Australian Government

Department of Infrastructure and Transport

A study of Wilton and RAAF Base Richmond for civil aviation operations

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Director - Publishing and Communications
Communications Branch
Department of Infrastructure and Transport
GPO Box 594
Canberra ACT 2601
Australia

Email: publishing@infrastructure.gov.au
Website: www.infrastructure.gov.au

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PART 1
INTRODUCTION

1. Introduction

1.1. Setting the scene

In March 2012, the Australian and New South Wales governments received the Joint Study on aviation capacity in the Sydney region (the Joint Study). The Minister for Infrastructure and Transport immediately released it and the underpinning technical papers for wider public information. The Joint Study analyses Sydney's future aviation capacity constraints and describes the consequences of growing congestion at the local and national levels of the economy.

The findings were unambiguous. The Sydney region is already facing a progressively worsening aviation capacity and congestion problem that will constrain access into Sydney and have detrimental social and economic effects especially in New South Wales (NSW).

The Joint Study assessed a variety of proposals for meeting Sydney's aviation needs. While some had potential to provide marginal capacity benefits (such as amending cap and curfew arrangements), these were considered extremely short-term – in some cases, providing less than one year of capacity. Other proposals (such as expanding Sydney (Kingsford-Smith) Airport, or connecting a high speed train to Canberra or Newcastle) were identified to require significant investments, without necessarily relieving air traffic pressures.[1]

The Joint Study identified that a supplementary airport in the Sydney basin is needed in service before the end of the next decade. Taking account of the considerable work to agree on a site, conduct the necessary environmental assessments and start design and construction (estimated up to 21 years)[2], the Study highlighted that a decision on the way forward is required without delay.

A summary of the Joint Study recommendations is at Section 6.5.

1.2. Purpose of the current study

In May 2012 the Australian Government considered the Joint Study and agreed to a strategy that included:

- ensuring that Sydney Airport Corporation Limited develops a strategy to invest in terminal, apron, taxiway and other improvements to operate Sydney (Kingsford-Smith) Airport to maximum efficiency;
- working with the NSW Government to develop a long-term plan to meet projected demand on the road and rail networks servicing Sydney (Kingsford-Smith) Airport;
- a detailed investigation into the suitability of sites available in the Wilton region, including conducting preliminary economic, social and environmental studies; and
- assessing the scope and consequences of utilising RAAF Base Richmond for limited civil operations, including consideration of social, economic and environmental impacts.

This report sets out the assessment of the most suitable site in the Wilton area for greenfield airport development that would be capable of supporting Sydney's civil aviation needs on a 50 year planning horizon, and the further assessment of the consequences of opening Richmond to limited passenger services. It draws from three technical studies commissioned by the

1 Further detail on these assessments is in Part Three and Six of the Joint Study. The recently released *High Speed Rail Study: Phase 2* report affirms this finding.
2 This estimate made in Part Eight of the Joint Study is based on the complete construction of a full international airport.

Department of Infrastructure and Transport (the Department) in mid-2012, including:

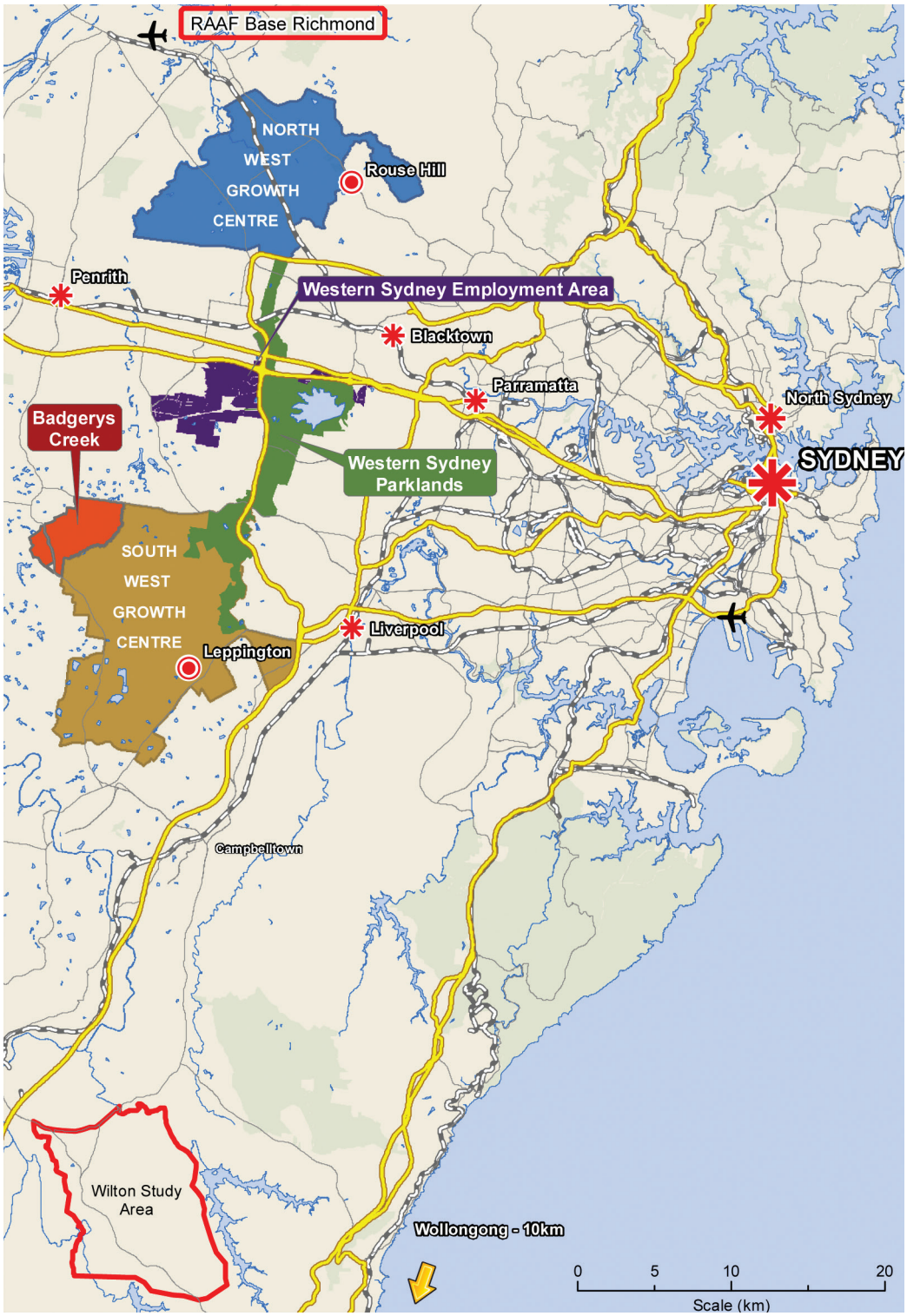
- scenario-based passenger demand analysis, undertaken by Booz & Company;
- a detailed assessment of environmental and engineering issues of an airport development near Wilton, led by WorleyParsons; and
- a thorough examination of the scale and nature of impacts of an airport development on the surrounding Wilton and Richmond communities, including factors such as aircraft noise, opportunities for employment and infrastructure investment, conducted by Ernst & Young.

In undertaking this analysis for Government, the Department also considered the consequences of using the Commonwealth-owned site at Badgerys Creek. This was to provide an objective basis for assessing the economic and social benefits of a site at Wilton. To a lesser degree, it also helps understand the contribution that RAAF Base Richmond could make.

In addition to these studies, the Department contracted PwC to host an industry forum in November 2012. The forum included representatives from a number of domestic and international airline interests and senior analysts from major financial institutions.

The purpose of the industry forum was to explore market attitudes to a supplementary airport in Sydney. Given that no new major capital-city airport has been built since the late 1980s, the Department believed that industry perspectives would be valuable in understanding what factors in Australia would influence the commercial use and viability of a supplementary airport. To this end, determining where the national interest aligns with industry investment strategies and market forces is important for any consideration of what and when to build new airport capacity to avoid the worst consequences of Sydney's aviation congestion.

Figure 1 Wilton and Richmond sites in the Sydney region



Note: The Western Sydney Employment Area shown is as defined by the NSW Metropolitan Plan for 2036. The recently released draft Metropolitan Strategy for Sydney proposes to expand this towards and including Badgerys Creek.

Source: Department of Infrastructure and Transport.

1.3. Key issues and assumptions underpinning the scoping studies

The analytical work conducted builds on key findings from the Joint Study but it was also guided by some general parameters to ensure consistency across the different streams of work.

The assumptions focussed on:

- the volume and type of demand that could be catered for;
- the capacity required to meet that demand; and
- the timing of capacity being provided given construction and other development requirements.

Wherever possible, the latest data from the Australian Bureau of Statistics have been used. However, when that has not been possible, it has been noted in the text. In addition, this report uses forecasts from the Joint Study, and background data drawn from the NSW Bureau of Transport Statistics and the NSW Government's draft *Metropolitan Strategy for Sydney* released in March 2013.

Passenger demand

The Joint Study identified that passenger travel was the main aviation market likely to be affected by long-term capacity constraints in Sydney. In particular, the Joint Study considered that Sydney (Kingsford-Smith) Airport would be unable to meet long-term passenger demand for the region.[3]

The report found that the airport is currently constrained in peak periods, and will come under increasing pressure.

- By 2015, all peak hour slots at the airport will be allocated; and the road access to the domestic precinct will be at capacity.
- By 2017, the long term operating plan, which was designed to distribute the effects of aircraft noise more equitably across communities, will only be able to operate for limited periods.
- By 2020, there will be inadequate aircraft stands at the airport to park aircraft and load/off-load passengers.
- By 2027, slots across all hours of the day will be allocated.
- Beyond 2033, demand across all operating hours will be unmet.

Unmet demand is estimated to reach 54 million passenger movements in 2060, excluding any new demand generated by a new airport (see Section 1.4). This represents a cumulative shortfall of approximately 665 million passenger movements over a 27 year period (Figure 2). The unmet demand will be across all market segments – regional, domestic and international.

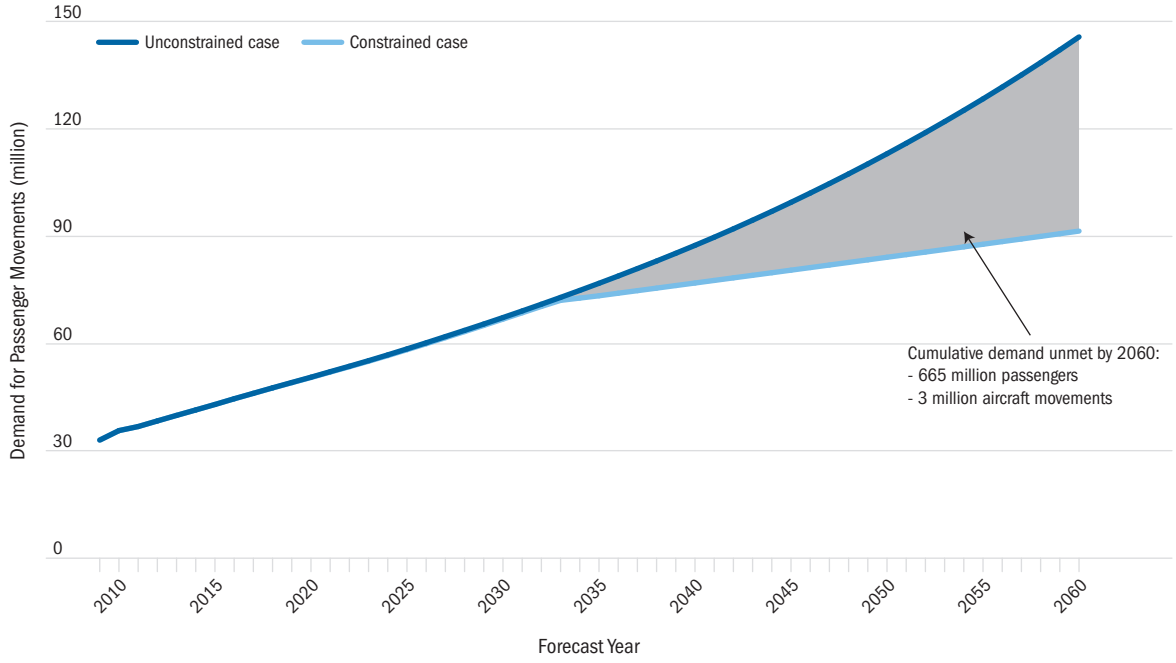
The Steering Committee considered these figures to be conservative. As shown in Part Three of the Joint Study, forecasts from the Bureau of Infrastructure, Transport and Regional Economics suggest Sydney (Kingsford-Smith) Airport will reach capacity by the mid-2020s.[4] This has been supported by separate analysis published recently by the Commonwealth Bank of Australia.[5]

3 A level of freight demand may also need to be accommodated given the curfew restrictions on overnight freight. However, freight data are more limited and accordingly analysis was only considered in general terms and not specifically by site. Consistent with the Joint Study, it was assumed that freight would only move to a second airport in 2033. Further information is in the technical papers.

4 Bureau of Infrastructure, Transport, and Regional Economics, *Aircraft movements through capital city airports to 2029–30*, Research Report 117, 2010. Comparison of these forecasts and the Joint Study forecasts are in Part Three of the Joint Study.

5 Commonwealth Bank of Australia, *Global Markets Research Sydney Versus the World,* 2013.

Figure 2 **Expected capacity shortfall for passenger movements at Sydney (Kingsford-Smith) Airport, 2010 to 2060**



Note: *Unconstrained case represents forecast passenger demand without any capacity limits. The constrained case represents forecast passenger demand taking into account the legislated 80-movement-per-hour cap and curfew arrangements; and a level of capacity lost to weather impacts (estimated by Airservices Australia at 10 per cent of total theoretical capacity). A level of upgauging (increasing aircraft size) has been considered.*

Source: Joint Study on aviation capacity in the Sydney Region 2012.

Booz & Company was commissioned to undertake analysis on the unmet passenger demand and how it would be distributed between Sydney (Kingsford-Smith) Airport and a second airport. In conducting this work, they made certain assumptions about a range of factors that would affect passenger demand at the different sites. Specifically, that:

- distribution of passenger demographics (e.g. income) and demand in the Sydney region remains constant;[6]
- air fares are assumed to remain consistent across the board, irrespective of the ownership and operating model of the second airport and the services that may be provided by airlines at both sites; and
- accessibility of travel to and from the airport is based on current fares, travel times and distances.[7]

The range of services that might be offered at one airport compared with another was taken into account only in general terms; and further modelling would be helpful in understanding how patronage would vary with particular service offerings.

