable.
- 5.2 In the Air Transport White Paper the Government anticipated that the demand for air travel could rise nationally, from 200 million passengers in 2003 to between 400 million and 600 million by 2030. At the same time the Department for Transport issued long term traffic forecasts for all airports in the United Kingdom. The 'central scenario' assumes a new runway at both Stansted and Heathrow (in that order) and predicts that Bristol would reach 7.2m passengers at 2015 and 11.6m passengers at 2030. This represents a compound average annual growth rate of 4.1% from 2003 compared with an average annual growth rate of 13.8% at Bristol over the past ten years.
- 5.3 BIA has prepared its own high level forecasts as part of the preparation of the Airport Master Plan. At a high level the forecasts have been produced by:
- *Growing underlying traffic demand from Bristol's catchment area from a base year of 2000; and*
 - *Estimating the market share that Bristol will capture of the traffic from this catchment area.*
- For domestic traffic the issue of traffic substitution from surface modes has also been considered.
- 5.4 The underlying traffic demand has been assessed using the CAA passenger survey and the Department for Transport (DfT) forecasts⁹ for the long term growth in passenger demand across the United Kingdom as a whole. Growth rates for the South West catchment have been estimated using additional data provided by the DfT in support of the forecasts accompanying the Future of Air Transport White Paper and our knowledge of the market in the South West and elsewhere.

⁸ GDP is usually expressed as a measure of the value of domestic goods and services produced by an economy over a period of time, usually one year.

⁹ Air Traffic Forecasts for the United Kingdom 2000: Department of the Environment, Transport and the Regions.



5.5 The market share has then been forecast taking into account the following factors:

- *Type of service available at Bristol International Airport;*
- *Type of service available at competitor airports;*
- *Level of underlying traffic demand by district; and*
- *Journey time to BIA from each district relative to competitor airports.*

It has also been assumed that there will be some narrowing of the fare differential between low cost carriers (e.g. easyJet and Ryanair) and full service carriers (e.g. British Airways and KLM) from current levels.

5.6 The following geographical areas are considered as a potential source of traffic for BIA:

- *South West region - near South West, far South West and Dorset; and*
- *Parts of Wales and the Midlands.*

In general the catchment area is expected to remain broadly as at the present day.

5.7 The forecasting work assumes that the airports in the South West have complementary roles and respects the distinctive roles of Exeter, Plymouth and Newquay Airports in serving their local catchment areas as identified in the Air Transport White Paper.

5.8 Given its location, developments at other airports in the United Kingdom will have an impact on demand at BIA. For the purposes of the forecasting work it has been assumed that competitor airports, including the London area airports, grow within the framework set out in the Government's Air Transport White Paper.

5.9 The results forecast that BIA will grow to around 8 million passengers per annum (mppa) by 2015, growth of 55% compared with 2005. By 2020 the forecasts indicate demand for just over 9 mppa rising to around 12.5 mppa at 2030. The forecasts are presented in Table 5 by traffic segment.

5.10 It has been assumed that capacity at some London airports will become increasingly constrained. The assumptions relating to capacity constraints were subjected to sensitivity tests from which it was concluded that the BIA forecasts were not overly sensitive to these constraints because of the use of low cost services on most routes. It is possible that these constraints could become more severe should the delivery of the proposed third runway at Heathrow be delayed. This is an issue that will affect the longer term growth of BIA beyond 2020 and will need to be considered in future reviews of this Master Plan when there is greater clarity. However because the Heathrow third runway is focussed on domestic and short haul services, any impact is likely to be limited because BIA will already have a comprehensive flight programme covering these markets.

5.11 The growth in passenger air transport movements (ATMs) – an arriving or departing commercial passenger aircraft – has also been forecast and the results are presented in Table 6.

Table 5 – Bristol International Airport passenger forecasts

Traffic Type	2005	2010	2015	2020	2025	2030
Domestic						
Existing Routes		1,448	1,636	1,841	2,071	2,330
New Routes		191	215	315	426	478
Total	1,401	1,638	1,851	2,156	2,497	2,809
Short Haul						
International Scheduled						
Point to Point		3,275	4,047	4,658	5,403	6,231
Connecting to Long Haul		163	189	218	253	292
Total	2,486	3,438	4,236	4,877	5,655	6,523
Long Haul Scheduled						
Point to Point		20	157	134	234	338
Connecting to Long Haul		181	226	283	354	443
Total	200	383	417	588	588	781
Holiday Charter						
Long Haul		156	178	232	303	396
Short Haul		1,263	1,428	1,589	1,768	1,968
Total	1,312	1,419	1,606	1,821	2,072	2,364
Grand Total	5,199	6,695	8,076	9,271	10,812	12,476

Table 6 – Bristol International Airport ATM forecast

Aircraft Type	Max Seats	2005	2010	2015	2020	2025	2030
Turbo Prop	77	11,666	9,888	11,433	13,596	6,695	3,399
Small Regional Jet	50	11,864	12,978	11,948	12,978	15,759	9,888
Large Regional Jet	100	4,725	7,210	8,652	10,815	12,566	25,338
Small Jet	180	27,858	37,286	43,363	42,436	46,041	46,659
Medium Jet	230	4,175	5,047	4,120	6,592	12,978	17,407
Small Dreamliner	230	0	824	927	1,236	1,648	2,060
Wide Bodied Jet	300	0	0	2,163	2,163	2,884	3,605
Total		60,288	73,233	82,606	89,816	98,571	108,356
Total Passengers		5,199,220	6,695,463	8,075,573	9,270,722	10,811,736	12,476,488
Passengers per ATM		86	91	98	103	110	115



- 5.12 The Bristol forecasts are broadly consistent with the forecasts in the Air Transport White Paper, which indicated that traffic could reach between 10mppa and 12mppa by 2030. However, BIA predicts slightly higher growth, with a forecast of 8.1m at 2015 and 12.5m at 2030. The differences result from more up to date assumptions regarding the share of the South West catchment area, market growth and the attractiveness of Bristol in comparison with the South East airports. The forecasts also reflect BIA's experience of operating and marketing the Airport. The difference between the BIA forecasts and those prepared by the Government is not considered to be material in the context of the range predicted for demand from the UK as a whole of between 400-600 million passengers by 2030.
- 5.13 The following points emerge from our forecasting exercise:
- *The compound average traffic growth for the Airport is forecast at 6.3% per annum for the period to 2015. From 2015 to 2030 average traffic growth is predicted to drop to 2.9% per annum. The average forecast growth rate from 2003 to 2030 is 4.39% per annum.*
 - *The route network is forecast to continue to be dominated by European short haul destinations.*
 - *A market for long haul destinations is forecast but in the period to 2030 the number of destinations that can be supported remains limited.*
 - *The aircraft type that is forecast to operate remains almost exclusively twin engined jets and turbo props, the aircraft that currently operate from Bristol. The average aircraft size is forecast to increase as the smaller jets and turbo props are upgraded to larger aircraft. Load factors will also increase. The increase in aircraft movements is therefore somewhat less than the increase in passenger numbers. The introduction of new generation aircraft will result in a reduction in aircraft noise.*
 - *BIA estimates that the increase in air traffic equates to an average of between five and six additional movements per hour over the main operating hours of the airport (06:00 to 23:00) at 9mppa, compared to summer 2004.*
 - *The majority of growth is forecast to take place in the low cost carrier sector, with modest growth by full service carriers.*
 - *The proportion of business passengers using BIA is forecast to grow from the 20% reported in the 2003/04 CAA Passenger Survey to 30% by 2030.*
 - *The proportion of the South West air passenger market capture by BIA is forecast to rise from 22% in 2000 to 40% in 2030.*
- 5.14 The forecasts indicate growth on existing routes and new routes which could include the following potential destinations:

Table 7 – **Potential new destinations**

Airport		
Atlanta	Larnaca	Seville
Bilbao	Limoges	Stuttgart
Bologna	Lisbon	Stockholm
Boston	Liverpool	Tallinn
Cologne	Lyon	Toronto
Connaught	Nantes	Vienna/Bratislava
Copenhagen	Naples	Warsaw
Doncaster Sheffield	Orlando	Washington
Dubai	Oslo	
Dubrovnik	Perpignan	
Hanover	Riga	
Istanbul	Salzburg	
Kerry	Sardinia	

- 5.15 No specific forecasts have been prepared for freight activity as part of this Master Plan. In our response to the Government's consultation on the Future Development of Air Transport in the United Kingdom we pointed out that freight remains a very small part of our business and this situation is expected to remain during the period of the Master Plan. Most freight is carried in the belly hold of passenger aircraft. Such space is limited in the aircraft operating out of BIA, with narrow body aircraft dominating the fleet mix. Furthermore the quick aircraft turnarounds which are a feature of the low cost airline business model cannot accommodate the loading and unloading of freight.
- 5.16 BIA maintained a Freight Centre at the Airport until the mid 1990s. Almost all the freight handled arrived by road from Heathrow and consequently the operation was relocated to Avonmouth. In recent years the operation became less and less viable and in 2004 BIA closed the facility. There is no evidence of a market for air freight either now or in the future out of Bristol. The South East airports and East Midlands Airport appear to be able to meet the South West's demands for air freight with freight transport to these airports by road. In view of this and the significant night noise issues raised by air freight operations this is a market that BIA has decided not to pursue. We also note that there are significant uncertainties associated with forward forecasting of freight demand on an airport-by-airport basis. There is no evidence to suggest that air freight services from BIA might contribute to the South West economy.
- 5.17 No specific forecasts have been prepared for General Aviation¹⁰. Whilst General Aviation is an important component of the air traffic at Bristol, there has been a tendency for such

¹⁰ General aviation movements are movements by aircraft other than those engaged in commercial air transport of military flying. This usually encompasses private, aerial work and recreational flying.



aircraft movements to decline in the recent past and this trend can be expected to continue. It is therefore unlikely that operations by general aviation traffic will place any increased pressure on the current facilities for such aircraft.

- 5.18 The structure of the General Aviation market has changed in recent years. Increased activity by commercial passenger aircraft have made BIA less attractive to private flying and this traffic is tending to be displaced to other airfields. In addition private pilot licence training at BIA is declining - training is now almost exclusively for commercial licences. This trend is anticipated to continue.
- 5.19 Employment forecasts are included in Chapter 6.

Summary and key points

- Passenger numbers forecast to rise from 5.2m in 2005 to 8.1m in 2015 and 12.5m in 2030.
- Passenger air transport movements forecast to rise from 60,288 in 2005 to 82,606 in 2015 and 108,356 in 2030.
- No expansion of the air freight market is anticipated.
- General aviation activity is likely to decline and no additional pressure on facilities is anticipated.

Chapter 6

Economic and social considerations

6

6.1 The Government's Air Transport White Paper noted that airports are an important focus for the development of local and regional economies. They attract business, generate employment and open up wider markets. They can also provide an impetus to regeneration and a focus for new commercial and industrial development. In respect of the South West the Air Transport White Paper notes that there are likely to be considerable opportunities to attract inward investment and inbound business travellers as the region's airports grow.

6.2 Many of the responses to the first consultation on the Statement of Intent were concerned with the economic benefits of the growth of the Airport. The responses from the business community supported the view that there was an important link between aviation and competitiveness, whilst others were more sceptical of the economic value of air travel. BIA, in conjunction with the South West Regional Development Agency, has therefore commissioned an Economic Impact Study as part of the preparation of the Master Plan. This work, undertaken by consultants Roger Tym & Partners, has ascertained the economic impact of the recent infrastructure investment and assessed the direct and indirect economic impacts of the airport's growth focusing on the following areas:

- *Employment;*
- *Labour and skills;*
- *Tourism; and*
- *Inward investment, competitiveness and regeneration.*

The results of the study are discussed in the following paragraphs.

Socio-economic baseline

6.3 The South West region contributes 8% of UK GDP, the fourth highest English region outside the South East. The unemployment rate is one of the lowest in the country. However the region has a disparate economy. The far south west of the region, and in particular Cornwall and the Scilly Isles, have the lowest GDP and the highest average unemployment rates in the UK. In contrast the north east of the region has enjoyed high levels of inward investment and industrial expansion. It has a strong technology base and has developed considerable specialities in sectors such as financial services, aerospace and telecommunications. These sectors contribute around 25% of the total GDP of the South West¹¹.

¹¹ Source: The Future Development of Air Transport in the United Kingdom: South West, Department for Transport 2002.



- 6.4 Bristol is one of the eight English Core Cities (with Birmingham, Leeds, Liverpool, Manchester, Newcastle, Nottingham and Sheffield) that make up the Core Cities Working Group in conjunction with the nine Regional Development Agencies and departments of central government concerned with national economic performance. The performance of cities is now seen as an important contribution to national welfare and economic competitiveness. Bristol has the highest GDP per capita of the UK Core Cities. However it achieves a ranking of just 34th when compared with the top cities in Europe¹².
- 6.5 However Bristol also contains areas of high deprivation. In particular BIA is within close proximity of two of the South West Region's most deprived areas in South Bristol and Weston-super-Mare. Both contain wards that are amongst the 5% most deprived in the country.
- 6.6 Both South Bristol and Weston-super-Mare have been identified as a priority for public investment through schemes such as the Single Regeneration Budget, Surestart and a range of other interventions, including employment schemes. Both areas already benefit from employment at the Airport and provide further potential labour supply in the future. Weston-super-Mare provides an important current pool of labour for BIA.
- 6.7 The social and economic indicators for the South Bristol and Weston-super-Mare areas reveal the following:
- *Although the labour force in West of England overall has an above average standard of qualification, the deprived wards of South Bristol and Weston-super-Mare are below average.*
 - *South Bristol is notable for its reliance on the construction sector, and public administration, education and health. Weston-super-Mare is particularly reliant on distribution, hotels and catering. Both areas have a small proportion of businesses in the high value, banking and finance sector which is strong in Bristol generally.*
 - *Employment in the West of England generally is relatively heavily concentrated in large employers. However Weston-super-Mare has a dramatically lower than average proportion of employment with such businesses.*
 - *The unemployment rate in South Bristol is high and well above the national average. Weston-super-Mare's unemployment rate is high compared with the rest of North Somerset, the South West and the West of England. The proportion of income support claimants is particularly high in South Bristol.*

Employment at BIA – its significance as an employer in the South West region and sub-region

- 6.8 The numbers of people employed at BIA has grown considerably, particularly since 2000. BIA has undertaken regular surveys of businesses operating at the Airport which show that the numbers employed have risen from 2,160 in 2003 to 2,577 in 2004. At April 2005 the numbers stood at 2,653 employees which equates to 2,284 full-time equivalents (FTE's). Fifty two separate businesses now operate on the Airport, including Bristol International Airport Limited, the airport company.

¹² Source: Competitive European Cities: Where do the Core Cities Stand? ODPM 2004.

- 6.9 A survey of the principal employers on the airport was undertaken by BIA in August 2004. In total nearly 900 staff were included in the survey. The survey shows that the vast majority of employees live within easy travelling distance of the main centres of population (Bristol and Weston-super-Mare) or are drawn from local villages close to the airport. Some businesses (especially retail and catering) rely more heavily on local labour. Long distance commuting is only practised by a small number of employees, who are likely to be in the higher salaried managerial or executive roles where shift working is not required.
- 6.10 Employment generated by the Airport can be considered in the following three categories:
- **Direct employees** are those employed on-site at the Airport. They include the airlines, shops and other concessions, catering, ground engineering and handling, air traffic control and car parking facilities, and several other business activities. The number of direct employees is relatively straightforward to ascertain by undertaking a survey of airport businesses.
 - **Indirect employees** are those employed in organisations and companies off-site supplying goods and services to the Airport - including all goods and services that airport-based companies need to purchase in order to carry out their work. These jobs may be locally based or more remote from the Airport, depending on the nature of the goods or services provided and the procurement systems that are used.
 - **Induced employment** refers to employment generated by the spending of wages and salaries earned by employees in the direct and indirect activities.
- 6.11 Estimates of future direct employment have been calculated based on an assessment of the forecast passenger growth and the potential development deriving from it. The business models operated by the on-airport companies have been investigated to determine how they might operate in the future and then that information has been applied to each area of the business to develop future employment forecasts. It is estimated that the future direct airport employment will grow to 3,802 jobs at 2015, and to 5,686 jobs at 2030¹³.
- 6.12 Indirect employment has been assessed using an analysis of the current airport supply chain. Roger Tym & Partners estimate that at least £78m worth of annual supply chain costs are borne by businesses operating at BIA in total. A proportion of annual supply chain costs correspond to jobs within the internal economy of the Airport. It has been estimated that BIA procures £56m of supply chain costs from external sources. The number of jobs arising from the supply chain is therefore assessed at 1,306¹⁴. Many airport businesses operate national supply chains and 5% of the total indirect employment is estimated to be local (South West region) jobs. Future supply chain employment has been assessed on the basis of future growth of passengers.
- 6.13 In addition to the growth in indirect employment brought about by increased procurement of goods and services by airport businesses, there will be indirect construction employment associated with the expansion of the Airport. The proposed capital expenditure to 2015 is estimated to be between £160m and £180m. Construction jobs have been estimated on the basis of one job per £52,000 of capital investment and converted to permanent full time equivalent jobs using a standard ratio of ten years of construction employment per one full time equivalent job. However whilst construction jobs provide a short term boost to the

¹³ The Economic Impact Study considered two methods of estimating future employment using passenger growth and aircraft movements. For simplicity the figures relating to passenger growth are presented here.

¹⁴ In calculating this figure £22m of aviation fuel costs have been discounted from the calculation.



economy they do not, of themselves, raise the long term productive capacity of the regional economy. They have not therefore been carried forward into the overall employment impact calculation.

- 6.14 Induced employment has been estimated from an assessment of salary costs relating to current direct employment. The direct jobs are estimated to create a total of £24.5m disposable income. Using Gross Value Added and average salaries the proportion of labour costs arising from this expenditure has been determined and related to average salaries in the South West region. In this way Roger Tym & Partners estimate that at the current time 978 FTE's are induced by the spend from Airport employees and indirect employees. This is equivalent to a multiplier of 0.416 of direct and indirect jobs. The same multiplier has been applied to direct and indirect employment forecasts to give estimates of the growth in induced employment associated with the airport.
- 6.15 The total employment impacts are summarised in Table 8 below.

Table 8 – **Employment forecasts** ¹⁵

	Direct Employment	Indirect Employment		Induced Employment	Total Economic Impact FTE's ¹⁶
		Supply Chain	Construction		
Employment at 2005	2284	65		978	3,327
Employment at 2015	3802	116	165	1631	5,714
Net Change 2005-2015	1518	51		653	2,222
Employment at 2030	5686	180	299	2441	8,606
Net Change 2016-2030	1884	64		810	2,758

- 6.16 The forecasts indicate around 63% growth in airport related employment to 2015, compared with 35% in England and Wales, 19% in the South West and only 8% in the West of England. In the period to 2030 BIA is forecast to experience around 135% increase in employment. These forecasts therefore confirm BIA's importance as an employer in the region and sub-region as growing to double its current contribution. This estimated growth of employment is particularly impressive when compared to North Somerset, where there is forecast to be a 49% growth in employment in the period to 2015, whilst Bristol is expected to see a decline of 7%.

¹⁵ These figures exclude indirect employment generated by capital spending on construction.

¹⁶ The Economic Impact Report includes two scenarios for estimating future employment figures, one based on passenger numbers and one based on aircraft movements. Only one scenario, that relating to passenger numbers, is reported here to avoid confusion. This is considered to be the more realistic estimate, but it should be noted that only the airline component varies between the two estimates.

- 6.17 The BIA employment forecasts and the methodology used have been the subject of discussion in responses to the draft Master Plan consultation. It is clear that there have been a number of misunderstandings regarding the approach used. In particular:
- *Standard multipliers have not been used to calculate the employment figures. Forecasts have been built by a 'bottom up' method examining operational practices and the likely changes in the future. Future productivity levels and changes in technology have been included as far as they can be currently anticipated.*
 - *It has been suggested that that aviation is a volatile industry and that jobs created are fragile and liable to be lost in future job cuts. The airlines that are most vulnerable to these future job cuts are the large national airlines and some of the American airlines. The BIA passenger mix is dominated by efficient and profitable airlines and the exposure to future airline cost cutting measures is very small.*
 - *A variety of forms of sensitivity testing were integral to the Economic Impact Study. These involved the use of different scenarios for employment growth, consideration of the impact of the type of airline operator on growth, different forecasting methodologies and by benchmarking against standard multipliers.*

Tourism impacts

- 6.18 Roger Tym & Partners have considered the impacts on the regional economy from overseas visitors using BIA. The CAA passenger survey of 2003 provides data on the numbers of overseas residents visiting the South West region via BIA. The same data provides estimates of lengths of stay. Estimates of expenditure by visitors and projections of changes in the characteristics of visits have been made with reference to research material from South West Tourism. On this basis, expenditure by overseas visitors using BIA is forecast to rise from £38.3m in 2004 to £60.3m in 2015 and £72.7m in 2030.
- 6.19 In addition the proposal to develop an on-airport hotel has also been considered. This facility is estimated to provide 67 FTE direct, indirect and induced jobs and 16 FTE equivalent temporary construction jobs.
- 6.20 The overall total employment associated with the visitor spending in the South West region and the operational employment tied to the new hotel has therefore been estimated at 1,097 linked jobs in 2004, rising in 2015 to 1,793 jobs and 2,149 jobs in 2030.
- 6.21 It has been suggested that BIA contributes to the UK tourism deficit and that this is a net drain on the resources of the country. It is argued that this deficit could be reduced if the expansion of BIA were to be constrained.
- 6.22 It has been mistakenly assumed by some readers of the draft Master Plan that the 80% of passengers who are travelling for leisure reasons are all taking holidays abroad. However the 80% figure also includes domestic passengers. The proportion of passengers flying to international destinations for leisure purposes was actually around 57% in 2004¹⁷.

¹⁷ Calculated using CAA survey journey purpose data and 2004 passenger figures.



- 6.23 The international leisure passenger category covers a wide range of reasons for travel apart from 'holidays' in the conventional sense of the word. This includes for example visiting friends and relatives, educational trips, students returning home, cultural exchanges. The proportion of BIA passengers using the airport for foreign holidays is therefore somewhat less than the 57% of total passengers referred to above.
- 6.24 The South West as a whole is a net importer of tourism. However the majority of South West residents (63%) take holidays outside the region. We can only speculate on how people might spend their holidays if growth at BIA were not to take place. However it is reasonable to assume that the majority would continue to holiday outside the South West and therefore only a proportion of the additional trips from BIA are potentially diverting spend from the regional and local economy. The net impact of services from BIA on passenger expenditure is around £41m spent in non-South West locations in 2004 and this is expected to rise to £83m at current prices by 2030. This expenditure might have supported 700 SW FTE jobs in 2004, with the potential to support 1,400 SW FTE jobs in 2030. However this 'loss' to the SW economy is part of the anticipated worldwide growth in travel and tourism and it is expected that visitor expenditure in the South West will continue to grow irrespective of the changes at BIA.
- 6.25 Constraining growth at BIA will not act as a control on outbound international tourism. There is no restriction on travel in the UK and ferries, trains and other airports are available to take the demand, possibly with greater environmental impact.
- 6.26 However the notion that constraining the growth of air travel would serve to reduce the UK tourism deficit is fundamentally flawed. Research by the British Tourist Authority (BTA)¹⁸ indicates that tourism to the UK is highly competitive and price sensitive. As an island nation most visitors to the UK arrive by air. If the cost of air travel to the UK increases, through constraints in capacity (for example by not expanding airports), then the majority of potential visitors to the UK will simply choose to travel to a different cheaper country resulting in a significant fall in the UK's earnings from inbound tourism. Conversely the research shows that UK residents are much less sensitive to increases in travel costs. Those people wanting to holiday abroad have little choice but to fly. Therefore if capacity is constrained and air fares rise as a result, outbound travellers from the UK will out-compete inbound travellers for the available seats. As a result a greater percentage of the people on the available flights will be British outbound travellers. The effect of constraining aviation growth would therefore be to make the current tourism deficit worse.
- 6.27 In recent years there has been an upward trend in overseas visitors to the UK. At the same time Weston-super-Mare has also recorded an increase in visitor numbers, expenditure and employment in tourism¹⁹. Any decline in the popularity of traditional UK holiday resorts reflects long term changes in fashion (which may be changing as resorts reinvent themselves) and is not therefore linked to the recent growth of low cost airlines, such as has occurred at BIA. In fact low cost airlines may be contributing to recently recorded rises in overseas visitors to the UK.

¹⁸ The Price Sensitivity of Tourism to Britain, BTA, 2001.

¹⁹ As noted in 'Towards a 10 year Economic Development and Regeneration Strategy for North Somerset' by North Somerset Council, 2006.

- 6.28 South West Tourism's strategy is to achieve sustainable growth of the South West tourist industry²⁰. This is concerned with growing the value of visitors to the region rather than just the volume. Domestic tourism is heavily reliant on the car and is concentrated on visits to rural areas. An increase in domestic tourism numbers is potentially unsustainable and could have a detrimental effect on rural tourist attractions. International tourists, on the other hand, tend to use more sustainable means of transport such as public transport and concentrate their visits to cities.
- 6.29 The debate about tourism cannot ignore the social and health benefits of international leisure travel and the quality of life benefits that this brings. There is real benefit in visiting the destinations served by BIA (particularly the European capitals and cities).

Inward investment, competitiveness and regeneration

- 6.30 Analysis of a range of indicators shows that Bristol and the South West are characterised by a buoyant economy. This economic strength is particularly important in the context of this Master Plan, as there is evidence that the economic benefits of airports and air services are dependent on the strength of a region's economy and thus the ability for the regional economy to respond to travel opportunities.
- 6.31 The strength of the economy also indicates the ability of the population to use services that are delivered for leisure and business purposes - which are a function of a number of factors including wage levels, disposable income and the inclination of people to spend it on air travel. However the characteristics, including weaknesses, of a region's economy may also indicate specific ways in which BIA's growth plans may be advantageous in stimulating growth.
- 6.32 The West of England sub-regional economy in which BIA is located, which centres on Bristol and the former county of Avon, is the most prosperous in the South West and out performs many other areas of the country. A number of sectors in the local economy are expected to out perform the average for the region including, aerospace/defence, insurance, professional and business services, media and creative industries, tourism and higher education. Many of these sectors have a higher than average propensity to use air services as well as higher than average Gross Value Added per worker. Such a promising and positive environment in the South West provides a strong demand base to support the Airport's growth plans and indicates that such growth will generate specific as well as wider economic benefits.
- 6.33 The performance of the UK Core Cities has been considered in research commissioned for the Office of the Deputy Prime Minister²¹. This research reached the following conclusions:
- *Cities matter to national performance;*
 - *The most competitive regions have the most competitive cities; and*
 - *The relationship between Core Cities and their economic hinterlands is an increasingly important issue.*

²⁰ Towards 2015 Shaping Tomorrow's Tourism: South West Tourism/SWRDA.

²¹ 'Competitive European Cities: Where do the core Cities Stand?' Report to the Office of the Deputy Prime Minister, January 2004.



- 6.34 Internal and external connectivity was identified in the research as one of the key characteristics of economic competitiveness. The most successful cities have the physical and electronic infrastructure to move goods, services and people quickly and efficiently. External communications are particularly important since exporting remains critical to success. So airports are critical. They facilitate face to face communication, which has been supplemented not replaced by technological communication. The research also identifies a cultural dimension to this connectivity as well.
- 6.35 The link between connectivity, transport and inward investment has been a subject of debate in the consultation on the draft Master Plan. There is no doubt about the importance of aviation to the economy in the eyes of the business community. The Confederation of British Industry (CBI), in their response to the consultation stated:

'The South West economy in the twenty first century must in order to succeed compete not only with other parts of the United Kingdom but also with dynamic emerging economies throughout the world.

The Regional Economic Strategy aspires to bring about growth of 3.2% per annum. A thriving, growing airport which serves the region is essential for the economic development, and therefore the public and private prosperity, to which the South West aspires. It will underpin confidence in the region as a place to do business and act as a magnet for further public and private investment.

The South West cannot hope to compete in terms of cost with emerging, low cost economies. High skill, high value added companies must be attracted to and retained in the region in order to deliver growth in competitiveness, employment and quality of life. Experience has proven that such companies have high travel requirements. Their customers, suppliers and centres of knowledge are situated across the globe and a successful international airport will be a factor in their decision to locate and remain in the region.

Actual and perceived peripherality exert constraints on economic growth in the South West and increased services from and to the region's airports will contribute to overcoming this.

Fast travel to major centres across the world will give South West business access to new markets, suppliers, knowledge and competitive pressure, which will assist in increasing export opportunities, innovation and productivity.

Physical connectivity with other parts of the United Kingdom, Europe and the world is an important factor in the decision making of global companies when considering the level of business which will be allocated to their plants in the South West. Development of Bristol International Airport is therefore crucial if the region is not to lose out on inward investment opportunities.'

- 6.36 The views of the CBI are supported by a wide body of contextual evidence, further details of which are provided in the Economic Impact Report.
- 6.37 Other consultees have sought to equate a disparity between inward and outward investment in the UK to a negative economic effect resulting in an annual loss to the South West estimated at 104,850 jobs. This job loss is 25% higher than the entire unemployment figures for the South West suggesting that the logic is flawed.

- 6.38 In response to comments raised to the consultation the cost and time savings that are made by South West business passengers using BIA have been assessed. It is estimated that these savings could be approximately £120m per annum by 2030.
- 6.39 BIA is an important component in plans to regenerate Weston-super-Mare and South Bristol. The Weston-super-Mare Area Development Framework prepared for North Somerset Council, the South West Regional Development Agency and English Partnerships provides guidance on the range of measures to be pursued for economic regeneration and expansion of the former. The studies identify access to Bristol International Airport as one of the key factors that identifies Weston as an outstanding opportunity for urban regeneration and economic development with the South West. The economic strategy identifies objectives to develop high quality offices serving a broad range of employment opportunities. Access to BIA will be an important factor in making sure businesses take advantage of these opportunities.
- 6.40 BIA can also serve regeneration objectives in indirect ways. The employment opportunities provided at the Airport will serve to raise skill levels. BIA will further this by working with schools to raise standards of education in travel and work related areas. The opportunities for travel offered from BIA will also widen the knowledge of the world, raising aspirations and making the South West a better place in which to live.

Regional economic strategy

- 6.41 The Regional Economic Strategy for the South West of England 2006 - 2015 has been prepared by the South West of England Regional Development Agency and the South West Regional Assembly. The strategy states that recent strong levels of growth are likely to continue and the region needs to plan for annual growth rates of between 2.8% and 3.2%. This growth would be likely to depend on considerable improvements in productivity and on the availability of a flexible and highly skilled workforce. The work on regional productivity highlighted issues around connectivity and access to markets. Better transport infrastructure and reliable public transport services are key to a region's prosperity.

- 6.42 The Regional Economic Strategy includes three strategic objectives:

- *successful and competitive businesses*
- *strong and inclusive communities*
- *an effective and confident region*

The strategic objectives will be delivered through 11 headline economic priorities - the most important issues that need to be delivered to secure a dynamic and growing economy. Of these the following are considered to be relevant to the development of BIA:

- **Priority 1D - Compete in the global economy**
The region needs to continue to develop a climate in which more of our businesses trade internationally and where companies from outside of the South West are encouraged to invest in the region.
- **Priority 2B - Regenerate the most disadvantaged areas**
Many of the most disadvantaged neighbourhoods lie within the region's major cities, particularly in Bristol and Plymouth, where low skills, unemployment and poor housing are key challenges.



- **Priority 2C - Plan sustainable and successful communities**
The region has begun to focus on developing dynamic, international cities capable of attracting global businesses, the best creative talent and high levels of investment. Activities are focussed on promoting the renaissance of the region's largest cities.
- **Priority 3A - Improve transport networks**
The Regional Economic Strategy priorities are to enhance connectivity, providing access to markets and tackling peripherality. Priorities include improvements to strategic road, rail, air and sea networks.

Priority sectors in the South West

- 6.43 The South West Regional Development Agency identifies five current priority sectors for business development – advanced engineering, including aerospace; food and drink; ICT; tourism and marine – and three emerging sectors; creative industries, biotechnology and environmental technologies. The Regional Economic Strategy identifies other key sectors which are important to the region because of their size or linkage with other industries. These are health and social care; retail; engineering; construction; public administration; finance and business services; distribution and transport, including logistics, and paper and printing.
- 6.44 South West businesses are currently responsible for over £9.7bn of exports to the rest of the world. The European Union accounts for nearly 60% of these exports. North America and Asia and Oceania are also important to South West businesses accounting for £1.3bn and £1.2bn of exports respectively. Manufacturing is the main industry sector responsible for exports with over 96% of the total by value.
- 6.45 Of these exports the priority sectors perform a vital role. The Economic Impact Study therefore considered the extent of the business links with these sectors and how they view the Airport's future growth plans. Case studies concentrating on key businesses from each sector were considered to illustrate some of the direct links and benefits of BIA and its growth plans to specific businesses. The following businesses were included in this work:
- *Airbus UK (Advanced Engineering and Aerospace);*
 - *Industrial Art Studio (Creative Industries);*
 - *Astra Tech (Biotechnology);*
 - *The Meteorological Office (Environmental Technologies);*
 - *Yeo Valley Foods (Food and Drink);*
 - *Hewlett Packard (ICT);*
 - *Von Essen Hotels (Leisure and Tourism);*
 - *Vetco Gray (Marine Technologies);*
 - *Royal Bank of Scotland (Finance);*
 - *The Wrigley Company;*
 - *Watson-Marlow Pumps; and*
 - *Travel services and agents.*
- 6.46 This work shows that South West businesses can and do benefit from the destinations and connections offered by BIA and that their future growth plans are important in maintaining what are increasingly important business and trade links between the South West and the

rest of the world. The following messages were given by these businesses that testify to this importance:

Industrial Art Studio

- *“it prefers to depart from BIA and change at an international hub airport, than to access the London Airports for direct flights.”*
- *“it prefers BIA to London Airports because of poor rail and road connections from the South West to the London Airport flight schedules.”*

Airbus UK

- *“it sees Bristol International Airport as a very important link in its communications, as it is considered that growth at the Airport will be a significant catalyst in the assisting Airbus [and the Filton operation] to achieve growth.” [An Airbus spokesperson]*

Royal Bank of Scotland

- *“it greatly welcomes recent new routes to Manchester and to Leeds Bradford, for the convenience they provide, particularly compared to the alternative, which is road travel.”*

Vetco Gray

- *“growth at BIA is likely to help its business, particularly if it provides improved access to intercontinental destinations [either via European hubs, or direct].”*
- *“the Aberdeen route therefore provides both increased convenience and improved health and safety [reducing travelling time, and the need to drive long distances early in the morning or late at night].”*

Hewlett Packard

- *“It uses BIA as a convenient local start/stop point for access to Europe, Ireland and other UK destinations.”*
- *“Visitors to HP from European destinations also use BIA as their incoming airport.”*

The Meteorological Office

- *“BIA currently provides a preferred option for convenient national and international travel, thus supporting the Met Office business for its communications’ requirements.”*

6.47 In total the Economic Impact Study estimates that in the region of 3,500 South West businesses currently use Bristol International Airport. The 2003 CAA Passenger Survey indicates that BIA captured 38% of the overall South West business air traffic market in that year. The growth of the route network since then is likely to have increased this figure.



Local economic benefits

- 6.48 The main local economic benefit of BIA is in terms of jobs. The Airport as a whole is the largest private sector employer in North Somerset. Surveys of staff working at BIA suggest that up to 43% of staff live in North Somerset. The towns of Nailsea, Portishead and Clevedon account for around 9% of staff, 19% are from Weston-super-Mare, and 15% are from the rural villages, including those in the immediate vicinity of the airport.
- 6.49 In 2005 approximately half BIA's capital expenditure of £15m, was spent with local construction companies, including companies located in North Somerset.
- 6.50 BIA and the businesses located at the airport use local suppliers where possible. Local garages, caterers and food and beverage suppliers benefit in this way. Airportcarz, the airport taxi company has a fleet of 60 Ford Galaxies, supplied new by a local garage, which are replaced every six months. The Airport is also one of the largest outlets for the locally brewed Butcombe Beer.
- 6.51 The area in the immediate vicinity of the airport supports a number of businesses providing overnight accommodation, particularly for air travellers, including 116 hotel rooms on the A38 and up to 20 bed and breakfast establishments with 101 bedrooms in total. Similarly local taxi companies and coach operators benefit from Airport business.
- 6.52 The local community is expected to continue to provide a significant proportion of the Airport's labour requirements. Weston-super-Mare has provided the main source of labour historically and this will continue. South Bristol also has an important role in meeting Airport employment requirements. Much of BIA's work on skills and employment has been focussed through North Somerset Council, Go Skills, the Learning Skills Council and Business West. The Airport's 'Passport to your Future' publication has been prepared, in conjunction with Clevedon JobCentrePlus to highlight the Airport employment opportunities to the local community.

Maximising potential

- 6.53 The Economic Impact Study has considered the matters and issues that present challenges and opportunities which might influence BIA's ability to realise its full potential. The work concludes that there should be a current and future workforce available to service employment growth within the Airport's operations, particularly from South Bristol. However a number of issues affecting recruitment are identified, including:
- *Competition for labour from other imminent large developments in Bristol, particularly within lower paid occupations;*
 - *Shift working (currently around 95% of airport staff work shifts);*
 - *High reliance on the car for access to the Airport; and*
 - *Security requirements.*
- 6.54 The key issue is access. It is clear that initiatives such as travel plans are needed to reduce this as a barrier to employment and to improve the sustainability of passenger travel to the

Airport. In respect of employment, tailored support may be needed to assist employees gaining access to work. Some initiatives may become more viable as growth in employment and passenger numbers continues and economies of scale become apparent. Such initiatives are likely to benefit both passengers and staff. Co-ordination of effort between employers is required. Providing better access to the Airport from Bristol and Weston-super-Mare in particular will be important in securing future labour supply from these areas. The BIA Staff Travel Plan has been prepared to respond to these challenges, further details of which are provided in Chapter 9.

6.55 Roger Tym & Partners also suggest a number of areas where the businesses at BIA might intervene in the labour market to assist employees and to improve skills and initial training of new staff, through working with schools, colleges and sector specific forums. BIA's strategy to tackle labour market issues is concerned with:

- *Working with local partners to address skills shortages, in particular through schools and local training providers;*
- *Working with Go Skills to provide skills training for those working at the Airport in the service sector;*
- *Making it easier for people to access jobs at the Airport - see for example the Passport to your Future publication produced in conjunction with the Clevedon Jobcentreplus;*
- *Addressing access issues through the Airport Surface Access Strategy and Staff Travel Plan, in particular providing improved opportunities for staff to get to the airport by public transport from both Bristol and North Somerset.*

Social considerations ²²

6.56 Although more difficult to measure (in economic terms) the social impacts of air travel are as significant and widespread within society as the economic benefits. Increasing numbers of people take foreign holidays for granted and more are travelling further a field for leisure and tourism. The social benefit derived for leisure travel and tourism is real and significant. Access to holiday travel is an important quality of life indicator. The same drivers also stimulate inbound tourism from the rest of the world. Increasing disposable income, more frequent exposure to the sights and sounds of remote locations (through television and the internet), coupled with a declining insularity, have all driven and will continue to drive, additional demand for tourism, both inbound and outbound.

6.57 Other social drivers for increased air travel to and from Bristol International Airport include:

- *Connecting communities to services, such as further education, with four universities within Bristol and Bath;*
- *Enabling remote and island communities to participate more fully in Europe, thus promoting social inclusion;*
- *Visiting friends and family both for European residents, within the UK and for ex-patriots living abroad;*

²² It should be noted that this section of the Master Plan is not derived from the Roger Tym & Partners report.



- *Cultural, sport and educational exchanges; and*
 - *Facilitating access to South West attractions and events, such as the Glastonbury Festival, Cheltenham Festival and events at the Millennium Stadium.*
- 6.58 The Master Plan Environmental Appraisal has considered the effects of airport development on the landscape, ecology, air quality, noise and traffic, the details of which are provided in Chapter 8. These assessments are being developed into a full Environmental Impact Assessment, and the effect on community will form a fundamental part of this. The EIA Scoping Report (published alongside the draft Master Plan) sets out how the community effects will be further considered. This will include a rural character study which will consider the effect of increased patronage upon the rural area and the character of surrounding villages.
- 6.59 BIA takes its responsibilities to the local community seriously and aims to play a responsible role in community affairs. Members of staff are actively involved in a number of initiatives in primary and secondary schools to promote education and employment opportunities. In particular BIA (with its on-airport business partners) is involved in a number of current and potential initiatives around recruitment and skills, including:
- *Work experience programme in conjunction with 'S-cool'. These placements sometimes lead to permanent appointments;*
 - *A training and work placement scheme with Weston College;*
 - *Work with the Local Education Authority with regard to matching education provision to business needs - particularly in the South Bristol area;*
 - *Adoption of the Connexions publication 'Working at Airports' demonstrating which routes should be selected at school age to lead to eventual employment at an airport. This package is to be launched with local schools in South Bristol.*
- 6.60 BIA has been involved with the following particular educational activities in North Somerset:
- *'World of Work Event' with Priory School at Worle;*
 - *Worle Community School fire awareness training;*
 - *Around the World in 80 days reading project with St Katharine's, Felton and Court de Wicke, Claverham;*
 - *St Katharine's School reading recovery*
 - *Teacher resource days - including attendance by North Somerset teachers;*
 - *Members of staff are Governors of a number of schools, including St Katharine's, Felton*
 - *Search for Santa disabled day care event*
 - *North Somerset Agricultural Society 'Gate to Plate' project;*
 - *Goblin Combe Environment Centre;*
 - *Backwell School assistance with performing and visual arts.*
- 6.61 Trips abroad are a feature of the curriculum in many schools and a number of local secondary schools make use of BIA for visits abroad associated with subjects such as music,

art, history, sport, languages, science and dance. BIA has also supported the Bristol-Bordeaux exchange facilitating the continuation of this programme with flights from the Airport and providing office accommodation. Many local sports teams take part in tours that include the use of flights from BIA. Hitherto such trips would either not have been possible or would have involved the use of airports outside the South West. There are no practical restrictions to these exchange opportunities.