Airport capacity

For the purposes of this report, the Department assumed that a new airport at Wilton would eventually need to be able to cater for up to 400,000 aircraft movements (take-offs or landings) or around 70 million passenger movements (arrivals or departures) annually (depending on the type and size of aircraft). The airport would need to be capable of serving all market segments, including long-haul international; and provide for all aircraft types, both narrow and wide body.

6 In practice, with increasing population moving towards Western Sydney, there could be a greater shift in distribution of aviation users to those locations. This means the estimates could be conservative.

7 Changing costs, airfares or investment upgrades could make either airport more or less attractive to passengers or other users.

Specific features include:

- two 4,000 metre runways, sufficient to handle existing and future widebody aircraft;[8]
  - the runways would need to be 'wide-spaced',[9] permitting independent operations (typically involving aircraft arrivals on one runway with departures from the other);[10] and
- a crossrunway to manage services when the main runways were unavailable, usually due to adverse weather conditions (including high crosswind components).[11]

In order to determine the potential economic, employment and social consequences of an airport at Wilton it has been assumed that full services would be available from the outset. In practice, however, investment in infrastructure and services would grow with demand. For example, only a single runway layout with sufficient terminal and apron space for limited startup services is anticipated for operations to commence. This would then grow to a parallel runway configuration when passenger numbers warrant it. Accordingly, it is also important that the site has the capability to allow for staging and that the design is flexible to adjust to changes in technology or land use planning needs.

In the case of Richmond, and consistent with recommendations of the Joint Study, the analysis assumed no significant change to the airfield footprint or aeronautical infrastructure. As a fully functioning airfield, Richmond could accommodate a level of passenger services with relatively modest investment - including terminal facilities and whatever modifications might be required to physically separate its military and civilian functions. However, given the runway is between the townships of Richmond and Windsor, there is no scope to expand the existing runway (2,134 metres). The capacity on the existing east–west runway is estimated at approximately 42,000 aircraft movements or approximately 5 million passenger movements per year. This capacity permits ongoing RAAF operations consistent with current Defence needs.

The Joint Study identified that there may be scope to build a north-south runway at Richmond of up to 4,000 metres to cater for international traffic. Under this scenario, the capacity is expected to be approximately 186,000 to 250,000 aircraft movements or 20 to 30 million passenger movements per year. This report takes the conservative estimate of 20 million passenger movements for its analysis.

Airport start-up

In addition, the commencement dates for each location have been assumed. This was important to give an indication of when an airport may be able to be operational, but also to more accurately assess scale and timing of the economic and social benefits associated with an airport.

The start-up dates were based on an estimate of the time it could take to proceed through a formal environmental assessment, develop detailed designs and construct an airport suitable for the early years of operation. This would be a significant and time-consuming process in the case of a greenfield site. The Joint Study estimated anywhere between 11 and 17 years from site study to initial operations, depending on location.[12] The Department's judgement was that an airport at Wilton would take longer to bring into service than would be the case at Badgerys Creek. This is because land at Badgerys Creek has already been acquired by the Commonwealth; extensive environmental assessments have been concluded and implemented; and the

8 Runway length, width and weight capabilities affect the size and load of aircraft that can operate.
9 The international standard for wide spacing means that these runways are separated laterally by at least 1.525 kilometres.
10 International standards specified by the International Civil Aviation Organization apply to the separation of aircraft in the airspace around the airport and on the airfield itself. The appropriate separation distance is important from a safety perspective to minimise the risk of collision.
11 As a comparison, the current cross-runway at Sydney (Kingsford-Smith) Airport operates, among other times, when there are strong westerly winds preventing use of the parallel north-south runways.
12 Further information on possible time frames for when a greenfield airport may become operational can be found in Part Eight of the Joint Study.

topography is less challenging for constructing an airport. Commencement of services for the purpose of these studies was therefore assumed to be:

- Wilton 2030;
- Badgerys Creek 2025; and
- Richmond 2017.

In adapting the forecast demand analysis to incorporate these dates, Booz & Company assumed a period of three years before the airport was adequately established. Accordingly, Wilton, Badgerys Creek and Richmond were considered to be capable of meeting all forecast demand by 2033, 2028 and 2020 respectively. Ernst & Young's economic and social analysis was conducted on this basis.

Actual commencement dates would depend on a number of factors, not least being how soon a decision to proceed with one or more of these sites can be made. It should be noted that the phasing and staging of an airport development was also only given general consideration in this report.

1.4. Methodology

Booz & Company and Ernst & Young applied the same approach for all the sites to assess the level of forecast passenger demand, and the associated economic and employment benefits of an airport. These methods are described below.

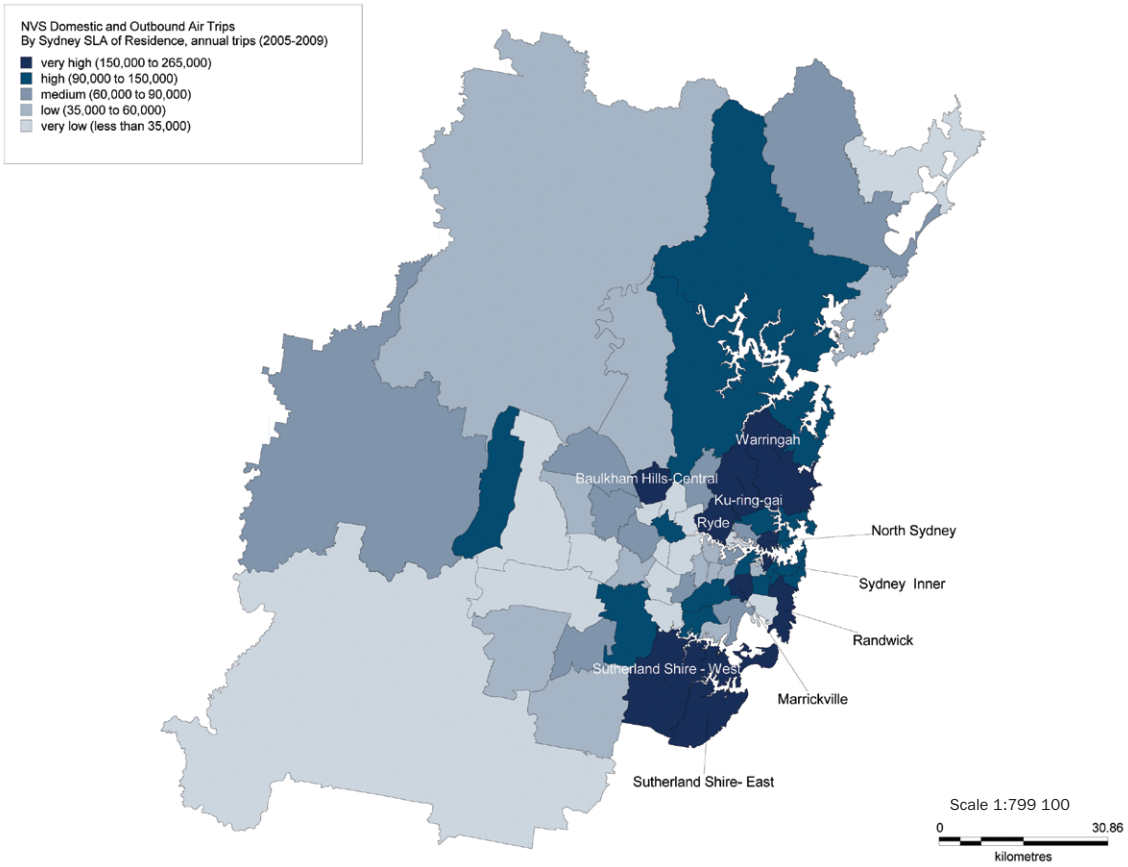
Developing a forecast for passenger demand at Sydney (Kingsford-Smith) Airport and a second airport

Booz & Company's analysis was based on a high-level generalised cost model, building on the concept developed in the Joint Study for potential demand at Richmond. It took into account the:

- forecast unmet demand in the region (54 million passenger movements per year by 2060 as shown in Figure 2);
- current distribution of passengers in the Sydney region (as shown in Figure 3);[13] and
- factors considered in determining accessibility, including cost and time to travel between the alternate site and their origin and destination as compared with Sydney (Kingsford-Smith) Airport.

13 Additional detail in Part Three and Four of the Joint Study.

Figure 3 **Origin of airline passengers in the Sydney region, 2005 to 2009**



Note: *This map shows the number of outbound domestic and international trips made by residents of the Sydney region, in statistical local areas, in response to the question: 'where do you live'. It is based on National and International Visitor Survey data for 2005 to 2009, collated by Tourism Research Australia. Analysis by Booz & Company for the forecast patronage modelling focused on the 2009 data elements. It excludes trips made by international visitors and those travelling domestically from other parts of Australia to Sydney.*

Source: Joint Study on aviation capacity in the Sydney region 2012.

This allowed Booz & Company to estimate how passengers may preference use of Sydney (Kingsford-Smith) Airport and a second airport.[14] Accordingly, forecast demand could be distributed between passengers who:

- continue to use services at Sydney (Kingsford-Smith) Airport;
- prefer to use the alternative site instead of Sydney (Kingsford-Smith) Airport because it is more accessible (generally cheaper or quicker);
- use the alternative site, as capacity is reached at Sydney (Kingsford-Smith) Airport; or
- choose to not fly at either site (suppressed demand).

This provides an indication of the potential passenger demand for services at the alternative airport site.

A second airport could also increase the size of the base market by providing an attractive alternative in circumstances where Sydney (Kingsford-Smith) Airport may have been considered inconvenient. In the analysis following, this is identified as generated demand. This would have the effect of increasing the overall market compared to that identified in the Joint Study.

14 Booz & Company notes that, depending on location, a second airport could affect demand at other airports such as Newcastle or Canberra. However, the impact of these was not considered in the model.

Four scenarios were then considered, based broadly on the range of destinations passengers may wish to access, described in Table 1, to develop an understanding of the number of passengers who may use a second airport depending on the scale of operations.

Table 1 **Forecast demand scenarios**

Demand scenario	Destinations demanded	Assumed capacity associated	Example of a comparable airport
Scenario 1	short-haul domestic market (Australian east-coast)	2 million passenger movements per year	Avalon Airport
Scenario 2	short and medium-haul domestic markets (North Queensland and Central Australia) short-haul (trans-Tasman) international markets	5 million passenger movements per year	Gold Coast Airport
Scenario 3	all domestic markets unmet regional markets short and medium-haul international (including Asian) markets	20 million passenger movements per year	Brisbane Airport
Scenario 4	all services	70 million passenger movements per year	Sydney (Kingsford-Smith) Airport (as projected in the Master Plan)

Source: Booz & Company.

Demand in each scenario was considered on an unconstrained basis. That is, except for the range of services sought and passengers' willingness to access the airport sites, the model considered no other impediments on passengers' use of the airport. It was assumed that all demand can be met, subject to the capacity constraints identified in this report.[15]

For the purposes of this work, Booz & Company was not asked to consider specific markets (such as demand for new services to China or India or the potential for fly-in fly-out). Similarly, no estimates were made of associated aircraft movements.

Assessing the economic and employment effects of an airport

Economic effects

The Department commissioned Ernst & Young to conduct a thorough examination of the scale and nature of potential economic and employment effects of an airport. This work differed from the approach taken in the Joint Study in that it considered the costs and benefits of providing additional capacity at specific locations. The Joint Study specifically examined the cost of constrained aviation capacity in the Sydney region.

Ernst & Young's analysis considered three distinct areas:

- **economic benefits:** the expected increases in economic activity as a result of the development of an airport;
- **employment:** the direct and indirect employment created as a result of airport construction and operation; and
- **social factors:** the factors likely to affect the communities surrounding an airport such as noise, access to aviation and surface transport connections.

To assess the economic benefits Ernst & Young used a two stage approach. First, the increases to direct expenditure were estimated. Factors taken into consideration included the cost of

15 Other factors, however, are important to determining passenger demand such as the commercial decisions of airlines. These are explored further in Section 4.3.

constructing an airport as well as the increased economic activity generated at and immediately around the airport.

The second stage of the analysis involved the use of a computable general equilibrium model (CGE model).[16] Building on the estimated increases in direct expenditure, the CGE model assessed the resulting economic benefits likely to be generated throughout NSW and Australia.

To calculate the changes to the direct expenditure of a supplementary airport, Ernst & Young estimated the following factors:

- **capital costs:** the costs of land acquisition, site restoration, airport construction and supporting infrastructure construction;
- **recurrent costs:** the cost of operation, maintenance and renewal of airport infrastructure and support infrastructure;
- **positive impacts of aviation:** the positive impacts of airline activity, airport operations, airport retail, freight activity and tourism activity; and
- **other developments:** the impacts of activity from the associated business parks.

In assessing the economic benefits of an airport, the maximum demand scenario developed by Booz & Company (Scenario 4) was used to inform Ernst & Young's consideration of the long-term potential for employment and economic contribution by an airport. Further input was also drawn from the analysis conducted by WorleyParsons on the infrastructure and construction requirements.

Employment effects

To estimate the size and type of direct employment impacts of an airport at Wilton, Ernst & Young initially reviewed domestic and international literature on employment created by airports. The findings were then compared against actual experiences of airports around the world. This allowed Ernst & Young to identify key factors that determine the scale and type of employment at airports generally (such as size, location and the services offered) and develop a methodology to estimate the direct employment of an airport.

16 Undertaken by Monash University's Centre of Policy Studies.

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PART 2
ASSESSING WILTON

P2

2. Assessing Wilton

Wilton – Key findings

Forecast demand

- By 2035, there could be annual demand for 17.1 million passenger movements across all service types.
- This could increase to 44.2 million passenger movements a year in 2060.
- Due to the distance from key sources of passenger demand, Wilton will only ever be an overflow airport for Sydney (although it could support some additional demand from Wollongong).

Airport capacity

- Wilton will be environmentally challenging to build.
  - It requires extensive earthworks and site clearing (approximately 91 million cubic metres of cut and fill).
  - Mine subsidence poses a major safety risk for any future development. Existing mining leases would also have implications for any land acquisition required to establish a site.
  - Over 60 species were identified in the study area that will likely be protected under the Environment Biodiversity and Conservation Protection Act 1999. This will require extensive environmental assessment and appropriate mitigation.
  - Significant engineering solutions would be required to ensure discharge of runoff and wastewater does not contaminate Sydney's water supply.