6.62 In 2003 the airport launched a community fund aimed at supporting local projects that will:

- *Benefit and develop the surrounding community in terms of facilitating projects aimed at leisure, recreation and education;*
- *Promote environmental improvement and heritage conservation ;*
- *Advance awareness of environmental issues through ecological education;*
- *Progress and protect local nature and wildlife; and*
- *Utilise / share some of the skills and knowledge of BIA staff.*

In 2005 27 projects benefited from donations. Examples of some of the ways the Airport has helped the local community are as follows:

Donations towards:

- *Goblin Combe Environment Centre;*
- *North Somerset Agricultural Society;*
- *Bristol school Panathlon Events for able bodied and disabled children;*
- *Footpath & cycleway (Winford);*
- *Ball court & skate park (Withywood);*
- *Village Hall Environmental & Heritage Centre (Nempnett Thrubwell);*
- *Purchase of woodland (Backwell);*
- *Village marquee (Barrow Gurney);*
- *Control regrowth of scrub (Cadbury Hill); and*
- *Schools / Playgroups - raffle prizes / equipment.*

Resources:

- *LoveBristol Community Festival;*
- *Priory School maths project;*
- *Hartcliffe Community College engineering project;*
- *Gleblelands Project (Yatton); and*
- *Success@ Education Action Zone (S Bristol Schools).*



- 6.63 BIA also undertakes various fundraising activities in conjunction with our chosen charity of the year. For 2005/06 BIA is working with Children's Hospice South West supporting Babe's Big Appeal. £40,000 is expected to be raised for this cause.
- 6.64 The lack of taxation on aviation fuel and zero rating for VAT purposes of tickets is sometimes taken to mean that aviation is subsidised. However VAT is not charged on any form of public transport in the UK and registered public transport services by bus and rail receive a rebate of 80% of the fuel duty. In these respects aviation is little different to any other form of public transport. BIA pay £1.3m per annum in rates to North Somerset Council and is therefore one of the largest ratepayers in the area. Passengers from BIA also contribute £16.5m²³ a year to the exchequer in Air Passenger Duty. In addition air passengers pay VAT on commercial spend at BIA such as car parking. Taxation is a means of collecting money for the Exchequer. The lack of taxation on a particular form of transport should not be construed as meaning that this form of transport is supported by public funds. The air transport industry in the UK is self-financing. The Air Transport White Paper anticipates that investment in new airport development will be funded by airport operators, without recourse to public funding. This is not necessarily the case for other transport sectors such as bus and rail. Subsidies to airlines like Air France and Olympic are cited as examples of airlines being funded by government. However this is not relevant to BIA as these airlines do not operate here. As far as we are aware none of the airlines operating at BIA are in receipt of a public subsidy.

Summary and key points

- Direct employment forecast to rise from 2284 full time equivalents in 2005 to 5686 at 2030.
- Total employment impact from BIA forecast to be 8606 jobs at 2030.
- Expenditure by overseas visitors using BIA forecast to rise to £72.7m a year at 2030. Employment associated with visitor spending estimated at 2149 jobs at 2030.
- A thriving growing airport serving the region is essential for the economic development of the region.
- Cost and time savings by South West business passengers using BIA is estimated to rise to £120m a year by 2030.
- BIA is committed to contributing to the social well-being of the South West Region.

²³ 2005 estimate.

Chapter 7

Development requirements to 2015



7.1 BIA's objectives for the development of the Airport are to provide facilities to meet the demand for air travel in the South West, in line with national policy, and to deliver the benefits of airport growth within a context of sustainable development. BIA aims to meet this demand in line with the 'balanced approach' outlined in the Future of Air Transport White Paper, reducing and minimising the impacts of airport growth on the surrounding communities through appropriate mitigation.

7.2 The primary land use categories at the Airport are:

- *Passenger terminal;*
- *Aircraft parking apron;*
- *Car parking for passengers and staff;*
- *Landside and airside ancillary areas; and*
- *Runway and taxiway.*

The requirements for these facilities have been assessed as part of the preparation of the Airport Master Plan.

7.3 The Government requires airports to produce detailed Master Plans covering development to 2015. For the period 2016 to 2030 only indicative land use plans are required. BIA explained in the Statement of Intent how it intends to meet the Government's requirements and proposed to prepare the detailed and outline Master Plans on the following basis:

Now to 2015

The forecast passenger throughput for 2015 is 8.1mppa, close to the Air Transport White Paper's assessment of the capacity of the existing terminal site. The key issue is accommodating additional aircraft stands. Our latest assessment is that the White Paper's conclusion underestimates this capacity and 9mppa is a more appropriate limit for consideration in this Master Plan. Therefore we have developed the 2015 detailed Master Plan on the basis of 9mppa to ensure that mitigation, land use and impact are assessed at the high end of a range of expected growth, based on the capacity limit of the north side site. BIA's preferred option for development is based on an expansion of the existing terminal building facilities. The alternative option of developing a second terminal south of the runway at this stage is not justified on the basis of operational need, is not the best use of land resources and would be economically inefficient.



2016 to 2030

The 2030 Master Plan will include indicative land use plans to cover growth to 12.5mppa. The plan will explore the possible further development potential of the airport including the White Paper proposals for a second terminal building and a runway extension. However, at this stage, we are not bringing forward firm proposals for these developments. These are challenging projects with potentially significant impacts. The Master Plan discusses these challenges and impacts and presents an indicative land use plan for 2030. These developments will be the subject of further work in subsequent Master Plan reviews when the air transport requirements can be assessed with a greater degree of certainty.

The remainder of this Chapter considers the implications of a 9mppa development at BIA. The implications for development post 2015 are considered in Chapter 12.

Development options

- 7.4 In many areas of airport development there may be more than one possible approach. The options for development can be considered in a hierarchy of alternatives as follows:
- Level 1: Level of air transport demand;
 - Level 2: Distribution of air transport demand;
 - Level 3: Alternative ways of processing demand;
 - Level 4: Alternative layouts for facilities to process demand; and
 - Level 5: Alternative ways of mitigating the effects of demand.
- 7.5 The Government has considered the strategic alternatives associated with the future demand for air travel, and the ways that this demand might be distributed at a national and regional level in its work, in advance of publishing its Air Transport White Paper. The Air Transport White Paper sets a national framework for the level and distribution of air transport demand and we will not revisit these issues as part of this Master Plan. In particular it is clear now that the proposed sale of Exeter Airport will not result in the two airports being in the same ownership. Issues relating to the distribution of traffic between Exeter and BIA that arose in early consultations therefore no longer apply. Our consideration of alternatives has therefore concentrated on matters relating to passenger processing, layouts and mitigation. Alternatives for mitigating the effects of demand and development are covered in Chapter 8.
- 7.6 We have considered a number of potential options for the proposed expansion of airport facilities which have been assessed using environmental, land use planning, operational, financial and design criteria. Particular attention has been paid to landscape and visual impact, and a study has been completed to analyse the intrusion of new buildings on key views. The results of this appraisal are reflected in the proposals included in this Master Plan. A separate Sustainability Appraisal of the Master Plan and its options has also been carried out (see Chapter 11).

Passenger Terminal - existing terminal building

- 7.7 The need to provide additional terminal building capacity is central to any plan to deliver passenger growth at Bristol International Airport. The existing terminal building was originally designed in 1990 to provide a planned capacity of 2 mppa. Delays to the project through the planning system and securing finance meant that adjustments to the design were required to accommodate passenger growth in the intervening years prior to commissioning the building in 2000. The floor area was increased by the addition of a mezzanine passenger floor and a basement plant room. These adjustments were made without affecting the external appearance of the building or its footprint. However a number of compromises to the layout of facilities were necessary in order to achieve this. The resulting building is compact and efficient in its use of floor space. We believe that the building is one of the most efficient passenger terminals, in terms of floor space per passenger in the UK²⁴.
- 7.8 The efficient use of internal floor space has been achieved at the expense of internal flexibility. Reconfiguration of internal floor space does not provide an option for increasing capacity and extensions of the building are needed to meet future growth. The check-in and baggage reclaim facilities have been extended since opening. These developments comprise the 15% extension of floor area that is allowed as permitted development under the Town and Country Planning (General Permitted Development) Order 1995. Any further extensions to the building will now require full planning permission.
- 7.9 The terminal building is increasingly experiencing congestion and is already operating at or near its capacity at peak periods, on a daily basis during the summer season. The photographs overleaf illustrate the current passenger experience at such times.
- 7.10 This crowding has an adverse effect on the passenger experience. However, more fundamentally the terminal building has operational processing capacity constraints (e.g. check in facilities, security search, baggage reclaim, immigration) and safety limits on occupancy. Therefore the application of these constraints in an increasingly busy terminal will ultimately have an adverse effect on airline punctuality and compromise the success of the operation. This will in turn deter airlines from introducing new services or expanding existing services.
- 7.11 We estimate that the terminal can continue to function until 2009 - when passenger numbers are forecast to exceed 6.5mppa. Failure to deliver additional terminal capacity by this time will mean that passenger growth will need to be constrained and BIA's ability to meet the region's air transport needs, and hence the Air Transport White Paper, will be compromised.

²⁴ The current 30th busiest hour one way passenger flow rate is about 1200 pax/hour. The conventional 'rule of thumb' is that there should be 49.5 sq m per pax, or 59,400 sq m on this basis. The actual area of the terminal is just over 20,000 sq m. Billund Airport Terminal is a good example of a new 21st century terminal building - it comprises 40,000 sq m floor area for an annual throughput of 2mppa. Liverpool John Lennon Airport handled 4.4m pax in 2005 in a terminal building that is at least 20% bigger than BIA.





Departure Lounge



Departure Lounge at Gate 5

Passenger terminal design criteria

7.12 The capacity of a passenger terminal building is a function of three factors:

- *The design passenger flow rate;*
- *A space standard relating to the space per passenger available at each facility within the building; and*
- *A service standard relating to the level of service provided at each facility (such as the queuing time).*

Passenger flows through the building are subject to daily, weekly and seasonal peaks. This situation will continue through the Master Plan period and the development of new facilities will be required for the anticipated growth in peak period traffic. It is normal practice to plan to accommodate the passenger throughput appropriate to the thirtieth busiest hour of the year, so that the terminal building operates at or below capacity for all but thirty hours of the year. BIA applies space and service standards appropriate to a 'good'²⁵ level of service as defined by the International Air Transport Association.

7.13 We have assessed the design flow rates for the future development of the terminal building with the assistance of specialist consultants. The projected flow rates have been determined based on benchmarks from similar sized regional airports and an estimate of the likely pattern of traffic.

7.14 The terminal building is a system of interactive components, each of which needs to be planned to provide a balanced passenger process from forecourt through to aircraft. The main components comprise:

- *Terminal road system including drop off and pick-up areas;*
- *Landside departures concourse including check-in, baggage facilities, waiting area, catering and shops;*
- *Security search;*
- *Airside departure lounge, including seating, shops, catering and airline lounges;*
- *Departure gates and passenger transfer to aircraft;*
- *Arrivals gates;*
- *Immigration;*
- *Baggage reclaim and customs;*
- *Arrivals concourse; and*
- *Offices, storage and accommodation for airport companies.*



Existing terminal building

²⁵ A good level of service is defined as a condition of stable flow; acceptable throughput; related subsystems in balance.



Terminal building - strategic layout options

- 7.15 As part of the preparations for the emerging Airport Master Plan a study investigating options for extending the terminal building has been undertaken for BIA by specialist consultants. At this stage the level of detail is sufficient to allow the scale and optimum location of development to be determined, but full designs have not yet been produced.
- 7.16 At a strategic level the following site options have been identified:

Extend the existing terminal building (see Drawing 2)

The existing terminal has been planned on the assumption that it would be extended and land is safeguarded to the east and west for this expansion. A single terminal has advantages in terms of land use and operational economies of scale. A single terminal can be accommodated and operated effectively on this site. The recent expansion of the check-in and reclaim facilities have progressed based on an assumption regarding a single terminal.

Develop a new terminal, separate to the existing terminal, on the north side of the airfield (see Drawing 2)

A two terminal system introduces a duplication of facilities and therefore is inherently less efficient in terms of land use and operation. It is in conflict with the original Terminal Master Plan and current land uses at the airport.

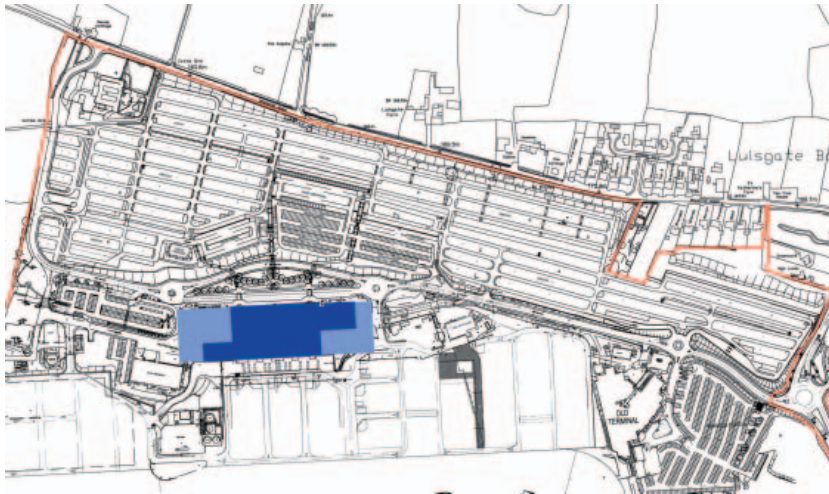
Develop a new terminal to the south of the airfield (see Drawing 3)

The south side of the airfield is relatively undeveloped in terms of infrastructure. In particular there are no aircraft parking stands or appropriate taxiways in this area. A new terminal so remote from the existing terminal introduces significant additional development requirements, cost, operational inefficiency and is not a prudent use of land as a natural resource. It would also fail to deliver the supported expansion of the existing terminal site indicated in the Air Transport White Paper.

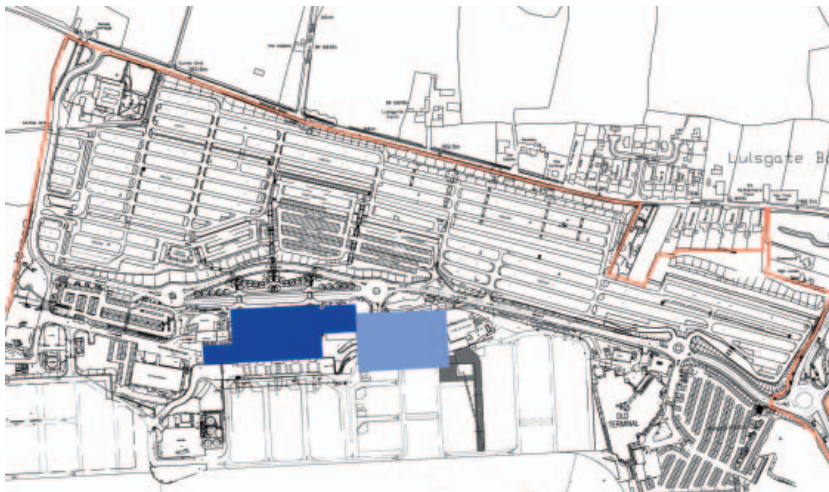
Develop satellite facilities with elements of the passenger process to reduce the size of the core terminal building

There are few operational facilities that can be satisfactorily located remotely from the main terminal building. BIA has considered locating elements of the check-in system remotely from the main terminal building, but this approach introduces inefficiencies into the operation. Experience elsewhere has indicated that this approach is of limited value. Satellite buildings are often used for departure gates and this approach is being considered. However the layout of the airside facilities dictates that the buildings remain within the grouping of the core terminal building.

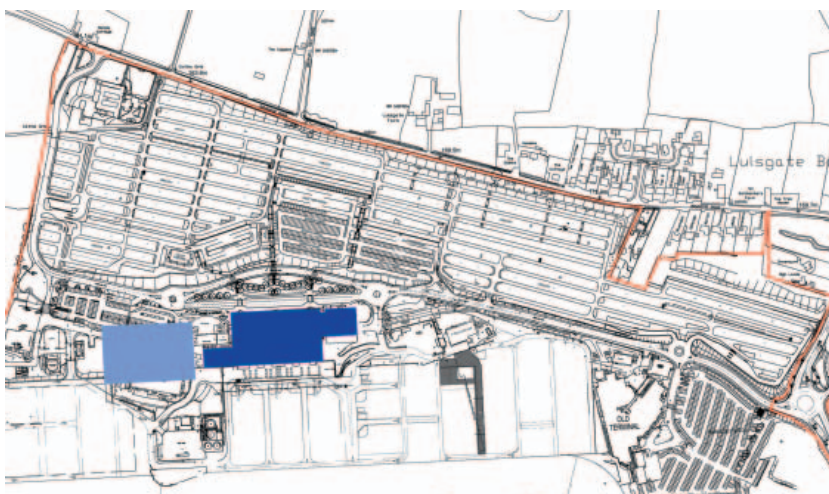
Drawing 2 – North side terminal options



**Expansion
of Existing
Terminal**



**New East
Terminal
Building**



**New West
Terminal
Building**

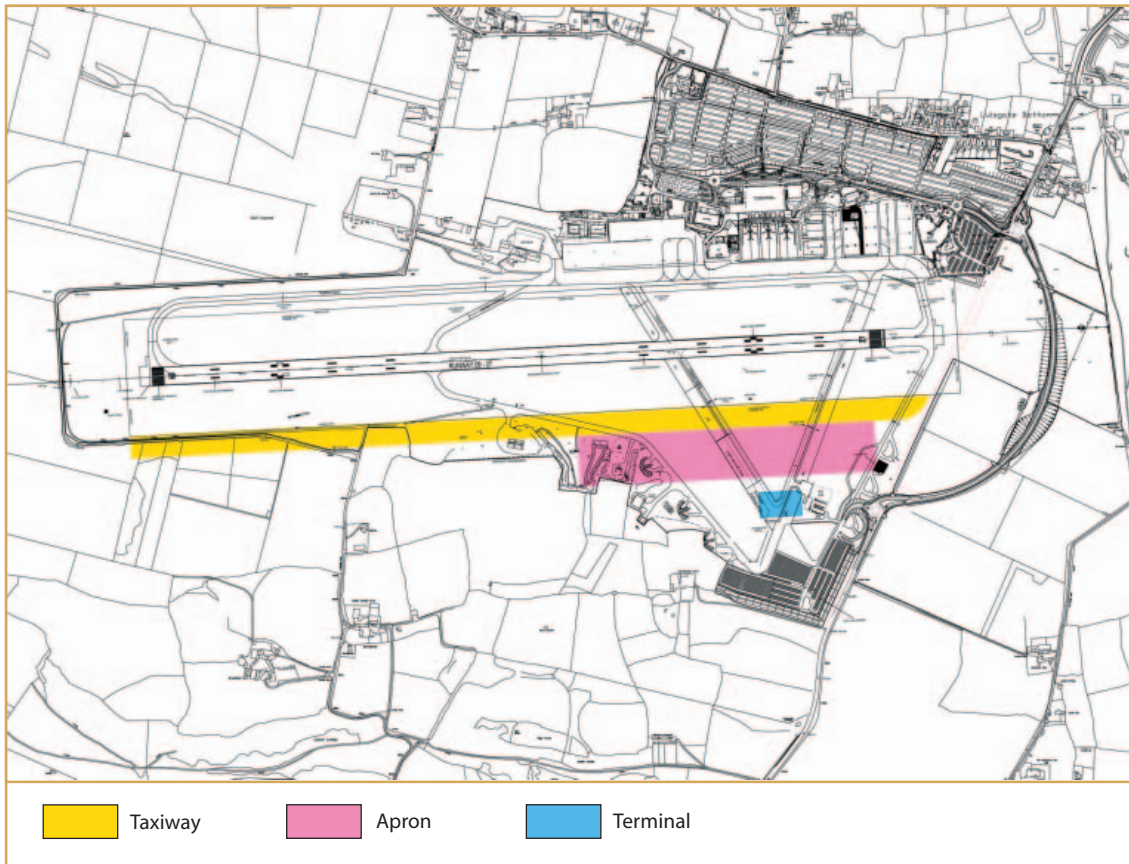
 Existing Terminal

 Extension / New Building

 2005 Airport Boundary



Drawing 3 – South side terminal option



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- 7.17 It has been suggested that expansion could be accommodated within the existing building by the addition of further mezzanine floors. However not only would this prove prohibitively expensive and disruptive to the current operations, it could not provide the right amount of floor space in an appropriate location to suit future operational needs. Whilst there may be some merit in minor extensions to the existing mezzanine floor this approach will not remove the need to extend the terminal building.
- 7.18 It has also been suggested that the improved use of technology will mean that the existing facility can accommodate additional passengers removing the need for the extension. The size of the terminal building is determined by the number of passengers and staff to be accommodated and the facilities required to service the passenger operation. Technology and use of the internet will benefit a number of processes but the effect on the overall size of the building is expected to be limited. The current trends in the airline industry are to use self service check-in facilities or on-line check-in. Check-in can also benefit from the use of Common User Terminal Equipment (CUTE) allowing any airline to use any desk. These developments, which have been factored into the terminal plans as far as they can be anticipated, will allow better utilisation of facilities but the need to expand check-in in the future will remain, in order to accommodate increased quantities of baggage. Technology will have little influence on the need to expand other areas of the terminal building (e.g. security search, departure lounge, departure gates, immigration, baggage reclaim etc). The facilities also need to be flexible enough to respond to changing regulatory requirements, particularly in respect of security.

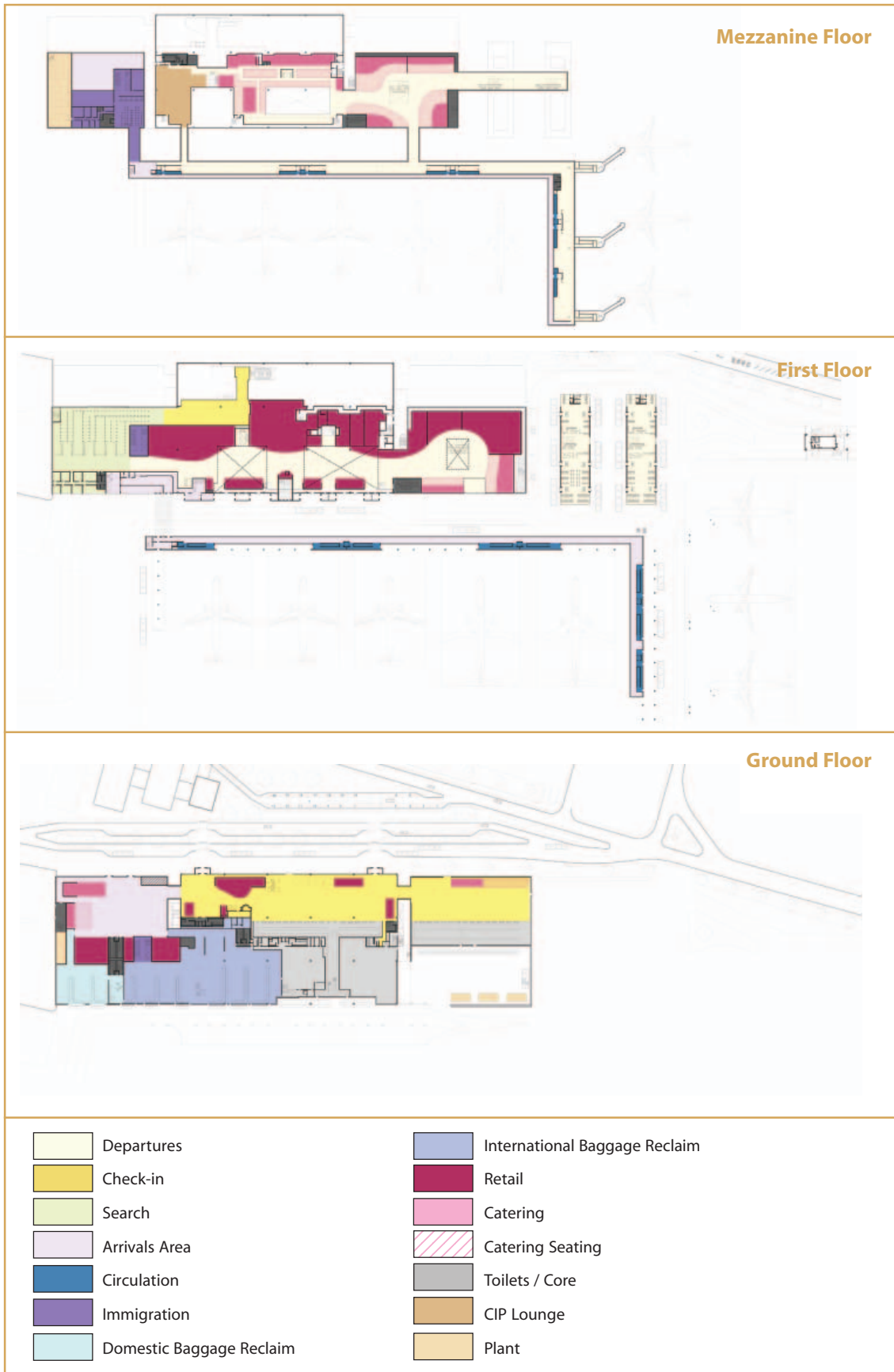
- 7.19 On the basis of development cost, land use, impact and operational efficiency and prudent use of land as a natural resource BIA has concluded that the preferred and most sustainable option is an extension to the existing north side terminal building. Different layout options have been considered. An east/west expansion, in line with the original 1990 Terminal Master Plan, offers the most favourable distribution of facilities. The ground floor would comprise check in, offices, outbound and inbound baggage facilities, immigration, customs and the arrivals concourse. Subject to detailed design studies, an extension with a footprint of around 4000 sq m is anticipated to be required at the east end to accommodate extensions to check in, outbound baggage and the departure lounge. A further 3000 sq m needs to be safeguarded at the west end of the building to accommodate the expansion of arrivals facilities.
- 7.20 Drawing 4 (overleaf) shows a possible layout for the extended terminal building. The emerging design is also illustrated on Drawing 5.
- 7.21 The current arrangements for transferring passengers between the terminal building and the aircraft involve walking at ground level to aircraft stands immediately adjacent to the terminal building, or coaching to remote stands. Whilst these arrangements are satisfactory for today's levels of passenger throughput, they are operationally complex and inefficient for future passenger numbers. Drawing 4 shows proposals for overcoming the current operational constraints through the development of a two level pier (effectively a covered corridor building) between the terminal building and the aircraft stands. A coaching facility within the terminal at the east end of the building is also proposed. These arrangements will facilitate simple and effective vertical separation of arriving and departing passengers and the segregation of walking and coached passengers.
- 7.22 The new terminal development will be to a high quality design. Our aim will be to deliver a coherent design that sensitively and comfortably blends the new and existing facilities; that respects and complements the strong image presented by the original design and provides a comfortable and memorable feel to the building. The objectives of sustainable construction will be a key factor in the design.
- 7.23 The proposals described above are intended as a guide to the extent of land use required for the terminal building. Detailed proposals will be brought forward through the planning system as soon as they are available.

Aircraft parking apron

- 7.24 The requirements for additional aircraft stands have been assessed using indicative flight schedules, statistical assessments of delays and BIA's knowledge of the evolving airline operation. We estimate that around 30 aircraft stands will be required to handle 9 million passengers per annum (mppa). This represents an additional 12 stands compared with the current provision. The strategic layout options for providing additional aircraft stands are as follows:
- *Provide additional stands by expanding the aircraft apron to the west of the Air Traffic Control Tower and in the longer term to the east of the fire station on the site of the old terminal building/administration offices. This is our preferred option. It makes efficient use of land, minimising the need for additional airport land, and creates a simple operational interface*



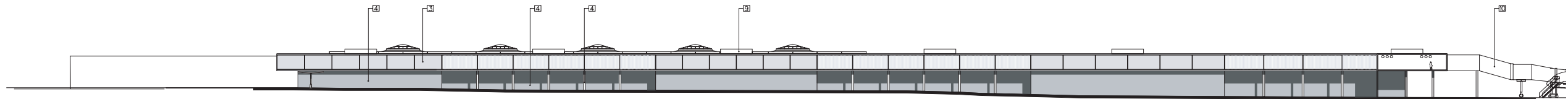
Drawing 4 – Terminal layout



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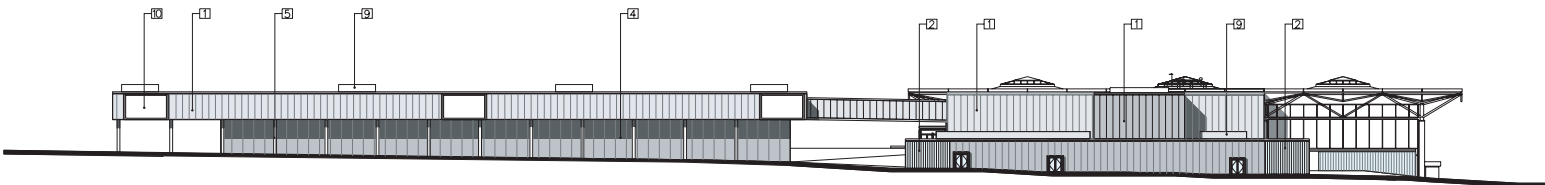
01 NORTH ELEVATION
SCALE 1:500



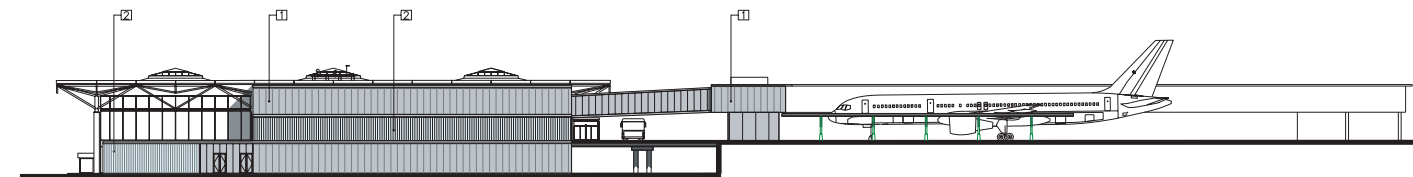
02 SOUTH ELEVATION - WALKWAY



03 SOUTH ELEVATION



04 EAST ELEVATION



05 WEST ELEVATION

NOTES

- 1 COMPOSITE PANEL - RAL 9006
- 2 CAST GLASS
- 3 GLAZED PANELS
- 4 PRECAST CONCRETE PANELS
- 5 CAST CONCRETE COLUMN
- 6 ROOFLIGHT
- 7 BRISE SOLEIL - POWDER COATED METAL
- 8 CURTAIN WALL GLAZING
- 9 INDICATIVE PLANT LOCATION
- 10 AIRBRIDGE BY SPECIALIST

with the main terminal building. Expansion of the apron in this way requires the relocation of the ancillary facilities at the west end of the apron, the fire station, the fuel farm and the old terminal/administration building. Alternative sites on the north side of the airfield are identified in this Master Plan for the fuel farm and the administration building.

- *Provide additional aircraft stands on the south side of the airfield. These stands would be separated from the Terminal Building by the runway creating a number of operational difficulties that cannot be easily overcome. Furthermore, car parking would need to be displaced and provided elsewhere in order to create the land for the stands. This puts increased early pressure on the need to expand airport land. This option is therefore not preferred or sustainable when set against the preferred option.*
- *Provide additional aircraft stands by expanding the aircraft apron to the north of the existing aircraft apron. Based on the current stand provision only three additional aircraft stands can be provided to the north of the existing apron. This is not sufficient to meet the demand for aircraft stands for 9mppa and with structural fill to a depth of up to 4m required the technical challenges of delivering this option are not insignificant. Expansion outside the existing airport boundary would also be required. This is an option that will be further considered in the context of the long term (post 2015) expansion of the apron as a means of deferring the need for a south side second terminal building. However there is a concern that a single taxiway on the north side may not be able to deliver the required runway movement capacity with a further increase in the number of stands, beyond that required for 9mppa. Some of the existing stands feature 'push back' on to the taxiway which have an effect on movement capacity. There seems to be no prospect of an additional taxiway on the north side so the southern apron option may be more attractive on these grounds.*

- 7.25 The proposed re-organisation and extension of the apron area will cause changes in the ground noise environment. In particular aircraft stands will be closer to neighbouring properties and the barrier effect of the old terminal building will be lost once it is demolished. A detailed ground noise modelling exercise has concluded that these factors can be mitigated by the provision of an acoustic barrier and the use of restrictions on the use of aircraft auxiliary power units.
- 7.26 It is anticipated that stands would be developed in blocks of two to three stands at a time to meet the short term growth requirements.

Car parking for passengers and staff – strategic considerations

- 7.27 Planning Guidance on Transport²⁶ establishes the following principles with regard to the provision of car parking:
- *The provision of car parking should be considered as part of a package of planning and transport measures to promote sustainable transport choices;*
 - *Wasteful competition between different locations based around the supply or cost of parking should be avoided;*
 - *Car parking charges should be set to encourage the use of alternative modes of transport (to the car);*
 - *Airport operators should be partners (through Airport Transport Fora) in implementing surface transport initiatives to ensure that access to airports by public transport is enhanced.*

²⁶ PPG13 Transport.



- *Care should be taken to avoid perverse incentives for development; and*
- *Controls over public parking need to be backed up by adequate enforcement measures.*

7.28 In accordance with the policy requirement BIA has set up an Airport Transport Forum, with strategic partners responsible for highways and public transport, and prepared an Airport Surface Access Strategy. The strategy sets out short and long term targets for decreasing the proportion of journeys to the airport by car and increasing the proportion by public transport, for both air passengers and airport workers. BIA's original Airport Surface Access Strategy was published in 2000 as part of the Local Transport Plans of Bristol City Council and North Somerset Council.

7.29 A provisional updated surface access strategy for 2006 to 2011 was prepared to accompany the draft Master Plan. This has been reviewed following the receipt of comments from the consultation and revised proposals for surface access and car parking have been prepared in the context of an overall transport strategy. The objective of this review has been to deliver an integrated transport solution for BIA that:

- *Provides the best opportunities for the use of non-car modes of transport for journeys to the airport;*
- *Manages the impact of airport traffic on the highway network in the most effective way possible;*
- *Meets the demand for airport car parking in the most sustainable way;*
- *Minimises the loss of Green Belt land; and*
- *Provides an economic return on the investment in car park infrastructure.*

The work associated with surface access, public transport, car parking and highways impact is contained within the Transport Assessment to be published in conjunction with the Master Plan, further details of which are included in Chapter 9.

7.30 The Transport Assessment has reviewed the public transport provision, developed a more detailed public transport strategy and confirmed BIA's aim to significantly increase the use of public transport. These figures, together with forecasts in passenger, staff and contractor growth, and current car park space availability have been used to identify the actual car parking space requirements for the forecast growth in passenger numbers up to 9 million passengers per annum (mppa).

7.31 The conclusions of the Transport Assessment are reflected in the revised Airport Surface Access Strategy, which is included at Appendix A.

7.32 The work to prepare the public transport strategy has confirmed that the previously proposed target of 13% of passengers using public transport at 9mppa is ambitious and stretching, but nevertheless achievable. The anticipated split by journey mode for access to the airport has been recalculated based on the proposed public transport strategy using a route by route adjustment to current journey modes indicated by the 2003/04 CAA Passenger Survey. The current and proposed split by mode for journeys to the airport is set out in Table 9 opposite. These projections have been used to refine and develop the forecasts for car parking demand.

Table 9 – **Mode of transport to BIA, current and proposed**

Journey Mode	Proportion of Passengers	
	Current	9mppa (proposed)
Bristol International Flyer	5%	9%
Public bus	Included in above	4%
Other bus (e.g. travel agent buses)	2%	1%
Car dropped off	36%	32%
Short stay car park	2%	2%
Long stay car park	38%	35%
Hire car	5%	5%
Taxi	12%	12%

- 7.33 There is a delicate balance to be achieved with the provision of car parking. Experience shows us that high car parking charges can stimulate perverse behaviour, such as excessive use of drop-offs and pick-ups (which generate twice as many trips to the Airport compared with a car parked at the Airport), uncontrolled development of unauthorised off-airport car parks and anti-social parking in the neighbourhood around the airport. The Highway Capacity Study (see Chapter 9) has considered the relationship between highways impact and transport strategy with the conclusion that constraints on car parking could generate an increase in trips to the Airport. It would therefore be unwise to promote drop off and pick ups by limiting the supply of car parking, as this approach would have a more adverse environmental effect overall by contributing to traffic congestion and deteriorating air quality. This is particularly important in the light of the concerns generally expressed in the Master Plan consultation regarding the traffic impact of airport growth.
- 7.34 The Master Plan therefore needs to ensure that proposals are in place to accommodate the increased demand for car parking that will arise from airport growth. The Surface Access Strategy recognises that providing for unconstrained demand is not sustainable. A managed demand strategy is therefore proposed which recognises the various needs of the passengers within a context of promoting sustainable transport provision.

Current demand for car parking

- 7.35 The current BIA car parks are located in two areas. The long stay, short stay, business and car rental car park spaces are located to the north of the terminal building. A further long stay car park, known as the Silver Zone Car Park, is located to the south of the runway, used by passengers who pre-book their car parking.
- 7.36 The peak occupancy of the BIA long stay car parks (North Side and Silver Zone) has grown from just under 6000 cars in 2003 to around 10000 cars in 2006. There is some evidence that the proliferation of unauthorised off-airport car parks has served to stimulate the demand for car parking.
- 7.37 The main staff car parking is provided adjacent to the Administrative Building where 665 spaces are available. A number of terminal building staff also park in the main northside long stay car park.



Car park management

- 7.38 BIA follows the typical UK practice for the segmentation of its car park products. Car park spaces are currently made available on the following basis:

Table 10 – Current BIA car park products

Car Park Product	Customer Market	Duration of Stay	Location
Short stay (360 spaces)	Short stay drop off; Short/medium passenger stays (premium charged compared with long stay car parks).	1-2 hours; 12-48 hours	Close to terminal (100m walk)
Rapid pick up (171 spaces)	Passenger pick up (taxi, friend/ relative, courtesy minibuses)	< 2hours	Close to terminal (100m walk)
Navigator / Business (354 spaces)	Frequent/business travellers (discounted rates for members of the airport loyalty scheme).	>24 hours	Close to terminal (100m walk)
Long stay (3400 spaces)	Long stay car parking, flexible stay length, no advance booking, short transfer to terminal. Mainly non-leisure or short duration stays.	>24 hours, <4 days, but no restriction.	North side of airfield.
Silver Zone (4800 cars peak in 2005)	Pre-booked car park offering a discount on the gate price. Cars block parked by car park staff to maximise land use.	>4 days	South side of airfield

- 7.39 Car park tariffs are set with reference to:
- *Normal practice at UK airports;*
 - *The needs of customers;*
 - *The cost of alternative modes of transport, and alternative car park arrangements;*
 - *The need to provide a commercial return to BIA;*
 - *Convenience offered by car park product and relationship with the terminal building.*
- 7.40 The past development of unauthorised car parks has been linked to previous airport pricing policies. BIA has reacted to this by introducing Early Bird discount rates for customers who pre-book their car parking. The Early Bird rate of £29 for one week's car parking is now one of the cheapest car park offers at any UK airport. The discounted on airport pricing structure has acted to deter customers from using unauthorised sites on grounds of price. However

the situation remains very sensitive and only a small increase in price could reverse this trend. The car park pricing policy remains heavily influenced by the prices at off-site locations and the opportunity to use price to manage car park demand is limited. In the future it is envisaged that passengers will be encouraged to consider alternative modes of travel through modest price increases and the use of more sophisticated booking systems to control the number of spaces available at the cheapest price and optimise the use of the car parks. Draconian increases in price would serve to stimulate the adverse effects referred to in 7.33 above.

Future demand for car parking

- 7.41 The review of car parking has identified the opportunity to increase the number of long stay spaces on the north side of the airfield. The additional spaces will be within convenient walking distance of the terminal building and should be able to attract a premium to the tariff charged elsewhere. The review has therefore concluded that the following long stay car parking products could be offered in the future:

Table 11 – Potential long stay car park facilities

Car Park Product	Customer Market	Location Requirements
Long stay premium pre-book	All stay lengths, but main market likely to be high value mid-stay leisure/business/weekend (includes the current Navigator product).	Within 5 minutes walk of the Terminal Building.
Long stay gate	Main market business and leisure mid stay length. Prebook and pay on departure.	Within easy reach of the Terminal Building – 5 minutes coach transfer.
Prebook long stay	Mid to long stay leisure market.	Less location sensitive – with 15 minutes coach transfer.