Economic benefits

- There could be significant benefits to the community from an airport.
- A full international airport at Wilton could contribute approximately:
  - $5 billion additional direct expenditure in 2035, increasing to $20 billion in 2060.
  - $3.8 billion additional to NSW Gross State Product (GSP) by 2035, increasing approximately four-fold to $16.9 billion by 2060.
  - $4.1 billion additional to Australia's Gross Domestic Product (GDP) by 2035, increasing to $20.0 billion by 2060.

Employment benefits

- Construction employment: approximately 4,500 jobs created.
- Operational employment: approximately 15,400 jobs by 2035, increasing to 28,000 by 2060.
- Indirect employment: approximately 4,100 jobs by 2035, increasing to 12,700 jobs by 2060.

- Employment will be generated in a variety of industries, including passenger and freight services, supporting services (ground transport, administration, and retail), other services (such as maintenance), as well as by flow-on commercial and industrial developments collocated around the airport, and wider economic impacts (e.g. employment at airports in other states served by Wilton).

Other impacts

- Aircraft noise at full capacity: approximately 1,500 people within the current population around Wilton would be exposed to noise within the 20 ANEF contour. This is compared with the 130,000 people exposed at Sydney (Kingsford-Smith) Airport today.
- An airport development will necessitate bringing forward substantial new investment in infrastructure and utilities for the Wilton area. This will generate significant additional economic activity for the region.

Cost and timing of construction

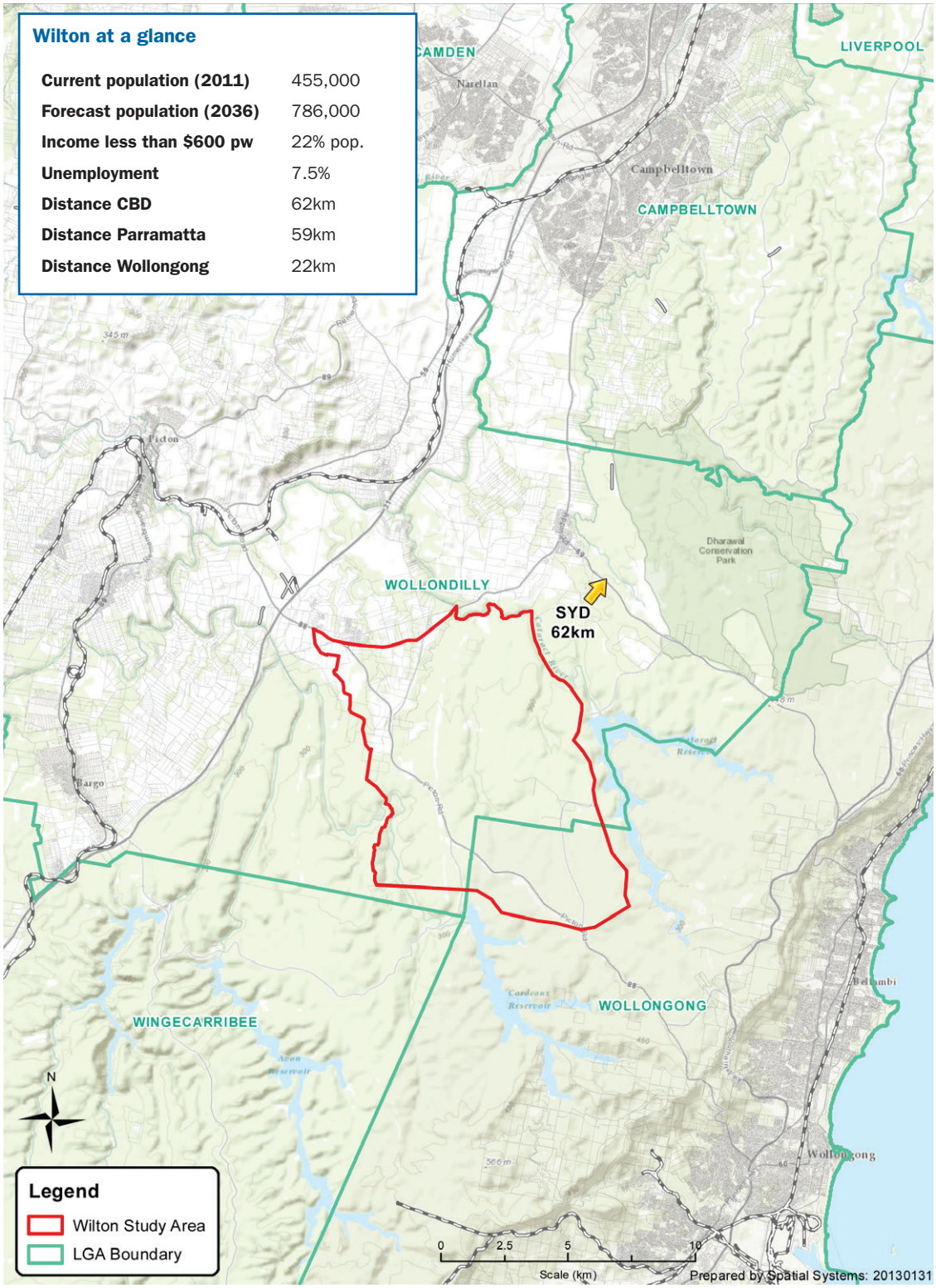
- Development of the first stage of an airport at Wilton is expected to cost at least $3.4 billion and take 17 years to acquire and prepare the site, and construct the airport.

Concluding comments

- The environmental challenges for a full scale airport at Wilton are extremely difficult and would involve considerable costs.
- There could be significant economic benefits for the community.

2.1. Background

Figure 4 Wilton region



Note 1: Population includes population from local government areas of Wollondilly, Camden, Campbelltown and Wollongong.
Note 2: The grey-lined cadastral map shows land parcels and property boundaries, accordingly urban areas are reflected in darker denser property arrangements than industrial or rural areas.
Note 3: Wilton Study Area is as defined by WorleyParsons (later in this report).
Source: Department of Infrastructure and Transport Spatial Systems; ABS Census of Population and Housing 2011; NSW Department of Planning and Infrastructure

Setting the scene

The Wilton area has been included in a number of studies that focussed on the identification of a second airport in the Sydney basin. In the mid-1980s, it was subjected to a site selection process and a draft environmental impact assessment along with a site at Badgerys Creek. That analysis determined a site at Badgerys Creek to be the preferred location for a second airport.

The Joint Study again identified the Wilton area as one of the few in the Sydney region on which a full-scale international airport could potentially be established. The Joint Study found that key factors such as noise, airspace interaction with Sydney (Kingsford-Smith) Airport and its location in a key growth corridor made it a possible viable area for further consideration.[17]

Wilton at a glance

Population

Wilton and the immediate townships around it, such as Appin and Douglas Park, have a population of approximately 40,000 people.[18] This is expected to grow to approximately 60,000 over the next twenty years.[19]

In the four local government areas around Wilton (Wollondilly, Camden, Campbelltown and Wollongong), the population comprises approximately 455,000 people.[20] This is expected to increase by 72 per cent to 786,000 residents by 2036, compared to a 30 per cent projected population growth in the wider Sydney region over the same period.[21]

The local government areas around Wilton with the highest level of population growth are forecast to be Camden and then Liverpool.

Education, income and employment

The Wilton Study Area is located in proximity to a number of employment centres in Sydney's southwest. Of the major employment centres within the region that support Wilton, Wollongong is an established and major 'regional city', while Warrawong and Campbelltown are established 'major centres'. Dapto and Leppington are 'planned major centres'.[22]

The region's largest industries of employment are health care and social assistance (14 per cent) and manufacturing (13 per cent).

Income levels tended to be lower than Sydney as a whole. While Sydney's median household weekly income was $1,447 in 2011 with 19 per cent earning less than $600 per week, two of the local government areas around Wilton exhibited lower income levels with Campbelltown and Wollongong having median household incomes of $1,250 and $1,100 per week respectively, or percentage of households earning less than $600 per week ranging from 22 to 29 per cent.[23]

The unemployment rate is higher in the Wilton area at 7.5 per cent, in comparison with both Sydney (4.5 per cent) and New South Wales (4.9 per cent).[24]

Forty-three per cent of people in the surrounding region have no post-school qualification.[25]

17 The Joint Study did not however identify the site examined in the 1985 Environmental Impact Statement as the representative site as it is now located in the Upper Nepean Conservation Area.
18 Based on the SA3 of 'Wollondilly' (includes Appin, Bargo, Buxton, Douglas Park, Oakdale, The Oaks, Picton and Tahmoor), Estimated Resident, *Population Regional Population Growth,* Cat No 3218.0, 2012.
19 Worley Parsons.
20 ABS Estimated Resident Population, *Regional Population Growth,* Cat No 3218.0, 2012.
21 Current population drawn from ABS Estimated Resident Population, *Regional Population Growth,* Cat No 3218.0, 2012. Forecast populations, from the NSW Department of Planning and Infrastructure were based in 2006.
22 NSW Government *Draft Metropolitan Strategy for Sydney,* 2013
23 ABS, *Census of Population and Housing* 2011.
24 Department of Education, Employment and Workplace Relations 2012, *Small Area Labour Market, Employment Research and Statistics,* September 2012.
25 ABS, *Census of Population and Housing,* 2011.

Surface transport

The Wilton region is served by a number of major road links, including the M5 and the Hume Highway. It is also accessible from the Bankstown and Inner West rail lines to Liverpool and the Cumberland line from Blacktown to Campbelltown. However, there is currently no train station at Wilton; the nearest is at Douglas Park (12 kilometres north of the proposed airport site on the Southern Highlands line). Approximate travel times to key centres in Sydney are in Table 2.

Table 2 **Wilton – Approximate travel times to major centres**

Area	Approximate straight-line distance	Road		Rail	
		Approximate off-peak travel time	Approximate peak-hour travel time	Approximate travel time	Changes required
CBD/Central	62km	58min	2½ hours	1½ hours	1
North Sydney	67km	61min	2¾ hours	1¾ hours	2
Parramatta	59km	53min	2¼ hours	1½ hours	1-2
Penrith	60km	53min	1½ hours	2 hours	2
Blacktown	58km	48min	1¾ hours	1¾ hours	1-2
Liverpool	44km	34min	1½ hours	1 hour	1
Campbelltown	25km	22min	¾ hour	20min	0
Hornsby	74km	72min	2½ hours	2 hours	2
Wollongong	22km	36min	¾ hour	3 hours	2

Note 1: These estimates are based on current surface transport levels and patterns.

Note 2: Road times were estimated on travel time from the suburb train station to the airport site; off-peak travel times were based on an estimate from Google Maps; peak hour travel times were drawn from NSW Bureau of Transport Statistics and include an estimate of congestion at peak times.

Note 3: Train times were estimated on peak hour travel from suburb train station to the station nearest to the airport; the minimum time/changes required were cited. They do not include average wait or transfer times.

Note 4: Times may vary significantly based on the connections used, particularly in off-peak periods.

Source: Department of Infrastructure and Transport analysis from Google Maps and CityRail, Bureau of Infrastructure, Transport and Regional Economics analysis of NSW Bureau of Transport Statistics Strategic Travel Model (STM) outputs, 2011.

2.2. Forecast passenger demand at Wilton

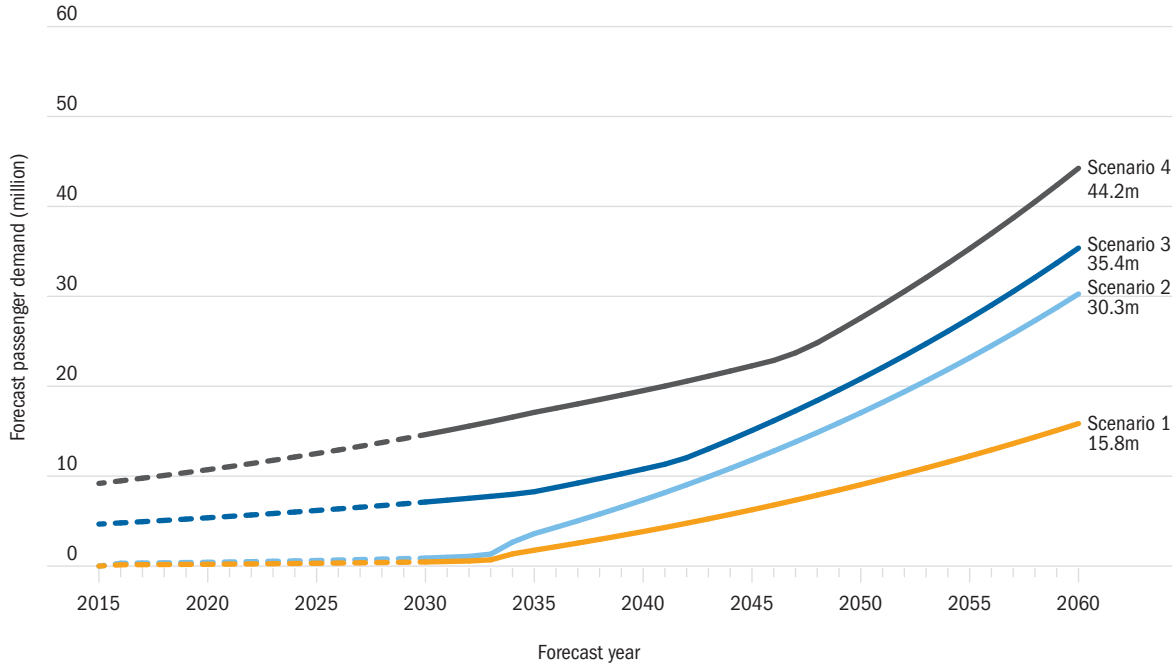
Booz & Company considered the potential passenger demand at Wilton through to 2060. The key purpose was to identify how much of the unmet demand would be met and how many passenger movements could be diverted from Sydney (Kingsford-Smith) Airport.

Total unconstrained demand at Wilton

There is substantial variation in the forecasts for the four scenarios driven by the range of services that are being considered (Figure 5):

- **Scenario 1:** short-haul domestic market (Australian east-coast);
- **Scenario 2:** short and medium-haul domestic markets (including North Queensland and Central Australia), and short-haul (trans-Tasman) international services;
- **Scenario 3:** all domestic markets, unmet regional markets, short and medium-haul international (including Asian) markets; and
- **Scenario 4:** all services – full-scale international, domestic and regional services.