- 7.42 The underlying demand for car parking has been estimated by extrapolating recent car park behaviour, passenger origins and purpose of visit. The resulting demand has then been adjusted to take account of the allocation of cars to car park product, seasonality by product and the reduction in demand from the future shift to public transport. The demand forecasts have also been adjusted to reflect the actual demand experienced in 2005 and 2006. The number of cars to be accommodated at 9mppa is therefore estimated to be as follows:

Long stay (all products)	15285
Short stay	700
Staff	1200 (reduced to take account of staff travel plan measures)
Car hire	650



Current estimates of future car parking requirements rely on a number of assumptions relating to factors that influence demand. These include factors such as passenger behaviour and travel patterns and the future of unauthorised off-airport car parks. Many of these issues are outside the direct control of BIA. The demand estimates should therefore be considered as a guide to demand rather than an absolute requirement. The projections may need to be adjusted up or down as a result of knowledge gained in the future. The land use allocation will therefore need to retain some flexibility to reflect these uncertainties. The land use requirements are also sensitive to how the car parks are managed. The allocation of spaces between block/valet and self parking, between north and south of the airfield and the utilisation of spaces at peak are important factors. The Master Plan has made reasonable assumptions in order to determine the land requirements for car parking. These assumptions will need to be regularly revisited based on operating experience and the land use allocations may need to be adjusted accordingly.

- 7.43 The Master Plan developments require a number of existing facilities to be relocated within the existing operational boundary. This will have a knock-on effect of displacing some car parking and this has been considered in the land use planning for car park expansion.

Sequential approach to car parking locations

- 7.44 In consultation with the Local Planning Authority, and to reflect the criteria established in Policy T12 of the Replacement Local Plan and the Inspector's Report, a sequential approach to assessing potential residual car parking locations and options has been undertaken to determine the optimum solution with respect to the proposed expansion of BIA (e.g. environmental effects, planning policy, legislation, viability and financial implications). The sequential approach considers land in the following order:

- *Operational land within the proposed Green Belt inset;*
- *Operational land outside of the Green Belt inset;*
- *Strategic Park and Ride locations;*
- *Sites with a contiguous boundary or non-operational land adjacent to BIA, and*
- *Sites in the vicinity of BIA.*

The aim of the sequential approach is to ensure that all potential development options are appraised before moving onto the next area of search in the sequence. The approach is aimed at ensuring that the maximum use is made of BIA's operational land, both inside and outside of the Green Belt, before looking at land outside of the existing boundary.

Potential locations for future airport car parking

- 7.45 Potential sites for car parking have been appraised on the basis of environmental criteria, of which access, visibility and landscape designation have been the main considerations. In this respect the following issues have been considered to be important:

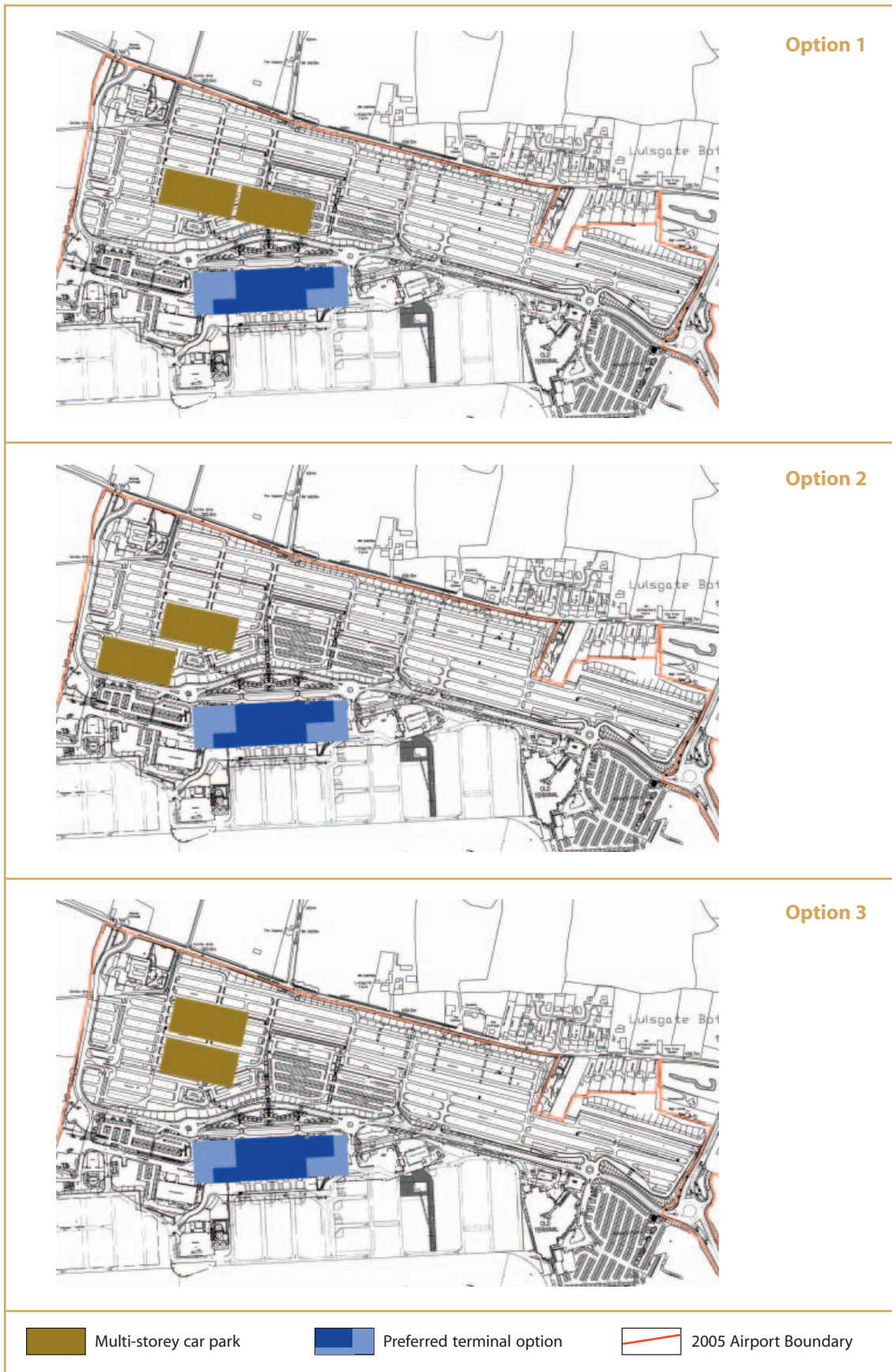
- *The effect of the development on the landscape and views, with particular reference to key viewpoints in the near vicinity of the Airport;*
 - *The effect of the development on views from the Mendip Hills Area of Outstanding Natural Beauty, and in particular from Black Down;*
 - *The relationship of development with existing airport buildings and the communities, such as Lulsgate Bottom, Downside and Downside Road; and*
 - *The impact of lighting.*
- 7.46 The car park site appraisal has also considered the Local Plan zoning and the impact on the Green Belt. Other considerations have included:
- *Operational viability and relationship with other airport land uses;*
 - *Deliverability; and*
 - *Financial viability.*

Sites and options within the existing airport boundary within the proposed Green Belt inset

- 7.47 In his report on the North Somerset Replacement Local Plan Inquiry, the Inspector recommended that the northern part of BIA should be excluded from the Green Belt. North Somerset Council in their proposed modifications to the plan have supported these conclusions. Development within this inset would therefore be appropriate development. A range of car parking options have been considered within this area including multi-storey, low level decking, and surface parking.
- 7.48 The draft Master Plan considered options for the development of multi-storey car parks. Complete redevelopment of the northside car park with structures of, say, four storeys high would have a significant effect on views of the Airport from the residential areas to the immediate north of the airport and will show up as an additional intrusive impact on the landscape. The car park appraisal confirms this view. However a certain amount of multi-storey car parking is considered possible in close proximity to the terminal building without causing undue adverse effects. Location options are illustrated in Drawing 6 – Multi-storey car park options.
- 7.49 The car park appraisal has given further consideration to the size of the multi-storey car parks. The original proposal was to accommodate 2000 spaces in two four storey car parks. Further design work has identified the opportunity to increase the capacity to around 2,360 spaces, without increasing the overall height of the structure. The preferred option locates these car parks immediately to the north of the terminal building grouping buildings together and maintaining a clear separation from the airport boundaries. The multi-storey car parks will accommodate the demand for short stay car parking with surplus space available for long stay use.
- 7.50 Low level decked car parking (i.e. a structure with ground and first floor parking) is proposed for the remaining area of the north side car parks, apart from a small area at the east and west ends where other land uses conflict with this approach.



Drawing 6 – Multi-storey car park options



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- 7.51 This approach significantly intensifies the density of car parking on the north side, adding more than 2,500 potential additional north side car parking spaces. The proposal will be financially viable provided customers will be willing to pay a long stay premium for the added convenience of parking in close proximity to the Terminal Building. The car park spaces created therefore will only be viable for long stay premium pre-book and long stay gate products. They will not be suitable for the pre-book long stay market. Furthermore the capital costs of these developments are considerable and their deliverability also depends on BIA being able to get access to the funding required for their construction. The market for a premium product is untested at Bristol and therefore the demand assessments carry some uncertainty. These matters will be kept under review as the Master Plan proposals are implemented.
- 7.52 The north side car park proposals are illustrated on the terminal area land use plan included as Drawing 11. Concerns related to visual impact and disturbance will be addressed through the use of green roofs and screens to the north elevation of the structures, designed using natural materials to blend into the landscape. These measures will ensure that the adverse visual effects of parked cars, the noise caused by car parking activities and light pollution will be minimised. The green roofs will enhance biodiversity, attenuate storm water flows and act to reduce pollution risks. They may also provide an opportunity for the installation of renewable energy generation such as photo-voltaic cells and small wind turbines. Overall the proposals represent a significant improvement on the current situation.

Sites and options within the airport boundary, within the Green Belt

- 7.53 Even with an intensification of car parking on the north side of the airport, there is still clearly a need to allocate additional land for car parking, particularly for the pre-book long stay product. Using the sequential approach the next option is to consider operational land within the airport boundary, outside the north side Green Belt inset. Operational constraints and other land use proposals restrict the opportunities for car parking to the area of the existing Silver Zone car park. Development of car parking in this area will generally be permitted development by virtue of the General Permitted Development Order. Consideration has been given to options for multi-storey, low level decking and surface parking.
- 7.54 The existing Silver Zone car park is very well contained and screened by existing vegetation and earth bunding on the boundary of the airport. Local near and middle distance views are curtailed but the car park is visible in long distance views from Black Down as a narrow strip of car parking on the southern edge of the airport. However the car park forms a minor component in the overall view. Multi-storey car parks in this area, however, would form a prominent feature to the south of the airport, even as a two storey structure. The structure would be visible from the A38 and from Winters Lane and the visual effects are likely to give rise to significant visual intrusion in local and middle distance views. It would also increase the perception of urbanisation and built form along the A38, encroaching into areas of open countryside between the Airport and Redhill. Increasing the number of car parking spaces in Silver Zone by decking or multi-storey car parking would be difficult to justify on economic grounds as the construction costs involved would require the car park to be charged at a premium. BIA'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 Silver Zone. Furthermore the development of structures in this area creates a conflict with the potential future development of a second terminal as identified in the Air Transport White Paper. The development of multi-storey car parks on the south side of the airfield is not, therefore, our preferred option.

- 7.55 The future capacity of the Silver Zone Car Park is affected by the need to relocate facilities, such as car rental and staff car parking from the north of the airport. Taking these developments into consideration Silver Zone cannot accommodate all the remaining demand for car parking leaving a residual demand for around 3000 pre-book long stay cars.
- 7.56 The redevelopment of the south side of the airfield will include the construction of sustainable urban drainage systems for all new surfaced areas of car parking and the development of new reception facilities for the Silver Zone Car Park.

Off site car park options

- 7.57 We have identified the following issues connected with the use of off airport car parks:
- *Land around BIA is either Green Belt or open countryside, and dispersed car parks in the countryside away from the Airport are likely to be more damaging to the Green Belt than car parks concentrated at BIA;*
 - *Satellite car parks tend to increase traffic movements through empty transfer vehicle movements unless they are developed on a large scale. We believe that at least 1000 car parking spaces would be needed to generate a solution that would have any overall benefit in terms of trip generation between the car park and the Airport. These movements would adversely affect the openness of the Green Belt and spread disturbance from airport activities;*
 - *Satellite car parks do not contribute to reduced congestion unless they are strategically located to reduce journeys through urban areas;*
 - *Off airport car parks are likely to increase passenger journey distances by diverting or extending trips;*
 - *There are few, if any, opportunities for off site car parks outside the Green Belt or open countryside; and*
 - *Car parking must be delivered within the context of the Airport Surface Access Strategy.*
- 7.58 The following options have been considered for off-site car parks:
- *Strategic park and ride sites - i.e. sites located on the primary road network which can serve to reduce congestion on primary roads and within urban areas; and*
 - *Sites in the vicinity of BIA.*
- 7.59 A number of potential areas have been considered as having potential as strategic long stay park and ride car parks for BIA. These include sites at Worle, Avonmouth, Ashton Vale, Bedminster Down and Whitchurch. The appraisal of these sites has identified the following concerns:
- *There is no land available at Worle for large scale car parking, although this site may have*

some potential as a transport interchange and staff travel hub;

- *Flood risk issues and land availability mean that there is no possibility of development of airport car parks at Avonmouth;*
- *Sites in Ashton Vale and Whitchurch are in the Green Belt;*
- *Sites in Ashton Vale and Whitchurch are on the urban fringe and close to residential properties;*
- *Access to the sites to the south of the Bristol conurbation is currently poor; and*
- *The financial assessment has shown that high transportation costs mean that these sites are not financially viable.*

7.60 Strategic long stay park and ride is therefore not our preferred option. In the long term the highway improvements identified in the GBSTS may mean that access difficulties will be overcome, in which case the situation can be reviewed in future revisions of the Master Plan.

7.61 The land surrounding BIA is typically rural and agricultural in character. This area has seen a number of car park sites operating without formal planning permission, which have been the subject of consequent enforcement action by North Somerset Council. Nine appeals against this enforcement action by car park operators have been dismissed by Planning Inspectors, primarily because it is inappropriate development in the Green Belt (PPG2). Based on the large number of refusals of planning applications for small scale airport car parking by private landowners, enforcement against many owners, and a planning inspector's decision not to overturn such refusals of permission at a recent inquiry, it is considered that parking in the Green Belt away from the boundary of BIA is inappropriate, and is highly likely to be refused if a planning application was submitted. Due to these reasons no sites in the vicinity of BIA are considered to be appropriate for inclusion in the Master Plan.

Sites contiguous with BIA, within the Green Belt

7.62 The final area of search in the sequence is to examine sites that have a contiguous boundary with BIA. Land to the north of the airport adjacent to the north side car park; to the south of the airport (as identified in the Draft Master Plan); and the south east of the airport have been identified as potential sites for car parking. Lulsgate Quarry has also been included in this category although this site is not directly contiguous with the BIA operational boundary, but it was mentioned as a potential car park location in the Draft Master Plan. All these sites fall within Green Belt, therefore when assessing the impact on the Green Belt, all sites have been given equal weight.

7.63 The balance of environmental and operational viability considerations used in the car park assessment indicated that the preferred option to be taken forward into the Master Plan is the land to the south of the Airport. The area of land required has been reassessed at up to 9 hectares - reduced from the 27 hectares proposed in the Draft Master Plan. This has been achieved as a result of the proposed densification of car park uses on the north side. In the first instance car parking will be required in the fields immediately adjacent to the Silver Zone Car Park.



- 7.64 The potential areas for expansion of car parking to the south of the existing Silver Zone Car Park are shown on Drawing 7. Approximately 2.5 hectares of the additional land required can be accommodated on land in airport ownership adjacent to the Silver Zone Car Park (known as Cornerpool Farm). The remaining 6.5 hectares would be located in the land indicated along side the BIA land. Approximately 37% of the land indicated would need to be developed based on the current projections. The precise distribution of development would be determined by land acquisition matters. Irrespective of which parcel of land is used development would be arranged to abut the southern boundary of the airport so that the effects on landscape, visual impact and biodiversity are minimised. A comprehensive nature conservation management plan would be implemented to enhance the biodiversity of the undeveloped part of the land. The aim would be to achieve a net improvement in biodiversity as a result of the development. The mitigation measures would include a number of improvements to the existing foraging areas of bats.

The land use plan for the development of the south side of the airfield is illustrated at Drawing 8.

Staff car parking

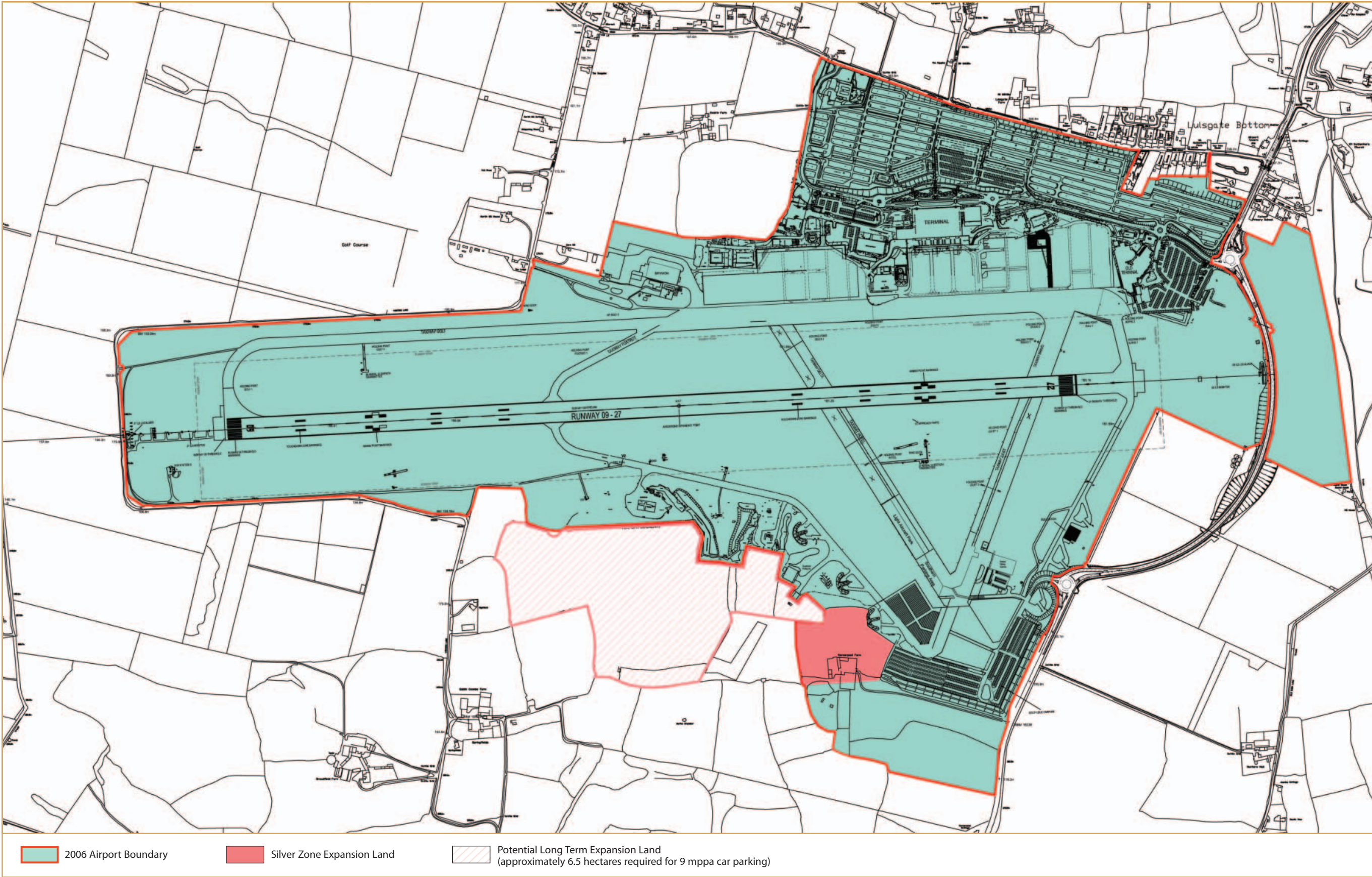
- 7.65 It is proposed that space be allocated for the majority of staff on the south side of the airfield, including the expansion land, with a small number of spaces remaining on the north side for key staff and car sharers. A total of 1200 spaces for staff use are forecast to be required at 9mppa, taking into account the initiatives identified in the Staff Travel Plan.

Car rental

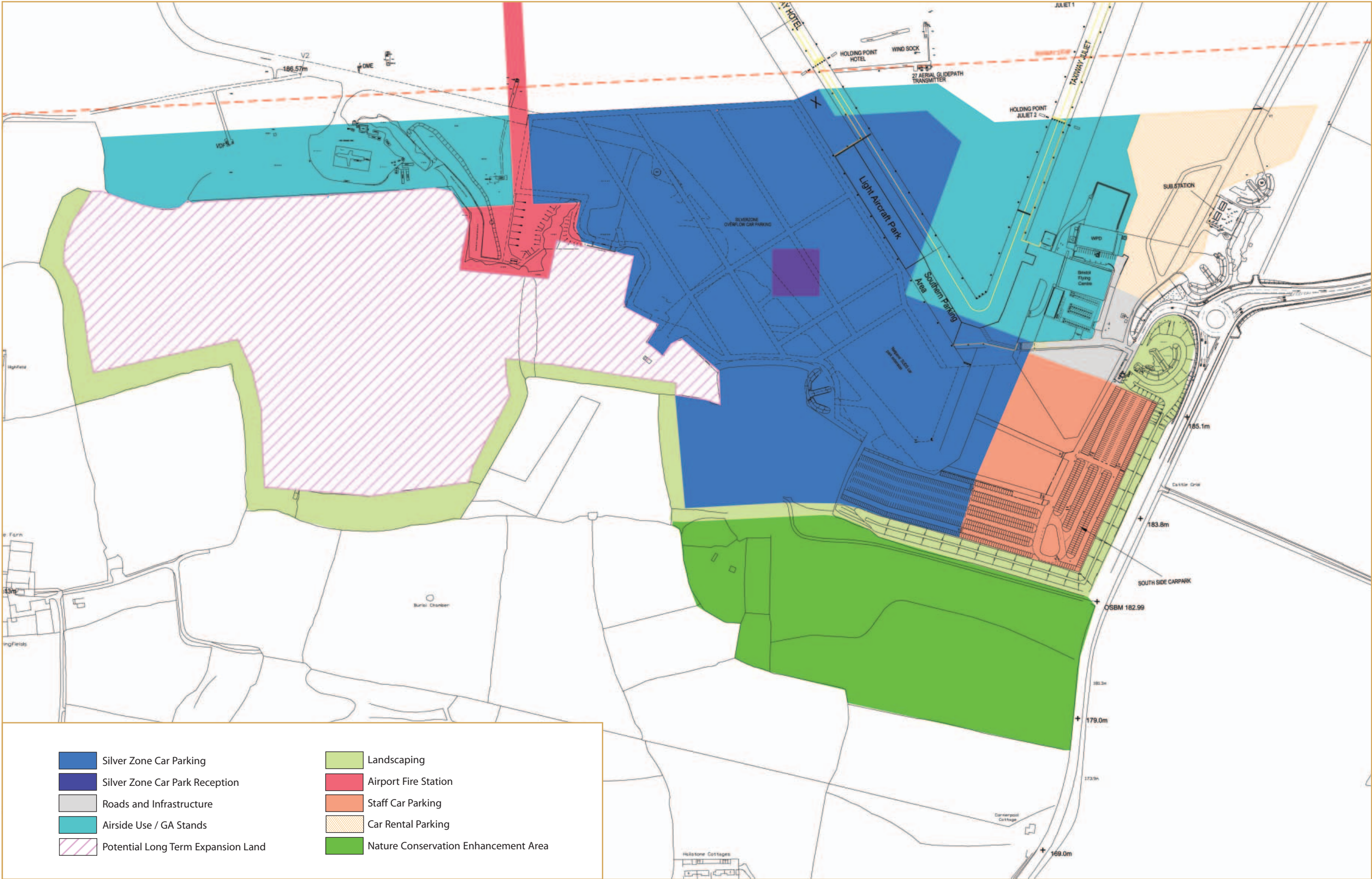
- 7.66 An estimated 5% of passengers make use of the car hire facilities at BIA and 340 car park spaces and a reception building are provided near the Terminal Building for this operation. Car valeting takes place at Stone Farm to Downside Road. To cater for future demand we estimate that around 650 car parking spaces need to be provided for car rental use. It is proposed that the car rental operation including the Stone Farm car valet facility be relocated to the south side of the airfield to share a defined section of the expanded Silver Zone Car Park. This would also require the relocation of the car rental company reception building.

Aviation fuel storage

- 7.67 The current aviation fuel storage depot was developed in the 1980s before the terminal building was constructed. The site is constrained by adjacent aircraft stands and other operational facilities and operations at this location cannot be sustained in the longer term.
- 7.68 Although the long term trend is for aircraft to become more fuel efficient, in the period of this Master Plan the demand for aviation fuel will grow with the rise in aircraft movements. An additional tank was added to the current fuel depot in 2004 and projections of growth indicate that further storage should be provided by 2009. The fuel depot is currently located



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close to the terminal building and some of the most utilised aircraft parking stands. Expansion can only be achieved at the expense of the adjacent aircraft stands and the preferred solution is to relocate the entire depot. This also provides an opportunity to improve the environmental protection of this key facility. The use of underground storage tanks is now an attractive option that provides enhanced environmental protection, whilst minimising visual impact and land take. Projections of the future demand for fuel storage have been provided by specialist consultants.

- 7.69 The factors that govern the selection of the best location for an airport fuel depot include:
- *Allocation of land for other airport uses;*
 - *Safety rules regarding the storage of fuel;*
 - *Relationship with aircraft parking apron;*
 - *Fuel supply method;*
 - *Delivery method to the aircraft;*
 - *Size of facilities needed; and*
 - *Visual impact of storage tanks.*
- 7.70 These requirements dictate that the relocated fuel depot must be located on the north side of the runway. The topography of the site and layout of aircraft stands limit the number of sites available and consideration has been given to a number of possible sites, both adjacent to and remote from the expanded aircraft apron. The latter would require a short length of pipeline to a fuel tanker loading point adjacent to the aircraft apron. Both underground and above ground storage options have been considered.
- 7.71 The current fuel storage depot has capacity for 1425 m³ of Jet A-1 aviation fuel. To meet future growth the relocated facility would be planned to accommodate three tanks of 1200 m³ capacity each. It is normal practice to include three tanks in such a facility for ease of operation. One tank is used for filling, one for settling and one in use. The footprint of the developed site would increase accordingly compared with the current facility.
- 7.72 Our preferred option is to develop underground storage tanks at the western end of the north side car park.
- 7.73 The alternative of constraining the supply of fuel would tend to give rise to aircraft carrying excess fuel to avoid refuelling at Bristol. This practice increases the aircraft fuel burn and has an inherent adverse environmental impact.
- 7.74 It is envisaged that fuel supplies will continue to be delivered by road for the foreseeable future. Options for connecting the airport to the national pipeline system will be considered as part of our planning for longer term growth.

Fire station

- 7.75 The Airport Fire Station accommodates the crew and equipment of the Airport Rescue and Fire Fighting Service (RFFS). The requirements to be met for the provision of these services



are laid down by the CAA. The level of protection provided is determined by the size of aircraft operating at the airport. This is known as the Aerodrome Rescue and Fire Fighting (RFF) Category. The BIA Rescue and Fire Fighting Service are licensed to RFF Category 7. This means that the RFFS provides protection based on operations by aircraft up to Boeing 757 size. The license allows for operations by aircraft of the next category (Category 8), by prior arrangement. This would typically include aircraft such as the Boeing 767. The additional manning that is required for the small number of Category 8 movements is currently provided through the use of overtime.

- 7.76 Movements by the larger aircraft will increase over the period of the Master Plan, although they will remain a small proportion of total aircraft movements. This increase will require the RFFS to have a full complement of crew available at all times commensurate with the Category 8 requirements.
- 7.77 The existing fire station was originally built in the 1980s and is in a deteriorating state of repair. It could not provide the facilities for Category 8 fire protection without a significant building extension. The building is located adjacent to a busy part of the passenger aircraft apron and further expansion the RFFS on the current site is undesirable. The current building also conflicts with the extension of the terminal building and the aircraft apron. We are therefore proposing to relocate the fire station.
- 7.78 The site of the fire station needs to be chosen so that the RFFS can meet required response times to the operational parts of the airfield. Sites to the west of the aircraft apron, both to the north and south of the runway have been considered. The south side option is preferred to avoid conflicts with other land uses on the north side. The new facility would need to be built to accommodate a full complement of Category 8 appliances and crews meaning that the building would be around twice the size of the current facility. The new site would need to safeguard a possible future requirement to upgrade to RFF Category 9.

Administration building

- 7.79 The old terminal building accommodates offices for airport administrative staff, airline crew report facilities and storage for airport businesses. The building is of variable construction quality, with parts dating back to 1957. It presents an unsatisfactory appearance to the airport entrance. Expansion of the aircraft apron in this area is proposed, which will require the demolition and replacement of the building.
- 7.80 A number of alternative sites have been considered for the replacement administrative and airline crew report building. The location of the building is dictated by the operational requirements of crew as they go through their flight briefing and reporting procedures. It is preferable to locate these facilities so that crew can pass efficiently through security and onwards to the aircraft without eroding their operational time. For this reason a site between the Terminal Building and the Control Tower has been identified as a potential location for the new building. It should be possible to arrange the accommodation in the new building more efficiently, reducing the building footprint required compared with the old terminal building. The need to restrict the height of the Terminal Building to limit its visual impact rules out any possibility of reducing the developed footprint by incorporating the administration and crew reporting facilities into the extended Terminal.

- 7.81 Possible sites for the relocated office building are shown on Drawing 9 – Office location options (overleaf). This shows options for a further office block in addition to the one described above that would be needed to meet longer term growth. It is proposed that land be allocated within the landside ancillary area to the west of the north side car park for this longer term expansion, should the need arise. The floor space requirement for the first phase office building is estimated to be of the order of 4,800 sq m. A three storey building is envisaged. In addition there will be a requirement to develop around 1500 sq m of warehouse space and a flight catering unit to replace other facilities currently located in the old terminal building also to be located in the landside ancillary area referred to above.

Road layout

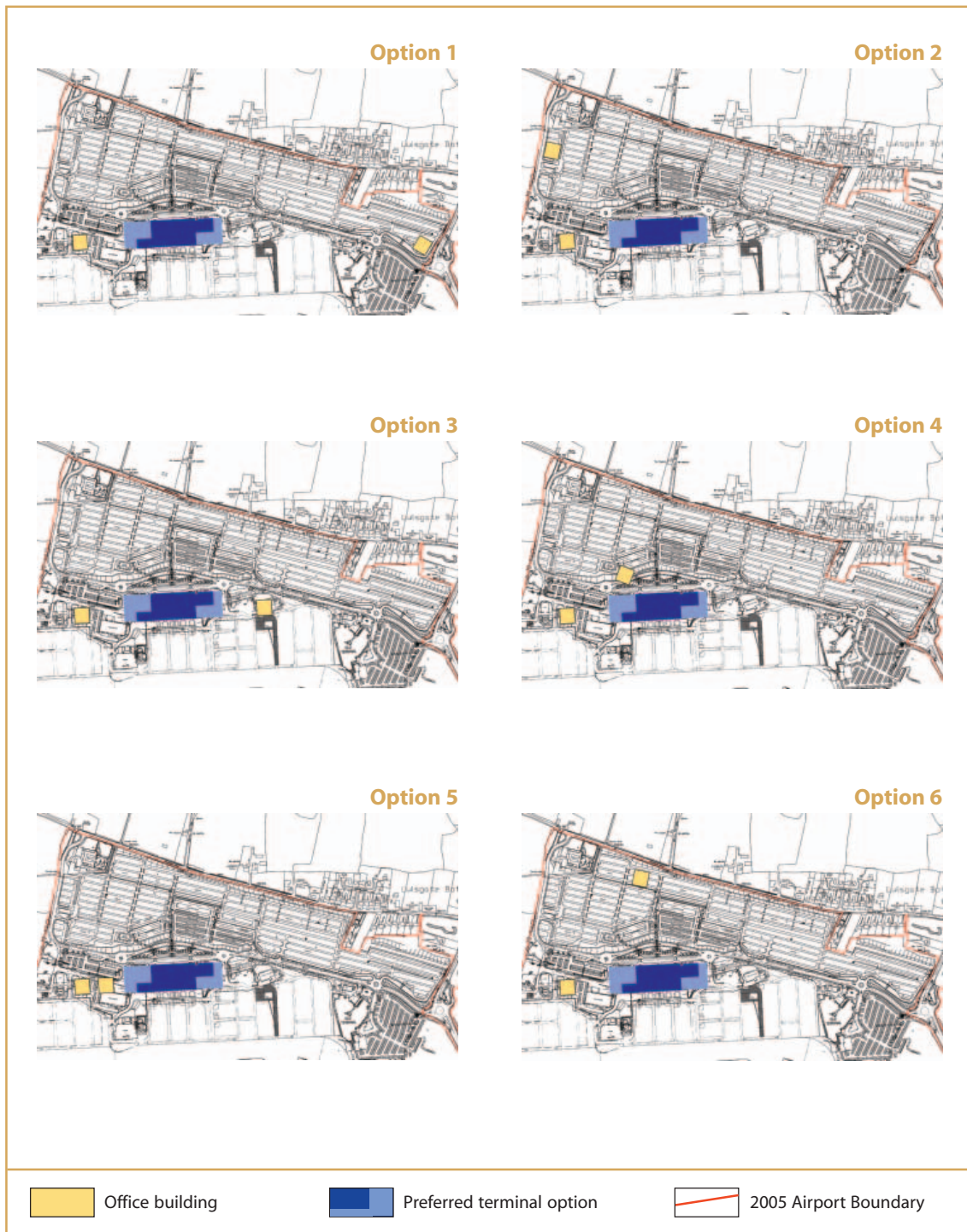
- 7.82 The proposals for the Master Plan facilities necessitate reconfiguration of the north side internal access road. Various alternative layouts have been considered and the proposed land use plan (Drawing 10) reflects the preferred option. The revised road layout will improve the facilities for passenger pick up and set down.

Runway and taxiway

- 7.83 The scheduled peak hourly movements at 9mppa are not expected to rise above 22. Actual movement rates might exceed the scheduled rate as a result of delays. An analysis of typical delay patterns shows that delays might create short term peaks up to three movements per hour greater than the scheduled peak. The theoretical runway capacity has been calculated using a probabilistic model of the relationship between delay and runway movement rate. This shows that the existing runway can accommodate at least 30 movements per hour without an undue effect on aircraft punctuality.
- 7.84 A similar model of delay on the taxiway shows that the taxiway system can also satisfactorily deliver a capacity of 30 movements per hour. However the schedule features a strong morning departure and bottlenecks can arise if several aircraft need push back clearance at the same time. The provision of additional holding areas at the runway joining points will be beneficial to give some flexibility in these situations. This is a particular issue at the east end of the runway where aircraft queuing on the taxiway can block access to and from the eastern aircraft stands. The Master Plan therefore proposes the development of an additional taxiway holding area in this location.
- 7.85 Our assessment of runway capacity shows that the addition of rapid exit taxiways is likely to be of little benefit. The length of the runway prevents such taxiways being provided in a location that would have a significant effect on runway occupancy time.
- 7.86 There is likely to be a need to add paved shoulders to the runway during the Master Plan period. BIA will review this requirement with the CAA on a regular basis and work will be programmed to fit in with scheduled runway closures for major maintenance.



Drawing 9 – Office location options



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Airport hotel

- 7.87 Bristol International Airport currently does not have an on-site hotel. Facilities for passengers wishing to stay overnight are provided in local guest houses with the nearest hotel being at least five kilometres from the airport. South Bristol has few hotels and generally the hotel provision in and around BIA is limited. Much of the demand is therefore taken up by city centre hotels. BIA research indicates that the city centre hotels are currently operating at average occupancy rates of around 70% with demand dominated by the corporate and leisure market. Air crew and airport staff requiring overnight accommodation currently need to use facilities remote from the airport.
- 7.88 The provision of an on-airport hotel is consistent with the general transport policy requirement to reduce the need to travel. An on-site hotel would offer the opportunity to provide passengers and staff with overnight accommodation, food and beverage, and business and leisure facilities without the need to leave the Airport. These facilities would complement the facilities available in the passenger terminal. Provision of such a facility is consistent with the expectation that the use of the hotel for passengers and air crew staying overnight, delayed flights, business meetings and conferences should be contained within the core airport facilities to limit off-site transportation needs.
- 7.89 A hotel needs to be considered as part of the package of facilities provided at medium to large airports. BIA is the largest of only three airports handling more than two million passengers per annum without an on-site hotel (the other two being Prestwick and Belfast City Airports). Hotels at regional airports generally operate at occupancies of between 75% and 85% indicating the strong demand from airport users for such facilities.
- 7.90 We have assessed the market demand and feasibility of providing an on-site hotel with the conclusion that there is demand from airport passengers and staff at BIA for a mid-market hotel with around 120 bedrooms, restaurant, bar, business centre and limited leisure facilities.
- 7.91 A number of sites within airport land have been considered for locating the hotel. The favoured location is immediately to the north of the terminal building, on land currently occupied by the short stay car park. This provides good connectivity with the terminal building with an opportunity for facilities to be made available to passengers and staff without the need for vehicular traffic.
- 7.92 The hotel also provides an opportunity for air passengers with early morning check in times to arrive the previous day using public transport. The provision of such a facility is therefore seen as part of the essential components of the airport, consistent with objectives to promote sustainable transport for journeys to the airport.

General Aviation

- 7.93 As noted in Chapter 5 General Aviation is not expected to place any further pressure on airport facilities in the Master Plan period. Commercial general aviation will therefore continue to operate from the existing facilities on the south side of the Airport.



Mail and freight

- 7.94 The Royal Mail operation has declined to just four movements a night, from a regular 16 movements a night prior to 2004. The operation also involves the delivery of mail to the Airport using up to 18 lorry movements per night. The current facilities comprise a sorting office and rest room facilities, aircraft parking and lorry parking.
- 7.95 The Master Plan seeks to retain the Royal Mail operation on the north side of the Airport. Relocation to the south side places additional pressure on airport land for car parking and this is no longer the preferred option.
- 7.96 The freight handling operation with Ward Aviation Support will be retained within the north side airside area.

Flight Catering

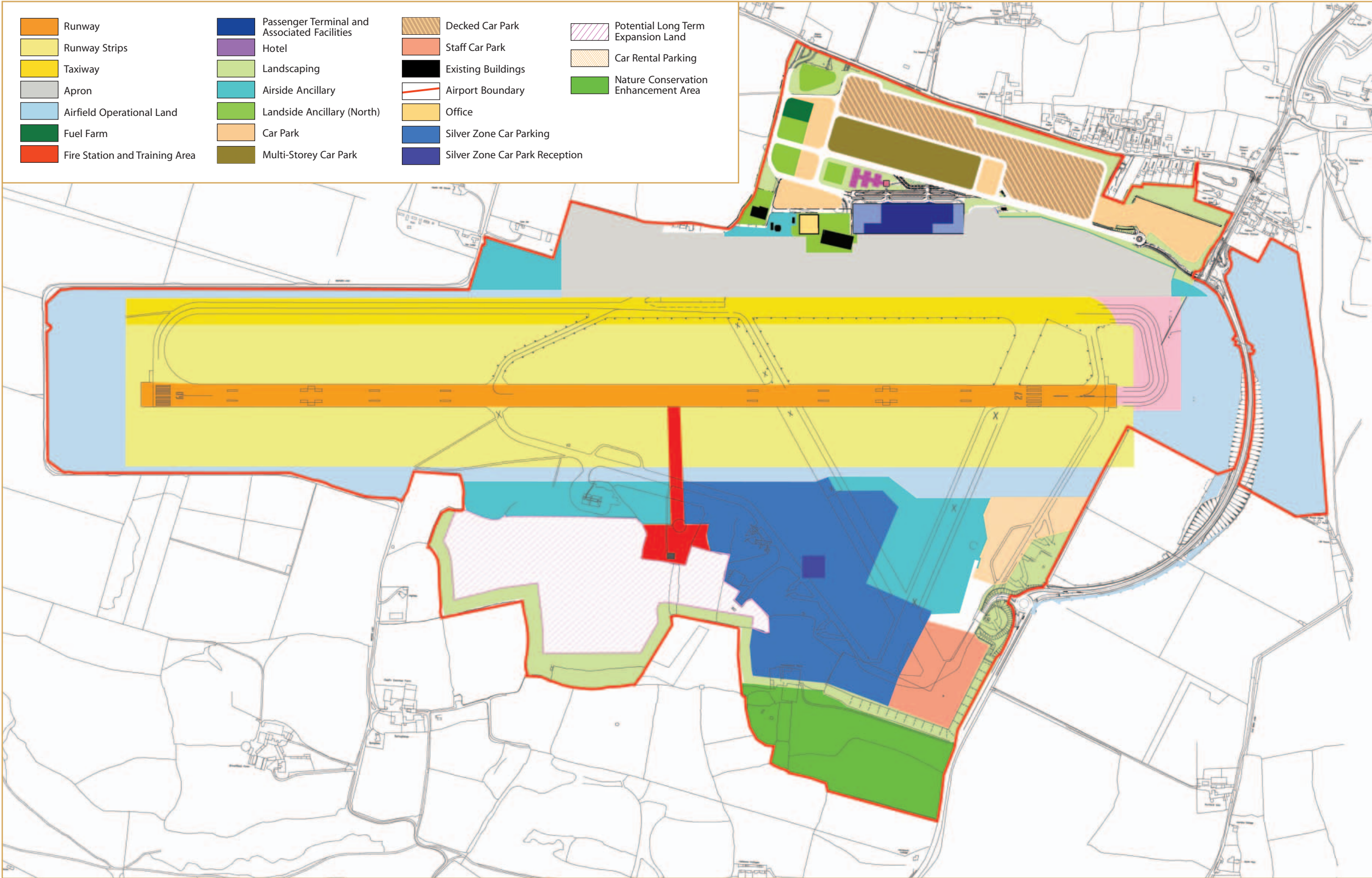
- 7.97 Currently there are two flight catering operators serving the airlines at BIA. Alpha is based in the Administration Building and their relocation has been considered in paragraph 7.78. Gate Gourmet is based in the main flight catering building located between the Terminal Building and the Control Tower. Although this is not in the ideal location it is not essential to relocate this building in order to extend the terminal building. In the longer term there may be a need to reconsider the future of flight catering in this location at which time consideration will need to be given to locating this facility off-site.