Figure 5 **Forecast passenger demand at Wilton, 2015 to 2060**



Note: This analysis was based on annualised capacity constraints which the Joint Study identified would become acute particularly after 2033. The Joint Study noted peak capacity pressures are already experienced at Sydney (Kingsford-Smith) Airport.

Source: Booz & Company.

Where the services offered at Wilton are limited (for example, in Scenarios 1 and 2) the majority of passengers are expected to continue to seek services at Sydney (Kingsford-Smith) Airport. It is only when capacity is reached at Sydney that demand increases in these markets.

In contrast, if Wilton provided a broad range of international and domestic services comparable to Sydney (Kingsford-Smith) Airport (Scenario 4), it could start to draw some demand from that Airport.

In particular, on this scenario it is estimated:

- there could be demand of approximately 9 million passenger movements now;
- in 2035, this could increase to approximately 17.1 million passenger movements, including:
  - 12.8 million passenger movements diverted from Sydney (Kingsford-Smith) Airport due to the greater accessibility of Wilton as a site;[26]
  - an additional 4.3 million passenger movements that would not be met at Sydney;[27] and
- in 2060, Wilton is expected to cater for approximately 44 million passenger movements.[28] This is equal to the size of Sydney (Kingsford-Smith) Airport and Adelaide combined today.[29]

This is not to imply that the greatest unmet demand is for international services but that there are more opportunities to meet passenger requirements if more services are available. Booz & Company noted that the larger the range of services at the alternative airport, and the more competitive they are with those at Sydney (Kingsford-Smith) Airport, the higher the demand that could potentially be attracted. Ultimately, however, the key criterion is whether the services available at the alternative airport align with the needs of passengers.

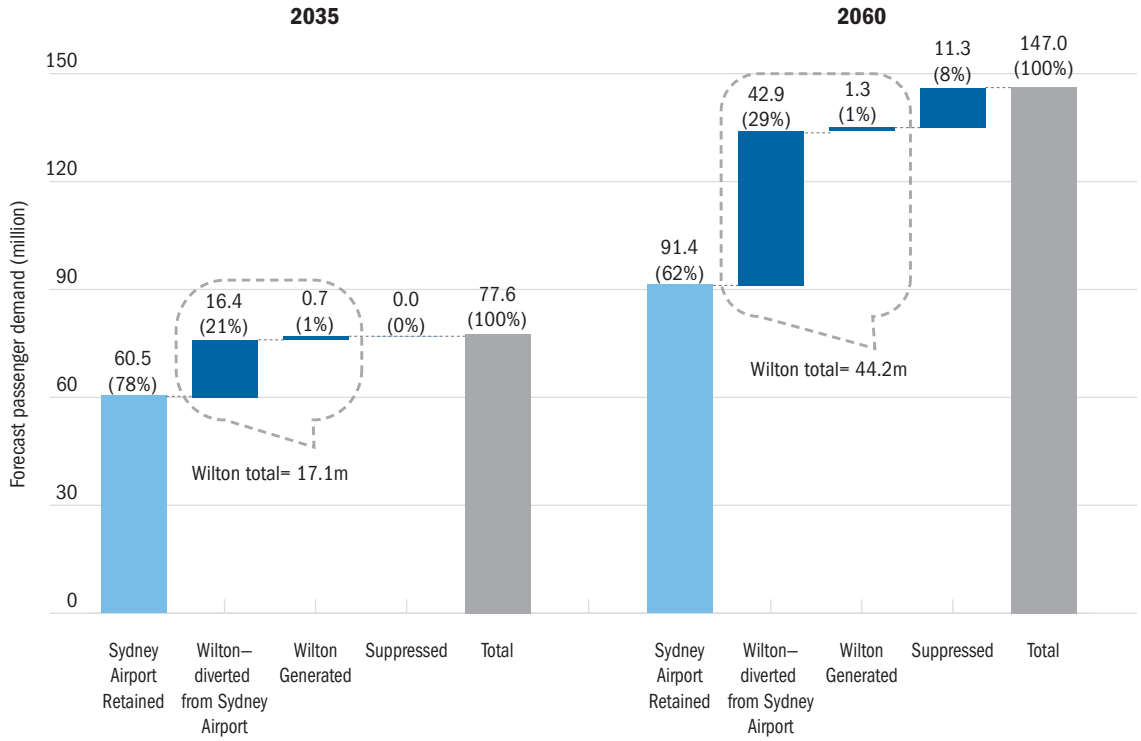
A new airport could also generate new markets, based on its location and its ability to provide services to those who would not have considered travelling to Sydney (Kingsford-Smith) Airport. This has been included in the forecasts above.

As shown in Figure 6, the generated demand at Wilton comprised between 0.7 and 1.3 million passenger movements from 2035 to 2060. This is 3 to 4 per cent of demand at Wilton for that period, or less than 1 per cent of overall unconstrained demand in Sydney. This would imply that, owing to its geographic location, Wilton's primary role would be to support the overflow demand at Sydney (Kingsford-Smith) Airport.

The relatively modest level of generated demand is unsurprising. Wilton is further from the current market of aviation users who are predominately in Sydney's north and northwest, and to Sydney's central business district.[30]

26 This would free up capacity at Sydney (Kingsford-Smith) Airport.
27 This is because of capacity constraints, meaning demand cannot be met at Sydney; or additional accessibility at Wilton generating demand which would not have existed at Sydney (further explanation on generated demand is later in the following pages).
28 Even with diverted demand, Sydney (Kingsford-Smith) Airport would again reach capacity by 2060.
29 Bureau of Infrastructure, Transport and Regional Economics airport traffic statistics indicates in the financial year 2011–12, Sydney and Adelaide Airports supported 36 and 7 million passenger movements respectively.
30 See Figure 3.

Figure 6 **Distribution of forecast demand at Sydney (Kingsford-Smith) Airport and Wilton – Scenario 4 (all services), 2035 and 2060**



Source: Booz & Company.

It should be noted that the analysis does not consider the potential demand as Sydney's population continues to spread towards Sydney's west and south in the study period. In addition, passenger data for the Wollongong and Illawarra regions was not available for this analysis. Wollongong Local Government Area consisted of more than 201,000 people in 2011.[31] This is approximately 45 per cent of the population of the four local government areas surrounding Wilton. Wollongong is currently the largest population centre in Australia without direct access to an airport offering passengers services.[32] Consequently, an airport at Wilton could potentially generate slightly more of its own demand than indicated here.

On Booz & Company estimates, at least 11.3 million of the unmet demand in 2060 (or 8 per cent of total demand) will not be catered for at either Wilton or Sydney (Kingsford-Smith) Airport (Figure 6). Improvements in travel time and cost (including transport fares) to Wilton however could assist in reducing the level of unmet demand.

2.3. Capacity to establish an airport at Wilton

The approach taken for Wilton was to explore both the environmental and economic aspects of developing an airport in this area, given that no detailed site assessment has been done since the early 1980s.

Environmental analysis of Wilton

A team of engineering and environmental experts led by WorleyParsons was engaged to undertake more detailed analysis of the area identified in the Joint Study, in particular to assess issues which may impact on the decision to build an airport large enough to cater for long-term demand that cannot be met at Sydney (Kingsford-Smith) Airport.

31 ABS, *Regional Population Growth, Australia*, Cat. No. 3218.0, 2011.
32 Illawarra Regional Airport near Wollongong has for short periods provided passenger services to Melbourne. However, these have ceased.

WorleyParsons was tasked with building on the preliminary investigations, analysis and designs undertaken for the Joint Study. They were contracted to test their findings against a range of environmental factors that are required to be considered under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act aims to balance the protection of environmental and cultural values (particularly nationally and internationally important flora, fauna, ecological communities and heritage places), with society's economic and social needs by creating a legal framework and decision-making process based on the guiding principles of ecologically sustainable development.

Specifically, the EPBC Act aims to:

- provide for the protection of the environment, especially matters of national environmental significance;
- conserve Australia's biodiversity;
- protect biodiversity internationally by controlling the international movement of wildlife;
- provide a streamlined environmental assessment and approvals process where matters of national environmental significance are involved;
- protect our world and national heritage; and
- promote ecologically sustainable development.

In addition, the EPBC Act confers jurisdiction over actions that have a significant impact on the environment where the actions affect, or are taken on, Commonwealth land, or are carried out by a Commonwealth agency.

Source: Department of Sustainability, Environment, Water, Population and Communities

This work is not to be considered in place of an Environmental Impact Statement (EIS) or provide an assurance that an airport at Wilton would meet the EIS provisions. Its purpose is to provide additional information about key environmental issues, and any mitigation options that may be required.

Approach to analysis

WorleyParsons did not begin this analysis with the site identified in the Joint Study, as that site did not cater specifically for two wide-spaced 4,000-metre runways.[33] They commenced this task by investigating a larger area that included the locality 'Wallandoola' in the Joint Study. Wilton and Wallandoola are separated by Wallandoola Creek, with little difference between the two from an environmental perspective.

33 The representative site at Wilton, identified for analysis in the Joint Study, only catered for 1 x 4,000 metre runway and 1 x 2,500 metre runway on a 1,783 hectare site.

Site identification

WorleyParsons' approach to the analysis is defined in Figure 7.

Figure 7 **Wilton site identification and preliminary assessment of site suitability**

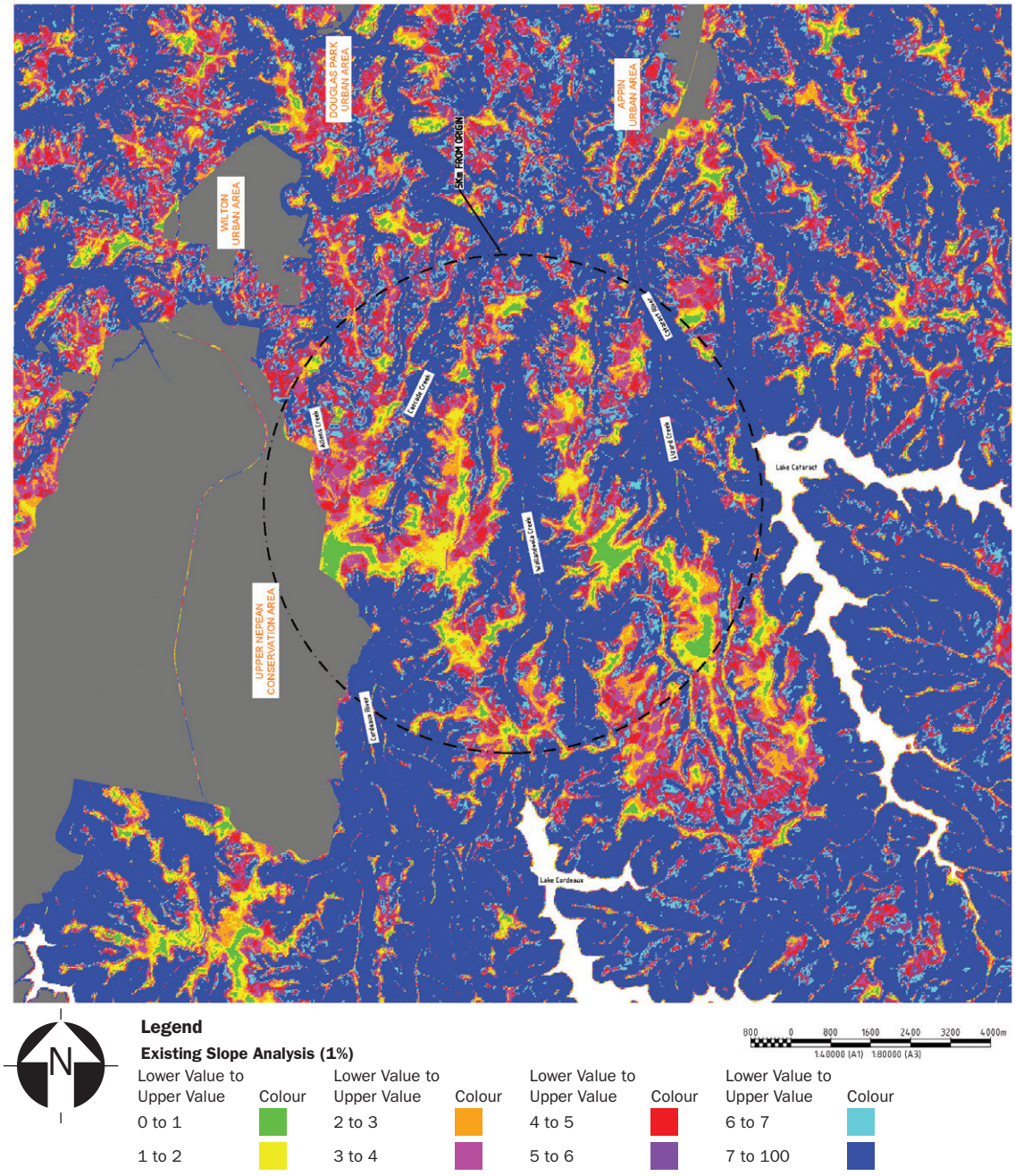
Step 1: Define airport type required	Two Independent, wide-spaced parallel runways 4,000m x 60m and a cross runway 2,500 x 60 m.
Step 2: Define study area based on key constraints	West: Upper Nepean State Conservation Area East: Cataract River dam area North: Townships of Wilton, Douglas Park and Appin South: Cordeaux River dam area
Step 3: Undertake screening within Study Area to refine areas more suitable to accommodate airport type	Avoid areas of steep terrain, Avoid deep gorges using Slope Analysis to understand terrain.
Step 4–1: Identify sites and runway alignments that will form base case airport concepts for analysis and relative suitability	- Option 1 - Option 1 South - Option 2 - Option 3 - Option 4 - Option 5 - Option 6 - Option 7
Step 4–2: Preliminary technical assessment of the environment of Wllton using base case airport concepts to compare options, assess issues and identify mitigation strategies	Preparation of 25 Working Papers to address airport and infrastructure planning and environmental issues in order to understand the constraints and opportunities of the Wilton Study Area and its surrounds
Step 5: Develop summary matrix of options	Using the data from both Steps 4-1 Airport configurations and Step 4-2 summarize quantitative and qualitative data to show as possible the relative differences, merits and demerits of each airport concept.

Source: WorleyParsons.

Steps 1 and 2 were similar to the analysis conducted for the Joint Study. They provided an opportunity to verify that the criteria used were appropriate and that no area was incorrectly assessed. This included ensuring national parks and urban centres continued to be excluded from consideration.

This left approximately 8,500 hectares in the Wilton area, which were potentially available for airport development.

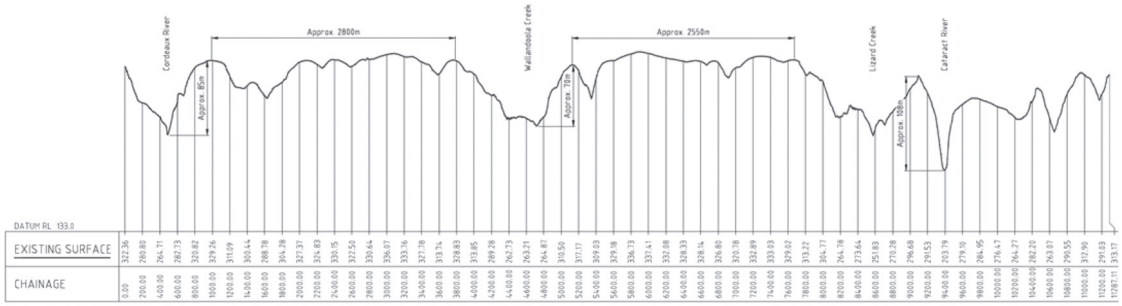
Figure 8 Slope analysis of the Wilton area



Source: WorleyParsons.

Sites containing deep gorges or slopes (greater than 7 per cent gradient, in blue) were considered to be disproportionately costly to develop to the appropriate standards for a runway and excluded accordingly (Figure 8). This analysis showed that in some parts the gradients were extreme, as can be seen in Figure 9.

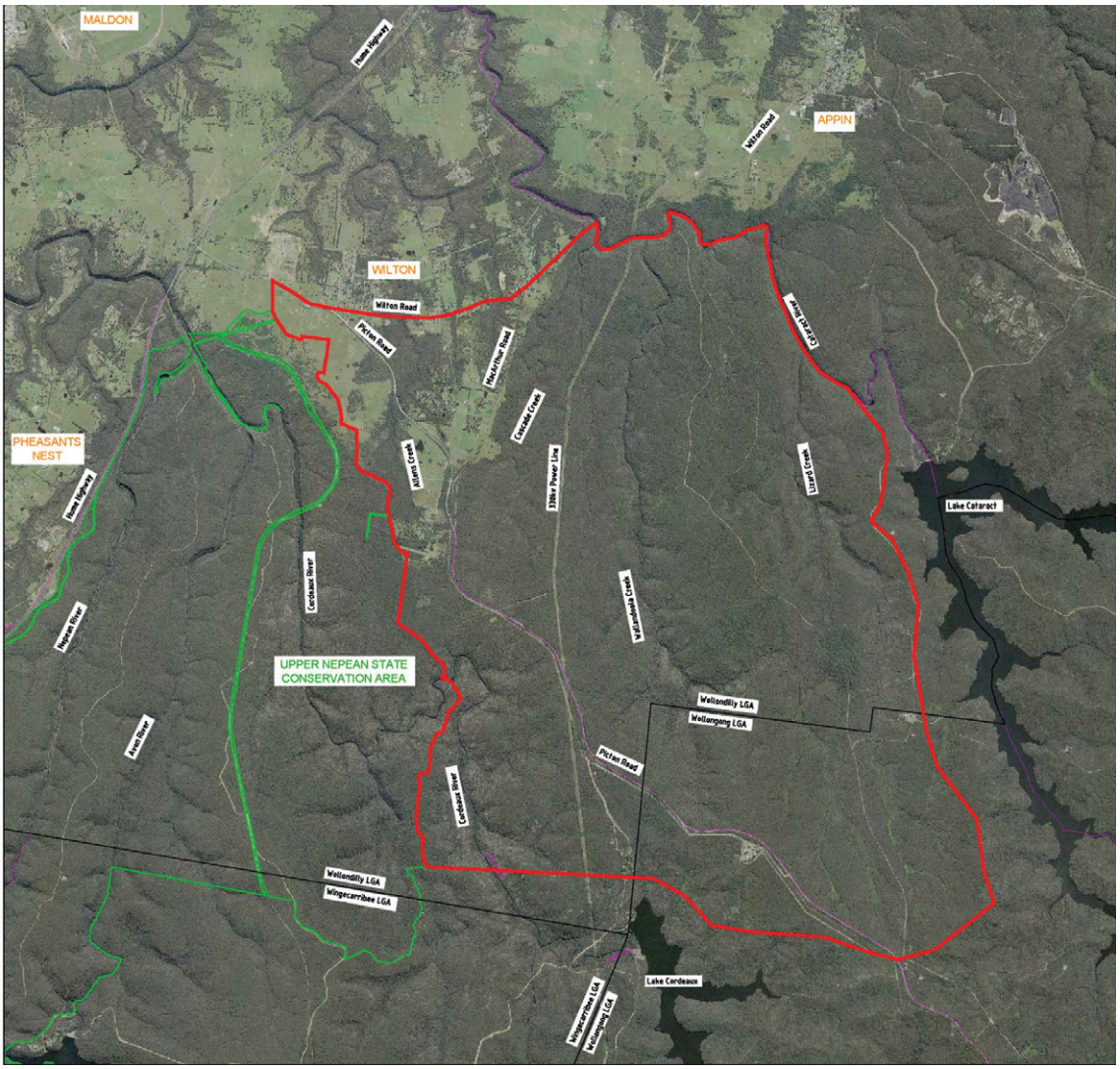
Figure 9 **Cross-section in terrain height**



Source: WorleyParsons.

Ultimately, the Wilton Study Area (as shown in Figure 10) was determined to be broadly suitable for more detailed study. It is located primarily in the Wollondilly Local Government Area (LGA) with a small part of the southwestern area in the Wollongong LGA. Adjoining LGAs include Camden, Liverpool, Campbelltown, Blue Mountains and Wingecarribee. It is divided into Western (Wilton) and Eastern (Wallandoola) precincts of approximately 4,000 hectares each.[34]

Figure 10 **Wilton Study Area**



Source: WorleyParsons.

34 These precincts are separated by Wallandoola Creek.

Airport runway concepts

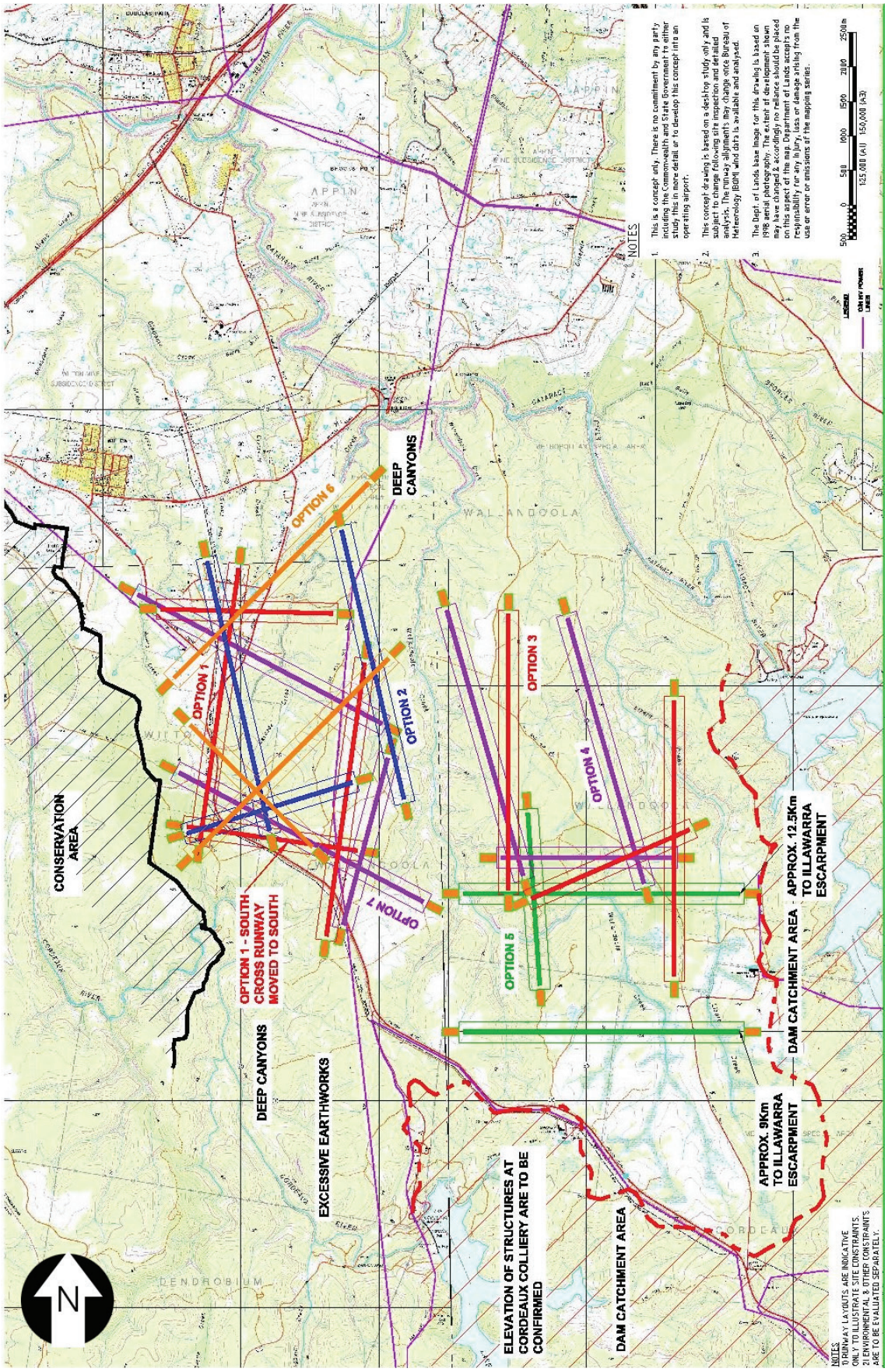
Once the study area was defined, WorleyParsons identified eight possible runway alignments (Table 3 and Figure 11) and determined appropriate site boundaries for each of these alignments, ranging between approximately 1,700 hectares and 2,200 hectares. Options 1, 1 South, 2, 6 and 7 were located in the western precinct of the study area. Options 3, 4 and 5, were located in the eastern precinct.

Table 3 **Eight possible runway alignments**

Option	Precinct	Runway orientation	Comments
1	West	North-south	Similar to the site which was selected in the Joint Study as representative of the Wilton area. This version provides for two 4,000 metre long main runways, 2,000 metres apart.
1S	West	North-south	Option 1 but with the cross runway to the southern end of the airport site (to improve the concept layout and to facilitate future road and rail access).
2	West	Northwest-southeast	New Option with runways parallel with those of Sydney (Kingsford-Smith) Airport.
3	East	North-south	Runway separation was made 2,400 metres to better fit the dissected and steep terrain. Similar to site identified as “Wallandoola” in the Joint Study.
4	East	Northwest-southeast	Alignment closer to Sydney (Kingsford-Smith) Airport. Due to the terrain in this area, this necessitated a reduced runway separation to 1,650 metres.
5	East	East-west	Provides for an east-west option for the purpose of comparative analysis.
6	West	Northeast-southwest	Provides for an option to reduce potential noise impacts to the north. However, more noise directed over Appin.
7	West	Northeast-southwest	Provides for an option for improved noise and air traffic outcomes.

Source: WorleyParsons.

Figure 11 Identified sites and possible runway alignments at Wilton



Source: WorleyParsons.

Environmental assessment

Analysis was undertaken against all of the options to identify:

1. if there were any environmental issues that would rule any of the sites out as a full-scale airport; and
2. if not, the mitigation strategies (if any) that would be required to ensure an airport could be built at a site with as little impact on the environment as possible.

The factors examined included:

- earthworks;
- geology;
- resources and extraction;
- water catchment;
- water management;
- flora and fauna;
- air quality;
- site hazards;
- Aboriginal cultural heritage;
- European cultural heritage;
- safeguarding; and
- noise.[35]

No factor was given more weight than any of the others.

Key findings of the environmental analysis

WorleyParsons' analysis found that:

"no absolute showstoppers were identified to building an airport within the general vicinity of Wilton, [but] there will be a set of very challenging issues to resolve... in order to meet, amongst other legislative requirements, the provisions of the... EPBC Act."[36]

WorleyParsons considered each site against the factors above and no single site performed better on all the measures, although some clearly performed better than others.

Overall however, there were four factors that would have the most influence in determining the environmental constraints outlined in their findings:

- earthworks and site clearing;
- geology and geotechnical matters (mine subsidence);
- drinking water catchment, hydrology and drainage; and
- flora and fauna.

Other factors such as Aboriginal and European heritage sites, hazard risks and noise were also identified and would need to be addressed. However, in comparison to the four issues listed above, they did not demonstrate significant difficulties or challenges in the context of an EPBC assessment.

35 Airspace issues were also taken into consideration. However, no further analysis was undertaken at this point as next steps would require the development of flight paths and an integrated airspace management plan.
36 WorleyParsons.

Overall, building a fullscale airport would fundamentally alter the existing environment, especially as business parks, housing and surface transport grows to support the airport.

Earthworks and site clearing

Earthworks are likely to be a substantial element of the environmental impact as well as the cost of developing an airport at Wilton. To develop a full scale airport, the average size of a site is approximately 2,000 hectares with up to a further 500 hectares requiring clearing for appropriate buffers and easements.

The amount of earthworks required at each site was assessed as shown in Table 4.

Table 4 **Estimated earthworks for each airport option**

Option No.	Site Area (hectares)	Modelled Cut (million cubic metres)	Modelled Fill (million cubic metres)	Modelled Balance (million cubic metres)	Modelled Cut and Fill (million cubic metres)
Option 1	1,930	-52	52	0	104
Option 1 South (1S)	2,077	-45	46	1	91
Option 2	2,084	-69	67	-2	136
Option 3	1,988	-78	79	1	157
Option 4	1,727	-49	49	0	98
Option 5	2,209	-60	66	6	126
Option 6	2,022	-50	48	-2	98
Option 7	1,823	-49	50	1	99

Source: WorleyParsons.