Airspace

- 7.98 The flight paths into BIA have been recently adjusted as part of a joint exercise with Cardiff Airport. This is concerned with extending the managed airspace operated by the two airports, introducing new noise preferential routes, and standard instrument departure and arrival routes. This has been the subject of a widespread separate consultation. Formal approval from the CAA has now been received and the new airspace management came into effect on 31 August 2006.

Land use plan

- 7.99 The proposed airport land use plan is shown on Drawing 10 – 9mppa Airport land use plan and Drawing 11 – Terminal area land use.





Timescales and milestones

- 7.100 The key milestone in the delivery of the Master Plan is the delivery of the extension to the Terminal Building. Our assessment is that the first phase of this development needs to be in place no later than 2009 and a planning application will be brought forward after completion of the Master Plan in 2006. A phased development is anticipated with the fully extended building being in place early in the next decade.
- 7.101 Expansion of the aircraft apron and car parks will take place incrementally according to the growth in passenger numbers. The fully extended north side apron is expected to be in place by around 2012. In order to develop the multi-storey car parks on the north side of the airport it will be necessary to displace the car hire operation from the north side car park to the south side. At this point the north and south side car parks are expected to be operating at full capacity so in order to facilitate the relocation, and consequent north side expansion it will be first necessary to develop an overflow car park on land immediately to the south of the airport. The north side multi-storey and decked car parks will then be developed progressively from 2009 onwards. There will be a need to continue to use the land to the south of the airport as an overflow car park whilst the north side car parks are redeveloped. In practice the use of the overflow car parking will therefore be permanent, although it is likely to remain empty during the winter.
- 7.102 The development of the new office building, fire station and the relocation of the fuel farm will take place around the end of this decade.
- 7.103 The need for an on-airport hotel exists now and a planning application will be prepared and submitted following completion of the Master Plan. This proposal will be brought forward in conjunction with a hotel operator.



Summary and key points

- Development requirements to 2015 have been assessed on the basis of 9mppa. Current airport capacity estimated to be 6mppa.
- Extensions to the existing terminal building and aircraft parking apron are proposed.
- Car parking proposals have been developed on the basis of a strategy to increase public transport use to 13% of passengers.
- An increased concentration of car parking is proposed on the north side of the airfield using multi-storey and decked car parks.
- Staff car parking and car rental will be displaced to the south side of airfield by terminal related development.
- Redevelopment of the Silver Zone car park is proposed. Limited expansion of car parking outside the airport boundary is required. BIA is committed to maximising the on-site car park provision.
- The fuel depot, fire station and administration building are to be relocated.
- A new taxiway hold area is proposed at the east end of the runway.
- A new on-site hotel for passengers and staff is proposed.
- No further changes to flight routings are required following implementation of the airspace changes in 2006.

Chapter 8

Environmental impacts and mitigation (2015)

8

8.1 A preliminary environmental appraisal of the proposed development has been undertaken by specialist consultants as part of the work to prepare this Master Plan. The purpose of this work has been to identify the scale of potential impact and mitigation measures across the major impact areas.

8.2 The environmental topics considered by the environmental appraisal of the Master Plan, are:

- *Air quality;*
- *Biodiversity;*
- *Community;*
- *Cultural Heritage;*
- *Geology and land quality;*
- *Landscape and visual environment;*
- *Noise;*
- *Transport; and*
- *Water*

The findings of the environmental appraisal are discussed below.

8.3 The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2000 require that for certain types of development under the Town and Country Planning Act 1990 an Environmental Impact Assessment (EIA) is to be undertaken before planning permission can be granted. The Environmental Impact Assessment will include an in depth analysis of the likely significant effects of the development and identify appropriate methods to avoid, reduce or mitigate such effects. Such work is beyond the scope of this Master Plan. The full EIA, the scope of which is set out in the Scoping Report, will be prepared to accompany the planning application or applications for development envisaged by this Master Plan. Other environmental work will be undertaken to satisfy the requirements of other relevant legislation, and associated consents.

8.4 The RASCO Study undertaken by the Government as part of the preparatory work for the Air Transport White Paper included an appraisal of the policy scenarios based on the five core objectives for transport of:

- *Safety;*
- *Economy;*



- *Environment;*
- *Accessibility; and*
- *Integration.*

Air quality

- 8.5 The RASCO study undertook a screening analysis to identify airports that might exceed air quality objectives in either 2015 or 2030. Those airports for which the initial screening suggested the possibility of air quality exceedences were subject to further analysis. This work concluded that the level of impact at Bristol was minimal and there was no need for the further analysis in this case.
- 8.6 The Environmental Appraisal concluded that further work would be required before it could be established whether any effect on air quality from airport growth will be significant. In view of this and the significant interest shown from the first stage consultation, a detailed study of air quality matters including dispersion modelling, has therefore been undertaken as part of the Master Plan work.
- 8.7 The detailed air quality study has assessed the local air quality impacts of activities at Bristol International Airport by estimation of emissions of key pollutants to the atmosphere and then modelling the dispersion of these pollutants to estimate the resultant ground level pollutant concentrations. Emission inventories for Bristol International Airport have been constructed for the years 2004 and 2020.
- 8.8 The pollutant emissions estimated in this study were oxides of nitrogen (NO_x), carbon monoxide (CO), non-methane volatile organic compounds or hydrocarbons (HC's) as they are commonly known, sulphur dioxide (SO₂) and particulate matter (PM₁₀). Emissions were calculated from aircraft related activities including auxiliary power units (APU's), engine testing and fuelling operations, from ground support equipment and airside vehicles, and from airport access roads.
- 8.9 Aircraft represent the single largest source of emissions of NO_x, CO, HC's and PM₁₀ at the airport. There were no major sources of SO₂ at the airport, with emissions from aircraft being low. The breakdown of emissions for 2004 and 2020 is given in Table 12.
- 8.10 Dispersion modelling has been undertaken to estimate the ground level contributions from the airport and the total ground level concentrations in the vicinity of the airport. For the dispersion modelling, the key pollutants nitrogen dioxide (NO₂) and particulate matter (PM₁₀) have been modelled. These two pollutants are the most significant in terms of ambient concentrations as exceedences of the health-based air quality standards related to these pollutants are observed at a number of locations in the UK.

Table 12 – Summary of Airport Emission Sources (tonnes per annum)

Year	Emissions	NO _x	CO	HC	PM ₁₀	SO ₂
2004	Aircraft and APUs	79.910	209.150	39.470	1.380	3.690
	Fuel Farm	–	–	0.071	–	–
	GSE	11.730	18.320	6.390	0.830	1.890
	Access roads and car parks	1.534	2.643	0.324	0.004	–
	Total	93.174	230.113	46.255	2.214	5.580
2020	Aircraft and APUs	133.730	194.650	74.150	2.500	6.260
	Fuel Farm	–	–	0.144	–	–
	GSE	18.490	28.870	10.070	1.310	2.980
	Access roads and car parks	2.648	2.871	0.290	0.009	–
	Total	152.220	226.168	87.235	4.100	9.249

8.11 The highest concentrations of pollutants tend to occur close to the runway, aprons and road network, which is to be expected as these are the locations of the highest sources of emissions. All estimated air pollution concentrations indicate that there are no expected exceedences of air quality standards within the local area for 2004 for nitrogen dioxide or particulate matter. However, for 2020, exceedences of the annual average nitrogen dioxide standard are predicted for a small area within the Airport boundary at the edge of the eastern aircraft apron. Levels of nitrogen dioxide are predicted to be well below the annual average standard outside the Airport perimeter.

8.12 The Master Plan research shows that the air quality at BIA will continue to meet the standards laid down by Government in the National Air Quality Objectives. The air quality assessment will be further developed to meet the full requirements of Environmental Impact Assessment for forthcoming planning applications. This will include consideration of the effects of pollutants on the natural environment. BIA currently undertakes regular monitoring of nitrogen dioxide concentrations at the Airport. This monitoring will continue and the level of monitoring will be kept under regular review.

8.13 In light of the above it is anticipated that the community effects on air quality can be mitigated by:

- *Adopting airfield layout, scheduling and operating protocols designed and operated to minimise idling and taxi times. The proposed additional hold area at the east of the runway reflects this approach;*
- *Reducing the use of aircraft auxiliary power units through the use of fixed ground power and mobile ground power units;*
- *Siting junctions and intersections away from sensitive receptors;*
- *Designing traffic management schemes to achieve free flow traffic conditions;*
- *Achieving improvements to public transport connections and use, to reduce private car use;*
- *Designing roads and car parks to minimise congestion;*



- *Reducing emissions from ground support equipment, including the use of alternative fuels and technology (the airport vehicle fleet has recently been converted to biodiesel);*
- *Operating a dust management plan for construction operations;*

Biodiversity

- 8.14 BIA is located on a flat plateau and is dominated by buildings, car parks, areas of hard standing (runway, taxiway and apron), other airport infrastructure, areas of grassland and small areas of scrub. The surrounding landscape is more complex and supports a high concentration of sites of designated value. A number of Sites of Special Scientific Interest (SSSI) are located near the airport. Two of these sites are also a component of the North Somerset and Mendip Bats Special Area of Conservation (SAC) due to their populations of greater and lesser horseshoe bats. A further 19 non-statutorily designated sites, known as Wildlife Sites are located within two kilometres of the airport, including Felton Common, which is also designated as a Local Nature Reserve.
- 8.15 A number of legally protected species, including great crested newts, greater and lesser horseshoe bats, other species of bat, badgers, dormice and slow worms have been recorded within a two kilometre radius of BIA.
- 8.16 BIA operates a Nature Conservation Management Plan, the aim of which is to safeguard the wildlife and nature conservation value of the land in its stewardship. Further wildlife surveys are being undertaken as part of the Environmental Impact Assessment of the proposed development. It is anticipated that through careful design, and by adoption of a mitigation strategy based on tried and tested techniques, effects on legally protected species, and other conservation notable habitats and species can be minimised and disturbance to the SAC can be avoided. The Environmental Appraisal identifies that the opportunity exists to create new habitats and enhance existing habitats as part of the proposed development. The land to the south of the Silver Zone Car Park will be the focus of a number of nature conservation initiatives aimed at enhancing the biodiversity of the airport estate. In particular the Environmental Appraisal has identified a number of opportunities for improving the areas to the south of the airport that are used for foraging by bats, which would be undertaken in conjunction with the car park expansion proposals. The aim would be to achieve a net improvement in conditions for the bats. Similarly the proposal to include green roofs in the north side car park development will achieve positive biodiversity benefits.

Community

- 8.17 Consideration of a number of potential effects on local communities (i.e. arising from changes in air quality, landscape and visual environment, noise and transport) are dealt with in other sections of this chapter. Potential socio-economic effects, including effects on employment, tourism, trade and investment and recreation have been considered in Chapter 5. The effects on health have been a consideration in the Sustainability Appraisal and future planning applications will be accompanied by a health study.

- 8.18 The EIA will consider these community effects further, including the overall effect from the growth of the Airport and its increased patronage on the rural characteristics and amenities of the area local to BIA. This will include a rural character study which will consider the effect of increased patronage upon the rural area, its tranquillity and the character of surrounding villages.

Cultural heritage

- 8.19 The implications of future development for cultural heritage have been evaluated as part of the environmental appraisal of the Master Plan. The available baseline information has identified the following features or areas of interest:

Prehistoric features

The airport lies within an area known for its prehistoric activity in particular, with artefact finds dating from the Mesolithic period onwards identified in the Sites and Monuments Record. There has previously been some archaeological investigation in advance of earlier developments.

Lead extraction

To the south of the airport, south east of Cornerpool Farm, there is an area of former lead extraction, manifested by small depressions surrounded by regular earthworks, locally known as 'Gruffy Ground'. It is likely that these are the remains of early post Medieval lead mining activity.

Lulsgate Airfield

The modern airport and runway occupy the site of the former Lulsgate Airfield, which was in use during World War II and abandoned in 1946. Little of the original infrastructure survives, although some features are of historical interest. Perhaps the most important of these are the remains of six aircraft dispersal pens, which are arranged in two groups of three to the south west and south east of the airfield.

- 8.20 The development is unlikely to pose any threat to features identified within the airport but the remains of the World War II features are of interest. The following further work and mitigation is proposed:

- *Further desk based work to determine the scope and timing of any investigative field work into prehistoric remains required. There is no current evidence that any remains exist that would be sufficiently important to warrant their preservation in situ.*
- *The 'Gruffy Ground' remains are of local importance and it is anticipated that there is the potential to minimise disturbance or loss of these features. Further consultation of documentary sources will be undertaken as part of the EIA and the exact nature of mitigation or compensation required will be agreed with North Somerset Council.*
- *Features relating to the World War II airfield of RAF Lulsgate Bottom are of historic interest and may be directly affected by development. Any direct effects will be determined as the development details are finalised and a scheme for mitigation and/or compensation of identified effects will be developed in consultation with North Somerset Council.*



Geology and land quality

- 8.21 The Environmental Appraisal has undertaken a qualitative assessment of the potential human health and environmental risks through potentially contaminative land uses or potential sources of contamination in the vicinity of the airport and proposed development areas. This work has concluded that the environmental changes and risks in respect of geology and land quality are not expected to result in significant effects after the adoption of standard pollution prevention measures, and best practice methods of working.

Landscape and visual

- 8.22 BIA is located within a group of landscape types described as a settled limestone plateau. A Landscape Character Assessment prepared by consultants for North Somerset Council has suggested a strategy of conserving existing positive features (such as blocks of woodland) and enhancing the rural and pastoral nature of the area by improving hedgerows and careful design and management of airport infrastructure. Policies within the North Somerset Local Plan generally seek to improve and enhance the landscape and reduce the harm of any development on the landscape surrounding BIA.
- 8.23 There are numerous short and middle distance views towards the Airport from the immediate surrounding area, mainly to the north and east and to a lesser extent from the west and south. However long distance views are also available from the Mendip Hills Area of Outstanding Natural Beauty (AONB) at Black Down, 7km to the south. The control tower and general aviation hangar are particularly visible from this vantage point but the terminal building and the car parks form a minor component in the view.
- 8.24 The Environmental Appraisal has highlighted the need to ensure that detailed designs respect mature vegetation and that proposals are accompanied by effective landscape designs and a management plan to avoid increased dominance of airport infrastructure in the wider landscape.
- 8.25 In terms of visual effects the appraisal has identified the need to design the proposed infrastructure sensitively to reduce visual impact and to include an effective landscape scheme to screen and soften any major structures. This factor will form an essential part of the evaluation of alternative designs and selection of preferred options. In sensitive areas design options are available which can be considered if visual impact results in a significant impact. For example the aviation fuel storage depot is proposed to be constructed with below ground tanks; multi storey car parks will be constrained by height and the north side decked car parks will be provided with green roofs where appropriate. The Environmental Appraisal has identified areas in Cornerpool Farm where car parks are unlikely to be able to be effectively screened through landscape schemes and these areas would be dedicated to uses such as nature conservation enhancement.
- 8.26 In view of the importance of visual impact to the appraisal of development options and the general interest shown in this aspect in the stage one consultation, a preliminary landscape and visual impact appraisal of the key components of the proposed development has been undertaken. This work has been undertaken at a broad level. The objective of the appraisal has been to identify the locations of each component that would potentially result in

'acceptable' levels of impact on landscape and visual grounds and those locations that would give rise to landscape and visual objections. Those options that would give rise to objections would therefore be 'unacceptable' and should be avoided unless other issues outweigh the landscape harm. By its very nature the assessment includes an element of subjectivity. However this value assessment has been informed by preliminary computer models to illustrate the likely visual effects from selected viewpoints.

- 8.27 The following key issues are considered important when assessing the location of the components of the Master Plan:
- *Impact of development on the ridgeline and consolidating the perception of development close to the terminal rather than creating isolated developments to the east or west;*
 - *Impact of development in close proximity to the A38 and the perception of encroachment of built development northwards towards Lulsgate Bottom, Downside Road and Downside;*
 - *The impact of development in close proximity to Stone Farm (a listed building) and the impact on its setting;*
 - *The perception of likely impact of development on the openness of the Green Belt within BIA and from the surrounding area; and*
 - *The impact of increased lighting within the airport and the potential adverse impacts that could be generated by additional lighting associated with the proposed development.*
- 8.28 Views to the south from Downside Road and the public footpath to the east of the Oatfield Estate and the view to the west from the A38 near the airport entrance have been considered.
- 8.29 This approach has been used to assess the options for the administration building, multi-storey car park, hotel, terminal building, fire station and car parks. The preferred options identified in the proposed land use plan result in moderate or lesser visual impact. In respect of the possible redevelopment of the Silver Zone Car Park as a two level multi-storey car park the assessment concludes that this would have substantial and detrimental visual effects with some adverse landscape effects and should be avoided unless other material considerations outweigh the landscape harm. For further discussion of visual impacts in the context of car parking see Chapter 7.

The landscape strategy plan will include:

- *Enhancement of the existing planting scheme to the north side of the airport;*
- *Green roofs to sensitive areas of the proposed two-storey car park;*
- *A lightweight roof structure to the multi-storey car parks to reduce light pollution;*
- *A planting scheme for the north side acoustic barrier;*
- *A planting scheme to create a new southern boundary to the airport, extending the existing Silver Zone buffer mound.*
- *A reassessment of existing lighting and the replacement of existing lights with dark skies compliant lighting where possible; and*
- *All new lighting will be designed to reduce glare and light spill in line with dark skies guidance.*



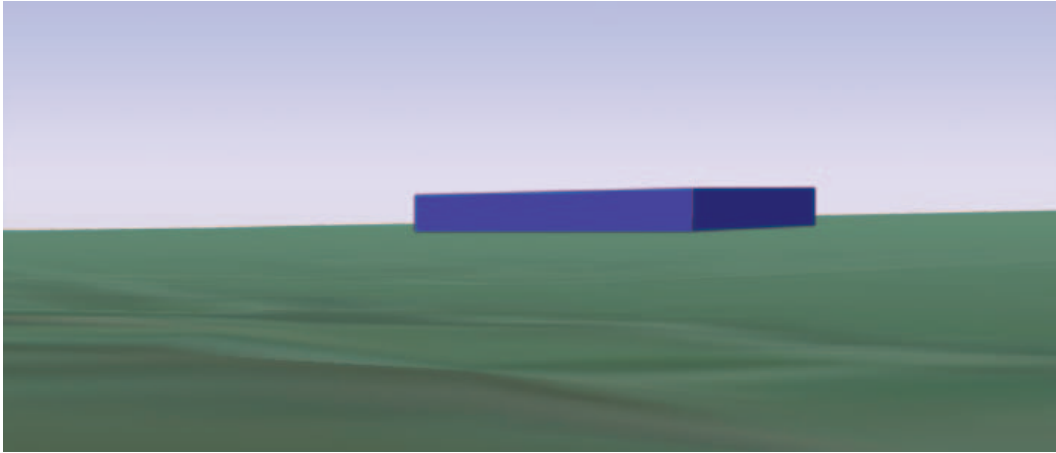
- 8.30 An indicative visualisation of the impact of the development of the terminal area is provided in Drawing 12. BIA is committed to developing well designed high quality facilities that sit well within the landscape. Buildings will respect the height restrictions and principles established for the existing Terminal Building.
- 8.31 Many consultees expressed concern about light pollution from the Airport. The Environmental Impact Assessment will include a light pollution study and where possible facilities will be designed to minimise its impact. In respect of proposals for car parking to the south of the runway the car parks will be managed to maximise the use of block parking which require reduced levels of lighting. The use of green roofs in the north side car parks will eliminate much of the light pollution in this area.

Noise

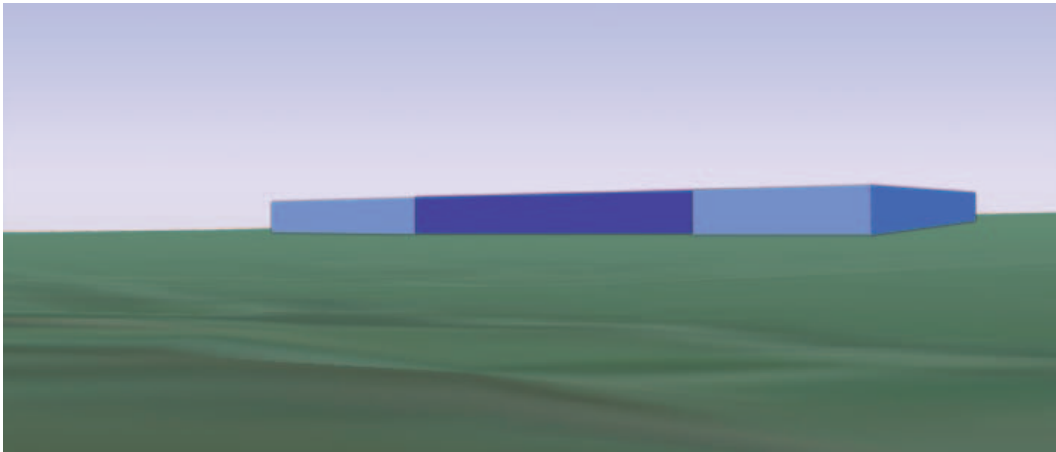
- 8.32 Noise from the airport can be considered as four different categories comprising:
- *Construction noise;*
 - *Airborne noise;*
 - *Ground operations noise; and*
 - *Road traffic noise.*
- 8.33 Construction noise will be assessed once detailed designs are complete. Past experience would suggest that this impact can be managed through the adoption of suitable noise minimisation procedures.
- 8.34 The Air Transport White Paper refers to the balanced approach to the management and control of noise at airports agreed at the International Civil Aviation Organisation (ICAO) Assembly in 2001. Elements of this framework are now reflected in UK law by the Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003. The balanced approach to controlling noise has four elements:
- *Reducing noise at source;*
 - *Land-use planning and management;*
 - *Noise abatement operation procedures; and*
 - *Operating restrictions.*
- 8.35 The ICAO approach to reducing aircraft noise at source has been related to the development of stricter noise certification standards. The initial standards were included in Chapter 2 of Annex 16 to the Convention on Civil Aviation. Aircraft such as the Boeing 737-200 (unmodified), BAC 1-11, and Douglas DC-8 are examples of aircraft that meet the Chapter 2 standard. All such aircraft have now been modified or withdrawn from UK operation and no Chapter 2 aircraft have operated from BIA since 2002.
- 8.36 Stricter Chapter 3 standards now apply and from January 2006 a new Chapter 4 noise standard for new aircraft has taken effect²⁷. The UK Government committed, in the Air

²⁷ The Chapter 4 standard applies to all newly certified aircraft after 1 January 2006. There is no definitive data for compliance of aircraft manufactured before this date. However we estimate that around 70% of the aircraft operating at BIA in 2006 would meet the Chapter 4 standard.

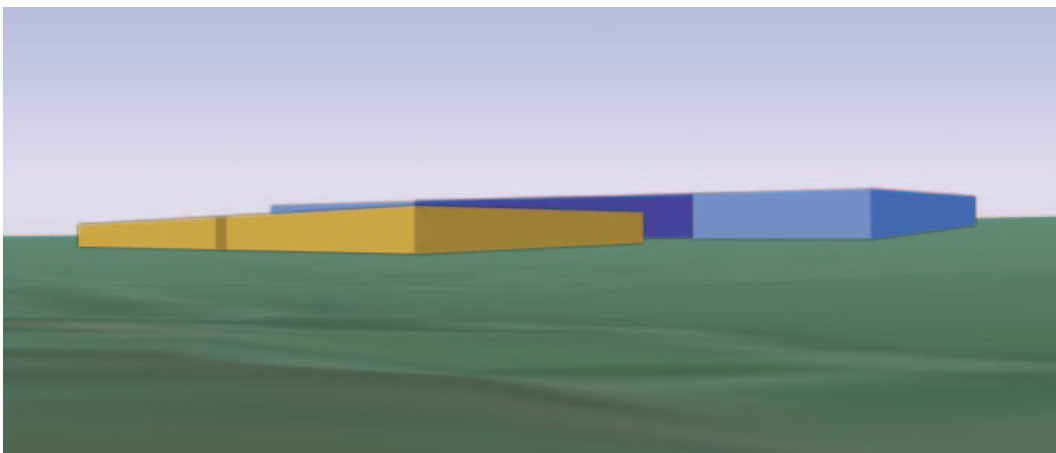
Drawing 12 – 3D massing study



Indicative 3D computer model representing the existing terminal building's height, when viewed from an elevation equivalent to the Downside Road



As above, with the addition of new terminal extensions



As above, with the addition of a new multi-storey car park building, constrained in height so that it is visually no higher than the terminal building – thereby minimising its potential visual impact

Transport White Paper, to continue to press for even better performance standards in the future. BIA is committed to achieving continual improvements in the noise climate at the airport through the introduction of quieter aircraft. In particular, the Boeing 737-200, operated by Ryanair which was the subject of many complaints from local residents was replaced by the quieter Boeing 737-800 at the end of 2005. Ryanair's aircraft are now amongst the most modern and fuel efficient operating at BIA. BIA will continue to work with its airline partners, to make clear their long term need to recognise the needs of the community around the airport if they are to expand their operations. BIA will ensure that high end Chapter 3 aircraft, such as the Boeing 737-200, are not scheduled to operate from 2008 onwards.

- 8.37 An objective of land-use planning and management is to ensure that inappropriately located development is discouraged or prohibited around airports. Planning Policy Guidance Note 24 (Planning and Noise) sets the appropriate standards for noise-sensitive development. The methodology used to assess the effect of aircraft noise on development involves the preparation of noise contours.
- 8.38 Detailed noise modelling has been undertaken as part of the Master Plan to assess the effects of increased airborne noise during the day as a result of an increase in air traffic movements.
- 8.39 In order to review the current and future noise impact of aircraft at BIA the aircraft movements on a typical 16 hour summer day (07:00 to 23:00) has been used in accordance with the current convention in the UK. The typical summer day is taken to be the average of the aircraft movements over the 92 day period from 16 June to 15 September. Historic noise contours have been determined using actual aircraft movements recorded on the BIA database for the index period. The database records the aircraft types and movements to which routings have been assigned according to destination. A typical 65/35 modal split for runways 27 and 09 has been assumed. The Master Plan includes contours for 2004, which was the latest available data at the time of going to press. The Environmental Statement, under preparation for the forthcoming planning application, will include contours for 2005. The Environmental Statement will also explore the sensitivity of the contours to assumptions regarding future runway modal splits.
- 8.40 Future noise impact has been assessed by reference to an indicative summer weekly schedule representing 6 and 9 million passengers per annum.
- 8.41 The Federal Aviation Administration computer modelling software Integrated Noise Model v6.1b has been used to produce the LAeq:16hour daytime noise contours. This is consistent with the approach suggested in the DEFRA consultation on the assessment and management of environmental noise associated with the implementation of the Environmental Noise Directive²⁸. The contours are reproduced at Appendix C.
- 8.42 The analysis of the contours focuses on the 57dBA Leq contour which in planning policy terms is recognised as marking the approximate onset of significant community annoyance. This reflects the World Health Organisation health based standard of 55dBA. The noise

²⁸ Consultation on proposals for transposition and implementation of Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise.

contours for 9 million passengers per annum (mppa) show that the 57dBA contour changes shape to become longer and thinner. This shows a predicted small increase in noise in areas at the ends of the runway and a reduction in noise to the north and south of the runway. The areas of the noise contours is given in Table 13 below. It can be seen that the area of the footprint for each decibel level decreases between 2004 and 6mppa. Even though the figures increase between 6mppa and 9mppa, the overall footprint is never greater than that experienced in 2004.

Table 13 – Noise contour area calculations

Noise contour dBa	4.8 mppa – 2004 Km ²	6 mppa Km ²	9 mppa Km ²
54 to 57	21.20	15.79	20.08
57 to 60	13.15	9.78	12.53
60 to 63	8.11	5.69	7.55
63 to 66	4.94	3.09	4.18
66 to 69	2.71	1.65	2.22
69 to 72	1.46	0.96	1.24
72 and higher	0.89	0.62	0.77

- 8.43 The number of households within each decibel band has been determined from Ordnance Survey mapping and is as follows for 2004 and 9mppa:

Table 14 – Household numbers within decibel bands

dBa Levels	2004	9mppa
57 to 60	220	247
60 to 63	165	147
63 to 66	73	41
66 to 69	4	4
69 to 72	0	0
Total inside 57dBA	462	439

- 8.44 The Air Transport White Paper noted that the number of people living within the 57dBA noise contour in 1999 was only about 1,000 and only a very small increase in this number was expected by 2015, even at the higher end of growth forecasts. The noise modelling undertaken by BIA confirms this conclusion.
- 8.45 BIA continually monitors aircraft noise using monitors at each end of the runway, near Felton and Congresbury. In response to a number of queries from the local community about the computer predictions of noise levels the noise monitoring has been extended to include measurements recorded by portable monitors located at a number of locations in the vicinity of the airport for a week in February and August 2005. The results of the noise monitoring show that the measured L_{Aeq} values agree closely with the predicted noise levels



from the 2004 contours. At present the noise monitors are arranged to record noise from arriving and departing aircraft on runway 27 according to standard aircraft noise monitoring procedures. It is proposed that the monitoring will be extended to include runway 09 departures and arrivals.

- 8.46 The noise modelling work shows that no households are currently exposed to high levels of noise (69dBA Leq). The contours for 9 mppa suggest that this situation is likely to remain until at least 2015. The increase in noise in these locations is also predicted to be less than 3dBA Leq.
- 8.47 The Air Transport White Paper outlines measures to be applied as a benchmark for mitigating aircraft noise. These are as follows:

'...with immediate effect, we expect the relevant airport operators to:

- offer households subject to high levels of noise (69dBA Leq or more) assistance with the costs of relocating; and
- offer acoustic insulation (applied to residential properties) to other noise-sensitive building, such as schools and hospitals, exposed to medium to high levels of noise (63dBA Leq or more).'

'To address the impacts of future airport growth we expect the relevant airport operators to:

- offer to purchase those properties suffering from both a high level of noise (69dBA Leq or more) and a large increase in noise (3dBA Leq or more); and
- offer acoustic insulation to any residential property which suffers from both a medium to high level of noise (63dBA Leq or more) and a large increase in noise (3dBA Leq or more).'

- 8.48 In the Air Transport White Paper the Government places conditions on its support of development at Bristol International Airport based on a voluntary purchase scheme for any properties that would be adversely affected (by noise – see mitigation measures above) and the replacement of common land (see Air Transport White Paper paragraphs 10.11 and 10.12). The latter condition refers to the White Paper proposal for a runway extension. We are not bringing forward proposals for a runway extension as part of this Master Plan (see also Chapter 12), so this condition does not apply. The preliminary noise modelling also indicates that the condition relating to house purchase does not currently apply. BIA will be implementing the noise mapping proposals in the Air Transport White Paper to assess future changes in noise climate.
- 8.49 The noise modelling indicates that the noise climate at St Katharine's School, Felton, will not deteriorate and that the school will fall outside the 63dBA Leq threshold in the Air Transport White Paper. BIA has provided noise insulation to the school through conditions to previous planning approvals. Plans are being advanced to relocate the school and BIA will continue to work with the education authorities to enable this to be achieved at the earliest opportunity.

- 8.50 A number of respondents to the first phase consultation requested that BIA undertake noise mapping using the new L_{den} indicators stipulated in the European Noise Directive (Directive 2002/49/EC of the European Parliament). The day-evening-night level L_{den} is calculated using weighted long-term average sound levels for defined day, evening and night periods of a year. The evening and night noise levels are subject to a 5 and 10 decibel weighting. The night-time noise indicator L_{night} is the weighted long-term average sound level determined over all the night periods of a year. Day, evening and night periods are defined as 0700 to 1900, 1900 to 2300 and 2300 to 0700 respectively.
- 8.51 The European Noise Directive requires noise maps to be prepared for airports in 2007 and every five years thereafter. The 2004 noise climate has been modelled using L_{den} and L_{night} indicators in response to the consultation request and these contours are reproduced at Appendix C. The intention of the Directive is to map historical noise. It is not possible to prepare reliable maps for the future noise climate because of the need to have a whole year's data.
- 8.52 BIA has undertaken an extensive review of noise abatement operational procedures – steps taken by pilots and air traffic control to minimise the noise nuisance from over-flights – as part of the process for developing proposals for expanding the controlled airspace. The principal aim of this extension is to achieve better control of the arrival and departure of aircraft and enhance safety. However, the proposals also provide the opportunity to achieve best practice departure and arrival procedures to minimise the effects of aircraft noise on the local community. This includes the introduction of continuous descent approaches which will take aircraft on a higher approach path, with reduced use of engine power as aircraft begin the descent into the airport. The airspace changes have now been approved by the CAA and came into effect in 2006. BIA, in conjunction with National Air Traffic Services and the airlines, aims to achieve 95% of arrivals by continuous descent approaches within two years of the introduction of the airspace changes.
- 8.53 Standard instrument departure routes and standard arrival routes have been introduced as part of the airspace changes referred to above. This makes it possible to monitor and enforce the aircraft track keeping. BIA will introduce a system to enable this to happen and encourage improvements to airline performance including the use of penalties if necessary. The proposals for additional noise monitoring referred to above will also allow the introduction of a scheme for penalising aircraft that breach noise limits at the monitor location, in common with practice at some larger airports. The proceeds from the penalty system will be used to supplement the Community Fund.

Night noise

- 8.54 The impact of night flying has been one of the most commonly raised issues in responses to the Master Plan consultations. This is therefore the primary consideration in the context of operating restrictions.
- 8.55 Night time airborne noise is currently controlled by a noise quota, and mitigation against night time noise has been provided to households affected by a Noise Insulation Grant Scheme. Noise insulation grants have been provided to properties that regularly experience noise levels above 90 dBA SEL, based on the noise footprints of the B757-200 and B737-300



aircraft. The area identified for these grants exceeds the area of the 63 dBA Leq contours (see 8.46 above) and therefore properties identified for noise insulation in the Air Transport White Paper will have already benefited from the previous insulation scheme. It should also be noted that the B737-300 has been largely phased out of the fleet of aircraft operating at BIA and replaced with more modern, quieter aircraft.

- 8.56 The night noise quota system implemented at BIA is based on the system that has been in use since 1993 at Heathrow, Gatwick and Stansted airports. The restrictions specify a night period (23.00-07.00) during which time the noisiest types of aircraft may not be scheduled to land or take off. In addition, between 23.30 and 06.00, the night quota period, aircraft movements are restricted by a noise quota limit. Aircraft count against the noise quota according to their quota count (QC) classification. The quota count itself is related to the noise classification of aircraft as set out in a formal notice published by the CAA on a regular basis. The restrictions allow for dispensations to be given in certain circumstances and there are provisions for dealing with delayed departures and early arrivals. The quota limits are set on a seasonal basis, defined by the period of British Summer Time. The summer season is therefore about seven months long for which a current quota count limit of 1260 applies. The winter season is about five months long for which a current quota count limit of 900 applies. Up to 10% of the noise quota, if not used in the current season, is carried over to the following season. Similarly up to 10% of the next season's quota may be anticipated in the event of an overrun. Any excess overrun is penalised in the following season at double the amount of the excess.
- 8.57 The need for regular night flying arises from operations by the Royal Mail, the charter airlines and certain services by scheduled airlines, such as easyJet. The Royal Mail uses BIA as hub for its Skynet operation for the overnight delivery of letters and parcels. A significant proportion of BIA night flying is needed in order to meet its delivery times and service quality targets. The UK charter airline industry bases aircraft at BIA during the summer operating services for passengers booked on package tours. These aircraft operate short haul services usually on the basis of undertaking flights to three destinations in a 24 hour period. Typically one of the movements will take place during the night quota period. Due to slot restrictions and the need to maximise aircraft utilisation flights from a small number of easyJet destinations arrive at BIA in the night quota period during the summer season.
- 8.58 Table 15 records night movements and quota usage by season since the system has been in operation.
- 8.59 It can be seen from Table 15 that:
- *Relatively little night flying takes place during the winter season, when the quota count use is well within the quota of 900 allowed. Activities by the Royal Mail account for the majority of the winter night flying.*
 - *There is little or no headroom in the summer quota count use. In fact it has been necessary to use the facility to transfer a proportion of the unused winter quota on five occasions.*
 - *The level of night flying remained relatively constant, until 2003 when the Royal Mail reconfigured its distribution network. Summer night movements in 2004 were consequently 30% less than the previous summer. They were also the lowest recorded for any summer season since the introduction of the quota count system.*
 - *BIA has always complied with the quota count restrictions.*

Table 15 – Quota count usage and night movements

Season		Night Movements	Quota Count Use
Winter	1996/97	1251	447.5
Summer	1997	2334	1124
Winter	1997/98	1238	675
Summer	1998	2492	1351
Winter	1998/99	1361	765
Summer	1999	2940	1294
Winter	1999/00	1254	632.5
Summer	2000	2564	1239
Winter	2000/01	1371	435.5
Summer	2001	2999	1230
Winter	2001/02	1536	614
Summer	2002	2655	1150
Winter	2002/03	1386	444.5
Summer	2003	2960	1378
Winter	2003/04	1033	413.5
Summer	2004	2082	1288
Winter	2004/05	786	426
Summer	2005	2183	1308
Winter	2005/06	891	436

8.60 In response to the interest shown in this aspect of operations we have considered a number of options for the management of night flying as follows:

Option 1 – Increase the night quota to accommodate more night flying

This would offer the greatest flexibility for the expansion of the route network providing opportunities for operators to maximise the operating efficiency of their fleet and to work around slot restrictions and constraints at other airports. BIA accepts the advice that the region could gain economic benefit from this approach but it is clear that there would be widespread resistance from the local community.

Option 2 – Maintain the night quota at current levels

The latest forecasts indicate only modest growth in passenger numbers from the charter airline industry and a significant growth in night flying from this market sector is unlikely. Night flying by the Royal Mail flights has decreased, allowing a modest amount of night flying by easyJet. This night flying is restricted to a small number of destinations that are unlikely to change significantly in the future. Therefore BIA takes a value judgement that this approach is a realistic way forward which respects the needs of the local community in this respect, whilst continuing to facilitate growth at the airport consistent with the Air Transport White Paper, albeit with less flexibility than Option 1.

Option 3 – Reduce the night quota

It can be seen from the historic usage that there is no headroom to facilitate a reduction in



the night quota. A reduction in night quota would therefore place severe constraints on the operation of BIA which would result in restricted growth leading to failure to achieve the supported expansion of the Airport set out in the Air Transport White Paper. The aircraft that operate the passenger night flights also operate the daytime flights. Therefore removal of the night flight would also result in the removal of the daytime flights operated by this aircraft as these would no longer be economically viable. If the Royal Mail were to be barred from operating at BIA they would presumably need to find an alternative airfield to operate from. As the majority of the mail originates from the Greater Bristol Area this is likely to involve increased lorry movements on the road network. The noise disturbance would be transferred to the other Airport, with possibly more people being affected. This is therefore the least sustainable option.

Option 4 – Close the airport at night – operate a night curfew

This approach would not only affect the aircraft operating in the night quota period but it would also affect airlines operating services either side of the night curfew. Airlines cannot afford to operate services that risk diversion in the event that a delay might bring the service into the night curfew period. Such an approach would have a widespread effect on the viability of services from BIA to the extent that some major airlines could be forced to close down their operations. Aberdeen Airport has operated such a system for many years and with an adverse effect on the development of its route network. The authorities there recently agreed to introduce night flying in the face of economic pressure from business. This is therefore an unrealistic option if BIA is to achieve the implementation of national policy.

- 8.61 BIA undertook a widespread consultation on night flying in 2002, which included further detailed analysis of the issues and the noise impact. The results of this exercise have been provided to North Somerset. Changes to the night flying regime can only be implemented through the planning system as part of consideration of a future application for development. However the Master Plan provides an opportunity to consider these issues further and inform the way forward. BIA is proposing to proceed on the basis of Option 2.
- 8.62 The Government recently announced its decisions in respect of night flying restrictions at Heathrow, Gatwick and Stansted Airports. The key points emerging that are of relevance to BIA's night flying regime are as follows:
- *The quota count system is to be retained. However some changes to the classification of aircraft are proposed which would mean that some previously QC/exempt aircraft would be reclassified as QC/0.25. Also some QC/0.5 aircraft would be reclassified as QC/0.25 and the exempt category would be defined by reference to noise data, rather than weight. We believe that such a change, if applied at BIA, would make little difference to the quota usage.*
 - *QC/4 aircraft will be subject to an operating ban. No such aircraft operate out of BIA.*
 - *The existing definitions of night (23:00-07:00) and the night quota period (23:30 to 06:00) will be retained.*
 - *The carryover/overrun rule remains unchanged.*
 - *Night time noise mitigation is proposed in the form of noise insulation for properties within a 90 dBA SEL footprint. This criterion is the same as that used for noise insulation at BIA.*
 - *The night restrictions at Heathrow, Gatwick and Stansted Airports include movement limits as*

required by section 78 of the Civil Aviation Act 1982. The Civil Aviation Bill, currently before Parliament, contains a proposal to allow operating restrictions which do not include movement limits.

- 8.63 BIA is prepared to accept a suitably worded condition attached to a planning approval of future development related to night flying. As part of this BIA would propose that the current restrictions remain in place until 2015. Some consultees have expressed concern that there could be an increase in night flights and this will cause an increase in noise. However in practice the aircraft movements at night are almost all by aircraft rated at the low end of the noise quota scale (quota count 0.5 or 1) and there is little opportunity for an increase in flights. It should be noted that the number of night flights has declined slightly in recent years. The use of a movement limit is therefore not required. As the current planning condition is worded the changes to the classification of aircraft indicated above for Heathrow, Gatwick and Stansted would not apply. We would be happy to consider their application at BIA with the planning authority.
- 8.64 BIA is the only airport in the South West and Wales which operates with restrictions on night flying.

Ground noise

- 8.65 The main changes in the ground noise environment will be as a result of the re-organisation and extension of the Apron area. The apron area will extend eastwards into the area currently occupied by the old terminal building, and the old terminal building will be demolished. The majority of ground noise from existing operations is generated by the Auxiliary Power Units (APUs) of aircraft on the ground. The APU is a small generator, normally situated in the tail of an aircraft, which is run whilst the aircraft is on the ground to supply power to maintain aircraft systems whilst the engines are off.
- 8.66 Changes in ground noise levels experienced at properties close to the apron will occur for the following reasons:
- *More aircraft stands, which means that more aircraft could be running their APUs at a given time;*
 - *New aircraft stands are located closer to the properties; and*
 - *The barrier effect of the old terminal building would be lost once it is demolished.*
- 8.67 To mitigate against these factors, the following measures are proposed for inclusion in the development.
- *Provision of a acoustic barrier along the northern edge of the apron, to the east of the Terminal Building.*
 - *Operating restrictions on the use of APU's.*
- 8.68 The effects of the apron changes have been modelled as part of the work associated with our Master Plan. This work shows that, with the above mitigation measures, the resultant noise levels immediately to the north of the airport are predicted to decrease slightly.



Transport

8.69 Transport issues are considered in Chapter 9.

Water resources and quality

8.70 The Environmental Appraisal has considered the hydrogeology and surface water features of the airport site and assessed the potential effects on water resources and quality as a result of the Airport's proposed development. It concludes that it should be possible to avoid contamination of ground water, off-site flood risk and localised on-site flooding through appropriate design and management of drainage and pollution prevention systems. Discharges (to ground via a soakaway) from the site would meet conditions set out in a revised Discharge Consent, issued by the Environment Agency. The new development would include Sustainable Drainage Systems, and opportunities for increased water efficiency.

Minimising construction impact

- 8.71 Standard construction techniques as previously used for buildings, car parks, roads and pavements, lighting, utility services and telecommunications, and airport infrastructure will be adopted. There are no substantive earthworks associated with the development.
- 8.72 A site environmental management plan will be prepared by BIA in order to manage and minimise the potential environmental impacts of construction activities. This will cover areas such as pollution, visual effects, noise, dust, ground conditions, traffic, sensitive ecological and archaeological areas, protected species, the water environment and any necessary supervision by an ecological or archaeological clerk of works. It will incorporate construction practice with reference to appropriate British Standards (e.g. BS 5228: Noise and vibration control on construction and open sites). Best working practices will be stipulated and will be a contractual requirement for the chosen contractor(s). The plan will be audited and enforced by BIA during the works.
- 8.73 Waste material, other than that which can be recycled and re-used on site, will be disposed of to licensed landfill facilities. Excavated material that cannot be reused as backfill in the works will be disposed of off-site. The aim will be for re-use on site in order to minimise traffic movements, but surplus quantities may arise. The volume of material and likely impacts on the working method will be assessed during the EIA.
- 8.74 Where operational requirements permit, BIA will investigate the use of sustainable construction methods in terms of building materials, building orientation and building design to reduce energy costs.
- 8.75 It is likely that the majority of material and equipment necessary for the construction works will be delivered to BIA by road (via the A38). A construction transport management plan will be developed by BIA to minimise the number of vehicle movements (e.g. by ensuring that where possible both inward and outward movements are being utilised for

transporting materials/waste etc.), agree routings for construction traffic, and hours of activity. Standard best practice, agreed in advance with the relevant highways authority, will be adopted to manage potential effects on the entrance to the airport for non-construction traffic. It is unlikely that construction traffic will access the area in front of the terminal. However, all traffic movements will be subject to the normal requirements of airport security.

Cumulative effects

- 8.76 The construction and operation of the expanded Airport may not be the only activity that could exert an effect on the environment. The Environmental Statement for the proposed development at BIA will take into account other activities that may promulgate environmental changes, which could result in cumulative effects on the environment. In this context, cumulative effects should be taken to mean the combined effects of two or more development activities on, for example noise, air quality or landscape and visual aspects. Other developments that will be considered in this context will be agreed with the planning authority as part of the environmental impact assessment process.

Mitigation

- 8.77 Appendix D provides an outline of potential mitigation requirements identified by the environmental appraisal of the Master Plan. The mitigation identified here is based on the initial, largely qualitative studies, and should be viewed as a realistic indicator of potential mitigation requirements. Subsequent more detailed investigations as part of the Environmental Impact Assessment are likely to result in development and modification of these requirements.

Summary and key points

Air quality

- Air quality in the local area will continue to meet national and EU health based standards.
- Levels of nitrogen dioxide will continue to be monitored.
- BIA is committed to increase the use of public transport as part of the strategy to manage air quality. The surface access strategy includes challenging targets for public transport use and reducing staff reliance on the car.
- BIA will make the best possible use of alternative fuels and technologies to achieve improvements in air quality.

Continued...



Biodiversity

- Detailed surveys will be undertaken to confirm the impacts on legally protected species.
- Facilities will be designed to minimise disturbance to wildlife.
- Alternative habitats will be created where disturbance cannot be avoided.
- A comprehensive nature conservation management plan will be introduced in conjunction with plans to extend the south side car parks. The objective will be to achieve an overall enhancement to the biodiversity in this area.
- Areas to the south of the Airport used by bats for foraging would be enhanced in conjunction with plans to expand the south side car parks.
- The use of green roofs in the north side car parks will benefit biodiversity in this area of the Airport.

Community

- A rural character study will consider the effect of increased patronage on the rural area, its tranquillity, and character of the surrounding villages.
- Future planning applications will be accompanied by a health study.

Cultural heritage

- Archaeological investigations will be undertaken in advance of construction work.
- World War II historic features will be thoroughly investigated, recorded and preserved where appropriate.

Geology and land quality

- Pollution prevention measures and best practice methods of working will be adopted to avoid environmental changes to geology and land quality.

Landscape and visual effects

- The proposed new infrastructure will be designed to minimise visual impact. BIA is committed to delivering high quality design.
- An effective landscape scheme will be brought forward to screen and soften major structures and developments. Landscaping will be advanced ahead of construction where possible.
- Car parking will be designed to minimise light pollution through the use of block parking and green roofs.

Continued...

Noise

- The noise footprint is forecast to be no greater at 9mppa than it was in 2004 through the introduction of quieter aircraft.
- No houses are expected to be subject to a high level of noise (69dBA Leq or more) at 9mppa.
- Noise maps will be regularly prepared to indicate the noise impact of airport operations.
- Noise monitoring undertaken both regularly and in conjunction with the Master Plan shows that measured values agree closely with predicted values. Noise monitoring will be extended and used to provide incentives for the use of quieter aircraft.
- An aircraft track keeping monitoring programme will be introduced. A penalty system will be introduced for breaches of procedures.
- Monies raised from noise penalties will be used to enhance the Community Fund.
- Noise mitigation measures will be reviewed in the event that noise levels increase by 3dB.
- No high end Chapter 3 aircraft to be scheduled after 2007.
- Continuous descent approaches to be adopted for 95% of arriving aircraft.
- An acoustic barrier will be constructed to limit the effects of ground noise.

Night flying

- No change to the night flying restrictions is proposed and the night quota will be capped at the current level. Night flying is not expected to increase. BIA will accept a suitably worded condition in respect of night flying restrictions.

Water resources and quality

- An integrated water management strategy will be put in place for all new construction to control and manage the risk of water pollution. This will include the use of sustainable drainage systems for all new car parks and storm water attenuation using the green roofs proposed for the north side car parks.



Chapter 9

Transport and surface access

9

- 9.1 The relationship between activity at BIA and the wider road network is complex. Whilst airport activity is the driver for traffic demand on the roads within the airport site, airport users share the wider road infrastructure with other road users. BIA is located in an area of high car ownership, with a corresponding low take up of public transport. Bristol has the highest car ownership of any city of comparable or greater size. This is partly a reflection of the strength of the local economy.
- 9.2 Traffic levels within the West of England have increased significantly. Parts of the area now suffer from severe traffic congestion at peak hours and air quality in parts of Bristol and Bath is poor. The Joint Local Transport Plan therefore focuses on five main aims which are:
- *To tackle congestion;*
 - *To improve road safety for all users;*
 - *To improve air quality;*
 - *To improve accessibility; and*
 - *To improve the quality of life.*
- 9.3 The A38 provides the primary means of road access to BIA. Access is also provided, indirectly, by the rural road network in particular the B3130 which runs between the A37 and the A370. This is used by some airport users but it also acts as a cross country east-west route around the southern fringes of Bristol linking the Chew Valley with Clevedon, Nailsea and Portishead. The traffic flows on both the A38 and the B3130 peak in the morning and evening commuting hours reflecting a strong use of these roads for commuting. Although airport traffic does influence the peak flows the peak hours for travel to and from the airport occur outside the commuting peaks.
- 9.4 There is a perception that BIA is poorly served by road access and the strategic surface access links may not be as good as at some other airports. However accessibility has not acted to constrain growth to date. Nevertheless good surface access links are important to the future success of BIA. If passengers are unable to access the airport efficiently and reliably then the natural growth of the airport may be restricted and the benefits of growth at BIA anticipated in the Air Transport White Paper may not be realised. The accessibility of BIA is related to the road infrastructure in South Bristol, the general accessibility of the southern parts of the City, traffic congestion in Bristol City Centre and on the M5. The need for improved strategic access is therefore also driven by wider issues relating to the regeneration and economic development of South Bristol and Weston-super-Mare, as well as BIA.



Public transport strategy

- 9.5 The draft Master Plan proposed that the proportion of passengers using public transport should rise by 10% per annum with a proposed target of 13% of passengers using public transport at 9 million passengers per annum. This target was derived by extrapolating recent performance of the airport's public transport operations. This approach has been thoroughly reviewed as part of the work to finalise the Master Plan. This has been undertaken by analysing the distribution of passengers within the airport's catchment area to identify concentrations of passengers that might generate demand for public transport; and by using data relating to public transport use as a proxy indicator to determine the likely usage of new bus services serving these areas. Those services which are likely to be sustainable have been taken forward into the public transport strategy. The target for public transport use has then been reassessed using this 'bottom up' approach and benchmarked against other UK airports.
- 9.6 Data on general public transport use in the sub region has been taken from the 2001 Census. The travel to work data from the Census provides a good proxy indicator of the attractiveness and viability of public transport on a ward by ward basis. This shows that the South West Region has the lowest use of public transport of any of the English regions. The data also indicates that public transport use in Bristol and its sub region is lower than any of the eight English Core Cities. Outside the Bristol administrative boundary public transport use is well below the national average.
- 9.7 The CAA Survey of 2003/04 provides the most comprehensive analysis of the airport catchment area. This shows that 45% of passengers have an origin or destination in the West of England (North Somerset, Bath and North East Somerset, Bristol and South Gloucestershire). This comprises 25% from Bristol, 7.4% from North Somerset, 7.3% from Bath and North East Somerset and 5.5% from South Gloucestershire. Somerset and Devon accounted for 10% and 13% of passengers respectively. The principal urban areas of Exeter, Plymouth, Cardiff, Swindon and Taunton each accounted for between 2% and 3% of passengers. The dispersed nature of the catchment area outside the West of England suggests that the greatest potential for dedicated airport public transport services lies within the West of England.
- 9.8 The CAA survey provides information on the distribution of passengers down to district level. In order to determine the potential for public transport services an estimate of passenger numbers by town and/or ward is required. The 2001 Census population statistics provide further detail on the distribution of population within administrative areas. An estimate of the variation in propensity to fly from ward to ward has been made using airline data. By combining the two data sets it has therefore been possible to produce an estimate of the distribution of air passengers within the West of England and Somerset, and hence the number of air passengers from each location at various stages in the growth of the airport. The likely take up of public transport services on a route by route basis can therefore be determined using the estimate of passenger numbers on the proposed route and a target proportion of passengers that would use the service derived from the current usage of public transport in that area. The road network and journey time are also considerations in the assessment.

- 9.9 A number of consultees commented on the lack of a direct rail link to Bristol International Airport and saw the need to develop a link as a prerequisite for future development. The provisional surface access strategy and the draft Master Plan concluded that a rail link was not a realistic prospect. Whilst it may be theoretically technically feasible to develop such a link, in reconsidering this issue we note:
- *The RASCO study indicates that heavy rail is only a realistic option for airports handling in excess of 15 mppa;*
 - *For airports in the 5 to 15mppa category light rail may be an option. However the viability of light rail has been reassessed since the RASCO work was undertaken and most light rail schemes have been dropped on financial grounds. In particular plans for Bristol light rail scheme have been abandoned;*
 - *A rail link to Bristol International Airport would only ever be a spur link from the mainline and would not avoid the need for a change of trains at Bristol Temple Meads for most journeys;*
 - *No specific studies have been commissioned into the feasibility of a rail link but an indication of the potential cost of such a scheme can be gained by considering schemes being considered elsewhere. Plans for rail connections to Glasgow and Edinburgh Airports are being brought forward by authorities in Scotland with an estimated cost of £140m for Glasgow and £500m for Edinburgh. The challenges of the terrain between the airport and Bristol would suggest that a rail scheme for Bristol would be likely to be at the higher end of this range;*
 - *A completely new route for a rail link would be required with complex structures and earthworks required along the route. The Environmental Impact of such works must be a concern.*
- 9.10 The revised public transport strategy therefore reaffirms the airport's commitment to bus based public transport using Bristol Temple Meads as the primary rail head for the airport. The use of Worle Parkway or Nailsea and Backwell stations as secondary rail heads is discussed below. The rail network will be the primary means of accessing the wider catchment area by public transport.
- 9.11 The long distance (National Express) bus services through Bristol generally leave or join the M5 at junction 18. A significant journey time penalty is incurred by routeing these services via the airport, the A38 and junction 22 on the M5. This remains a significant barrier to the delivery of direct long distance services for which there is no short term solution. There is potential for overnight services to be routed via the Airport for which the journey time is less critical. The 404 and 406 services between Penzance and London operate in this way and there is further potential with other similar National Express routes.. Further National Express passengers will be generated by connecting services through the Marlborough Street Bus and Coach Station.
- 9.12 Public transport provision to the Airport in the future will fall into two categories:
- *Links to public transport interchanges providing connections to the wider public transport system (i.e. the Bristol International Flyer);*
 - *Bus services to destinations within the Airport catchment area;*
- 9.13 Analysis of the current usage of the Flyer suggests that around 90% of air passengers are using the Flyer in conjunction with the rail, rural or national long distance bus service via



interchanges in Bristol. For 2005 this would suggest that around 4.23% of air passengers used the Flyer to connect onto other transport services. This proportion will increase in the future as a result of:

- *Increasing proportion of inbound passengers;*
- *Better integration with the wider public transport system;*
- *Marketing and increased awareness of public transport opportunities;*
- *Improvements to the wider public transport system;*
- *Technology - improved ticketing and information systems.*

A target of increasing the 4.23% component of public transport by 5% per annum is therefore proposed based on past performance, and an assessment of the opportunities available. This would translate into a target of 8.4% of passengers using the Flyer for connecting services at 9mppa.

- 9.14 The following bus routes have been identified to be operated in conjunction with or as part of the Flyer network.

Airport to Clifton and Westbury-on-Trym

This service would target the city centre and its hotels and business district; the residential and business areas of Clifton; the University and the residential areas of Stoke Bishop, Henleaze and Westbury-on-Trym. A service between the Airport and Clifton commenced on 10 July 2006 in line with this strategy.

Airport to Bristol Parkway Station

This route has been identified as a potential new service by the Greater Bristol Strategic Transport Study. The estimated demand is low and the route is unlikely to be viable based on airport use alone. The public transport strategy envisages it being a potential long term option based on extending and adapting an existing bus route.

Airport to Portishead, Clevedon, Nailsea and Backwell

Based on the current usage of public transport and the journey times involved it seems unlikely that this route would achieve the level of patronage required to achieve an environmental benefit or to be commercially viable. Proposals for a service to Nailsea and Backwell Station are considered below.

Airport to Bath

At present a number of passengers use the indirect public transport route offered by the Flyer and rail via Temple Meads. With frequent services between the airport and Temple Meads and between Temple Meads and Bath this route offers a journey time that is generally better than could be offered by a direct coach service, albeit with the inconvenience of changing modes at the railway station. The quickest route is via the unsuitable B3130 through the Chew Valley but such a service must rely solely on the Bath/Airport point to point traffic. The business case for such a service is marginal, even at 9mppa. However the alternative route via Saltford, Keynsham and South Bristol shows more potential and as passenger numbers approach 9mppa this service is likely to become a viable option serving up to 1.1% of passengers. The demand for this service will therefore

be regularly monitored, with a likely introduction as passenger numbers approach 9mppa. However a new direct coach service would involve the displacement of passengers from rail to bus and this may prove a disincentive to some operators. In the meantime BIA will work with the public transport providers to ensure that a seamless interchange between bus and rail is achieved at Temple Meads for travellers to Bath.

Airport to Weston-super-Mare/Worle

The route to Weston is currently served by the 121 service operated by First which operates on an hourly basis during the day. The following options have been considered for improving public transport connections to Weston:

- **Maintain and develop the existing 121 service**
This service serves the rural community and is supported by North Somerset Council. Up to 0.2% of air passengers use the service but there is little scope to grow this proportion. It does not serve Worle and to do so might be to the detriment of its rural customer base.
- **Develop a new service between Weston and/or Worle and the airport**
The Weston Area Development Framework prepared by English Partnerships, North Somerset Council and the South West Regional Development Agency includes a number of proposals for transport infrastructure and public transport, including proposals aimed at improving the strategic links between BIA and Weston. The Development Framework and the draft RSS propose major development between Weston/Worle and the M5, including new local highway infrastructure. The GBSTS has identified a route for a new strategic road link between Weston and Bristol via BIA. Worle Station has also been identified as a 'Park 'n' Ride' site and as a transport interchange. In conjunction with these proposals the Area Development Framework suggests that a high quality bus link should operate a 20 minute frequency linking Weston town centre, Worle Station, RAF Locking and BIA. Should the Area Development Framework proposals come to fruition then the prospects for a new bus route will be good. The strength of the route will rest on Worle's development as a transport interchange. In this respect issues to do with the platform length and ability of inter-city trains to use Worle Station need to be overcome before it can deliver its potential. BIA will therefore monitor this situation and reconsider the need for such a service as the situation becomes clearer. In the meantime Worle Station will form a consideration in the Staff Travel Plan for the use of airport employees.
- **Rail/bus using Nailsea and Backwell Station**
Nailsea and Backwell station is an easy ten minute bus journey from the airport, assuming agreement could be reached on the use of the Downside Road entrance for the bus. It is well connected to Clevedon and Nailsea by bus and by train to Taunton, Bridgwater, Burnham and Highbridge, Weston, Milton and Worle. A shuttle bus service would also serve Backwell and could link with the X1 bus service between Weston-super-Mare and Bristol. The southbound bus stop location at the station is unsatisfactory for use in connection with the rail but it is possible that this is not an insurmountable issue.

The Nailsea and Backwell station is the preferred option, pending the delivery of plans for the Weston Vision and Worle Station and subject to overcoming the shortcomings of the station bus stop. The service is likely to require a subsidy but overall it is expected to make a worthwhile contribution to the surface access strategy. It is not possible to turn a bus at the station so it would carry on to Nailsea and turn there.

- 9.15 The route taken by coaches between the airport and Bristol will be kept under review as potential urban extensions foreseen in the RSS and the transport proposals in the GBSTS come to fruition. There might be an opportunity to co-ordinate the Flyer services with the proposed Ashton Vale to Emerson's Green rapid transit line in the GBSTS. However we share



the GBSTS conclusion that the extension of this service to the airport is likely to give rise to conflicts between the needs of air passengers and commuters.

- 9.16 The changes to the Flyer service introduced in July 2006, including the service between the Airport and Clifton, have seen the frequency of services from the city centre increasing to four buses per hour for most of the day. We envisage this frequency increasing to six buses per hour with the public transport strategy outlined above, perhaps rising to ten buses per hour in the long term.
- 9.17 The Chew Magna 'Go Zero' environmental project and the Dragonflyer 'dial-a-ride' scheme has shown how community based bus services might be developed to service commuters to Bristol and passengers alike. There is considerable scope to develop these services in the future and this forms a component of the surface access strategy, off-setting journeys by commuters by using the Flyer.
- 9.18 The proposed public transport strategy and split by each service is summarised in Table 16 below.

Table 16 – **Proposed public transport strategy (9mppa)**

Service	Proportion of Passengers
National Express direct services	0.2%
Bristol International Flyer	8.4%
Clifton/Westbury-on-Trym	1.2%
Bristol Parkway Station	0.4%
Bath/South Bristol	1.1%
Nailsea and Backwell/ Weston/Taunton/Bridgwater	0.3%
121 to Weston	0.2%
Other services (community/minibuses)	0.7%
Total	12.5% (say 13%)

- 9.19 The previously proposed 13% target is therefore considered an ambitious and stretching target but nevertheless it is proposed that it is retained. The potential delivery of new road infrastructure and improved bus priority measures through the Joint Local Transport Plan will assist with its achievement.
- 9.20 This target is set in the context of public transport performance across major cities of the UK and their airports in Table 17 opposite, from which it can be seen that only two airports outside London achieve public transport use that is higher than 13%.

Table 17 – Public transport use comparison

City	% Travel to Work by Public Transport	% Airport Passengers by Public Transport ²⁹
Birmingham	24.7%	22.3%
Bristol	14.6%	5.0%
Liverpool	26.1%	10.1%
Manchester	26.5%	10.3%
Newcastle	27.2%	11.2%
Nottingham	23.7%	3.5%
Glasgow	34.5%	11.0%
Edinburgh	28.2%	20.0%
London	42.1%	35.5% ³⁰

Staff Travel Plan

9.21 BIA currently operates a number of initiatives aimed at reducing staff reliance on the car for their journeys to work. The Bristol International Flyer coach service to Bristol, for example, is free for all airport staff. However in spite of this the use of the car by staff remains high. Consequently a formal Staff Travel Plan is being implemented to promote and encourage alternative means of travel to and from the Airport and reduce single occupancy car journeys by staff. Importantly, the Travel Plan will help to ensure that BIA can recruit and retain the staff that help to make the Airport a success.

9.22 The Travel Plan includes the following targets:

- To reduce the proportion of staff who commute on their own by car from 93% to 75%;
- To increase the level of those who commute as a car passenger approximately fourfold to 15.5% (currently 3.9%);
- To treble the proportion of staff who use bus based services from 2.5% to 7.5%;
- To achieve 1% cycle mode share; and
- To achieve 1% powered two wheeler mode share.

9.23 Ten key measures have been identified to ensure that the Travel Plan is a success. These are as follows:

- Easy-to-use Car Sharing Scheme;
- Extension to the Flyer airport express coach service;
- Staff only minibuses serving wide area and shift times;
- An improved secure staff car park with fairer charging policy;
- A staff travel incentive scheme;

²⁹ Data from 2003/04 CAA Survey and individual airports

³⁰ Figure for Heathrow. Stansted and Gatwick are similar.



- *Better information and promotion of travel options;*
- *A staff travel website with information and live travel news;*
- *A Travel Plan Coordinator to help with travel needs and journey planning;*
- *Cycle Facility improvements and cycle purchase scheme;*
- *Initiatives to reduce business travel Impact.*

9.24 The demand for staff car parking has been reassessed to reflect the Travel Plan proposals. The unconstrained demand for staff car parking based on current usage is estimated to be 1400 cars at 9mppa. This reduces to 1200 spaces with the Travel Plan.

BIA traffic impact

9.25 The Transport Assessment has considered the impact of the growth in airport traffic arising from the development of the airport to a capacity of 9mppa. The methodology used for the assessment is as follows:

- *The analysis has been carried out for the month of September, when both airport and non-airport traffic on the A38 are at relatively high levels;*
- *Baseline traffic data has been determined from traffic counters on the A38 and on the airport access roads;*
- *Future airport traffic flows have been calculated by reference to estimated future flight patterns. Airport traffic has been distributed within the airport in accordance with the proposed layout of facilities in the proposed land use plans;*
- *A specially commissioned survey of number plates has been used to determine the origin and destination patterns of airport traffic on the local road system³¹ ;*
- *The North Somerset Traffic Model has been used to model traffic flows through the highway network. The model is set up to calculate traffic flows for 2021.*
- *Scenarios relating to no development, development to 9mppa with 5% public transport and development to 9mppa with 13% public transport have been considered.*
- *The impacts on the wider highway network in the morning and evening highway peak hours have been considered.*

9.26 The Transport Assessment has considered the traffic impacts on the A368, A38, B3130, A370 and the connecting minor roads.

9.27 Initial modelling work considered the effect of constraining the capacity of the car parks and redistributing the displaced passengers to public transport and 'drop off' and 'pick up' modes of travel. Although this involved higher public transport than the proposed strategy the increased use of 'drop off' and 'pick up' gave rise to higher traffic flows on the A38. This emphasised the need to achieve a balance between car parking provision and measures that seek to manage the use of the car.

³¹ Following concerns expressed in the consultation on the draft Master Plan additional turning count surveys have been undertaken to validate the findings of the number plate survey. The additional surveys confirmed that the results from the number plate survey represented a 'worst case' in terms of impact on the road network.

- 9.28 The growth in airport traffic in the highway peak hour is not directly proportional to overall airport growth and is less than the growth in the daily average passengers. This results from the relationship between the flight pattern and the highway peak hour.
- 9.29 Airport traffic shares the highway network with other road users. The transport assessment has determined the proportions of traffic attributable to airport users on various parts of the highway network. The highest traffic flows are experienced in the commuting hours when the airport proportion is a lesser percentage than at some other times. The morning north bound peak (into Bristol) and the evening south bound peak (out of Bristol) are therefore the key hours for the consideration of highway and junction capacity. The modelling work shows that the proportion of airport traffic on the A38 and the B3130 in the vicinity of the Airport is significant but the increase in traffic between the development and no development scenarios in the peak hours is generally small in the hours and directions that are critical for congestion. The Airport traffic dissipates with distance from the Airport and accounts for only a small proportion of the traffic within the Bristol City boundary and on the A370. Details of the predicted flows on the A38 immediately north of the airport are provided in Table 18 below:

Table 18 – Predicted A38 traffic flows

Link / Period	2005 Baseline pcu/hr	2021 / 6mppa, No BIA Development pcu/hr	2021 / 9mppa, 5% Public Transport pcu/hr	2021 / 9mppa, 13% Public Transport pcu/hr
North bound AM Peak	1118	1448	1487	1468
South bound AM Peak	751	874	944	926
North bound PM Peak	684	1055	1300	1260
South bound PM Peak	1018	1374	1411	1403
North bound 24 hours		17187	19291	18740
South bound 24 hours		16340	17549	17121

- 9.30 The Transport Assessment has examined the capacity of those junctions where the increase in Airport related traffic flows has a significant impact. This work has shown that the following junctions will no longer function satisfactorily with the 2021 traffic flows:

- A38/Downside Road
- A38/West Lane
- A38/B3130 Barrow Lane



These junctions will not function with or without development of the airport, irrespective of future growth in public transport usage. The Transport Assessment recommends that these junctions are signalised to mitigate any capacity problems.

- 9.31 A number of highway links have a ratio of flow to capacity of more than 90% in the AM or PM peaks. Such links will exhibit congestion symptoms such as unstable flow. However the majority of these links exhibit less than a 5% change in traffic flows compared with the 2021 no development baseline i.e. the impact of development on congestion is not significant. Two links have both more than a 90% ratio of flow to capacity and more than 5% increase in traffic from the baseline as a result of development. These are the A38 between Downside Road and West Lane and Barrow Street northbound from the A38 during the PM peak. It is therefore only these links where the airport expansion can be said to be contributing significantly to congestion.
- 9.32 For the A38 the implementation of integrated traffic signals and associated changes in road layout should facilitate improved traffic flows through the junctions increasing capacity. In addition this link is not over capacity for the scenario with 13% public transport and so the likely development impact results in a link which continues to operate within capacity.
- 9.33 The traffic model runs were set up to constrain traffic flows on the B3130 through Barrow Gurney to reflect restricted capacity of the road through the village. The high traffic flows on the B3130 occur on the section of road between the A38 and the turn off for Wild Country Lane, with traffic flows through Barrow Gurney relatively unaffected by development. In practice traffic would be likely to be using the proposed A38/A370 link road rather than the B3130 or Wild Country Lane.
- 9.34 Full details of the traffic modelling work is provided in the Transport Assessment which is being published in conjunction with this Master Plan.

Strategic highway infrastructure

- 9.35 The Greater Bristol Strategic Transport Study (GBSTS) has developed a series of transport strategies for the Greater Bristol sub-region covering the period to 2030. The development and appraisal of the transport strategies was set out in the report published in 2006. The development of the strategy is based on significantly increased demand for travel arising from a projected growth in population and employment within the Greater Bristol area. The strategy sets out a series of transport measures designed to cater for and accommodate the projected growth in demand for travel in the following sequence:

- *encouraging the use of alternative modes;*
- *management of travel demand;*
- *public transport improvements; and*
- *highway measures.*

Surface access to Bristol International Airport was particular issue for consideration by the study.

- 9.36 The GBSTS strategy has a beneficial effect on access to BIA. The following highway schemes included in the strategy will be of particular benefit to Airport users:
- *South Bristol Ring Road*
 - *A38/A370 Link Road*
 - *M5 junction 21 relocation*
 - *M5 link to South Bristol International Airport*
- 9.37 The South Bristol Ring Road has a strong economic performance and significant transport benefits. These benefits accrue from the improved accessibility provided around the south and east of Bristol and through providing connections to areas of the city proposed for major development. It greatly improves the accessibility of the airport from South and East Bristol, and Bath and should enable these parts of the city to be easier to serve by public transport. The reduced congestion on the strategic road network will offer some benefit to passengers travelling from the north and east outer catchment areas but the journey time savings are likely to be a small proportion of the overall journey time. The GBSTS strategy does not include the M4 to A4174 link road at Emersons Green so traffic to the Airport from Swindon will continue to use the M5. Overall the scheme enhances the economic performance of areas of development to the South and East of Bristol, with part of this benefit deriving from access to the Airport. However additional measures will be necessary to ensure that the A38 south of the orbital route remains within capacity.
- 9.38 The principal economic benefits from the A38/A370 Link Road are not airport related and the scheme provides little benefit in terms of journey time savings for airport passengers. The latest work has shown that the 'red route', the route close to the city boundary, does provide significant relief for Barrow Gurney. The construction of the 'orange route', Barrow Gurney bypass, in addition has very little effect on the network performance. BIA notes that the driver for inclusion of the scheme on the strategy is economic performance associated with development. The BIA Master Plan Transport Assessment has identified the importance of providing relief from traffic for Barrow Gurney and therefore BIA strongly supports the early delivery of this element of the Strategy. The relationship between the red and orange routes on the performance of the A38 needs further consideration. BIA would be pleased to work with sub-regional partners to secure the successful early delivery of the A38/A370 Link Road.
- 9.39 The GBSTS has considered two schemes linking South Bristol and Weston-super-Mare. Of these a link from BIA to junction 21 on the M5 provides the better economic performance. Increases in travel are predicted from both BIA and the significant development identified at each end of the route. Substantial savings in journey times between Weston, Worle, BIA and South Bristol are achieved, but these are only of significance to Airport passengers from these locations. The journey time saving for passengers using the M5 from Somerset, Devon and Cornwall would not be significant. However the scheme would provide better connectivity between the Airport and Weston-super-Mare and may facilitate the introduction of new public transport services. In particular it might facilitate the rerouting of National Express coach services from the south via BIA. The principal benefit of the scheme to BIA is to improve the capacity of the A38. The priority is to increase the capacity between the Airport and the South Bristol Ring Road, but in the long term, the A38 to the south could also become a constraint on airport growth. However the link to junction 21 on the M5 has significant technical and environmental challenges to overcome.



Early further investigation is therefore required to establish whether a satisfactory proposal can be developed.

- 9.40 BIA will play its part in the delivery of the GBSTS strategy and the resolution of the sub-region's transport problems.

Other issues

- 9.41 BIA is acutely aware that traffic on the B3130 has an impact on communities, particularly the village of Barrow Gurney. The particular issues this causes for Barrow Gurney need to be solved. Although the traffic through this village is by no means entirely airport related, BIA has been actively working with the Parish Council to develop a traffic calming scheme, which also facilitates the construction of a footpath through the narrow section of the village. This work has shown that the traffic arrangements in the village can be improved and BIA will continue to work with the Parish Council to drive these works forward. The Transport Assessment has accordingly assumed that traffic flows through the village can be reduced in this way. The A38/370 link road will provide permanent traffic relief and ensure the continued efficient movement of traffic to the south of Bristol.

Summary and key points

- Good surface access links are important to the future success of BIA.
- The public transport strategy proposes expansion of the Bristol International Flyer service and new bus routes serving Weston-super-Mare and Bath over time. A challenging target of 13% of passengers using public transport at 9mppa has been set.
- A formal Staff Travel Plan is being implemented to promote and encourage alternative means of travel to and from the Airport and reduce single occupancy car journeys by staff.
- A formal Transport Assessment is being published in conjunction with the Master Plan. The traffic modelling work shows that the proportion of airport traffic on the A38 and the B3130 in the vicinity of the Airport is significant but the increase in traffic in the peak hour between the development and no development scenarios is generally small.
- Congestion is predicted on the A38 in the peak hour but the implementation of integrated traffic signals and associated changes in road layout should facilitate improved traffic flows and increased capacity.
- The Greater Bristol Strategic Transport Study strategy has a beneficial effect on access to BIA. The BIA strongly supports the early delivery of the A38/A370 Link Road. Further investigation is needed to establish whether a satisfactory proposal can be developed linking South Bristol and Weston-super-Mare.
- The traffic issues on the B3130 through Barrow Gurney need to be solved now. BIA has considered the potential for traffic calming in the village and is committed to ensuring that a suitable scheme is delivered.

Chapter 10

Climate change

10

- 10.1 The Guidance on the Preparation of Airport Master Plans, published by the DfT, does not explicitly require Climate Change to be considered in the scope of the Master Plan. This is presumed to be because the subject is a matter for national and international action. Nevertheless in response to requests for inclusion of this topic from the consultation this section considers the relationship between aviation and the problem of global warming.
- 10.2 Scientific evidence is growing that man-made greenhouse gas emissions are having a noticeable effect on the earth's climate and many consultees have focused on the growing contribution from air transport. Aircraft operations generate carbon dioxide, a direct greenhouse gas. However, other aircraft emissions are also linked to effects in the atmosphere, including ozone generation, methane reduction and cirrus cloud formation. The impacts from aircraft are therefore greater than that from carbon dioxide alone. There are various methods in use to measure these indirect warming effects. In 1999 the Intergovernmental Panel on Climate Change (IPCC) estimated that aviation's impact is about 2 to 4 times higher than the effect of its past CO₂ emissions alone. Recent EU research indicates that this ratio may be somewhat smaller (around two times).
- 10.3 Aviation's contribution to global warming is currently around 2%–3% of global emissions, compared, for example with 25% for energy production. However the IPCC forecasts that this could grow to between 5% and 15%, if action is not taken to tackle these emissions. Should other industries achieve significant cuts in their greenhouse gas emissions, in line with EU objectives, then aviation's share as a proportion of the remaining emissions would rise. It is important therefore that the aviation sector can demonstrate that its impact on climate change is under control.
- 10.4 The impacts of aviation on climate change principally occur when the aircraft are flying at altitude between airports rather than when they are at or near a particular airport. Action to address the climate change impact therefore has to be taken by Government at an international level, and by the aviation industry across all its sectors, including airports, aircraft manufacturers and airlines. BIA is a signatory to the recently published cross industry Sustainable Aviation initiative set out in 'A Strategy towards sustainable development of UK Aviation', along with most of the airlines currently operating here. The issues concerning aviation and climate change were also considered by the Government in the Air Transport White Paper. The key points from the White Paper are:
- *By 2030 aviation could account for about a quarter of the UK's total contribution to global warming;*
 - *The Government is committed to reducing carbon dioxide emissions by 60% compared to current levels by 2050;*
 - *There is no international agreement on ways of allocating aircraft emissions and therefore international flights do not count in the national inventory of greenhouse gas emissions;*
 - *The aviation sector, nevertheless needs to take its share of responsibility for tackling this problem;*



- *The Government is committed to a comprehensive approach, using economic instruments to ensure that growing industries are catered for within a reducing total;*
- *Fuel efficiency gains will make a contribution to reducing carbon dioxide emissions. The Advisory Council for Aeronautical Research in Europe (ACARE) has set a goal to reduce fuel consumption by 50% by 2020.*
- *A unilateral approach to aviation fuel tax would not be effective in the light of international legal constraints; and therefore*
- *The Government believes that the best way of ensuring that aviation contributes towards the goal of climate stabilisation would be through a well-designed emissions trading regime.*

10.5 UK targets for overall CO₂ reductions of 12.5%, by 2010 relative to 1990, have been set through the Kyoto Protocol. The UK Government has set longer term targets for 2020 and 2050, and has also projected that emissions from aircraft will grow. The UK aviation industry accepts that growth is an issue and is committed to play its full part in meeting internationally agreed targets alongside other industries. The Sustainable Aviation Strategy therefore sets out measures for aviation to minimise its impacts through technology and operational improvements, and meeting the external costs of its remaining emissions. The Strategy includes the following goal:

'Aviation (to be) incorporated into a global policy framework that achieves stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous man-made interference with the climate system.'

10.6 The Strategy includes the following commitments:

- *Airline and airport signatories to build support and assist policy makers in developing practical solutions for inclusion of aircraft CO₂ emissions in the EU Emissions Trading Scheme by 2008, or as soon as possible thereafter, as a first step towards a global approach;*
- *Take a proactive role towards securing a positive engagement from the international aviation community to support measures to address climate impacts;*
- *Provide relevant data and expertise for the scientific community to enhance understanding of the non-CO₂ atmosphere effects of aviation, and support improvements in metrics for quantifying and report effects;*
- *Propose appropriate mechanisms by 2012 for mitigating non-CO₂ effects based on a consensus of scientific understanding;*
- *Continual improvement in technology and air traffic management towards the ACARE emission targets;*
- *Develop and implement common reporting of total CO₂ emissions and fleet fuel efficiency by airline by end 2005;*
- *Inform passenger understanding of climate impacts of air travel, including evaluating carbon offset initiatives as a practical short term measure; and*
- *Provide an update by 2006.*

10.7 BIA has assessed its contribution to greenhouse gas (GHG) emissions in response to comments received during the consultation. Specialist consultants have been engaged to undertake this calculation. GHG emissions from aircraft operations at BIA have been calculated for the landing and take-off cycle (LTO) and the cruise phase of flights. For 2005

and 2019 information relating to the number of LTO's has been used to estimate emissions of CO₂, CH₄ (methane) and N₂O (nitrous oxide). Default emission factors and fuel consumption for aircraft are derived from the IPCC Guidelines for National Greenhouse Gas Inventories. Emissions from auxiliary power units (APU's) have been calculated based on the carbon content of fuel.