The site with the lowest level of cut and fill is Option 1S at 91 million cubic metres, with a maximum cut depth of 21 metres and fill depth of 41 metres (Figure 12). The highest is Option 3 at 157 million cubic metres or 36 metres and 63 metres respectively. To put this in perspective, this cut and fill is equivalent to between one sixth and one quarter of the volume of Sydney Harbour respectively.[37]

These numbers are substantial compared to most international airport developments around the world. For example, New Bangkok (Suvarnabhumi) International Airport is 3,200 hectares (that is 1.5 times larger than the site being considered in Wilton) yet only required 15.5 million cubic metres of cut and fill.

The cut and fill is also around twice the earthworks that were identified for the Commonwealth-owned site at Badgerys Creek in the Environmental Impact Statement in 1999. That analysis found earthworks of 51 million cubic metres would be required.[38]

Cut and fill: An operation commonly used in road building and other rock and earthmoving operations in which the material excavated and removed from one location is used as fill material at another location. This is typically to reduce the gradient of a site on which it would otherwise be prohibitive, unsafe, or too costly to construct.

In dollar terms, Option 1S is expected to cost approximately $900 million for the earthworks, as compared with around $356 million for Badgerys Creek. This means that doubling the earthworks could nearly treble the cost.

37 According to NSW Maritime (www.maritime.nsw.gov.au), Sydney Harbour is cited as 560 gigalitres in volume. One gigalitre of water is equivalent to 1 million cubic metres of water.

38 Option A runway alignment for Badgerys Creek. PPK Environment & Infrastructure, *Environmental Impact Statement: Second Sydney Airport Proposal 1999,* prepared for the Department (then the Department of Transport and Regional Services).

Figure 12 **Earthworks required – Wilton Option 1S**

N

325 Existing Surface Contours (5m Interval) Based on LiBAR Survey Captured October 2009

Proposed Surface Contours 1m Interval

Airport Development Boundary

250 0 250 500 750 1000 1250m

1:12,500 (A1) 1:25,000 (A3)

Earthworks Legend

PRELIMINARY EARTHWORKS DEPTHS (M)

Lower Value to Upper Value	Colour	Lower Value to Upper Value	Colour
-999999 to -30		0 to 25	
-30 to -15		25 to 50	
-15 to 0		50 to 999999	

Source: WorleyParsons.

To give this further context, the following photo (Figure 13) is taken from the F3 Sydney to Newcastle Freeway north of the Mooney Mooney. The cut shown is 40 metres in height. This is equivalent to the depth of the fill needed for Option 1S across the 2,000 hectare site or only 60 per cent of the fill for other options.

Figure 13 **Photo of Sydney-Newcastle Freeway construction**

Source: Worley Parsons.

It may be possible to consider an airport design that would reduce the amount of earthworks required. However, any such design could affect the overall capacity of the airport and its ability to meet Sydney's long-term demand forecasts.

Geology and geotechnical matters (mine subsidence)

The Wilton Study Area is underlain by coal seams (Figure 14). Consequently, surface subsidence due to previous coal extraction poses a major risk to any future airport development. While it may be possible to plan airport development around existing and future areas of subsidence, this is likely to significantly reduce design flexibility.

Options where coal mining and associated surface subsidence is unlikely are therefore preferable to other options. The current assessment on the level of coal mining activities is in Table 5.

Mine subsidence: When material is removed from an underground mine, the ground surface above it can shift, for example sagging into the cavity beneath. This can have consequences for buildings, pipelines and roads.

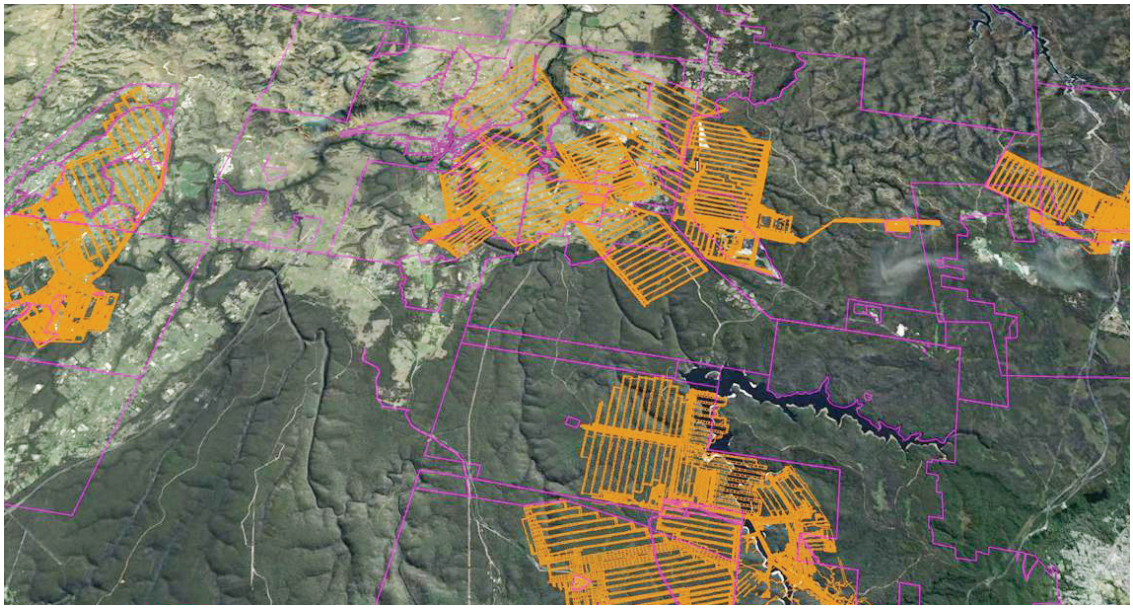
Based on a desktop analysis WorleyParsons found subsidence unlikely at Options 1S and 7, but this would need testing by more specialised geotechnical analysis.

Table 5 **Qualitative summary of impact of coal-mining activities on each option at Wilton**

	Option							
	1	1S	2	3	4	5	6	7
Site underlain by coal	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Site covered by current mining lease	Yes >50%	Yes >50%	Yes >50%	Yes 100%	Yes 100%	Yes 100%	Yes 100%	Yes >50%
Past or active mining	No	No	No	Yes	Yes	Yes	No	No
Proposed mining beneath airport site	No	No	Yes partial	Yes	Yes	Yes	Yes partial	No
Potential for airport site to subside	No	No	Yes partial site	Yes entire site	Yes entire site	Yes entire site	Yes partial site	No
Scale of subsidence expected	Unlikely	Unlikely	Up to 1.5 m	Up to 2.5 m	Up to 2.5 m	Up to 2.5 m	Up to 1.5 m	Unlikely
Additional design cost for infrastructure	Less likely	Less likely	Very likely	Very likely	Very likely	Very likely	Very likely	Less likely
Value of resources sterilised	Up to $20 billion (if fully mineable) with a possible lower limit of $5–6 billion	Up to $20 billion (if fully mineable with a possible lower limit of $5–6 billion	Up to $20 billion	Up to $20 billion	Up to $20 billion	Up to $20 billion	Up to $20 billion	Up to $20 billion (if fully mineable with a possible lower limit of $5–6 billion

Source: WorleyParsons.

Figure 14 Current mining lease boundaries around Wilton



Note: Pink outline denotes the existing mining lease boundaries; orange denotes existing longwall mines. The main water feature is Lake Cataract.

Source: WorleyParsons.

Drinking water catchment, hydrology and drainage

All of the Wilton options are located within Sydney's water catchment (Figure 15). Consequently engineering solutions would be required to ensure that surface runoff and wastewater are discharged appropriately to avoid the risk of contaminating the water supply. While it is possible to mitigate this under all options by discharging treated storm water and effluent to Allens Creek (which is located outside of the water supply route and drinking water catchment), some options (Options 3, 4 and 5) require substantially more infrastructure to achieve this. An additional estimated cost of $1 billion or more could be needed (see Table 6).

Options 1, 1S, 2, 6 and 7 are considered to achieve acceptable outcomes in the context of water catchment management (Table 6). However, they will still likely lead to a decrease in the flows to Cascade and Wallandoola Creeks and would therefore be expected to have an ecological impact.

Figure 15 Wilton in relation to Sydney's drinking water catchment

Note: The red outline denotes the Wilton Study Area; the blue outline denotes Sydney's water catchment. Only a small segment in the northwest corner of the Wilton Study Area is outside the catchment.

Source: WorleyParsons.

In addition, the WorleyParsons analysis indicates that all options result in a loss of catchment water, the implications of which would need to be analysed further if an airport is to proceed.

Table 6 **Summary of effects on water catchment of each option at Wilton**

	Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
Watercourses impacted by the footprint of the airport	Allens Creek, Cascade Creek and tributaries	Allens Creek, Cascade Creek and tributaries	Allens Creek, Cascade Creek and tributaries	Lizard Creek and tributaries of Wallandoola Creek	Tributaries of Wallandoola and Lizard Creeks	Wallandoola Creek, Lizard Creek	Allens Creek, Cascade Creek	Allens Creek, Cascade Creek
Area of lost drinking water catchment (hectares)	1,530	1,570	1,600	1,990	1,730	2,210	1,420	1,210
Financial cost to Sydney Catchment Authority of lost water per year	$0.7 million	$0.8 million	$0.8 million	$1.0 million	$0.8 million	$1.1 million	$0.7 million	$0.6 million
Long term economic cost to Sydney Catchment Authority of lost water per year	$19.4 million	$19.9 million	$20.4 million	$25.2 million	$21.9 million	$28.0 million	$18.0 million	$15.4 million
Discharge of treated stormwater and effluent	Direct to Allens Creek	Direct to Allens Creek	Direct to Allens Creek	to Allens Creek via 5km pipe/ tunnel system (~$1.0B)	to Allens Creek via 5km pipe/ tunnel system (~$1.0B)	to Allens Creek via 6km pipe/ tunnel system (~$1.2B)	Direct to Allens Creek	Direct to Allens Creek
Flood retarding dam operation (during storms up to 100 year ARI event)	Low flow outlet and spillway flow	Low flow outlet and spillway flow	Low flow outlet and spillway flow	Pipe outflow only	Pipe outflow only	Pipe outflow only	Low flow outlet and spillway flow	Low flow outlet and spillway flow
Size of retarding dam	~5,000ML	~5,000ML	~5,000ML	~8,000ML	~7,000ML	~9,000ML	~5,000ML	~5,000ML
Discharge of excess stormwater in extreme rainfall event (>100 year)	to Allens Creek	to Allens Creek	to Allens Creek	Spillage to drinking water catchment	Spillage to drinking water catchment	Spillage to drinking water catchment	to Allens Creek	to Allens Creek
Flow conveyance structure required for local waterway(s)	No	No	No	Yes, at Lizard Creek (1.5km)	No	Yes, at Lizard Creek (4km)	No	No

Source: WorleyParsons.

Flora and fauna

Over 60 species have been identified in the study area that will likely be protected under the EPBC Act. These include five endangered ecological communities, two priority fauna habitats, 33 threatened species, 12 aquatic species and 14 migratory species. There are also a number of other species identified under state legislation.

Notable species include the Cumberland Plain Shale Woodlands, koala, long-nosed potoroo and the regent honeyeater. Loss of habitat, including the Cumberland koala linkage through clearing and earthworks, will be significant for those airport options in the western precinct.

All of the sites are also likely to impact watercourses and the aquatic habitat of frogs and fish.

Table 7 shows the ecological assessments of each runway alignment.

Table 7 **Summary of potential ecological impacts for each option at Wilton**

Ecological impact criteria	Options							
	1	1S	2	3	4	5	6	7
Previously cleared land	Yes (approx. 10%)	Yes (approx. 10%)	Yes (approx. 15%)	No[1]	No[1]	No[1]	Yes (approx. 15%)	Yes (approx. 15%)
Clearing of endangered ecological community	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clearing of protected fauna habitat	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clearing of koala habitat	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cumberland koala linkage impacted	Yes	Yes	Yes	No[2]	No[2]	No[2]	Yes	Yes
Location within Metropolitan Special Area	1,348 hectares (70%)	1,496 hectares (72%)	1,510 hectares (72%)	100%	100%	100%	1,346 hectares (67%)	1,111 hectares (61%)
Aquatic habitat impacted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note 1: Except for access roads.

Note 2: Not impacted directly by airport footprint but may be impacted by noise.

Source: WorleyParsons.

Given the significant impact that construction would have on existing flora and fauna, mitigation strategies will be important. However, in cases where avoidance or mitigation cannot adequately reduce the impact, offsets will be required.

The Department of Sustainability, Environment, Water, Population and Communities announced its offsets policy in October 2012, which identifies ten principles to be used to assess any environmental impact.

Past experience indicates that for every hectare cleared, four to six hectares would have to be identified to offset this loss. This issue would therefore factor into the viability of the site and the overall cost of construction.

Environmental offsets policy

Under the EPBC Act 1999, suitable offsets must:

- deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action;
- be built around direct offsets but may include other compensatory measures;
- be in proportion to the level of statutory protection that applies to the protected matter;
- be of a size and scale proportionate to the residual impacts on the protected matter;
- effectively account for and manage the risks of the offset not succeeding;
- be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action);
- be efficient, effective, timely, transparent, scientifically robust and reasonable; and
- have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

In assessing the suitability of an offset, government decision-making will be:

- informed by scientifically robust information and incorporate the precautionary principle in the absence of scientific certainty; and
- conducted in a consistent and transparent manner.

Source: Department of Sustainability, Environment, Water, Population and Communities.

Aircraft noise

There are a number of ways to measure aircraft noise. The most commonly used measures for land use planning purposes are based on so-called 'equal energy' metrics - the amount of total noise energy expected to be received by locations on the ground near an airport on an average day. In Australia, this measure is known as the Australian Noise Exposure Forecast (ANEF).[39]

There are generally five levels of ANEF (or its international equivalent), used to guide planning decisions that affect houses, as shown in Table 8.

In Australia, properties within the 20 ANEF contour would be subject to some form of planning or construction requirements to minimise aircraft noise impacts.

According to this measure, the number of people that are currently in the area that would be exposed to aircraft noise (that is greater than 20 ANEF) range from Option 1S (approximately 260) to Option 7 (approximately 860).

39 Guidance on siting and construction of housing based on aircraft noise exposure in Australia is provided by *Australian Standard 2021–2000: Acoustics—Aircraft noise intrusion—Building siting and construction* (AS2021).