- 10.8 Emissions from aircraft cruise, defined as movements above 1000m between airports, have been calculated based on the departure airport to avoid double counting. The cruise emissions have been taken from the Emissions Inventory Guidebook (EMEP 2005) and calculated using the generic aircraft types referred to therein. The distances to each destination for 2005 and the forecast destinations for 2019 were calculated based on Great Circle distances, adding 9.5% to the distance to take account of variations in the flight path. The emissions were calculated by the individual components of carbon dioxide, methane and nitrous oxide and converted into carbon dioxide equivalents.
- 10.9 The conclusions of the climate change impact study are as follows:
- *Direct GHG emissions from aircraft activity at BIA is forecast to increase by approximately 66% between 2005 and 2019, from 437,000 tonnes to 725,000 tonnes CO₂ equivalent.*
 - *Aircraft emissions from BIA constitute some 1.2% of the total UK aircraft emissions (using 2002 figures - latest available); 0.2% of 2004 emissions from UK transport sources and 0.06% of total UK GHG emissions in 2004.*
 - *Aircraft emissions from BIA in 2005 were 0.4% of the total emissions from the South West Region. If the emissions from other sources remain stable BIA would rise to 0.7% in 2019.*
 - *The emissions inventory in the Bristol Climate Change and Sustainable Energy Strategy (published by Bristol City Council in 2000) indicates that Bristol City's total emissions amount to around 3.9m tonnes per annum. The BIA landing and take off emissions (LTO), being the on site emissions contribution from flights, is 0.18m tonnes on the basis of the 2005 calculation. This represents 4.6% of Bristol's total, potentially rising to 7% at 2019.*
- 10.10 Growth in aviation at BIA is dominated by low fares airlines. Low cost or low fares airlines distinguish themselves by providing a low cost 'no frills' service. This model, originally developed in the USA, has been successfully propagated in Europe through deregulation of the market. It involves minimising costs and maximising efficiency in order to offer lower fares to consumers. Characteristics of the low fares model include:
- *Efficient operations that maximise aircraft utilisation and minimise fuel burn;*
 - *Use of standardised and modern aircraft fleets that aim to reduce operational and maintenance costs for the airline;*
 - *A focus on serving uncongested regional airports, which have fewer delays and necessitate less fuel loss due to holding patterns and long taxi times;*
 - *The use of regional airports means that passengers have shorter distances to travel to catch their flights thereby reducing greatly the number of miles travelled by road which is the greater polluter;*
 - *A 'no frills' in flight service that costs less to deliver and reduces aircraft payload and therefore requires less fuel burn; and*
 - *More passengers per flight and therefore less fuel and emissions per passenger.*



- 10.11 The low cost airlines operating at BIA operate with a young aircraft fleet which is associated with more efficient engines and lower fuel consumption per passenger kilometre and therefore less CO₂. These airlines serve both the business and leisure market.
- 10.12 The greater part of GHG emissions associated with airport expansion, that from aircraft, will be dealt with at national and international policy levels. In this respect BIA supports the inclusion of aviation in the EU Emissions Trading Scheme as the primary means of addressing aviation's impact on climate change. In addition BIA will play its full part in reducing the on site emissions of GHG's by:
- *Designing buildings to achieve a saving in energy use over and above that required by the Building Regulations;*
 - *Incorporating on site renewable energy sources in future development where possible. In addition BIA will seek to purchase a significant proportion of its electricity requirements from renewable sources;*
 - *The use of improved operational procedures such as Continuous Descent Approaches to reduce fuel burn;*
 - *Designing the taxiway layout to minimise aircraft holding and taxiing times;*
 - *Using low embedded energy products in construction and consumable materials used by the airport;*
 - *The use of a Staff Travel Plan to reduce private car usage by staff; and*
 - *The use of ambitious targets to increase the usage of public transport by passengers.*
- 10.13 Tree planting has been suggested through the consultation as one form of compensation for climate change impacts. Increased afforestation forms part of the Government's Climate Change Programme and on this basis it would be appropriate to adopt this approach and include a tree-planting programme as part of the Master Plan initiatives, both for climate change and landscape compensation reasons. However there is increasing unease about the appropriateness of tree-planting schemes as a means of off-setting climate change impacts. These concerns can be largely overcome by taking a more sophisticated approach that includes investment in quality environmental projects, involving renewable energy and low carbon technology. Voluntary offset schemes, involving passengers or companies paying to offset the CO₂ emissions from their flights can contribute to reducing the carbon footprint of the Airport in this way. Such measures should be viewed as an interim measure pending the achievement of the technological improvements targeted by the Aviation Industry as set out in the Sustainable Aviation Strategy. Many businesses already adopt this approach and British Airways and a number of the tour operators selling holidays out of BIA promote such schemes. BIA will take steps to ensure that information on climate change and aviation is made available to passengers and promote the use of suitable offsetting schemes. This will include the offsetting of BIA's own business activities.
- 10.14 The UK's Climate Change Programme³² emphasises the need for adaptation to climate change. In the period of this Master Plan the South West is expected to experience an

³² Climate Change: The UK Programme; Defra 2000.

increase in mean annual temperature of around 1°C; a small decrease in summer precipitation and an increase in winter precipitation. Increased risk of flooding is likely to be an issue for coastal areas. The need to plan for increased visitor numbers in the South West has been identified. No specific measures are expected to be required in the design of the Master Plan facilities in order to adapt to Climate Change.

Summary and key points

- BIA is committed to delivering the commitments of the Sustainable Aviation Strategy. These include cross-industry commitments to tackle climate change.
- Direct greenhouse gas emissions from flights from BIA are forecast to rise from 437,000 tonnes in 2005 to 725,000 tonnes in 2019.
- Emissions from flights from BIA amount to 0.4% of the total greenhouse gas emissions from the South West Region. This could rise to 0.7% at 9mppa if all other emissions remain the same.
- BIA is committed to reducing on-site emissions of greenhouse gases through energy conservation, use of renewable energy, improved operational procedures, increased public transport use and low carbon design.
- Educational and carbon offset programmes will be introduced as an interim measure to address climate change issues.



Chapter 11

Sustainability appraisal

11

11.1 A sustainability appraisal (SA) has been undertaken of the BIA Master Plan. This was carried out to help improve the overall sustainability performance of the Master Plan which will ultimately help improve the sustainability of future development at the airport. There is no formal requirement to undertake a sustainability appraisal although it is current best practice to do so.

11.2 SA is a form of assessment used since the 1990's for regional and local plans and major development projects. It considers social, economic and environmental effects, and appraises them in relation to the aims of sustainable development. The most widely-used and accepted international definition of sustainable development is:

'development which meets the needs of the present without compromising the ability of future generations to meet their own needs'

11.3 The context for carrying out a SA is provided by the Government's UK Sustainable Development Strategy "Securing the Future" (March 2005). This sets out the following five guiding principles:

- 1 *Living within environmental limits;*
- 2 *Ensuring a strong, healthy and just society;*
- 3 *Achieving a sustainable economy;*
- 4 *Promoting good governance; and*
- 5 *Using sound science responsibly.*

11.4 The purpose of SA is to help integrate sustainable development considerations into the development of plans and projects and to help inform decision making. SA is an iterative process that identifies and reports on the likely significant effects and the extent to which implementation will achieve social, economic and environmental objectives. It exposes strengths and weaknesses in sustainability terms and helps to develop recommendations for improvement and mitigation.

11.5 The SA of the BIA Master Plan was informed by the South West Regional Sustainable Development Framework (RSDF) which was drawn up by the South West Regional Assembly. The RSDF provides a high level framework for the promotion of the sustainable economic, social and environmental well-being of the region and sets out the objectives and priorities for sustainable development within the region. The Regional Assembly intends the framework to be used by the public and private sectors in developing their proposals for future development in the Region and as the basis for an SA.

11.6 The SA involved the following steps:



- *Gathering evidence and information to support the appraisal. This included qualitative and quantitative information and trends in the social, economic and environmental context of the Master Plan area.*
- *Review of relevant plans, programmes and strategies, identifying synergies and inconsistencies.*
- *Development of the SA Framework (which sets out the criteria used to appraise the Master Plan) including the proposed SA objectives and an explanation of how they were chosen.*
- *Consultation on the proposed SA framework with stakeholders to gain consensus on the validity of the objectives and their applicability to the project. This was initially achieved through issuing a SA Scoping Report (July, 2005) to a range of consultees following which the Framework was amended taking into account comments received.*
- *Undertaking appraisal workshops using the SA objectives to consider the performance of the Master Plan. The workshops were attended by a range of representatives who discussed the framework and contributed to the SA of a number of options and then the preferred option. The options considered are presented in the table below. They are based on the facilities necessary for growth to 9mppa. The results of the SA were recorded within a SA matrix (below).*

Table 19 – Sustainability appraisal matrix

A Terminal building site options	A1	Extend the existing terminal
	A2	Develop a new terminal – north side of the airfield
	A3	Develop a new terminal – south side of the airfield
	A4	Develop a terminal with satellite facilities
B Additional aircraft stands	B1	Extend north side apron
	B2	Develop south side apron
C Car parking	C1	Provide car parking to meet unconstrained demand
	C2	Provide car parking to meet managed demand
	C3	Meet demand within the existing airport boundary
	C3	Meet demand within extended airport boundaries
D Additional support facilities – hotel	C4	Develop off airport car parks
	D1	On site
	D2	Off site
E Additional support facilities – flight catering	D3	Do nothing
	E1	On site
	E2	Off site

- *Developing recommendations to inform subsequent Master Plan development.*
- *Production of the final Sustainability Report, which sets out the baseline, the methodology used, and an appraisal of the sustainability effects of the Master Plan, coupled with a non technical summary.*

11.7 The chosen option concentrates development within the airport boundaries and to the north side of the site. In sustainability terms, concentrating facilities on site will potentially bring about a number of significant benefits:

- *It will create a significant economic opportunities through multiplier effects, strengthening economic linkages and employment opportunities.*
- *It has the potential to reduce the need for travel and the frequency of trips. For example, locating facilities such as the hotel on site will reduce the need for shuttling.*
- *Impacts to local communities should be also be reduced. For example, availability of more on site car parking will reduce the impacts caused by anti-social parking off site. In some areas there will also be reduction in noise impacts and visual intrusion.*
- *The north of the site is also far more accessible by public transport, and in conjunction with proposed public transport improvements to the airport, well managed parking and provision of accommodation on site (which will enable people to be more flexible in their transport choices) there is potential to reduce those harmful vehicle emissions associated with climate change and human health.*
- *It preserves landscape value to the south of the site- (green belt and the Mendips).*

11.8 Where the SA did identify areas where potentially negative impacts may arise or where there may be opportunities to improve potential negative or positive impacts, mitigation measures and recommendations have been proposed. These include a range of measures such as:

- *Measures to promote more fuel efficient transport and fuel efficiency. For example through the introduction of green travel plans for employees and improved public transport provision for passengers and employees.*
- *Measures to conserve natural resources (including energy) and reduce waste. For example through ensuring that best practice energy efficiency guidelines are adhered to in all development and construction, through formalising working practices (for example, implementing site wide waste minimisation and energy efficiency policies) and through the implementation of an Environmental Management System.*
- *Measures to engage with harder to reach groups to promote inclusiveness and sustainable communities. For example through building upon current community work, such as increasing the community fund pot for small community projects and linking with relevant organisations such as the SW Youth Parliament.*
- *Measures to improve the region's tourism product. For example through increased marketing activity within the terminal building and through investigation of potential opportunities to work with and to learn from South West Tourism and their sustainable tourism work.*
- *Measures to improve learning and skills. For example through increased partnerships with schools and colleges to promote job opportunities at the airport and through provision of sustainability awareness training to all employees on the airport site.*
- *Measures to improve employment opportunities. For example through campaigns specifically targeting those at most disadvantaged in the labour market (e.g. fostering links with initiatives such as 'Job Match' and organisations such as Connexions) and encouraging other employers on site to do the same.*



- 11.9 The findings of the SA have been used to drive forward further reviews of options following consultation for example car parking and building design (e.g. lighting, energy, rainwater harvesting, green roofs, travel plan etc).
- 11.10 The full Sustainability Appraisal report (with appraisal matrices) is available as a supplementary technical document alongside the Master Plan.

Summary and key points

- A Sustainability Appraisal (SA) of the BIA Master Plan has been undertaken.
- The purpose of SA is to help integrate sustainable development considerations into the development of plans and projects and to help inform decision making.
- The SA of the BIA Master Plan was informed by the South West Regional Sustainable Development Framework.
- The chosen development option will potentially bring about a number of significant benefits.
- The SA has identified a number of mitigation measures and recommendations that might improve potential negative or positive impacts.

Chapter 12

Development 2016 to 2030

12

- 12.1 This section of the Master Plan considers the longer term implications of growth to meet the demand for air travel from BIA to 2030. The Guidelines on the preparation of Airport Master Plans accept that proposals which will come to fruition so far in the future are likely to bring with them considerable uncertainty and that consequently there is likely to be little value in working them up in any degree of detail. Government therefore expects airport operators to include indicative land use plans for the period 2016 to 2030 as a minimum.
- 12.2 It is clear that the White Paper proposals for a second terminal and a runway extension to deliver the capacity needed to handle the anticipated 2030 passenger throughput of around 12mppa, require a step change in development. This is therefore a much more challenging prospect. We have carried out a preliminary assessment of the solutions that emerge and considered the social, environmental and economic implications of this growth.
- 12.3 The detailed Master Plan has been prepared on the basis of a passenger throughput of 9mppa. Based on our current assessments this is the estimated capacity of the fully extended north side terminal site, with the availability of suitable land for the development of aircraft parking aprons being the limiting factor. The Master Plan passenger forecasts indicate that this level of throughput would be achieved at around 2019. Therefore the issues to be considered relate to development that might be required thereafter.

Runway extension – aircraft performance

- 12.4 As part of the work to prepare this Master Plan BIA has commissioned a runway performance study to determine the flight range from the existing runway and for a theoretical 400m extension. The results of this work are tabulated overleaf.



Table 20 – Runway performance

Aircraft	Range from Existing Runway	Range with 400m Extension	Potential New Routes (Not Currently Served)
Boeing 757-200	4054km	6037km	Chicago Toronto Dubai Washington
Boeing 737-800	3424km	5046km	N/A
Boeing 767-300	6487km	7478km	Chicago Washington Florida Caribbean Kenya Karachi Bombay Atlanta East Africa
A320	4343km	4865km	N/A

It should be noted that these calculations are on the basis of assumptions regarding typical aircraft loads, configuration and weather conditions. They are therefore provided for guidance only to indicate the benefit in terms of sector length and destination that might arise with a runway extension. Actual aircraft performance will vary according to power plant and airline operating characteristics.

- 12.5 There is a limited demand for many of these destinations from the Bristol catchment area in the Master Plan period. The passenger forecasts identify demand for four potential long haul routes by scheduled airlines. These are New York, Washington, Dubai and another US destination such as Atlanta. New York is already served by Continental Airlines off the current runway. Dubai is forecast to account for 120,000 passengers at 2015, growing to 140,000 passengers at 2030. The other two US routes are forecast to account for around 290,000 passengers at 2030.
- 12.6 There is further demand for long haul services by holiday charter airlines. The forecasts estimate this demand at 180,000 passengers at 2015 rising to 400,000 at 2030. The total long haul market at 2030 is estimated to be 1.2 million passengers, taking into account all scheduled and charter operations and 560,000 passengers at 2015. At present BIA is handling around 130,000 long haul passengers off the current runway. It is likely therefore that a significant proportion of the forecast long haul passengers could be handled without the need for a runway extension. Assessing the size of this proportion is a complex balance of payload, aircraft performance and route economics.

12.7 The following aircraft have the potential to serve long haul destinations from BIA:

- *Boeing 757-200*
- *Boeing 767-300*
- *Boeing 737-700ER*
- *Boeing 787*
- *Airbus A319*
- *Airbus A330-200*
- *Airbus A350*

Aircraft larger than those listed above are unlikely to be able to operate satisfactorily from BIA's current runway. Payload penalties may apply to some of the aircraft listed on some routes.

12.8 The regional long haul scheduled service market in the UK is currently reliant on the Boeing 757 and 767, the range of which is considered in Table 21. The Master Plan research shows that all the forecast long haul routes can be served by these aircraft.

12.9 The last 757-200 was delivered by Boeing in 2005 and this aircraft is now out of production. These aircraft can be expected to continue to be in operation during the Master Plan period but a gradual phasing out and replacement by new generation aircraft will occur. The 767 aircraft is a potential replacement in the medium term. This aircraft remains in production with orders still being placed with Boeing in 2005. The 767 can be expected to remain in operation during most of the Master Plan period.

12.10 In response to demand from airlines Boeing are now developing the 787 Dreamliner, a mid size, long range aircraft with superior environmental performance, ideally suited to the UK regional market. This aircraft provides, possibly, the best opportunity to grow BIA's long haul market in the long term. Detailed discussions between BIA and Boeing, and with airlines that have placed orders for this aircraft (including Continental and First Choice) lead us to be confident about its ability to serve the long haul market from BIA. Information provided by Boeing would indicate that the aircraft would have the capability to serve destinations on the west coast of America and Cape Town, removing any effective constraint on the long haul market.

12.11 Boeing's development programme for the 737 also includes aircraft that are specifically designed for the long haul market. In particular the recently launched 737-700ER is capable of trans-oceanic flights with a maximum range of up to 10,200 kilometres. The technical characteristics of the 737-700ER would suggest that it would be capable of operating from the existing runway at BIA.

12.12 Airbus also feature aircraft that have long haul capabilities in their commercial aircraft programme. The A319 is capable of transatlantic flights and the A350 is under development as a competitor to the 787 Dreamliner.

12.13 BIA remains of the view that the long haul market for services is broadly as set out above. York Aviation, in their report for North Somerset Council, discuss the prospect of services to



other destinations including Toronto, Bangkok, Miami, Hong Kong, Singapore, Atlanta, Bahrain, Cape Town, Las Vegas and Kuala Lumpur. We doubt whether the market for these routes will be strong enough for airlines to offer dedicated services out of Bristol in competition to Heathrow. A more likely scenario is that BIA will have the capability to serve destinations in the Far East and Australia via a hub in the Middle East, such as Dubai or Abu Dhabi. Similarly US and Canadian destinations would be adequately served through hubs on the east coast of America, well within range of BIA.

- 12.14 Another factor that could affect the demand for long haul is the possibility of an 'open skies' policy with America which could see some US airlines migrating from Gatwick to Heathrow, subject to capacity constraints.

Runway extension options

- 12.15 BIA has considered the following options for extending the runway:

Option 1 – do nothing

From the analysis above it is clear that it is likely that a significant proportion of any long haul demand could be handled without the need for a runway extension. However, it is not possible to make precise estimates with any degree of accuracy over such a long time frame. This option carries some risk, but the timescales are such that this risk can be reassessed in subsequent revisions of the Master Plan if necessary.

Option 2 – extend the runway by 140m

This is assessed as the maximum extension that can be accommodated within the existing airport land, without the need for airport control of Felton Common. Nevertheless the A38 would need to be lowered into a tunnel for a length of 150m. The instrument landing system for runway 09 would need to be relocated to just inside airport land at the boundary with the Common. If the existing landing threshold is retained for runway 27 there would be no need to relocate the existing approach light array. There is a possibility that some regrading of the Common may be needed to maintain satisfactory clearances from obstacle limitation surfaces.

Option 3 – extend the runway by 389m

This has been assessed as the maximum extension that can be accommodated within the existing airport land. The end of the runway clear and graded area would then be at the boundary with Felton Common. The ILS localiser and, potentially approach lighting as well, would need to be relocated on to the Common and a 240m by 150m area of the Common would need to come into airport control. It may be necessary to regrade parts of the Common.

Option 4 – extend the runway by 239m with a 150m starter strip

A starter strip is a length of aircraft pavement that can be used by aircraft at the start of their take off run, but not for landing purposes. This option would add 389m to the runway 27 take off run, but only about 150m to the runway 09 take off run. This therefore means that runway 09 has performance penalties compared with runway 27. However the need to encroach on to Felton Common is avoided.

Option 5 – extend the runway further, with further encroachment onto the Common

Any improvements to the take off runs that would be achieved would be subject to licensing approval from the Civil Aviation Authority. It is possible that requirements to improve safety standards could erode some of the potential benefit. There is a further issue with the runway 27 approach lighting. The current approach light array is truncated to avoid the need to encroach on Felton Common. Any changes to the 27 landing threshold would require the approach lights to be relocated and possibly extended. This could have a significant effect on the Common.

North Somerset Council has declared Felton Common as a Local Nature Reserve under the National Parks and Access to the Countryside Act 1949. BIA has not, at this stage, carried out a detailed assessment of the impact of extending the approach lights and airport control on to the Common, but it is clear that the effects could be potentially significant. Furthermore any extension would cause the noise impact on the houses adjacent to Felton Common to increase, probably requiring the relocation of some householders. On the positive side a runway extension might remove the need for some use of reverse thrust on landing and allow take-offs to be undertaken at lower, and hence quieter, power settings.

- 12.16 Our overall conclusion is that the improvement in performance that might be achieved by extending the runway is relatively small in comparison with the costs and the potential environmental impact. Our preferred option at this stage is therefore the 'do nothing' option. We expect that a departure from the White Paper proposals in this respect will have little or no effect on the projected passenger numbers. However it will be necessary to keep this issue under review in subsequent updates of the Master Plan. Having considered the views expressed by York Aviation/North Somerset Council in respect of the runway length following the draft Master Plan consultation, we have concluded that there is no reason to change this approach.

Runway – other issues

- 12.17 The next generation of aircraft are expected to have longer wingspans than the aircraft currently operating from BIA, as part of the general development of technical and environmental performance. At present the clearances between the taxiway and Winters Lane to the south of Tall Pines Golf Club, limit operations to aircraft of Boeing 767 wingspan. This taxiway could not accommodate the future Boeing 787 aircraft in its current configuration. In the short term it is thought that this could be overcome by the construction of turning circles so that aircraft can avoid this part of the taxiway system. In the longer term consideration may need to be given to increasing the clearance by relocating Winters Lane to the north.



Aircraft parking apron

- 12.18 The Master Plan to 2015 delivers apron capacity for 9mppa by expanding the north side apron within the existing airport boundary. Options for further expansion of the aircraft apron include:
- *Further expansion of the aircraft apron on the north side of the airfield. It might be possible to develop up to three aircraft stands to the west of the control tower by extending one stand depth to the north. Most of these stands would lie outside the existing airport boundary. The ground profile creates technical challenges with up to 4m of earth fill required in order to bring the ground up the required levels but this may not be an insurmountable issue. The noise impact on neighbouring residential properties of further apron encroachment north would be a concern and an acoustic wall to shield these properties would have an impact on the landscape. The capacity of the north side taxiway to handle the additional aircraft movements would need to be investigated further when more detailed information on the flight profiles is available. The north side apron is served by a single taxiway/apron taxilane and the issues concerned with its capacity of the taxiway have been considered in Chapter 7. Should it prove possible overcome these issues the additional stands provided might deliver capacity for around one million additional passengers per annum.*
 - *The development of aircraft stands on the south side of the airfield, in the area currently occupied by the general aviation facility and the Silver Zone Car Park. The redevelopment involved would necessitate the relocation of car parking and the expansion of the airport land into adjacent farm land.*

Further consideration of the merits of these options will be undertaken in future reviews of the Master Plan when more information on the nature of demand is available to guide decision making.

Second terminal

- 12.19 The draft Master Plan concluded that new apron development on the south side of the runway would need to be brought into use in conjunction with a second, south side terminal building. However some consultees suggested that it may prove possible, and more cost effective, to transfer passengers to the north side existing terminal from aircraft in this location. This would need further consideration at the time more detailed proposals are prepared but at this stage it is difficult to envisage how satisfactory operational arrangements could be put in place for this transfer process. In terms of long term land use planning it would therefore be prudent to safeguard the delivery of the second terminal in line with the Air Transport White Paper proposals.
- 12.20 In principle a second terminal should be deliverable. However the following issues need to be considered:
- *A south side parallel taxiway would be needed to avoid the need for aircraft to cross the runway to get to and from the north side parallel taxiway. The terrain at the west end of the runway is particularly challenging and involves land outside BIA ownership.*
 - *The second terminal site is currently occupied by car parking. This would need to be relocated to suitable adjoining land. Expansion of the airport land into adjacent farm land would be required.*

- *We have not given any detailed consideration to the design of a second terminal at this stage. However it is likely that a low rise recessive building could be developed to limit the visual impact from land surrounding the airport.*

Car parking

- 12.21 It is difficult to reliably anticipate the passenger split by journey mode for the longer term development at this stage. Therefore assessments of car parking demand for the period 2015 to 2030 remain somewhat speculative. The land allocations in the 2015 Master Plan are sufficient to meet the demand at least up to 9 million passengers per annum. It is likely that further expansion to 2030 will require the south side to be extensively redeveloped and the relocation of existing car parking. Taking into account possible further growth in car parking our preliminary estimate is that up to 31 further hectares may be required for airport use. The car park appraisal referred to in Chapter 7 has identified potential land for car park and airport expansion. The need and options for providing car parking will need to be considered further at a later date in the context of long term strategic developments around Bristol and their implications for surface access.

Land use plan

- 12.22 An indicative land use plan has been prepared to show the potential land uses and land requirements for the 2030 passenger throughput. This has been prepared to indicate the scale of development that would be needed and indicative land uses.
- 12.23 The indicative land use plan shows locations for the primary passenger facilities – a second terminal to the south of the runway, with associated aircraft stands and a taxiway to each end of the runway. Cargo and aircraft maintenance could be expected to place demands on land use at these levels of passenger throughput and therefore zones for these facilities have been identified adjacent to the passenger facilities.
- 12.24 The indicative 2030 land use plan is included as Drawing 13. The location of the additional land required for the 2030 Master Plan has not been indicated at this stage. The potential locations for further airport expansion land, and options for car parking, have been identified in the car park appraisal work undertaken in conjunction with the 2015 Master Plan. The exact extent and location of the expanded facilities would be the subject of further detailed study when proposals for the 2030 expansion are brought forward.

Environmental issues

- 12.25 An environmental appraisal has not been undertaken of the potential further development to 2030. The uncertainties are too great at this stage to allow this to be done with any degree of accuracy. The issues are thought to be generally as those considered in Chapter 8. Clearly noise, air quality and impact on the countryside will be issues of most concern in terms of local impact. Climate change is considered in Chapter 10.



Noise

- 12.26 The RASCO study undertaken by the Government in preparation for the White Paper assessed the noise impact as being 'minimal' (defined as less than 2,500 more people affected compared with 1999). The number of people anticipated to fall within the 57dBA noise contour was expected to rise to around 3,500. Our interpretation of the noise contours prepared for 9mppa is that growth beyond that to 2030 will be associated with an increase in the number of people adversely affected by noise. However we anticipate that Government's estimate is a worst case scenario. The noise modelling undertaken for the 9mppa Master Plan included the 54 dB Leq contour as way of assessing the sensitivity of the noise impact to future growth.
- 12.27 Houses bordering Felton Common may suffer a high level of noise by 2030, were growth to continue in line with Government expectations. Were this to occur we would need to consult with the small number of residents that might be affected, on a voluntary house purchase scheme. The White Paper sets out clear requirements for airport operators in this respect.
- 12.28 With the emphasis on development expected to shift to the south side it would be reasonable to assume that the noise climate in the Lulsgate and Downside area would not deteriorate post 9mppa.

Air quality

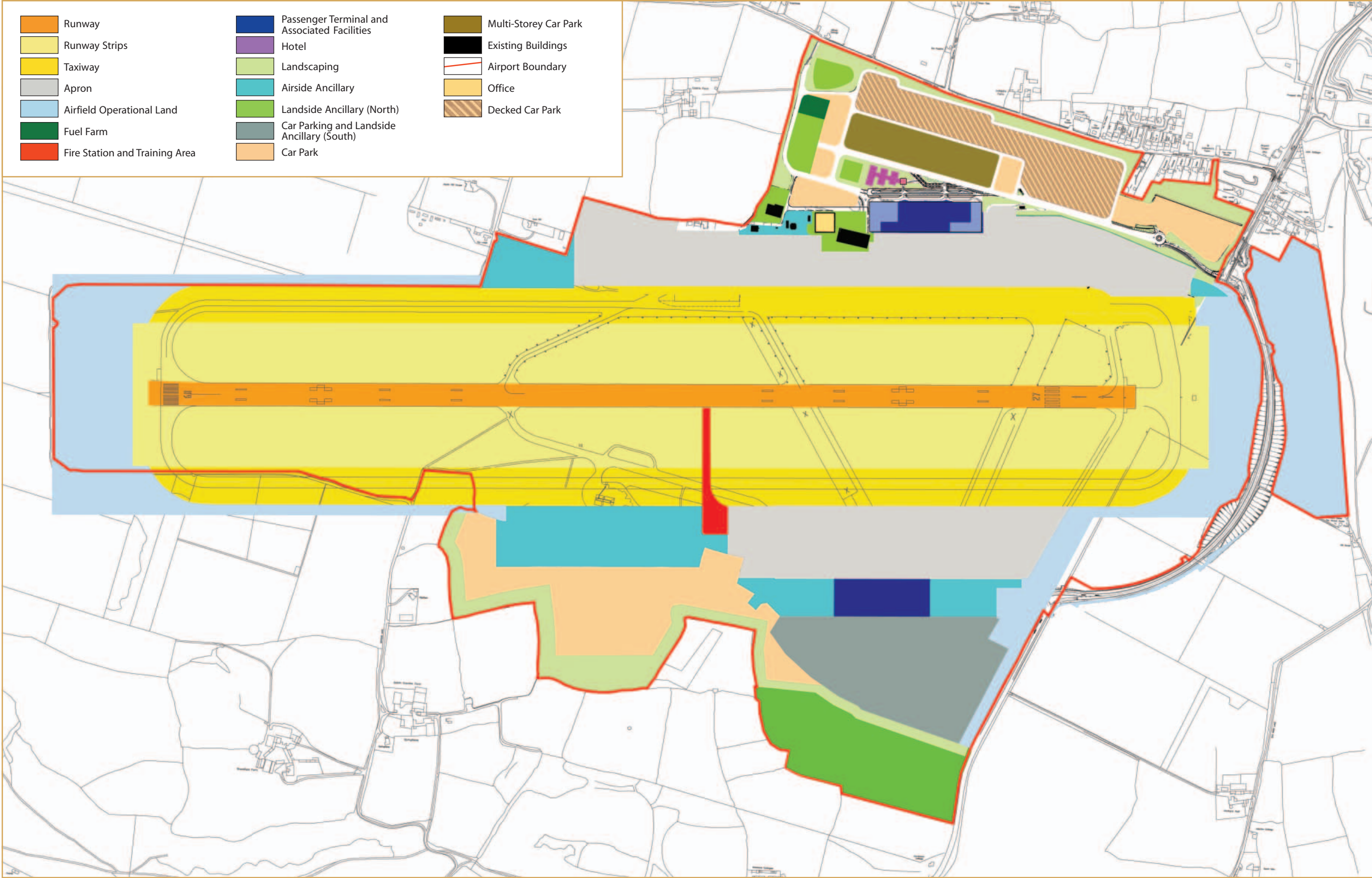
- 12.29 The RASCO study screening analysis indicated that BIA would not exceed air quality objectives in either 2015 or 2030. The air quality assessment undertaken by BIA for 9mppa is consistent with this conclusion and there is no reason to suspect that air quality issues would be a constraint on further growth. Full dispersion modelling would be undertaken as part of the process for preparing a detailed Master Plan for the 2030 development.

Impact on the countryside

- 12.30 Work on the indicative land use plan suggests that the airport land would need to expand by around a further 31 hectares, to a total area of 232 hectares. This would mean some further loss of Green Belt associated with the development of the second terminal. On the basis that the Master Plan is not proposing a runway extension, the loss of Green Belt will be less than that supported in the Air Transport White Paper. The Government concluded that this loss of Green Belt would not fundamentally affect the integrity of the Green Belt within the area and considered that it would, on balance be justified by the importance of the Airport's growth to the region's economy. This issue will need to be considered further in future reviews of the Green Belt as it applies at the Airport.

Surface access

- 12.31 The RASCO study forecast that by 2030 Airport traffic would account for 40% of traffic on the A38 which would suffer from major levels of congestion so constraining access to the



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airport. By 2030 all other key links would experience congestion to varying degrees due to high levels of background traffic, including intermediate levels of congestion on the A370 and M5.

- 12.32 The Greater Bristol Strategic Transport Study (GBSTS) has addressed the current and future transport needs within the Greater Bristol area and the outcomes from the study have been considered in Chapter 9. The proposed strategy addresses the long term surface access issues associated airport expansion.
- 12.33 Proposals for overcoming the 2030 surface access constraints need to be considered in the overall context of a transport strategy for the Greater Bristol sub region. Some improvements to road infrastructure are needed to improve accessibility and reduce traffic congestion. Improvements to the road infrastructure will also assist with the development of public transport to the Airport. The capacity of the A38 south of Bristol and connections with Weston-super-Mare are particular issues highlighted as being of long term concern from the work on the 2015 Master Plan.

Summary and key points

- A runway extension is not required and there are no proposals for this development.
- BIA is committed to maximising the development potential of the north side site but long term growth will require land outside the existing boundary to be safeguarded for airport use.
- The key issues for long term growth are noise, air quality, impact on the countryside and surface access.
- Detailed proposals for long term development between 2016 and 2030 will be brought forward as part of the Master Plan review process.



Chapter 13

Next steps

13

- 13.1 The Master Plan has been developed to communicate BIA's development plans to Government, and a wide range of stakeholders including local and regional interests. We will write to all those who responded to the consultation advising them that this substantial piece of work is now complete. The Master Plan reflects our detailed consideration of their contributions.

Further copies of the Master Plan can be obtained through the BIA website, www.bristolairport.co.uk or by referring to the local library.

- 13.2 The Master Plan will now be considered by North Somerset Council in preparation for the submission of planning applications for the development proposed. If you have any further comments on the proposals contained in the Master Plan you should forward these to the Council at the following address:

Kate Durston
Development Control
North Somerset Council
Somerset House
Oxford Street
Weston-super-Mare
Somerset BS23 1TG

E-mail: dccomments@n-somerset.gov.uk

Responses should be received by 22 December 2006.



Glossary of terms

ACARE

Advisory Council for Aeronautical Research in Europe. ACARE comprises about 30 members with a clearly defined and commonly agreed terms of reference, including representation from the Member States, the Commission and stakeholders, including manufacturing industry, airlines, airports, service providers, regulators, the research establishments and academia. The main aim is the strengthening and reorganising of aviation research and development efforts in Europe.

AONB

Area of Outstanding Natural Beauty. The primary purpose of AONB designation is to conserve and enhance the natural beauty of the area, which means that the area is protected for future generations to enjoy. The 41 AONBs in England and Wales share equal status with National Parks in terms of scenic beauty and landscape protection.

APU

Auxiliary Power Unit. A small auxiliary engine fitted to an aircraft to provide electrical power when main engines are shut down and air for air-conditioning and air starting.

Air Transport White Paper

The Future of Air Transport White Paper published in December 2003 setting out Government aviation policy across the UK.

ASAS

Airport Surface Access Strategy

ATM

Air Transport Movements. A landing or take off of a civil aircraft operating a scheduled or non-scheduled commercial service.

BIA

Bristol International Airport (used to refer to both the Airport and the Airport Operator).

CAA

The Civil Aviation Authority, the UK's independent aviation regulator, covering all civil aviation regulatory functions including economic regulation, airspace policy, safety regulation and consumer protection.

CO

Carbon monoxide.

dB

A logarithmic scale extending from 0 to 140 decibels (dB) corresponding to the intensity of sound pressure level.

dBA

A weighted sound level corrected to correspond more closely to the frequency response of the human ear.

DEFRA

Department for Environment, Farming and Rural Affairs (Government Department).



DfT

Department for Transport, the Government department responsible for transport policy, including aviation.

EIA

Environmental Impact Assessment, the regulatory process of assessing the effects of a project on the environment when deciding whether to authorise it.

ES

Environmental Statement, a document - or in many cases a series of documents - produced by the promoter of a project, or usually by consultants hired by the promoter, giving the promoter's assessment of the project's effects on the environment.

EU

European Union.

FTE

Full time equivalent. The number of staff expressed in terms of the hours worked by an equivalent full time person. This takes into account the amount of effort available from full and part-time staff whereas headcount merely counts the people irrespective of the number of hours worked.

GBSTS

Greater Bristol Strategic Transport Study, a study commissioned by the Government Office for the South West, assessing the current and future transport needs within the Greater Bristol area.

GDP

Gross Domestic Product.

HC

Hydrocarbons.

IATA

International Air Transport Association, a trade association representing the world's airlines.

ICAO

International Civil Aviation Organisation, an international organisation set up through the 1944 Chicago Convention as a means to secure international co-operation in safety and regulation of civil aviation.

ICT

Information & Communications Technologies.

ILS

Instrument Landing System. A radio aid used by pilots on their final approach and landing.

JLTP

Joint Local Transport Plan. Prepared jointly by Bath and North East Somerset, Bristol City, South Gloucestershire and North Somerset Councils the plan sets out the long term transport strategy for the sub-region and a five year action plan for 2006/07 to 2010/11. Published for consultation in autumn 2005.

JRSP

Joint Replacement Structure Plan. Prepared jointly by Bath and North East Somerset, Bristol City, South Gloucestershire and North Somerset Councils the plan sets out policy guidance for land use and transport planning decisions, providing a link between Government policy statements and local plans. Published in 2002 with a timescale to 2011.

 L_{Aeq}

The equivalent continuous sound level, the sound level of a steady sound having the same energy as a fluctuating sound over the same period. It is possible to consider this level as the ambient noise encompassing all noise at a given time. L_{Aeq} is considered the best general purpose index for environmental noise.

 L_{den}, L_{night}

Noise indicators identified in the European Noise Directive to be used to provide a strategic description of the noise environment at a particular location. The L_{den} considers an average 24 hour period in a year and divides the 24 hour period into three parts, namely day, evening and night. Penalties are added to noise occurring in evening and night to take account of increased sensitivity to noise at these times. L_{night} relates to the noise in the period 23:00 to 07:00. Both indicators are based on the L_{Aeq} .

LDF

Local Development Framework. A portfolio of documents which may be prepared at different times and cover different subjects and areas, but together provide a spatial strategy for North Somerset. Typically these will include:

- **Core Strategy.** *The overall vision and strategy for how development will be managed in North Somerset. This excludes site specific proposals which will be covered in a separate document.*
- **Site Allocations Development Plan Document.** *Showing sites to be allocated for housing, employment, community facilities etc*
- **Area Action Plans.** *To ensure development of an appropriate scale, mix and quality for areas of opportunity, change or conservation.*
- **Supplementary Planning Documents.** *These give detailed guidance on specific subjects or sites.*
- **Statement of Community Involvement.** *A document setting out how North Somerset will involve the local community and all other stakeholders in the preparation of documents within the Local Development Framework.*

LDS

The Local Development Scheme is a project Plan setting out what documents the Local Development Framework will contain. This sets out a timetable for the production of the various development plan documents over the following three years.

mppa

Million passengers per annum.

NO_x

Oxides of nitrogen.



ODPM

Office of the Deputy Prime Minister. Government department responsible for local and regional government, housing, planning, fire, regeneration, social exclusion and neighbourhood renewal.

Pax

Passenger movements - see mppa.

PM₁₀

Particulates smaller than, or equal to, 10 microns in diameter.

PSZ

Public Safety Zone. A defined area of land at the ends of a runway in which any development leading to an increase in the number of persons living, working or congregating within the zone is discouraged in the interest of public safety.

QC

Quota Count. A number (between 0.5 and 16) related to the noise classification of an aircraft.

RASCO

Regional Air Services Coordination Study. A component of a research programme into the future of aviation in the UK commissioned by the Government to help prepare for publication of the Air Transport White Paper.

RFF / RFFS

Rescue & Fire Fighting / Rescue & Fire Fighting Service.

RPB

Regional Planning Body. The South West Regional Assembly is the South West's Regional Planning Body charged with producing and implementing the South West Regional Spatial Strategy.

RSDF

Regional Sustainable Development Framework. A framework for the promotion of sustainable economic, social and environmental well-being of the region prepared by the Regional Assembly.

RSS

Regional Spatial Strategy. Part of the national planning system, the main purpose of which is to provide a long term land use and transport planning framework for the region.

SA

Sustainability Appraisal. A form of assessment for regional and local plans and major development projects which considers social and economic effects as well as environmental ones and appraises them in relation to the aims of sustainable development.

SAC

Special Area of Conservation. A European designated site of wildlife importance designated under the Conservation (Natural Habitats &c.) Regulations 1994.

SCI

Statement of Community Involvement. See LDF.

SEL

The Sound Exposure Level, a measure of sound energy, and is the sound pressure level which, if occurring over a period of one second would contain the same amount of energy as the sound event in question.

SSSI

Site of Special Scientific Interest. Sites of wildlife or geological interest which are protected under the Wildlife and Countryside Act 1981.

UK

United Kingdom.



Appendix A

Surface Access Strategy 2006 to 2011



Joint Local Transport Plan - 2006 to 2011

Bristol International Airport – Surface Access Strategy

September 2006

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1 Introduction

All airports in England and Wales with more than 1,000 passenger air transport movements a year are required to set up an Airport Transport Forum and prepare an Airport Surface Access Strategy. The strategy should set out short and long term targets for decreasing the proportion of journeys to the airport by car and increasing the proportion by public transport, for both air passengers and airport workers. Bristol International Airport (BIA) prepared an Airport Surface Access Strategy in 2000 which was included in the Local Transport Plans of Bristol City Council and North Somerset Council. This strategy is being revised to reflect the conclusions of the Future of Air Transport White Paper published in 2003 and the emerging BIA Master Plan. This document sets out a provisional strategy based on work undertaken to date on the Airport Master Plan. It has been prepared for inclusion in the Provisional Joint Local Transport Plan to be published in July 2005. Any adjustments that arise as a result of further work on the Airport Master Plan will be incorporated into a final version to be prepared in conjunction with the completion of the JLTP in March 2006.

2 Bristol International Airport

BIA is the United Kingdom's ninth largest airport and the fifth largest airport outside the South East¹. Currently the airport serves a network of 57 non-stop international and domestic scheduled destinations with a further 58 routes operated by charter airlines. In 2005 5.20 million passengers passed through the airport, of which 14% were carried on 'full service' scheduled carriers, 27% on charter (primarily leisure) services and 57% on low cost 'no frills' carriers (e.g. easyJet and Ryanair). 27% of passengers travelled on UK domestic services and 73% were international passengers.

BIA has a higher proportion of passengers flying for business purposes than many other airports in the United Kingdom, including Gatwick, Stansted, Nottingham East Midlands and Cardiff.

This underlines the importance of the airport to the regional economy. A survey of passengers undertaken by the CAA in 2003 showed that around 20% of passengers using Bristol were travelling for business purposes with the remaining 80% of passengers travelling for leisure purposes. 9% were foreign inbound passengers, split 3% business and 6% leisure.

The Airport has enjoyed significant growth over the last ten years (averaging 13.8%² passenger growth per annum). This compares with a UK average growth rate of 5.8%³ over the same period. The new facilities and in particular the new terminal building have served to stimulate interest in the Airport. Between 2000 and 2004 passenger growth has been particularly strong, primarily as a result of the development by GO (later taken over by easyJet) of a base at the Airport. In this period the number of passengers using the Airport has more than doubled from just under 2 million passengers per annum (mppa) in 2000 to 5.2 million passengers in 2005. Historical passenger growth is shown in figure A1 overleaf. The chart shows the steady growth in charter and scheduled passengers through the 1990's followed by a sharp rise in scheduled passengers from 2000 onwards resulting from the easyJet/GO operations.

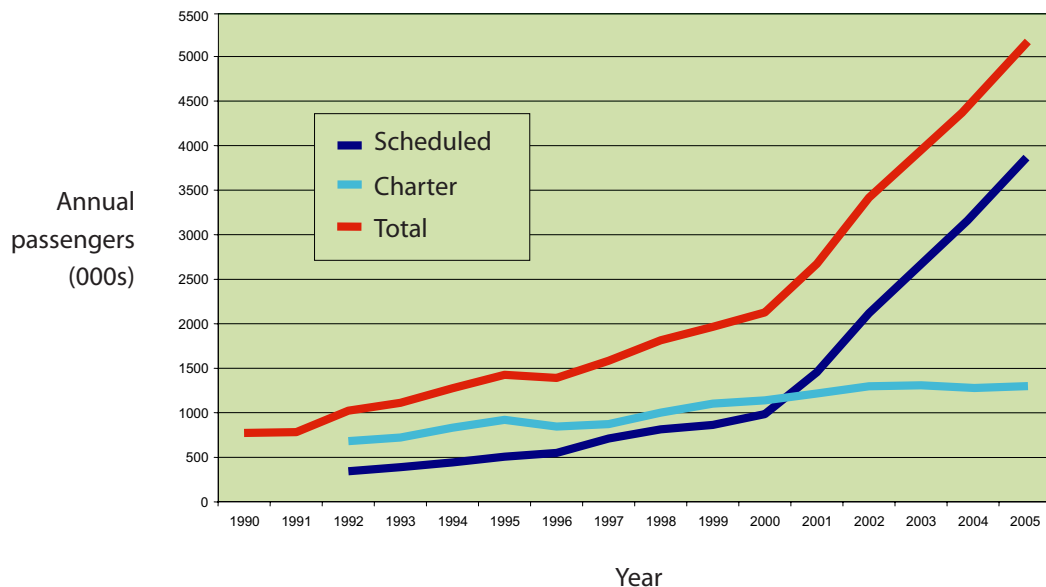
¹ Source CAA Airport Statistics 2005

² Source CAA Airport statistics. Calculated by BIA from data on www.caa.co.uk.

³ Source CAA Airport statistics - as above.

Figure A1 – Passenger growth at Bristol 1990 to 2005

Source – CAA Airport Statistics



3 Aviation White Paper

The National Policy on Aviation is set out in the Government's White Paper, 'The Future of Air Transport', published in December 2003. The Government's approach to airport expansion is to follow a balanced approach which:

- *Recognises the importance of air travel to our national and regional economic prosperity, and that not providing additional capacity where it is needed would significantly damage the economy and national prosperity;*
- *Reflects people's desire to travel further and more often by air, and to take advantage of the affordability of air travel and the opportunities this brings;*
- *Seeks to reduce and minimise the impacts of airports on those who live nearby, and on the natural environment;*
- *Ensures that, over time, aviation pays the external costs its activities impose on society at large;*
- *Minimises the need for airport development in new locations by making best use of existing capacity where possible;*
- *Respects the rights and interests of those affected by airport development;*
- *Provides greater certainty for all concerned in the planning of future airport capacity, but at the same time is sufficiently flexible to recognise and adapt to the uncertainties in long-term planning.*

In respect of regional airports the White Paper encourages growth to serve local and regional demand, subject to environmental constraints, with the following potential benefits:

- *Support for the growth of the regional economies;*



- *Relief for congestion at more overcrowded airports, particularly in the South East, and therefore making better use of existing capacity;*
- *Reducing the need for long-distance travel to and from airports; and*
- *Giving passengers greater choice.*

Specific issues identified by the White Paper for the South West of England are:

- *There is potential for beneficial growth at airports in the South West;*
- *Many passengers from the South West (currently around 70%) use airports in adjacent regions, mainly in the South East. This is one of the highest leakages of any English region and stemming this leakage is consistent with the key principle of reducing surface traffic by making better use of regional airports and BIA in particular;*
- *The Government's forecasts suggest that Bristol will remain the region's largest airport attracting between 10mppa and 12mppa by 2030. Expansion of the Airport, including a runway extension and new terminal is supported, subject to certain conditions; and*
- *The option of a new airport to the north of Bristol is not supported.*

In respect of surface access the White Paper notes that strategic surface access links to Bristol are not as good as at many other airports of a similar size. Links to the motorway network, which is some distance away, are via 'A' and 'B' roads that pass through villages and other built up areas. However it goes on to say that these roads are not heavily congested, except to the north of the airport where the A38 enters Bristol itself. Away from the immediate vicinity of the Airport the proportion of airport-related traffic is small. The express bus service from Bristol Temple Meads to the Airport, which is the main public transport link, is noted as being increasingly successful.

The Greater Bristol Strategic Transport Study (GBSTS) is considering what might be done to improve both road and public transport access to BIA. BIA is participating in the study process and has shared all available data on forecasts and surface access with the study team. The emerging Joint Local Transport Plan has also identified a number of initiatives to reduce congestion and promote public transport. It is clear from both the Local Transport Plan and the GBSTS that there is a wider traffic issue affecting the growth of the sub-region.

As part of the strategic view of air travel, the White Paper requires airport operators to produce master plans to explain how they propose to take forward the Government's strategic framework in the form of airport-specific proposals. BIA published its Master Plan Statement of Intent in February 2005 and is finalising its full Master Plan for autumn 2006.

4 Passenger forecasts

In the Future of Air Transport White Paper (ATWP) the Government anticipated that the demand for air travel could rise nationally, from 200 million passengers in 2003 to between 400 million and 600 million by 2030. At the same time the Department for Transport issued long term traffic forecasts for all airports in the United Kingdom. The 'central scenario' assumes a new runway at both Stansted and Heathrow (in that order) and predicts that Bristol would reach 7.2m passengers at 2015 and 11.6m passengers at 2030. This represents an average annual growth rate of 4.1% from 2003. This growth rate compares with the average annual growth rate of 13.3% at Bristol over the past ten years.

BIA has prepared its own high level forecasts as part of the preparation of the Airport Master Plan. At a high level the forecasts have been produced by:

- *Growing underlying traffic demand from Bristol's catchment area from a base of 2000*
- *Estimating the market share that Bristol will capture of the traffic from this catchment area.*

For domestic traffic the issue of traffic substitution from surface modes has also been considered.

The Bristol forecasts are broadly consistent with the forecasts in the ATWP which indicated that traffic could reach between 10mppa and 12mppa by 2030. However BIA predicts slightly higher growth, with a forecast of 8.1m at 2015 and 12.5m at 2030. The differences result from more up to date assumptions regarding the share of the South West catchment area, market growth and the attractiveness of Bristol in comparison with the South East Airports. The forecasts also reflect BIA's experience of operating and marketing the Airport. The difference between the BIA forecasts and those prepared by the Government is considered to be insignificant in the context of the range predicted for demand from the UK as a whole of between 400-600 million passengers by 2030.

In its Master Plan Statement of Intent BIA has indicated an intention to bring forward a detailed Master Plan for the period to 2015 based on annual throughput of 9 million passengers.

The 2003 CAA survey indicates that 22% of passengers on scheduled international services were of foreign origin. It is estimated that this might grow to more than 30% as the network of flights out of Bristol matures. There is no accurate data available to assess the proportion of inbound (i.e. not Bristol originating) passengers on UK domestic flights operating from BIA but for the basis of assessing public transport opportunities it has been assumed that this is around 40%.

5 Existing Surface Access Strategy

The Government indicated in its White Paper on the Future of Transport '**A New Deal for Transport: Better for Everyone**' that all airports in England with scheduled air services should establish Airport Transport Forums (ATFs) and prepare Airport Surface Access Strategies (ASAS) to feed into Local Transport Plans (LTPs). The Government published guidance⁴ in July 1999 on how airport operators should establish an ATF, and with their ATF partners, devise targets for increasing the proportion of journeys to airports by public transport and draw up a strategy for achieving these targets. Targets, and the strategies for achieving them were to feed into LTPs. The guidance required that all airports which have 1,000 or more scheduled and charter passenger air movements per annum set up ATFs and prepare ASAS. BIA is a 'qualifying' airport under this criteria.

BIA prepared an Airport Surface Access Strategy in 2000 in accordance with the Government's objectives for integrated transport. The purpose of the strategy is to promote improvements in surface access to the Airport and in particular, the use of public transport and other non-car modes of transport. The strategy includes an action plan and targets relating to public transport and green travel initiatives including:

- Increased use of the Bristol International Flyer coach service to Bristol;*
- Increased use of public transport, car sharing and cycling by airport staff;*

⁴ Guidance on Airport Transport Forums and Airport Surface Access Strategies (Department of the Environment, Transport and the Regions, July 1999).



- c. *Increased use of the local bus service between the Airport and Weston-super-Mare; and*
- d. *Increased use of the airport taxi service (AirportCarz) for two way journeys and shared taxis.*

The strategy noted the challenges that the Airport faced in changing the travel patterns of passengers and staff. The car was envisaged to continue to be the dominant form of transport to the Airport for the foreseeable future. However a small but steady reduction in the proportion of car borne transport was thought possible through the implementation of the strategy. Prior to the implementation of the ASAS the number of passengers using public transport was very low.

The Airport was providing a £150,000 per annum subsidy for the Flyer coach service, which had operated since 1998, by virtue of the Airport's part ownership by First, the bus operator. Prior to the options for non car travel to the Airport were very limited.

BIA's ASAS was published in the North Somerset and Bristol Local Transport Plans in July 2000.

The strategy and targets are reviewed on an annual basis. The successful delivery of the strategy and targets relies on a partnership between the members of the Airport Transport Forum, which currently includes representatives from:

- *Bristol International Airport Ltd staff and management*
- *Bristol International Airport Airline Operators Committee*
- *Bristol International Airport Consultative Committee*
- *First Great Western*
- *First Avon and Somerset, and First Bristol (bus operator)*
- *Bristol City Council*
- *Bath and North East Somerset Council*
- *North Somerset Council*
- *South Gloucestershire Council*
- *Government Office for the South West*
- *Network Rail*

The Surface Access Strategy has achieved many successes, such as:

- *Passenger numbers on the Flyer have increased from an estimated 60,000 in 1999 to 267,000 in 2004/05, including 51,000 journeys by airport staff. The proportion of passengers using the Flyer has increased from an estimated 3% of air passengers in 1999 to 4.6% in 2004/05 with a corresponding reduction in the proportion of passengers using the car for their journeys to the Airport.*
- *In August 2003 the service frequency was increased from two to three an hour for most of the day. The 20 minute frequency was extended to throughout the operating hours from March 2005. The effect of the increased frequency is that the connectivity with the rail network is significantly improved and journey times for many destinations are now comparable with undertaking the same journey by car.*
- *Travel on the Flyer is free for airport staff and stops have been added in South Bristol to facilitate their use of the bus. In 2004/05 51,000 journeys were made on the bus by staff, suggesting that around 3% of staff regularly travel to the Airport by bus.*
- *The operating hours of the Flyer have increased to cover early morning and late evening departures and arrivals and to cover the staff shift change pattern. The service now operates between 05:00 (to the Airport) and 23:40 (to Bristol).*

- *Development of the Flyer service has been achieved in close co-operation with the local bus operator, First, the Train Operating Companies and National Express. It is now possible to book through tickets on the rail system and through National Express between the Airport and anywhere in the UK.*
- *BIA has been working closely with North Somerset and Bath and North East Somerset to promote the awareness and usage of the opportunities for travel to and from the Airport using the local bus network. The Airport contributed funding to a leaflet and press campaign advertising the 121 service to Weston-super-Mare.*
- *BIA has invested in facilities for cyclists and car sharing.*
- *BIA co-funded a study into the A38/A370 link road in partnership with North Somerset Council, Bristol City Council and the South West Regional Development Agency. This scheme will now be considered by the Greater Bristol Strategic Transport Study.*

In February 2004 the route of the Flyer changed to take advantage of the bus priority measures provided in South Bristol as part of Bristol City Council's investment in the 76 and 77 showcase bus routes. This initiative by Bristol City Council and First represents a £1m a year investment in high quality public transport, resulting in new vehicles, bus priority measures and real time information. The new facilities were commissioned in autumn 2003. The Flyer has now been equipped with onboard GPS and intelligent signal priority equipment to take advantage of the bus activated traffic lights and real-time information displays that are available on the new route. The objective has been to improve the reliability and reduce journey times into the City Centre, particularly during peak periods.

The breakdown of the proportion of passengers by journey mode has been estimated using a combination of BIA data and CAA passenger survey data. The breakdown by mode is provided below.

Mode of transport	% age of passengers
Public service bus	5 %
Taxi	12 %
Charter or travel agent coach	2 %
Car hire	5 %
Car parked in long stay car park	38 %
Car dropped off	36 %
Car parked in short stay car park	2 %

The CAA Passenger Survey of 2003 recorded that 25% of the passengers parked long stay were parked in off airport car parks, almost all of which will have been unauthorised and operating without formal planning approval. The issue of unauthorised car parking and its effect on the Airport Surface Access Strategy has been considered at two enforcement appeal public inquiries and one informal hearing. In particular evidence to the inquiries assessed the relationship between pricing mechanisms for car parking and the use of public transport. This evidence demonstrated that below a certain level car park tariffs act as a disincentive to the use of public transport. To avoid this disincentive airport related car parks need to be under the control of the Airport. The Inspectors concluded that these car parks operated to the detriment of the Airport Surface Access Strategy, and the Green Belt.



The Airport Surface Access Strategy has developed and evolved since its initial publication in 2000. Since 2002 a target of increasing the proportion of passengers using the Flyer by 5% per annum has been adopted.

6 Surface Access Context

6.1 Overview

The Airport is located approximately seven miles to the south west of the main conurbation of Bristol, within North Somerset, in a rural part of the city region dominated by the city of Bristol. The Airport's main road access is by the A38. Bus connections from the city centre are provided at Temple Meads Station and the Marlborough Street Bus Station. There is no rail link at the Airport.

Analysis of the catchment area shows that in 2003, 45%⁵ of passengers came from the former county of Avon. This comprises 25% from Bristol, 7.4% from North Somerset, 7.3% from Bath and 5.5% from South Gloucestershire. Somerset and Devon accounted for 10% and 13% of passengers respectively. No other county accounted for more than 5% of passenger numbers. Analysis at district level shows that the Principal Urban Areas of Exeter, Plymouth, Cardiff, Swindon and Taunton each accounted for between 2% and 3% of passenger numbers. 10% of passengers came from Wales. The RASCO study undertaken by the Government as part of the preparation for the Aviation White Paper identified that 1.2m people lived within a one hour drive of BIA, with 7.3m within a two hour drive.

6.2 Rail

There is no rail link to BIA and no likelihood of one being provided in the foreseeable future. Access to the national rail network is provided by the Bristol International Flyer bus service to Temple Meads Station and the majority of bus passengers transfer to the rail network in this way. Sales of Flyer tickets through the rail network have grown dramatically since through ticketing became available through web-based sales agents, suggesting that ease of purchasing tickets is an important factor in securing public transport growth.

Temple Meads provides good local and national connections with regular services to London, Wales, the South West, the South Coast, Midlands and the North of England. Nailsea and Backwell station is slightly closer to the Airport, approximately 4.5 miles by road to the west, with limited local and commuter services, but no direct public transport link to the Airport. The local (121) bus service to Weston-super-Mare terminates at Weston-super-Mare station providing further opportunities for connections to the rail network.

The Strategic Rail Authority has awarded a new Greater Western rail franchise including the current Great Western, Great Western Link and Wessex Trains franchises, to First Great Western effective from 1 April 2006. The new franchise will run for seven years with an automatic three year extension subject to meeting agreed performance targets.

⁵ CAA survey 2003/04

6.3 Bus

The Bristol International Flyer service to Bristol Temple Meads Station and Marlborough Street Bus and Coach Station provides the mainstay of the public transport offer to BIA. In addition to the rail connections described above direct connections to the local and national bus and coach network provided by the Flyer include the following:

- 52 service to Hengrove and Highridge at Bedminster Down;
- 75, 76 and 77 services between north and south Bristol at Bedminster Parade;
- 8 and 9 services to Clifton at Temple Meads; and
- First Somerset and Avon and National Express services from the Marlborough Street Bus and Coach Station.

At present relatively little use is made of these connecting services, compared with the rail network. However a marketing campaign to promote the use of the local and rural bus network has been initiated with First, including the targeting of key audiences such as the student population. The facilities for passengers using the rural and national coach service will be transformed through the multi-million pound redevelopment of the Bus and Coach Station by First scheduled for completion in autumn 2005.

The draft provisional Joint Local Transport Plan identifies a number of new showcase Bus Routes for implementation during the plan period, with further potential to link with the Airport services.

The 121 local bus service between Weston-super-Mare and Bristol also calls at BIA. This service serves the villages on the A38 and A368 corridors with Weston-super-Mare and Bristol. The CAA Passenger Survey of 2003 records that just under 15,000 air passengers used the service that year.

Since March 2006 the National Express services 404 and 405 operating between Penzance and London have stopped at Bristol International Airport.

6.4 Highway network

The A38 provides the primary means of road access to the Airport. Data from North Somerset Council traffic counters indicates that this road is currently carrying between 8,000 and 12,000 vehicles a day each way to north of the Airport and between 7,000 and 9,000 vehicles a day each way to the south of the Airport. Between 4,500 and 7,000 vehicles both enter and leave BIA on a daily basis.

The road network experiences peak hour congestion in the Bedminster area of South Bristol, which affects journey times and accessibility to the motorway network and Bristol City Centre. Proposals to improve traffic circulation through South Bristol through the construction of a link road between the A38 and the A370, and the completion of the South Bristol Ring Road are being brought forward following the completion of the Greater Bristol Strategic Transport Study. There are also further proposals under consideration to relieve congestion on the M5 and improve access to Weston-super-Mare by linking a new south easterly ring road round Bristol to Weston-super-Mare via Bristol International Airport. Clearly such proposals would provide significant benefits for air passengers.

Access to BIA is also provided, indirectly, by the rural road network, in particular the B3130 between the A37 and the A370, which acts as a 'rat run' used by airport and commuter traffic seeking to avoid the



congested Bristol roads. The impact of Airport traffic on villages, especially those along the B3130 is a matter of some concern that has been investigated as part of the Transport Assessment for the Airport Master Plan.

An analysis of peak hour traffic flows on the A38 indicates little change in peak hour traffic volumes since 2000.

6.5 Airport car parking

There are currently around 11,500 car park spaces available for long stay car parking at BIA, arranged to the north of the terminal building and to the south of the airfield. The car park to the south is known as the Silver Zone Car Park and is available to passengers with stay lengths in excess of five days who pre-book their car parking.

A further 885 car park spaces are available in the north side car park for short and medium stay use. There are also 340 spaces for car rental cars and 665 spaces for staff.

The last five years have seen the emergence of a large number of unauthorised airport car parks, primarily in fields around the Airport. In excess of 2000 cars have been observed on these sites. Enforcement action by North Somerset Council has been upheld on appeal at public inquiries and there has been some success with curtailing the unauthorised activities. The issue of off site airport car parking in unauthorised locations has significant implications for the delivery of a successful Airport Surface Access Strategy.

6.6 Freight

BIA supports the operation of Ward Aviation Support, a cargo handling company, but the freight operation exists on a small scale with few vehicle movements on a daily basis. In addition the Royal Mail uses BIA as a hub for its Skynet service with air services transporting mail to the North of England and Scotland. Mail is brought to the Airport by road with up to 13 vehicle deliveries on a weekday night. However these deliveries take place during the late evening with no impact on peak highway capacity. No significant future changes in the freight and mail operation are expected.

6.7 Taxis

The airport taxi service is operated under a concession arrangement with Bristol International Cars (also known as AirportCarz). This concession has been operating since 1999 following the selection of AirportCarz through a competitive tender process.

The Airport taxi concession operates to strict service standards set by BIA in the concession agreement. BIA needs to operate its taxi system on this basis to ensure that taxis are readily available to passengers 24 hours a day. The service level agreement covers issues such as the availability of taxis, quality of vehicle, maximum waiting time, minimum number of taxis available and driver standards.

The concession agreement gives AirportCarz the sole right to ply for trade at the Airport. This does not prevent external companies from operating at the Airport as long as they have been pre-booked by customers. The Airport byelaws however prevent touting by external operators.

AirportCarz, being based at the Airport have the opportunity to use the same taxi for both arriving and departing passengers, by combining two jobs. The service uses seven seater Ford Galaxies with opportunities offered for taxi sharing. The Airport Surface Access Strategy notes the potential benefits of these features for reducing vehicle journeys to the Airport. In the year ending March 2005 AirportCarz carried an estimated 418,600 passengers, 7.9% of air passengers. This continues the trend of increased mode share over the previous years.

Pick-up facilities for taxis and members of the public are currently being upgraded with the development of a new fully surfaced car park to the west of the terminal building with a covered walkway connection.

6.8 Staff

BIA operates staff green travel initiatives under the auspices of the Airport Surface Access Strategy. The main opportunities for reducing reliance on the car are the use of the Flyer coach service and car sharing. The Flyer ticket machine data suggests that up to 3% of staff are making regular use of the coach service and surveys of staff indicate that up to 20% of staff make use of car sharing on an occasional basis. Less than 1% of staff use the bicycle or walk to work and in general the staff journey distances and local topography are not conducive to these modes of transport.

Surveys of staff have shown some interest in car sharing. However the majority of staff (around 95%) work shifts with shift patterns in many Airport businesses structured around the flight schedule. The number of Airport staff that drive to work on their own is therefore currently high, at around 93% of all staff. The same surveys show that the average journey to work for Airport staff is around 13 miles and there are a high proportion of females in employment at the Airport. 71% of staff reported that they operate variable shift patterns with many shifts incorporating working at unsociable hours.

Given the operational nature of the Airport business there is little opportunity for home working by Airport staff, except for administrative staff.

7 Role of Bristol International Airport

BIA is the main Airport in the South West Region, playing a leading role in the economic development of the region. BIA will continue to support the region by providing an increasing range of frequent scheduled services to the destinations required by business. It will also provide increasing choice and opportunities for leisure travel for people within its catchment area. By so doing the growth of BIA reduces the need for passengers from the South West to make surface journeys to airports outside the region.

The increasing range of scheduled services into and out of BIA means that the Airport has a key role to play as a gateway for tourists visiting the region. This includes overseas visitors and visitors from elsewhere in the UK. The development of services by Air SouthWest between Newquay, Plymouth and Bristol have shown the potential for Bristol to also act as a connecting airport, providing access to the Bristol route network for residents of the far South West, reducing the effects of peripherality.

BIA aims to meet the needs of both the business and leisure markets by providing services by low cost, full service and charter airlines.



8 Future Surface Access

8.1 Public transport strategy

The Provisional Revised Surface Access Strategy proposed that the proportion of passengers using public transport should rise by 10% per annum with a proposed target of 13% of passengers using public transport at 9 million passengers per annum. This target was derived by extrapolating recent performance of the airport's public transport operations. This approach has been thoroughly reviewed as part of the work to finalise the Master Plan. This has been undertaken by analysing the distribution of passengers within the airport's catchment area to identify concentrations of passengers that might generate demand for public transport; and by using data relating to public transport use as a proxy indicator to determine the likely usage of new bus services serving these areas. Those services which are likely to be sustainable have been taken forward into the public transport strategy. The target for public transport use has then been reassessed using this 'bottom up' approach and benchmarked against other UK airports.

Data on general public transport use in the sub region has been taken from the 2001 census. The travel to work data from the Census provides a good proxy indicator of the attractiveness and viability of public transport on a ward by ward basis. This shows that the South West Region has the lowest use of public transport of any of the English regions. The data also indicates that public transport use in Bristol and its sub region is lower than any of the eight English Core Cities. Outside the Bristol administrative boundary public transport use is well below the national average.

The CAA Survey of 2003/04 provides the most comprehensive analysis of the airport catchment area. This shows that 45% of passengers have an origin or destination in the West of England (North Somerset, Bath and North East Somerset, Bristol and South Gloucestershire). This comprises 25% from Bristol, 7.4% from North Somerset, 7.3% from Bath and North East Somerset and 5.5% from South Gloucestershire. Somerset and Devon accounted for 10% and 13% of passengers respectively. The principal urban areas of Exeter, Plymouth, Cardiff, Swindon and Taunton each accounted for between 2% and 3% of passengers. The dispersed nature of the catchment area outside the West of England suggests that the greatest potential for dedicated airport public transport services lies within the West of England.

The CAA survey provides information on the distribution of passengers down to district level. In order to determine the potential for public transport services an estimate of passenger numbers by town and/or ward is required. The 2001 Census population statistics provide further detail on the distribution of population within administrative areas. An estimate of the variation in propensity to fly from ward to ward has been made using airline data. By combining the two data sets it has therefore been possible to produce an estimate of the distribution of air passengers within the West of England and Somerset, and hence the number of air passengers from each location at various stages in the growth of the airport. The likely take up of public transport services on a route by route basis can therefore be determined using the estimate of passenger numbers on the proposed route and a target proportion of passengers that would use the service derived from the current usage of public transport in that area. The road network and journey time are also considerations in the assessment.

A number of Master Plan consultees commented on the lack of a direct rail link to Bristol International Airport and saw the need to develop a link as a prerequisite for future development. The provisional Surface Access Strategy and the draft Master Plan concluded that a rail link was not a realistic prospect. Whilst it may be theoretically technically feasible to develop such a link in reconsidering this issue we note:

- *The RASCO study indicates that heavy rail is only a realistic option for airports handling in excess of 15 mppa;*
- *For airports in the 5 to 15mppa category light rail may be an option. However the viability of light rail has been reassessed since the RASCO work was undertaken and most light rail schemes have been dropped on financial grounds. In particular plans for Bristol light rail scheme have been abandoned;*
- *A rail link to Bristol International Airport would only ever be a spur link from the mainline and would not avoid the need for a change of trains at Bristol Temple Meads for most journeys;*
- *No specific studies have been commissioned into the feasibility of a rail link but an indication of the potential cost of such a scheme can be gained by considering schemes being considered elsewhere. Plans for rail connections to Glasgow and Edinburgh Airports are being brought forward by authorities in Scotland with an estimated cost of £140m for Glasgow and £500m for Edinburgh. The challenges of the terrain between the Airport and Bristol would suggest that a rail scheme for Bristol would be likely to be at the higher end of this range;*
- *A completely new route for a rail link would be required with complex structures and earthworks required along the route. The Environmental Impact of such works must be a concern.*

The revised public transport strategy therefore reaffirms the airport's commitment to bus based public transport using Bristol Temple Meads as the primary rail head for the Airport. The use of Worle Parkway or Nailsea and Backwell stations as secondary rail heads is discussed below. The rail network will be the primary means of accessing the wider catchment area by public transport.

The long distance (National Express) bus services through Bristol generally leave or join the M5 at junction 18. A significant journey time penalty is incurred by routeing these services via the airport, the A38 and junction 22 on the M5. This remains a significant barrier to the delivery of direct long distance services for which there is no short term solution. There is potential for overnight services to be routed via the Airport for which the journey time is less critical. The 404 and 405 services between Penzance and London operate in this way. Further National Express passengers will be generated by connecting services through the Marlborough Street Bus and Coach Station.

Public transport provision to the Airport in the future will fall into two categories:

- *Links to public transport interchanges providing connections to the wider public transport system (i.e. the Bristol International Flyer);*
- *Bus services to destinations within the airport catchment area;*
- *Analysis of the current usage of the Flyer suggests that around 90% of air passengers are using the Flyer in conjunction with the rail, rural or national long distance bus service via interchanges in Bristol. For 2005 this would suggest that around 4.23% of air passengers used the Flyer to connect onto other transport services. This proportion will increase in the future as a result of:*
 - *Increasing proportion of inbound passengers;*
 - *Better integration with the wider public transport system;*
 - *Marketing and increased awareness of public transport opportunities;*
 - *Improvements to the wider public transport system;*
 - *Technology - improved ticketing and information systems.*



A target of increasing the 4.23% component of public transport by 5% per annum is therefore proposed based on past performance, and an assessment of the opportunities available. This would translate into a target of 8.4% of passengers using the Flyer for connecting services at 9mppa.

The following bus routes have been identified to be operated in conjunction with or as part of the Flyer network.

Airport to Clifton and Westbury-on-Trym

This service would target the city centre and its hotels and business district; the residential and business areas of Clifton; the University and the residential areas of Stoke Bishop, Henleaze and Westbury-on-Trym. A service between the Airport and Clifton commenced on 10 July 2006 in line with this strategy.

Airport to Bristol Parkway Station

This route has been identified as a potential new service by the Greater Bristol Strategic Transport Study. The estimated demand is low and the route is unlikely to be viable based on airport use alone. The public transport strategy envisages it being a potential long term option based on extending and adapting an existing bus route.

Airport to Portishead, Clevedon, Nailsea and Backwell

Based on the current usage of public transport and the journey times involved it seems unlikely that this route would achieve the level of patronage required to achieve an environmental benefit or to be commercially viable. Proposals for a service to Nailsea & Backwell Station are considered below.

Airport to Bath

At present a number of passengers use the indirect public transport route offered by the Flyer and rail via Temple Meads. With frequent services between the airport and Temple Meads and between Temple Meads and Bath this route offers a journey time that is generally better than could be offered by a direct coach service, albeit with the inconvenience of changing modes at the railway station. The quickest route is via the unsuitable B3130 through the Chew Valley but such a service must rely solely on the Bath/Airport point to point traffic. The business case for such a service is marginal, even at 9mppa. However the alternative route via Saltford, Keynsham and South Bristol shows more potential and as passenger numbers approach 9mppa this service is likely to become a viable option serving up to 1.1% of passengers. The demand for this service will therefore be regularly monitored, with a likely introduction as passenger numbers approach 9mppa. However a new direct coach service would involve the displacement of passengers from rail to bus and this may prove a disincentive to some operators.

Airport to Weston-super-Mare/Worle

The route to Weston is currently served by the 121 service operated by First which operates on an hourly basis during the day. The following options have been considered for improving public transport connections to Weston:

- **Maintain and develop the existing 121 service**
This service serves the rural community and is supported by North Somerset Council. Up to 0.2% of air passengers use the service but there is little scope to grow this proportion. It does not serve Worle and to do so might be to the detriment of its rural customer base.
- **Develop a new service between Weston and/or Worle and the airport**
The Weston Area Development Framework prepared by English Partnerships, North Somerset Council and the South West Regional Development Agency includes a number of proposals for transport infrastructure and public transport, including proposals aimed at improving the strategic links between BIA and Weston. The Development Framework and the draft RSS

propose major development between Weston/Worle and the M5, including new local highway infrastructure. The GBSTS has identified a route for a new strategic road link between Weston and Bristol via BIA. Worle Station has also been identified as a 'Park 'n' Ride' site and as a transport interchange. In conjunction with these proposals the Area Development Framework suggests that a high quality bus link should operate a 20 minute frequency linking Weston town centre, Worle Station, RAF Locking and BIA. Should the Area Development Framework proposals come to fruition then the prospects for a new bus route will be good. The strength of the route will rest on Worle's development as a transport interchange. In this respect issues to do with the platform length and ability of inter-city trains to use Worle Station need to be overcome before it can deliver its potential. BIA will therefore monitor this situation and reconsider the need for such a service as the situation becomes clearer. In the meantime Worle Station will form a consideration in the Staff Travel Plan for the use of airport employees.

- **Rail/bus using Nailsea and Backwell Station**

Nailsea and Backwell station is an easy ten minute bus journey from the airport, assuming agreement could be reached on the use of the Downside Road entrance for the bus. It is well connected to Clevedon and Nailsea by bus and by train to Taunton, Bridgwater, Burnham and Highbridge, Weston, Milton and Worle. A shuttle bus service would also serve Backwell and could link with the X1 bus service between Weston-super-Mare and Bristol. The southbound bus stop location is unsatisfactory for use in connection with the rail but it is possible that this is not an insurmountable issue.

The Nailsea and Backwell station is the preferred option, pending the delivery of plans for the Weston Vision and Worle Station and subject to overcoming the shortcomings of the station bus stop. The service is likely to require a subsidy but overall it is expected to make a worthwhile contribution to the surface access strategy. It is not possible to turn a bus at the station so it would carry on to Nailsea and turn there.

The route taken by coaches between airport and Bristol will be kept under review as potential urban extensions foreseen in the RSS and the transport proposals in the GBSTS come to fruition. There might be an opportunity to co-ordinate the Flyer services with the proposed Ashton Vale to Emerson's Green rapid transit line in the GBSTS. However we share the GBSTS conclusion that the extension of this service to the Airport is likely to give rise to conflicts between the needs of air passengers and commuters.

The changes to the Flyer service introduced in July 2006, including the service between the Airport and Clifton, have seen the frequency of services from the city centre increasing to four buses per hour for most of the day. We envisage this frequency increasing to six buses per hour with the public transport strategy outlined above, rising to ten buses per hour in the long term.

The Chew Magna 'Go Zero' environmental project and the Dragonflyer 'dial-a-ride' scheme has shown how community based bus services might be developed to service commuters to Bristol and passengers alike. There is considerable scope to develop these services in the future and this forms a component of the Surface Access Strategy off-setting journeys by commuters by using the Flyer.

The proposed public transport strategy and split by each service is summarised in the table overleaf.

The previously proposed 13% target is therefore considered an ambitious and stretching target but nevertheless it is proposed that it is retained. The potential delivery of new road infrastructure and improved bus priority measures through the Joint Local Transport Plan will assist with its achievement.

This target is set in the context of public transport performance across major cities of the UK and their airports in the table below, from which it can be seen that only two airports outside London achieve public transport use that is higher than 13%.



Proposed public transport strategy (9mppa)

Service	Proportion of Passengers
National Express direct services	0.2%
Bristol International Flyer	8.4%
Clifton/Westbury-on-Trym	1.2%
Bristol Parkway Station	0.4%
Bath/South Bristol	1.1%
Nailsea and Backwell/ Weston/Taunton/Bridgwater	0.3%
121 to Weston	0.2%
Other services (community/minibuses)	0.7%
Total	12.5% (say 13%)

8.2 Highway network

The Greater Bristol Strategic Transport Study (GBSTS) has developed a series of transport strategies for the Greater Bristol sub-region covering the period to 2030. The development and appraisal of the transport strategies was set out in the report published in 2006. The development of the strategy is based on significantly increased demand for travel arising from a projected growth in population and employment within the Greater Bristol area. The strategy sets out a series of transport measures designed to cater for and accommodate the projected growth in demand for travel in the following sequence:

- encouraging the use of alternative modes;
- management of travel demand;
- public transport improvements; and
- highway measures.

Surface access to Bristol International Airport was particular issue for consideration by the study.

The GBSTS strategy has a beneficial effect on access to BIA. The following highway schemes included in the strategy will be of particular benefit to Airport users:

- South Bristol Ring Road
- A38/A370 Link Road
- M5 junction 21 relocation
- M5 link to South Bristol International Airport

The South Bristol Ring Road has a strong economic performance and significant transport benefits. These benefits accrue from the improved accessibility provided around the south and east of Bristol and through providing connections to areas of the city proposed for major development. It greatly

improves the accessibility of the airport from South and East Bristol, and Bath and should enable these parts of the city to be easier to serve by public transport. The reduced congestion on the strategic road network will offer some benefit to passengers travelling from the north and east outer catchment areas but the journey time savings are likely to be a small proportion of the overall journey time. The GBSTS strategy does not include the M4 to A4174 link road at Emersons Green so traffic to the Airport from Swindon will continue to use the M5. Overall the scheme enhances the economic performance of areas of development to the South and East of Bristol, with part of this benefit deriving from access to the Airport. However additional measures will be necessary to ensure that the A38 south of the orbital route remains within capacity.

The principal economic benefits from the A38/A370 Link Road are not airport related and the scheme provides little benefit in terms of journey time savings for airport passengers. The latest work has shown that the 'red route', the route close to the city boundary, does provide significant relief for Barrow Gurney. The construction of the 'orange route', Barrow Gurney bypass, in addition has very little effect on the network performance. BIA notes that the driver for inclusion of the scheme on the strategy is economic performance associated with development. The BIA Master Plan Transport Assessment has identified the importance of providing relief from traffic for Barrow Gurney and therefore BIA strongly supports the early delivery of this element of the Strategy. The relationship between the red and orange routes on the performance of the A38 needs further consideration. BIA would be pleased to work with sub-regional partners to secure the successful early delivery of the A38/A370 Link Road.

The GBSTS has considered two schemes linking South Bristol and Weston-super-Mare. Of these a link from BIA to junction 21 on the M5 provides the better economic performance. Increases in travel are predicted from both BIA and the significant development identified at each end of the route. Substantial savings in journey times between Weston, Worle, BIA and South Bristol are achieved, but these are only of significance to Airport passengers from these locations. The journey time saving for passengers using the M5 from Somerset, Devon and Cornwall would not be significant. However the scheme would provide better connectivity between the Airport and Weston-super-Mare and may facilitate the introduction of new public transport services. In particular it might facilitate the rerouting of National Express coach services from the south via BIA. The principal benefit of the scheme to BIA is to improve the capacity of the A38. The priority is to increase the capacity between the Airport and the South Bristol Ring Road, but in the long term, the A38 to the south could also become a constraint on airport growth. However the link to junction 21 on the M5 has significant technical and environmental challenges to overcome. Early further investigation is therefore required to establish whether a satisfactory proposal can be developed.

BIA will play its part in the delivery of the GBSTS strategy and the resolution of the sub-region's transport problems.

BIA is acutely aware that traffic on the B3130 has an impact on communities, particularly the village of Barrow Gurney. The particular issues this causes for Barrow Gurney need to be solved. Although the traffic through this village is by no means entirely airport related, BIA has been actively working with the Parish Council to develop a traffic calming scheme, which also facilitates the construction of a footpath through the narrow section of the village. This work has shown that the traffic arrangements in the village can be improved and BIA will be pleased to be continued to be involved with the delivery of these works. The Transport Assessment has accordingly assumed that traffic flows through the village can be reduced in this way. The A38/370 link road provides permanent traffic relief and ensures the continued efficient movement of traffic to the south of Bristol.



8.3 Car parking

The future strategy and requirements for airport car parking are set out in the Bristol International Airport Master Plan which is being published in conjunction with the Airport Surface Access Strategy.

8.4 Taxis

The use of the Airport taxi concession (AirportCarz) for journeys to and from the Airport will continue to be supported and the operator will be encouraged to maximise the use of shared taxis and the use of taxis for both arriving and departing passengers. This approach minimises the adverse highway impacts of 'kiss and fly' trips to the airport.

8.5 Signage

The signage to the Airport was assessed prior to the issue of the 2000 ASAS in conjunction with Bristol City Council. Improvements were made to the signage around the Parsons Street gyratory at that time and subsequently the signage between Bath and the Airport has been adjusted to discourage the use of the B3130 as an access route. Passengers frequently make comments about airport signage on the road network, and with the growth in passenger numbers it is felt that a strategic review of this signage should be undertaken to include the Highways Agency.