Table 8 **Comparative land use planning controls in Australia and overseas for aircraft noise**

Noise Exposure (ANEF or equivalent)	Australia	United States	Netherlands	France	Canada	Germany
> 40	No housing	No housing	No housing	No new housing	Housing not recommended	No new housing
30 to 40	No new housing. Insulation of existing housing	No new housing. Insulation of existing housing	No new housing. Insulation of existing housing	Limited new housing	Housing not recommended	Limited new housing
25 to 30	No new housing	No restrictions	No new housing	No restrictions	New housing with insulation	Restrictions in some states
20 to 25	New housing with insulation	No restrictions	No new housing	No restrictions	No restrictions	Restrictions in some states
< 20	No restrictions	No restrictions	No restrictions	No restrictions	No restrictions	No restrictions

Source: WorleyParsons.

An alternative approach to assessing aircraft noise involves a measure of how often people experience noise events above a certain noise threshold. In the analysis, a threshold of 70 decibels (dB(A)) has been used. This is a commonly used metric around airports and has become known as the 'N70' measure. It has been chosen as it represents a level at which people might be expected to experience noise intrusion inside their homes which might disturb normal activities such as conversation or listening to television. It is equivalent to a vacuum cleaner operating approximately three metres away. Each option was assessed according to how many people would be exposed to this level of noise on between 10 to 20 occasions per day.

Based on this approach, the population exposed for each option is in Table 9.

Table 9 **Aircraft noise exposure for Wilton options – N70 > 10 to 20 events**

Option	Population affected
Option 6	37
Option 3	63
Option 4	162
Option 1	260
Option 1 South	334
Option 2	528
Option 5	2,605
Option 7	2,893

Source: WorleyParsons.

Potential noise was found to be considerably less significant for Wilton than at existing metropolitan airports, although it is noted that Wollondilly Local Government Area is developing proposals for housing to meet the expected growth in population from approximately 40,000 currently to over 60,000 in 25 years.[40] However, some runway alignments obviously provided a better outcome than others.

More information on the impact of noise is also discussed in the social analysis later in this report.

40 Final approval for these developments has not yet been provided.

Land acquisition

There are a number of allotments that would need to be acquired for the development of the airport. For Option 1S, this is approximately 90 and Option 7, about 100.

There are also allotments within the 20 ANEF to 40 ANEF that would potentially need a level of noise amelioration. For Option 1S, this is approximately 114. However, some of these allotments currently do not have residences built on them.

Surface transport

As noted in the Joint Study, planning for an airport should include associated surface transport and land use requirements.

WorleyParsons was asked to identify the issues and possible solutions for surface transport access to a site in the Wilton area given these have environmental implications.

The Wilton Study Area is approximately 85 kilometres southwest of Sydney or approximately one hour via the Hume Highway from Sydney's central business district. Access is available from Picton Road (off the Hume Highway) and Macarthur Drive.

Any of the identified sites would require upgrades to the road access even with the limited airport operations expected in the first decade of its operations. In particular, there is likely to be a requirement to redesign or relocate parts of Picton Road, especially for sites in the western precinct. Traffic at Picton Road has consistently grown at approximately four per cent over the last 10 years. If this is sustained, this will mean an increase in traffic of 50 per cent in 10 years or 120 per cent in 20 years.

Currently only one bus route (route 901) provides a limited service between Picton and Wilton. In addition, Sydney taxis are not allowed to collect passengers from the Wilton area for services to Greater Sydney. This is because Wilton lies outside of the Sydney Metropolitan Transport District; instead it falls within the Wollongong district. These issues would need to be addressed as part of any commitment to building an airport at Wilton.

It is assumed that extended rail services would not be built to the airport from the outset, but would be provided once demand was such that it warranted the additional investment. Currently the main rail access to Sydney is via the Main Southern Railway, with the most easily accessible station Picton,[41] approximately 15 kilometres by road from the sites studied.[42] There is a variety of options that could be considered to link an airport to the existing rail network, as well as extending lines throughout Western Sydney, providing better access to the expected catchment.

In planning transport linkages to an airport, several factors would need to be taken into account, including:

- access for passengers;
- access for employees (often at different times to passenger needs);
- access for others using the same routes to get to alternative destinations; and
- any changes as the airport, or surrounding housing and land use, develop.

It will be important to ensure that in designing the airport, transport linkages are integrated into the design concepts. This will ensure the right infrastructure is built at the right time, avoiding congestion and reduced quality of life.

41 The closest station is in Douglas Park, approximately 12 kilometres north of the sites but it requires going off main roads to get there.
42 Additional connections to the line itself could bring this distance closer.

Summary of site assessments

The work undertaken by WorleyParsons found that the sites in the eastern precinct were significantly more challenging than those in the west and were discounted as options for an airport development. On balance, Options 1S and 7 in the western precinct were identified as the preferable sites. However, the sites in the west would still have substantial environmental challenges to mitigate or offset.

Table 10 Factors which differentiate the two precincts at Wilton

Factors favouring Western Precinct	Common factors	Factors favouring Eastern Precinct
Fewer active mining and proposed mining leases Mine subsidence risks lower or non-existent Avoids the relocation of 20km of 330 kV transmission line Less area of drinking water catchment affected Runoff and wastewater able to drain to Allens Creek Water and wastewater management is simpler Less clearing of natural vegetation Better access for road and rail linkages	Airspace management issues Airport safeguarding Indigenous heritage Flooding hazard Bushfire hazard Social change Meteorology Air quality	Least number of allotments affected by airport footprint Least impact on landowner nominated sites Least number of properties within 40 ANEF, 35 ANEF and 30 ANEF contours Lesser impact on Cumberland Koala Linkage (but still koala habitat)
Summary	Summary	Summary
Relatively more people; less mineral and natural resources; relatively lower earthworks cost; relatively more disturbed environment; closer to transport corridors	Key issues to be resolved for all options	Relatively fewer people; more mineral natural resources, relatively higher earthworks cost; more pristine environment that would be disturbed; further from transport corridors

Source: WorleyParsons.

2.4. The social and economic effects of an airport at Wilton

A critical factor in determining the suitability of a supplementary airport site is an understanding of the social and economic effects that an airport may have on the local community, NSW and Australia.

Economic benefits

Overall the economic analysis found that an airport at Wilton will have a substantially positive impact for the local, state and national economy. All values are expressed in discounted 2012 dollars.[43]

43 Discounting is a commonly used financial technique to determine the present day value of a monetary amount that will be realised in the future.

Direct expenditure

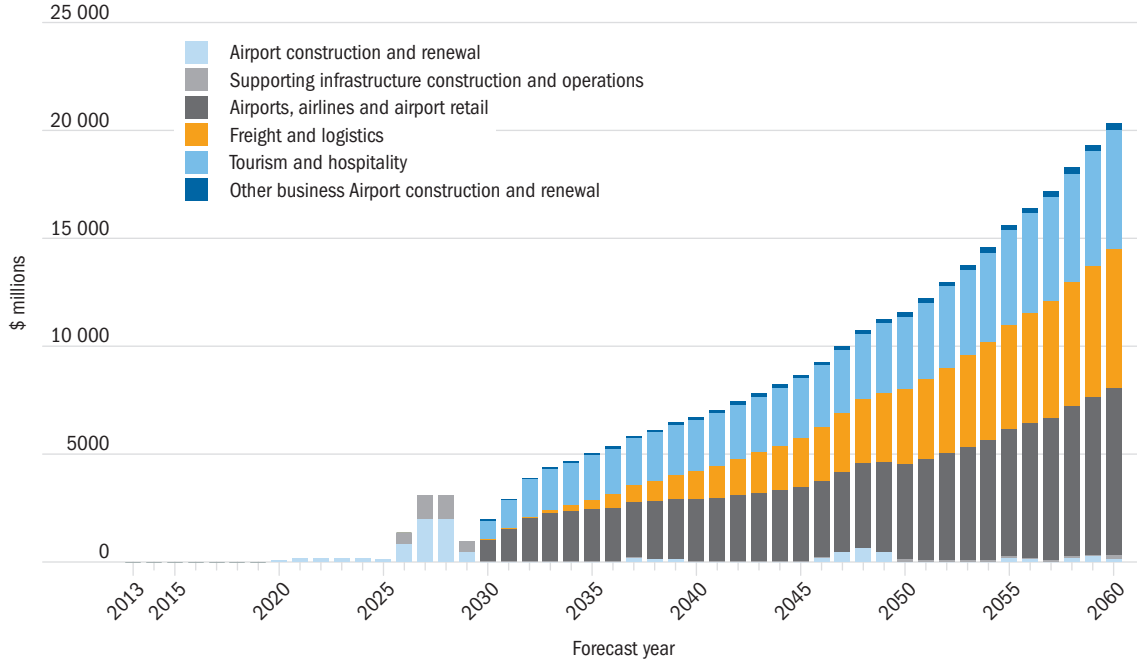
Figure 16 presents the estimated direct expenditure increases of an airport at Wilton. If operations were to commence in 2030 as assumed for the purpose of this analysis, direct expenditure is projected to be:

- approximately $5 billion in 2035;
- increasing to $20 billion by 2060.

Direct expenditure relates to the actual spending made by different industries into the economy. For example, the materials used by construction companies to construct the asset, as well as labour, consultancy and engineering design fees; and the expenses made by airlines to operate their services.

Airports, airlines and airport retail (i.e. retail business located within the terminal) are expected to contribute the largest share of these gains. Freight and logistics expenditure is also expected to grow as freight operations expand at the airport. As these expenditure components are related directly to the airport, they will largely occur within NSW. However, there will be some spillover effects for other states (for example, a passenger flying from Wilton to Melbourne to stay for a holiday).

Figure 16 **Direct expenditure generated by a full-scale airport at Wilton, 2013 to 2060**



Source: Ernst & Young.

Wider economic activity

Building on the estimated increases in direct expenditure, Ernst & Young used the CGE model to assess the likely increases to economic activity in NSW and Australia. These increases are measured by the changes to NSW Gross State Product (GSP) and national Gross Domestic Product (GDP).

Table 11 outlines the findings of the analysis. By 2035 an airport at Wilton would result in an increase to NSW GSP of $3.8 billion and an increase to Australia's GDP of $4.1 billion. By 2060 this would grow to approximately $17 billion for NSW GSP and $20 billion for Australia's GDP.

Table 11 **Wider economic activity generated by a full-scale airport at Wilton, 2035 and 2060**

Jurisdiction and economic indicator	2035	2060
NSW GSP	$3.8 billion	$16.9 billion
Australia GDP	$4.1 billion	$20.0 billion

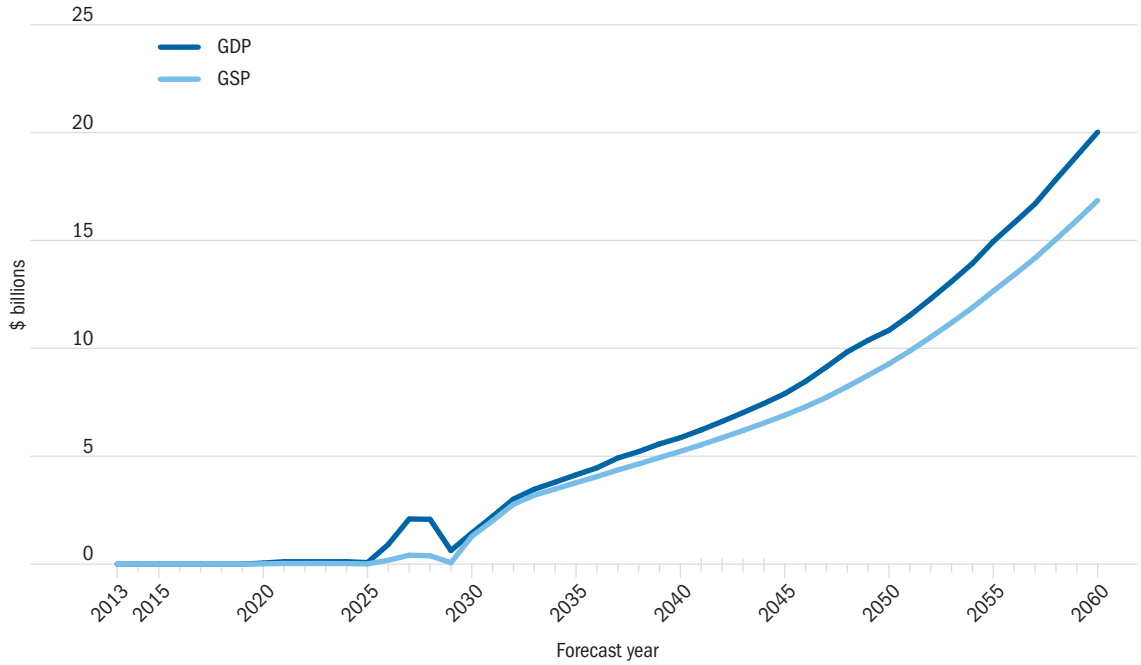
Note: Australia includes NSW.

Source: Ernst & Young.

The findings of the analysis show that, when compared to the base case of doing nothing, an airport at Wilton is expected to increase NSW GSP by 2.7 per cent by 2060. This increase is comparable in share to the entire NSW accommodation and food industry's contribution to the NSW economy in 2012.[44]

The profile of wider economic impacts to the NSW and national economy are shown in Figure 17. The analysis shows how NSW will experience the majority of economic benefits from the development of an airport at Wilton. In particular, NSW would benefit from the increased business activity that occurs in and around the airport site, and the increased economic activity that would occur as a result of more people being employed in NSW.

Figure 17 **Increases to NSW GSP and Australia's GDP resulting from a full-scale airport at Wilton, 2013 to 2060**



Source: Ernst & Young.

The increase in GDP and GSP from 2025 (shown on the graph) represents the construction phase of an airport. The Ernst & Young analysis assumed that it would take approximately four years to construct an airport at Wilton. The impact of construction expenditure during this time is also represented in Figure 16.

The analysis shows that the majority of economic benefits will be focused in metropolitan Sydney, including Western Sydney and the planned growth centres to the southwest and northwest. However, the analysis also shows that rural and regional NSW will receive economic benefits. This is primarily because of increased intrastate travel and general spill-over effects generated by economic activity in the Sydney metropolitan region.

44 The NSW accommodation and food industry contributed 2.8 per cent of NSW GSP in 2012. Source: ABS, *Australian National Accounts: State Accounts 2011-12*. Cat No: 5220.0.