8.6 Staff Travel Plan

BIA currently operates a number of initiatives aimed at reducing staff reliance on the car for their journeys to work. The Bristol International Flyer coach service to Bristol, for example, is free for all airport staff. However in spite of this the use of the car by staff remains high. Consequently a formal Staff Travel Plan is being implemented to promote and encourage alternative means of travel to and from the Airport and reduce single occupancy car journeys by staff. Importantly, the Travel Plan will help to ensure that BIA can recruit and retain the staff that help to make the Airport a success.

The Travel Plan includes the following targets:

- *To reduce the proportion of staff who commute on their own by car from 93% to 75%;*
- *To increase the level of those who commute as a car passenger approximately fourfold to 15.5% (currently 3.9%);*
- *To treble the proportion of staff who use bus based services from 2.5% to 7.5%;*
- *To achieve 1% cycle mode share; and*
- *To achieve 1% powered two wheeler mode share.*

Ten key measures have been identified to ensure that the Travel Plan is a success. These are as follows:

- *Easy-to-use Car Sharing Scheme;*
- *Extension to the Flyer airport express coach service;*
- *Staff only minibuses serving wide area and shift times;*
- *An improved secure staff car park with fairer charging policy;*

- *A staff travel incentive scheme;*
- *Better information and promotion of travel options;*
- *A staff travel website with information and live travel news;*
- *A Travel Plan Coordinator to help with travel needs and journey planning;*
- *Cycle facility improvements and cycle purchase scheme;*
- *Initiatives to reduce business travel impact.*

9 Targets and Actions

The operation of the 2000 ASAS established a target to achieve a 5% annual increase in the proportion of passengers using public bus services. The work to prepare the Airport Master Plan and this Surface Access Strategy has considered the opportunities for improving the public transport offer and the travel needs of Airport passengers in the future. As result of this work and the previous performance of the Flyer it has been agreed with the Airport Transport Forum that a more ambitious target should be adopted for the future. The 2006 to 2011 LTP ASAS seeks to put the Airport on a path to achieving 13% of passengers using public transport by the time passenger numbers reach 9mppa. To this end a 10% per annum target for the increase in the proportion of passengers using public transport is proposed for the LTP period. On this basis the proportion of passengers using bus services will need to rise to 8.9% by 2011. This is considered a challenging target given the nature of the catchment area and transport system serving BIA and its delivery is dependent on the successful closure of unauthorised car park sites, the successful delivery of airport growth through the planning system and the full involvement of the members of the Airport Transport Forum.

If it is assumed that the number of passengers using taxis remains at 12% of air passengers then the total number of air passengers using public transport would be 21% at 2011.

The Staff Travel Plan sets targets for reducing staff reliance on the car. These are set out in section 8.6 above.

The following objectives and actions are proposed for the period to 2011.

Objective	Actions
Increase the proportion of passengers using bus services by improving the availability and convenience of using Bristol International Flyer	Develop the Flyer coach service to better serve the Bristol catchment area through services to the city centre and Clifton. Increase the frequency of the Flyer service, with the aim of achieving, in time, a 10 minute frequency, with a bus always available at the Terminal Building. <i>(Action BIA/First)</i> Extend the hours of Flyer operation to include services for late night arrivals. <i>(Action BIA/First)</i>



Objective	Actions
...continued	Introduce internet ticket sales for bus journeys from BIA using best practice technology such as that used on the Dublin Aircoach. <i>(Action BIA/First)</i> Introduce a Flyer customer service point in the arrivals concourse to assist passengers and facilitate ticket sales. <i>(Action BIA/First)</i> Introduce a Flyer ticket sales point in the baggage reclaim hall. <i>(Action BIA)</i> Provide real time information at the Flyer bus stop outside the terminal building. <i>(Action BIA)</i> Consider opportunities for the sale of through tickets on the bus and rail network at the Terminal Building, using for example, self service ticket technology. <i>(Action BIA/First)</i> Develop the Flyer part of the BIA website, including consideration of a Flyer micro-site. <i>(Action BIA)</i> Provide an improved experience for passengers transferring between the Flyer and the rail network at Bristol Temple Meads Station. <i>(Action First Great Western/Greater Western Rail Franchisee)</i> Provide an improved experience for air passengers using the coach network at the new Marlborough Street Coach Station. <i>(Action First)</i> Market through ticket opportunities in conjunction with First. <i>(Action BIA/First)</i> Co-ordinate the Flyer and new showcase bus routes and facilities. <i>(Action BIA/UA's)</i> Provide improved facilities for passengers waiting for public transport services at the Airport. <i>(Action BIA)</i> Facilitate the use of public transport for passengers with early morning check in times by providing facilities for overnight stays at the Airport. <i>(Action BIA)</i>
Improve the reliability of the Flyer service	Deliver improved bus priority measures in conjunction with JLTP showcase bus routes. <i>(Action UA's/BIA)</i> Extend the operation of intelligent signal priority equipment to include further traffic light junctions. <i>(Action BIA/Bristol City Council/North Somerset Council)</i> Improve access to Bristol Temple Meads Station for buses. <i>(Action First Great Western/Bristol City Council)</i> Improve bus boarding process including consideration of pre purchased tickets (see above) and modifications to the bus fleet. <i>(Action BIA/First)</i>

Objective	Actions
Improve local bus services	Enhance the availability of local bus services for passengers and staff. <i>Monitor demand for new services and introduce services to Weston-super-Mare, Bath and Nailsea as demand arises. (Action BIA/First/North Somerset/Bristol City Council)</i>
Improve coach services	Work with coach operators and travel agents to encourage the provision of dedicated airport services and charter coaches from outside the West of England. Work with National Express to provide a stop off point for long distance services. <i>(Action BIA)</i>
Provide controlled expansion of airport car parking with pricing mechanisms to encourage the use of public transport	All car parking to be properly authorised through the planning system and developed within the context of the Airport Surface Access Strategy through airport control and management. <i>(Action North Somerset Council and BIA)</i> Maximise the use of existing airport land for car parking through appropriate use of 'block parking' and multi-storey car parks or other off airport car parking sites which produce a more sustainable option <i>(Action BIA)</i>.
Make efficient use of the highway network by airport traffic	Develop and improve the airport taxi service. <i>(Action BIA)</i> Provide car parking facilities and favour car parking over drop off/pick up. <i>(Action BIA)</i> Carry out a strategic review of airport signing on the highway network. <i>(Action BIA/highways authorities/Highways Agency)</i> Determine the impact on the local rural road network from airport traffic and develop appropriate mitigation measures where necessary. <i>(Action BIA/UA's)</i> Work with the local authorities to deliver new road infrastructure including the A38/A370 link road. <i>(Action BIA/North Somerset Council/Bristol City Council)</i>
Promote sustainable staff travel opportunities through the development and implementation of a staff travel plan	Explore local bus service opportunities for staff. <i>(Action BIA/First)</i> Promote and incentivise car sharing <i>(Action BIA)</i> Maintain facilities at the Airport for walking and cycling. <i>(Action BIA)</i> See also 8.6 above.



The ASAS will be the subject of an annual progress review when targets will be adjusted based on actual achievements. The ASAS will be further reviewed around 2011 when specific longer term actions can be refined. In the meantime it is proposed that following medium to long term actions are considered:

- Provision of dedicated direct bus services to further local and long distance destinations;
- Develop diverse bus routes through Bristol City Centre to widen the availability of access.
- Implementation of the Greater Bristol Strategic Transport Study transport improvements for the West of England sub region, including improved road infrastructure serving BIA.

10 Implementation

The Aviation White Paper makes it clear that the responsibility for bringing proposals for surface access improvements lies with airport operators working closely with the Department for Transport, Strategic Rail Authority, Highways Agency and regional and local bodies. The delivery of the specific actions identified in this Surface Access Strategy is seen as a collaborative effort involving:

- *Bristol International Airport and its airport business partners;*
- *Transport operators, in particular, First, the Greater Western Rail franchisee and National Express; and*
- *The local highway authorities.*

The delivery of improved transport infrastructure in the wider West of England sub region is seen as a wider issue with beneficiaries other than BIA. BIA will work with the local and sub-regional partners to contribute to the process for their delivery.

All the bodies listed above with specific actions are represented at the BIA Airport Transport Forum. BIA will take a lead role at the Forum and its sub-groups to deliver the proposed strategy.

This Surface Access Strategy should be read in conjunction with into the Joint Local Transport Plan for the West of England sub region. It is also anticipated that the ASAS will also be reflected in the Regional Spatial Strategy and Local Development Frameworks.

Detailed proposals for the development of BIA are identified in the emerging Airport Master Plan. The Master Plan has considered the impact of airport traffic on the highway network and proposals for developing the airport car parks. The details are set out in the Transport Assessment which is being published in conjunction with the Master Plan.

Appendix B

Public safety zone risk contours

B







Appendix C

Noise contours



Figure C1 – 2004 actual noise contours

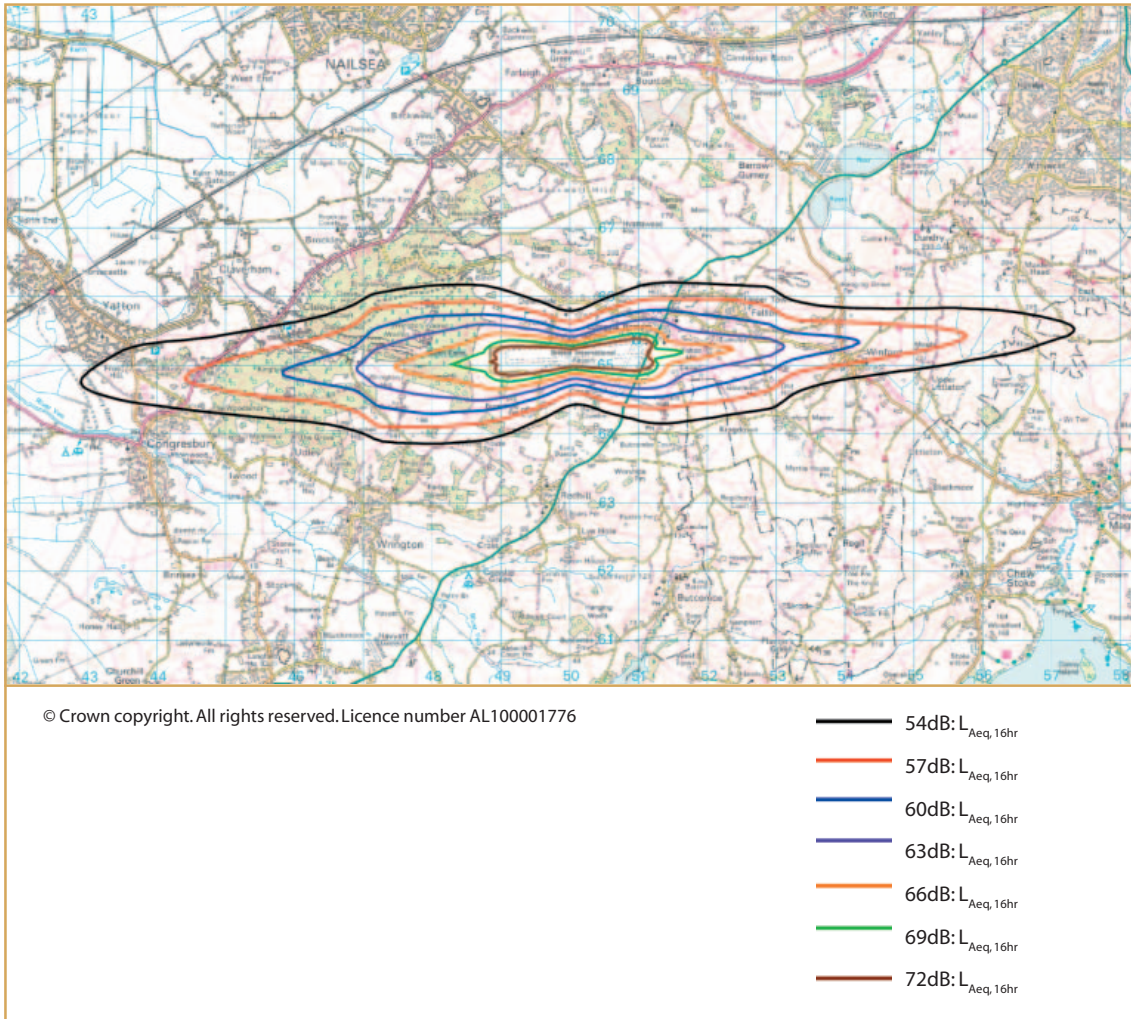


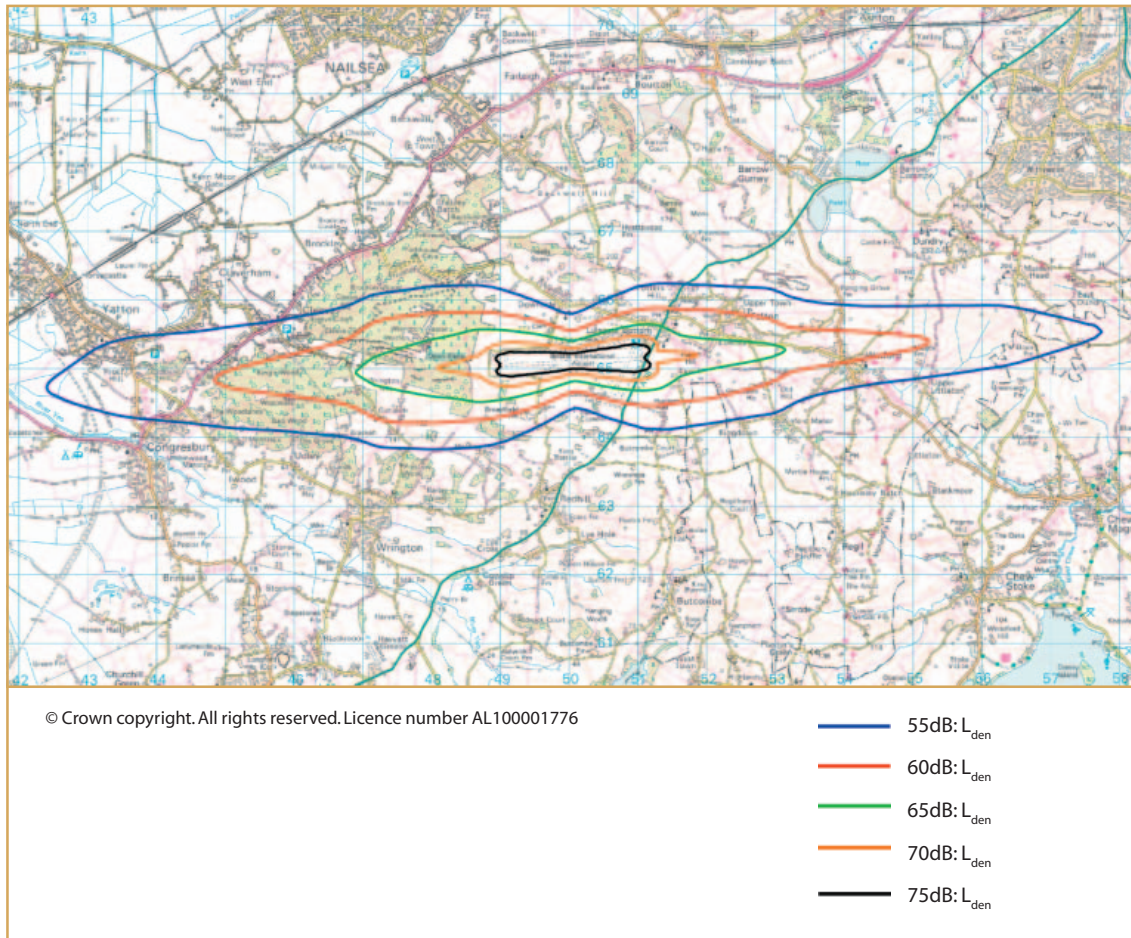
Figure C2 – 2004 L_{den} noise contours

Figure C3 – 2004 Night noise contours

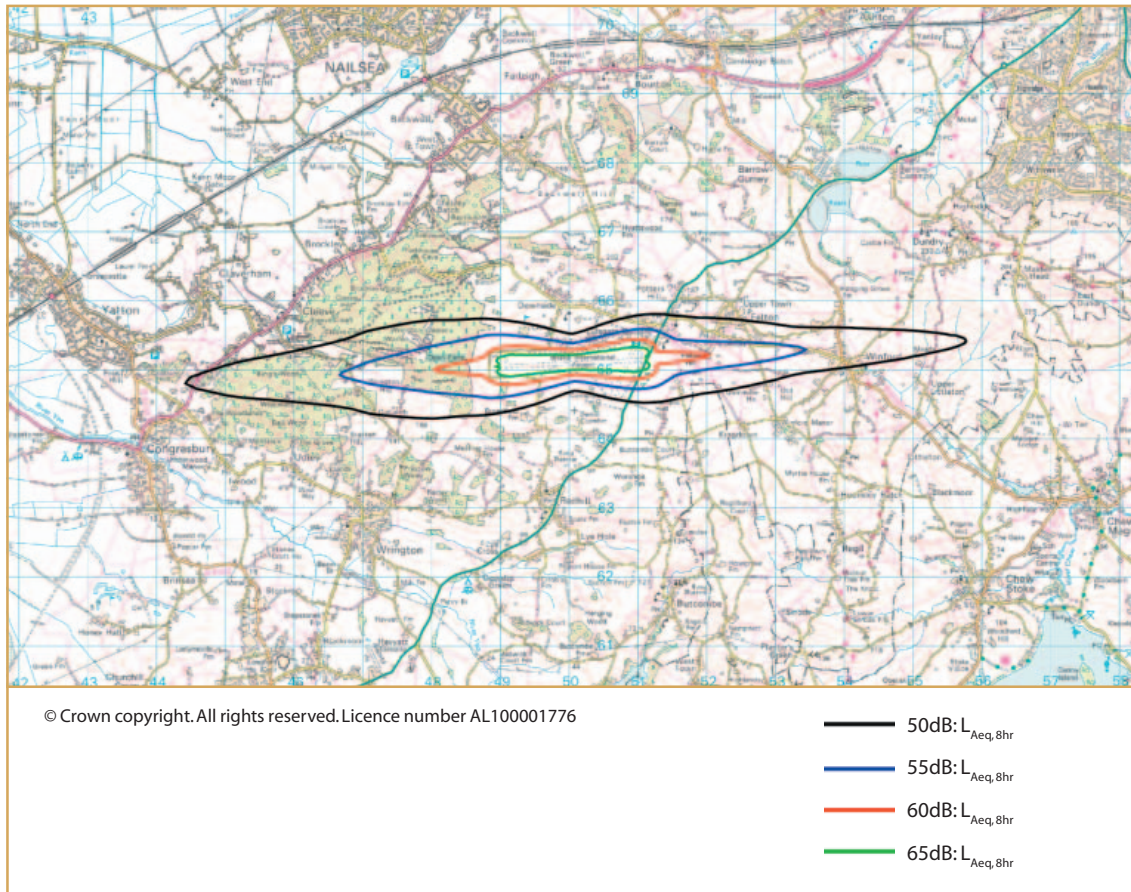


Figure C4 – 6 MPPA noise contours

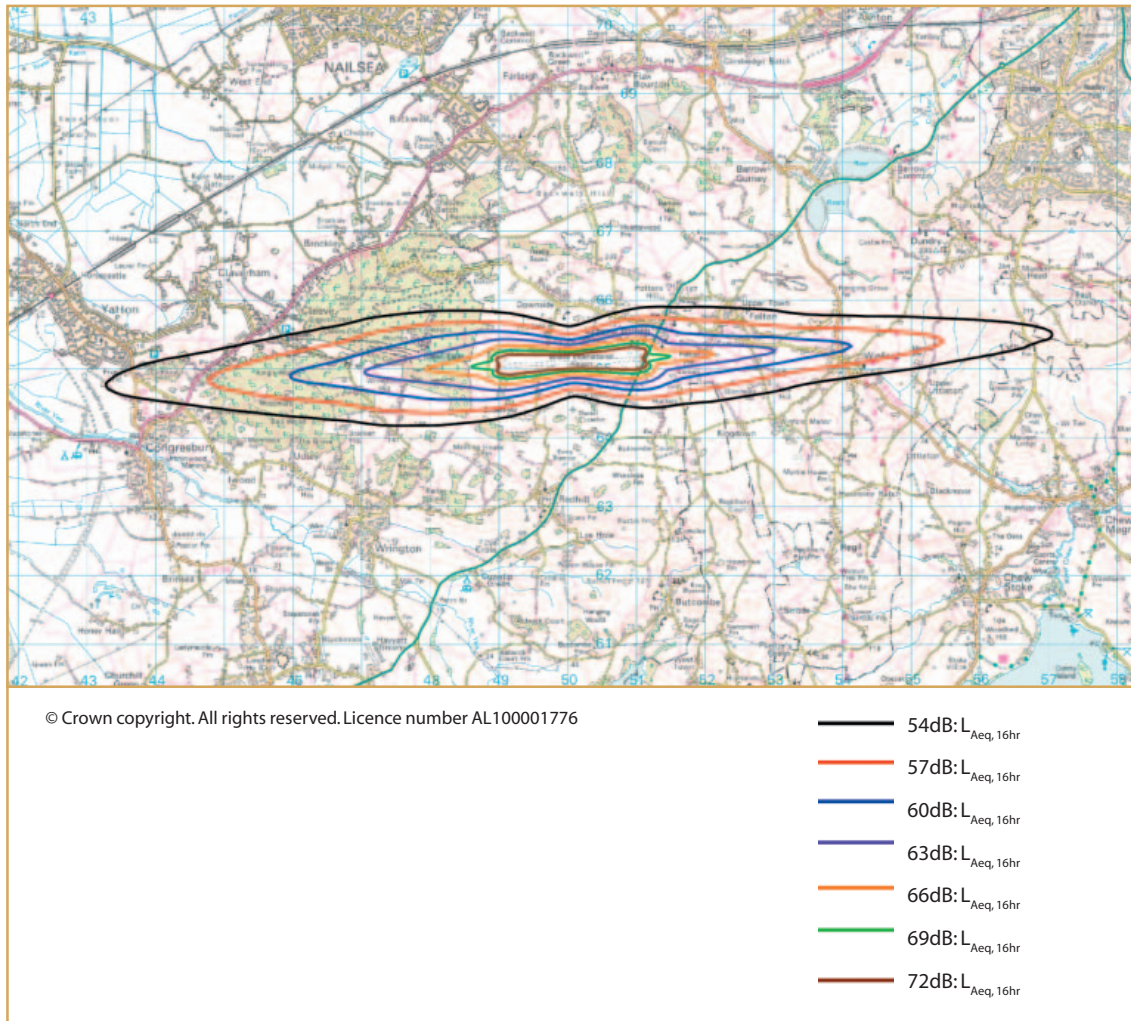
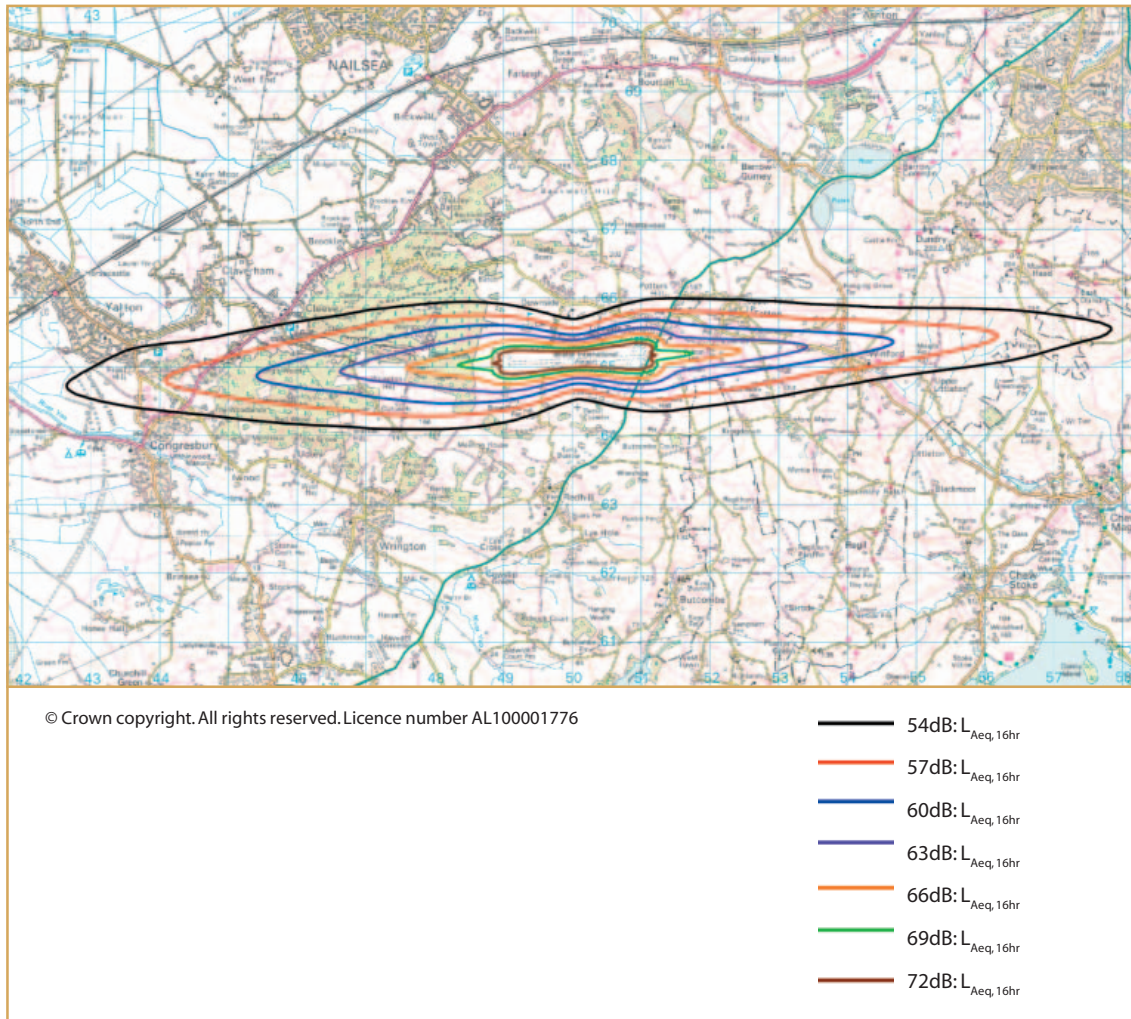


Figure C5 – 9 MPPA noise contours



Appendix D

Overview of mitigation measures



The table overleaf provides an outline of potential mitigation requirements identified by the environmental appraisal of Bristol International Airport's Master Plan. The mitigation identified here is based on the initial-phase qualitative studies, and should therefore be viewed as a realistic indicator of potential mitigation requirements. Subsequent more detailed quantitative investigations and consultations, together with evolutions of the master plan design, are likely to result in modifications to this table.



Issue	Mitigation (and supporting activities) <u>required pre and during construction to reduce significance to acceptable level (tried and tested best practice)</u>	Mitigation (and supporting activities) <u>required to minimise operational effects of the development</u>
Air Quality		
Generation of dust and its deposition on residential/employment sites/Felton Primary School and ecological receptors (including Felton Common CWS).	Development and implementation of a dust control strategy. Monitoring dust deposition at receptors located nearest to construction activities.	None
Increase in aircraft/vehicle/equipment emissions as a result in increased air traffic movements and associated infrastructure, and passenger, staff and commercial vehicle movements.	None	Optimal design of road layouts etc to minimise proximity of junctions, dropping off points etc to residential/employment sites/Felton Primary School and ecological receptors (including Felton Common CWS). Optimal design of aircraft stands, taxiways, etc to maximise buffer distance from adjacent residential/employment sites/Felton Primary School and ecological receptors. Increased use of clean technology/engines where appropriate. Collection of NO _x data from key ecological receptors (e.g. King's Wood and Urchin Wood SSSI and Goblin Combe SSSI). Monitoring of PM ₁₀ as part of post-scheme air quality monitoring.
Archaeology & Cultural Heritage		
Loss of features associated with the WWII Airfield	All of these features lie in the southern part of the airfield and outside to the south in the vicinity of Cornerpool Farm. Effects on these will need to be re-appraised in light of detailed plans for additional car parking and any other built development in these areas. Further consultation and research will also need to be undertaken to establish the significance of these features. Retention of the aircraft dispersal pens in particular should be retained by development wherever possible. However, it may be acceptable to preserve these by record, in accordance with PPG 16, if their loss is unavoidable.	Not applicable
Loss of the remains of surface lead extraction, known as 'Gruffy Ground'	These features lie in an area of land acquisition to the south of the current airport and to the south east of Cornerpool Farm. It is unlikely that they will be affected by development, however if they are it may be acceptable to preserve these by record, in accordance with PPG 16, if their loss is unavoidable	Not applicable
There is some potential for further unrecorded archaeology, particularly of a prehistoric date, to survive within the area proposed for development	There is no suggestion that remains of national importance survive within the area to be developed and therefore it is likely that the loss of any remains encountered can be sufficiently compensated by their preservation by record, in accordance with PPG 16	Not applicable
Indirect effects on the setting of Scheduled Monuments in the vicinity of the airport	Although these effects could be considered at the culmination of the construction stage, it is more appropriate to consider them as operational effects.	The development scheme should be re-appraised in light of any changes, although indirect effects are not likely to be significant given the existence of the present airfield and no mitigation is currently proposed

Issue	Mitigation (and supporting activities) <u>required pre and during construction to reduce significance to acceptable level (tried and tested best practice)</u>	Mitigation (and supporting activities) <u>required to minimise operational effects of the development</u>
Biodiversity		
Generation of dust and its deposition on ecological receptors.	Dealt with above.	Update nature conservation management strategy.
Demolition of structures that may potentially support roosting bats (if confirmed to be present).	Survey to confirm roost presence and population data needed for DEFRA licence application. Exclusion of bats and provision of alternative roost structures prior to demolition under a DEFRA licence. Post-scheme monitoring (depending on roost status and magnitude of effect).	Update nature conservation management strategy.
Loss of elements of known commuting routes and areas of foraging habitat for bats, particularly greater horseshoe bats, typically to the south of the airport.	Survey to confirm extent of bat foraging habitat within the development site and use of features such as hedgerows. Enhancement of surrounding hedgerows to develop alternative commuting routes. Creation/enhancement of alternative foraging habitat (cattle grazed grassland).	Update nature conservation management strategy. Post-scheme monitoring to demonstrate effectiveness of mitigation.
Disturbance of bats from lighting/ vehicle movements foraging/ commuting adjacent to new car parks	None	Provision of unlit buffer between car park and nearest known bat foraging/commuting habitat (typically a hedgerow). Use of lighting designed to minimise spillage of light off-site.
Disturbance or destruction of grassland and scrub that is potential foraging, resting/over-wintering habitat used by great crested newts (if confirmed to be present).	Survey to confirm presence/absence of great crested newt and, if present, gather population data needed for DEFRA licence application. Erection of exclusion fencing around perimeter of habitats within construction site, capture of newts and translocation to adjacent suitable habitat. Enhancement of alternative habitat for foraging/resting/over-wintering great crested newts. Post-scheme monitoring (depending on population size and magnitude of effect).	Update nature conservation management strategy.
Disturbance, isolation, or destruction of badger setts	Survey to confirm status of the badger populations and extent of territories to support licence application to English Nature. Creation of new artificial sett, potentially associated with new landscape bund. Exclusion of badgers and closure of setts prior to construction. Post-scheme monitoring of artificial sett to confirm success of translocation (depending on population size and magnitude of effect).	Update nature conservation management strategy. Install badger proof fencing and underpasses, if necessary, along new roads within the territories of existing badger populations.
Disturbance or destruction of grassland, scrub, rubble that is potential foraging, resting/over-wintering habitat used by reptiles (if confirmed to be present).	Erection of exclusion fencing (could be the same as the newt fencing identified above) around perimeter of habitats within construction site, capture of reptiles and translocation to local receptor site. Continued...	Update nature conservation management strategy.



Issue	Mitigation (and supporting activities) <u>required pre and during construction to reduce significance to acceptable level (tried and tested best practice)</u>	Mitigation (and supporting activities) <u>required to minimise operational effects of the development</u>
Biodiversity (continued)	Enhancement of alternative habitat for foraging/basking/over-wintering great crested newts. Post-scheme monitoring to confirm success of translocation.	
Potential disturbance to nesting birds, eggs and young, and loss of breeding habitat.	Removal of potential nesting habitat outside of the bird breeding season (i.e. removal between mid-August to mid-February), taking into account restrictions associated with other protected species. Enhancement of alternative habitat for birds (taking into account bird strike risk).	Update nature conservation management strategy.
Potential change in vegetation composition due to elevated NO _x deposition from increase aircraft movements, particularly in the North Somerset and Mendips SAC and constituent SSSI.	None.	Use of clean technology/aircraft where possible. Collection of NO _x data from key ecological receptors (e.g. King's Wood and Urchin Wood SSSI and Goblin Combe SSSI).
Potential use of land for ecological compensation.	Enhancement of habitats for bats, reptiles, badgers and semi-improved calcareous grassland flora, and local Biodiversity Action Plan target species/habitats.	Update nature conservation management strategy.
Community		
Effects upon rural characteristic of the area and character and amenities of surrounding villages.	Provision of a rural character assessment survey.	Update community strategy to incorporate survey recommendations.
Geology and land quality		
Exposure of site visitors and workforce to potential contamination	Appropriate site investigation and testing to confirm potential for contamination and to design necessary remediation/disposal strategy. Exclusion of site visitors from working area. Provision of appropriate safety induction training and Personal Protection Equipment (PPE) to construction workforce.	Adoption of best practice techniques in the design and operation of new infrastructure and equipment.
Exposure of water resources, biodiversity and uncontaminated soil to potential contamination.	Appropriate site investigation and testing to confirm potential for contamination and to design necessary remediation/disposal strategy. Adoption of appropriate design measures and management practices to restrict off-site migration of contaminants.	Adoption of best practice techniques in the design and operation of new infrastructure and equipment.
Landscape		
Change to landscape features and elements within the existing airport boundary.	Develop effective landscaping schemes. Avoid damage or loss of mature vegetation (where appropriate).	Ensure appropriate management regime is applied during the long-term operation of the site.

Issue	Mitigation (and supporting activities) <u>required pre and during construction to reduce significance to acceptable level (tried and tested best practice)</u>	Mitigation (and supporting activities) <u>required to minimise operational effects of the development</u>
Landscape (continued)		
Change to landscape features and elements at Cornerpool Farm.	Strengthen existing boundaries (e.g. hedgerows) - taking into account ecological requirements. Minimise/avoid damage or loss of mature vegetation (where appropriate), including hedgerows and field boundaries.	Ensure appropriate management regime is applied during the long-term operation of the site, including pro-active management of hedgerows and woodland blocks, which could be augmented by additional planting.
Change to landscape character of the wider area (subject to the findings of the landscape assessment)	Bring forward mitigation works such as boundary planting, construction of earth bunds so that they are in place for the majority of construction.	Adopt measures to reduce the apparent dominance of the airport, and in particular the car park extension and potentially the new office accommodation and tank farm, in the landscape are required. These could include appropriate design of buildings (selection of materials, colour, and use of screening vegetation [both on site and off-site]).
Visual		
Visibility of the new tank farm.	None.	Adopt an aesthetic design for the tank farm, use appropriate colours and textures to reduce visual impact. Augment intervening vegetation to mask views to the site from key receptors. Use underground tanks.
Change in views of the entrance to the airport from the construction of new aircraft stands and potential noise barrier.	Bring forward mitigation works such as boundary planting, construction of earth bunds so that they are in place for the majority of construction. Avoid damage or loss of mature vegetation (where appropriate). Develop effective landscaping schemes. Provide sufficient space to create a sense of arrival, and to screen and soften any new structures.	Ensure appropriate management regime is applied during the long-term operation of the site.
Change in views towards the short stay car park and proposed airport hotel/multi-storey car park.	None.	Careful choice of architectural style. Use of well-designed lighting to minimise off-site light pollution or glare.
Change in views from distant viewpoints (including the Mendips AONB) – visibility of the car park extensions.	None	Augmentation of vegetation. Construct additional earth bunds to the south of the areas, together with planting to screen views from the A38. Adoption of a lighting scheme to minimise glare and off-site light pollution.
Noise		
Disturbance of local residents, employees and school children from construction noise (subject to the findings of a noise assessment).	The site will be registered under the 'Considerate Constructors' (www.ccscheme.org.uk) scheme. Definition and adoption of suitable noise minimisation techniques (e.g. use of boarding, 'quiet plant', mufflers, limit construction to daylight hours).	None.



Issue	Mitigation (and supporting activities) <u>required pre and during construction to reduce significance to acceptable level (tried and tested best practice)</u>	Mitigation (and supporting activities) <u>required to minimise operational effects of the development</u>
Noise (continued)		
Change in airborne noise resulting in a modification in the position of the predicted 57 dBA contour (onset of community annoyance)	None.	Phase out of older noisier aircraft. Adjustment of operational procedures in conjunction with airspace changes. Noise monitoring and mapping.
Change in airborne noise resulting in a modification in the position of the predicted 63 dBA contour (threshold of noise insulation grant scheme)	None.	All houses likely to be affected covered by the previous noise insulation grant scheme.
Change in airborne noise resulting in a modification in the position of the predicted 69 dBA contour (threshold of noise insulation grant scheme)	None.	No houses anticipated to be affected.
Increased noise from ground operations in close proximity to the airport (e.g. properties at the north-western end of the runway, St Katharine's Primary School, Felton [if not relocated], and residential properties at Lulsgate Bottom and Felton (subject to the findings of the noise assessment).	None.	Construction of a suitable acoustic screen (materials, design, position and alignment cannot be determined at this stage) between the new stands and the sensitive receptors. Operational restrictions (e.g. restricting use of APU's for when passengers are on board only). Use of quieter ground equipment (e.g. fixed ground power rather than APU).
Increased noise from road traffic.	None.	Optimal design of road layouts etc to minimise proximity of junctions, dropping off points etc to residential/employment sites/St Katharine's Primary School, Felton. Promoting public transport to and from the airport.
Transport		
Impact of road traffic generated by airport activity	Construction environmental management plan with construction delivery strategy.	Travel plan for passengers and staff to reduce car use. Increased use of public transport as Airport Surface Access Strategy. Improved road infrastructure. Contribution to off airport highway works.
Vortex and Vibration		
Disturbance from vibration originating from ground-based equipment and aircraft in the take-off and landing cycle.	The site will be registered under the 'Considerate Constructors' (www.ccscheme.org.uk) scheme. Adoption of best practice techniques to minimise vibration during construction. Obtain a disturbance licence from English Nature if piling (or similar) is proposed within 50m of any badger sett entrance, or 30m if heavy plant, or 20m if light plant, or 10m if hand activities.	None.
Damage to properties from vortex strikes.	None.	BIA vortex repair scheme.

Issue	Mitigation (and supporting activities) <u>required pre and during construction to reduce significance to acceptable level (tried and tested best practice)</u>	Mitigation (and supporting activities) <u>required to minimise operational effects of the development</u>
Water Resources and Quality		
Potential spillage of construction contaminants, damage to existing tanks, or re-mobilisation of historic contaminants.	Development and implementation of a robust construction site environmental and health and safety management plan based on best practice procedures (e.g. those promoted by CIRIA and the Environment Agency). This would include a pollution response and clean-up plan. Site investigation and on-site remediation, isolation or off-site disposal of historic contamination within construction area prior to construction. Provision of temporary interceptors or balancing/settling lagoons if necessary. Monitoring of the quality of discharge to groundwater to ensure compliance with the EA discharge consent.	Monitoring of the quality of discharge to groundwater, and groundwater via existing boreholes, to ensure compliance with the EA discharge consent. Development of existing environmental management procedures, potentially leading to ISO 14001 accreditation.
Increased use of de-icers, fuels and other substances due to increase in aircraft and associated vehicles.	None.	Use of bunds/double-skinned tanks to prevent contamination from catastrophic tank failures. Potential use of bespoke drainage system and interceptors in new build areas where contamination may occur (e.g. fire station, tank farm). Adherence to protocols set out in current guidance on the use of de-icers by the Environment Agency. Monitoring of the quality of discharge to groundwater, and groundwater via existing boreholes, to ensure compliance with the EA discharge consent and efficacy of existing drainage system. Development of existing environmental management procedures, potentially leading to ISO 14001 accreditation.
Increase in areas of hard standing (new stands, modification to taxiway, apron and holding area, new roads and pavement, and car parking)	None.	Incorporation of SuDS (permeable car park surfacing with sand layer to intercept hydrocarbon spillages) into new car parking areas. SuDS will also promote natural recharge to groundwater, mimicking natural processes and reducing risk of local off-site flooding. Appropriate modifications to the interceptor system to take additional runoff from areas of hardstanding/new roofs etc. Discharge to soakaway, mimicking natural processes and reducing risk of local off-site flooding.
Sustainable Construction		
Use of natural resources in development of the Airport	Construction environmental management plan. Recycling and reuse of construction materials on site.	Design to minimise use of natural resources, conserve energy and water use.



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