Employment

Direct employment at the airport

Direct employment is defined as employment generated at the airport site. All employment increases are expressed as Full Time Equivalents (FTE), a standardised unit equivalent to the workload of a full time employee.

Construction employment

The construction of an airport at Wilton and the associated infrastructure (such as road and rail connections) are expected to employ approximately 4,500 FTE jobs over the construction period.

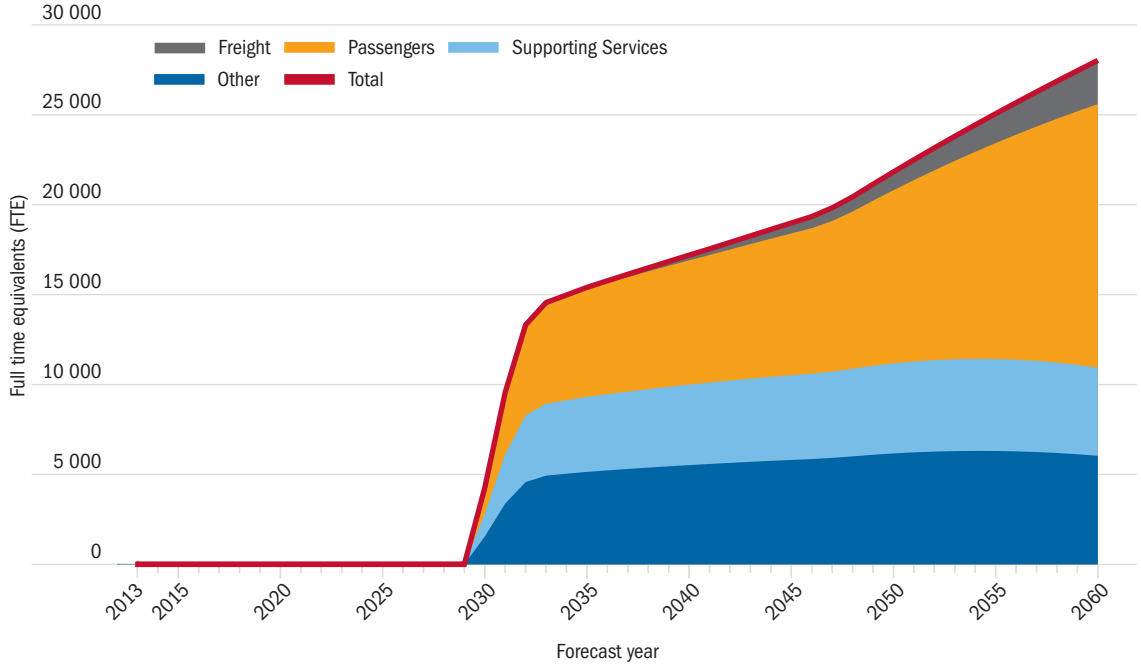
As discussed earlier, it has been assumed that an airport at Wilton would be subject to a staged development to allow the airport to expand as new demand arises. It is assumed therefore that construction employment at the site would also be staged in line with the physical expansion of the airport.

Operational employment

Unlike road infrastructure, where the employment opportunities cease after construction, an airport will continue to generate employment opportunities as demand for services increases. Indeed, the operation of the airport will generate significantly more jobs than its construction.

An airport at Wilton is expected to provide operational employment of approximately 15,400 FTE persons by 2035. This is nearly four times the number of construction jobs. This would increase to approximately 28,000 FTE jobs by 2060. Figure 18 shows the expected breakdown of how jobs could be created.

Figure 18 **Breakdown of operational employment generated by a full-scale airport at Wilton, 2013 to 2060**



Source: Ernst & Young.

This shows the variety of employment opportunities created by an airport across different industries. Passenger services (such as airline and air services employment) are expected to be the largest source of operational employment, accounting for 52 per cent of employment by

2060. Supporting services (such as ground transport, administration and retail employment) and other services (such as maintenance employment) will also make significant contributions throughout the operational life of the airport.

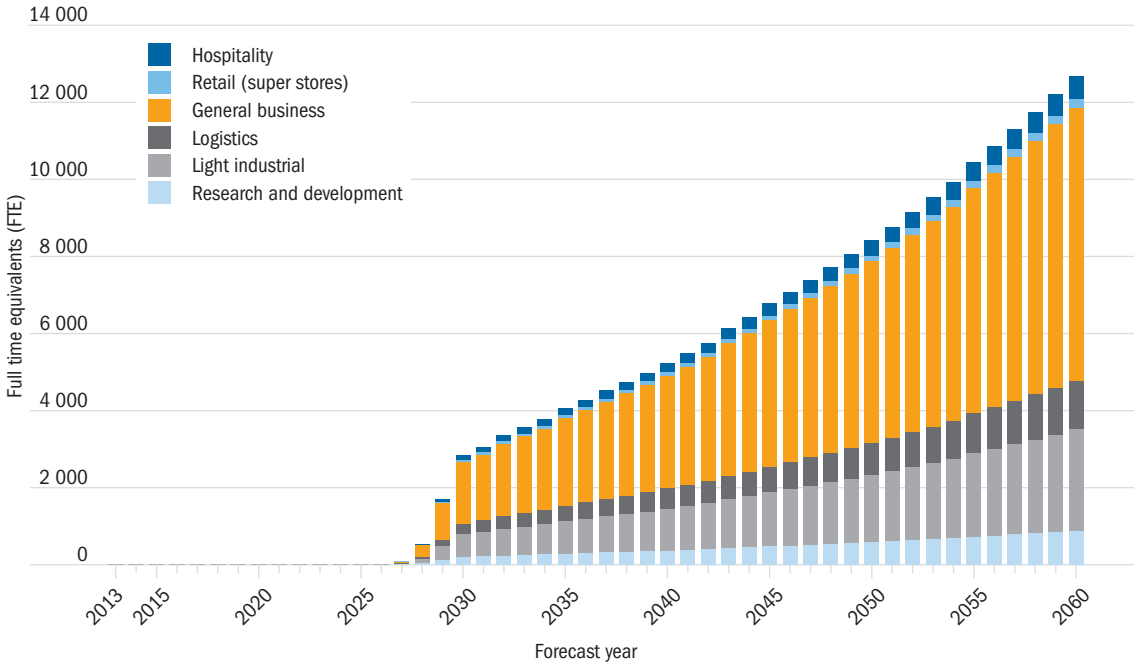
The analysis indicates that an airport at Wilton is likely to directly generate nearly 650 FTE jobs per million passenger movements. This is slightly below the international experience, which suggests airports generate approximately 1,000 jobs per million passenger movements.[45] However, Wilton's predicted jobs-to-passenger ratio is consistent with recent Bureau of Infrastructure, Transport and Regional Economics analysis on employment at Australian airports.[46]

Indirect employment outside the airport site

Aviation activity also encourages other industries to develop around the airport precinct and in the surrounding area. These industrial and commercial businesses will generate indirect employment around the airport site (for example, business parks and warehouses around the airport).

Figure 19 shows the indirect employment that is expected to be generated by businesses surrounding the airport. By 2035, an airport at Wilton is likely to result in approximately 4,100 FTE jobs being employed. This is expected to increase to approximately 12,700 FTE jobs by 2060.

Figure 19 **Breakdown of indirect employment around the airport site generated by a full-scale airport at Wilton, 2013 to 2060**



Source: Ernst & Young.

45 Note that this international rule of thumb is not expressed in terms of FTE positions.

46 Bureau of Infrastructure, Transport and Regional Economics, Information Sheet 46, *Employment generation and airports,* February 2013.

There is a range of sectors that will benefit from an airport in the area, many of which are different from the types of employment found at the airport. These include:

- retail;
- freight and logistics;
- light industrial;
- tourism and hospitality, including hotel employment; and
- general research and development.[47]

Again, this demonstrates the diversity of employment an airport precinct can offer. The analysis shows that the general business sector will have the highest employment levels in the developments surrounding the airport. The light industrial and logistics industries will also be important sectors for employment.

Total employment

Gross employment

Table 12 presents a summary of the total gross employment expected to occur in the region as a result of an airport at Wilton. The analysis covers two distinct periods: up to 2035 and up to 2060.

The analysis shows that an airport at Wilton would have a total impact (representing both direct jobs at the airport and indirect jobs around the airport site) of approximately 24,000 jobs by 2035 increasing to 40,700 by 2060.

Table 12 Gross employment generated by a full-scale airport at Wilton, 2035 and 2060

Employment type	Up to 2035	Up to 2060
Construction	4,509	(See Note 2)
Airport operation	15,403	28,028
Indirect employment around the airport site (e.g. Associated business park development)	4,061	12,679
Total employment	23,973	40,707

Note 1: Wider employment impacts unrelated to the airport site (mentioned below) are not included in this table.

Note 2: Construction jobs were estimated only for the period originally establishing Wilton as a civil airport. Some construction work will occur up to 2060 for any additional airport development throughout the lifetime of the airport, but the bulk of jobs for this type of work will be generated prior to start-up, and so have been shown in the first column.

Source: Ernst & Young.

In addition to the employment opportunities generated directly at the airport, Ernst & Young assessed the expected employment that may be generated in the surrounding region and beyond. By 2035, an airport at Wilton will support approximately 19,600 jobs within the wider region. As the airport develops over the long-term, it is estimated that it could support up to 27,000 jobs in the wider region by 2060.

It should be noted that the actual amount of jobs supported in the wider region is dependent on the size of operations at the airport. If the development of an airport were staged over a longer time period, it is likely that the number of jobs supported in the wider region would be lower and grow more slowly.

47 Businesses engaged in general research & development are expected to develop in business parks around the airport site as the area is expected to provide suitable types of office space with reasonably good connectivity to higher education institutions in the area.

Net employment

It is important to note that not all employment opportunities generated by an airport represent new jobs within the region. Some of these jobs will be the result of economic activity moving from other areas to be closer to the airport. For example, businesses involved in light industry may move to a business park adjacent to the airport to take advantage of location-specific benefits such as increased amounts of available land or better access to infrastructure. In these cases, there is actually no change to the overall employment levels.

Table 13 Net employment impacts generated by a full-scale airport at Wilton, 2035 and 2060

Economic Indicator	2035	2060
Net increase in jobs in NSW	8,900	27,700
Resulting decrease in Sydney's unemployment rate	0.26%	0.61%

Source: Ernst & Young.

Taking all of the above factors into account, the analysis in Table 13 shows that an airport at Wilton is expected to have substantial and long-lasting effects on the NSW labour market. The net employment generated by an airport at Wilton is estimated to be 8,900 new jobs by 2035. This is just under half of all the new jobs expected to be created. By 2060 this will increase to approximately two thirds of all jobs or 27,700 FTE.

This is equivalent to a net decrease in Sydney's unemployment rate of 0.26 per cent by 2035 and 0.61 per cent by 2060.

Meeting local employment growth targets

An important aspect of an airport is its ability to draw in economic activity and employment from outside the region. This has the potential to benefit the local community by providing residents with long-term and meaningful employment opportunities. It also benefits the wider community by generating sustained economic activity which contributes to the growth and viability of the local area.

The Draft Metropolitan Strategy for Sydney (the Metropolitan Strategy) recently released by the NSW Government sets out an integrated long-term planning framework to manage and promote Sydney's growth. This includes employment capacity targets for each of the subregions of the Sydney Basin.[48]

The NSW Government expects that an additional 134,000 jobs must be created within the South West subregion (which includes Wilton) by 2031.[49] This represents a growth in employment requirements of 45 per cent over the period 2011 to 2031 – by far the highest of any subregion.

As mentioned previously, Ernst & Young identified that an airport at Wilton is expected to generate a total of approximately 24,000 jobs by 2035, including construction employment. It is not possible to directly compare the two figures as the analysis in this report assumed Wilton would only commence operations in 2030. However, this figure equates to approximately 18 per cent of the draft Metropolitan Strategy's employment growth target for the surrounding subregion suggesting that an airport at Wilton would make a substantial contribution to medium-term employment targets in the South West.

As noted earlier, it is also estimated that the employment and economic activity generated by an airport at Wilton would support an additional 19,600 jobs within the wider region by 2035. This would be in addition to the 24,000 jobs created at or around the airport site. It is likely that

48 In its *Draft Metropolitan Strategy,* the NSW Government has defined the Southwest subregion as the local government areas of Bankstown, Camden, Campbelltown, Fairfield, Liverpool and Wollondilly. Accordingly they differ from the study regions identified in this report.

49 NSW Government, *Draft Metropolitan Strategy for Sydney,* 2013.

some of these additional jobs would occur within the South West subregion further increasing the airport's ability to cater for future employment growth targets.

Given that Wilton was assumed to only start operations in 2030, this contribution is likely to increase as operations at the airport grow over time.

Social factors

An airport at Wilton will give rise to a number of social factors which will affect the wellbeing of the people in the surrounding communities. These social factors are difficult to quantify as they often represent intangible changes that affect both users and non-users of an airport.

Aircraft noise

The Department investigated the number of people that would be affected by aircraft noise as the airport grew to certain levels of activity. To do so, a 20 ANEF contour was developed for an airport with a capacity of 70 million passenger movements per year (that is, all services consistent with modelling undertaken by Booz & Company). One was also developed for an intermediate level utilisation likely to be attained over the study period (in this case, approximately 20 million passenger movements serving all domestic and regional and medium-haul international services). This intermediate level of activity is expected to be reached around 2040. This was considered to be a more comparable representation of what would be realised in the forecast period.

The Department estimated the ANEF footprint based on Booz and Company's demand and the runway alignment for Option 1S. Overall the analysis supported the WorleyParsons findings that the noise impacts of an airport at Wilton would be very low.

Table 14 outlines the findings of the ANEF analysis. Based on the intermediate (20 million passenger movement) scenario, the number of people within the 20 ANEF is expected to be approximately 600. Between 2040 and 2060 Wilton is expected to increase its annual passenger movements from 20 million to approximately 44 million. Based on the current distribution of population, the number of people within the 20 ANEF is expected to be between 600 and 1,500.

Table 14 Estimated current population within the 20 ANEF contour at Wilton

Annual passenger movements	Estimated daily aircraft movements	Population within 20 ANEF (persons)	Approximate year this could occur
20 million	280	594	2040
70 million	824	1,526	Beyond 2060

Note: Population based on 2011 population figures only.

Source: Department of Infrastructure and Transport analysis.

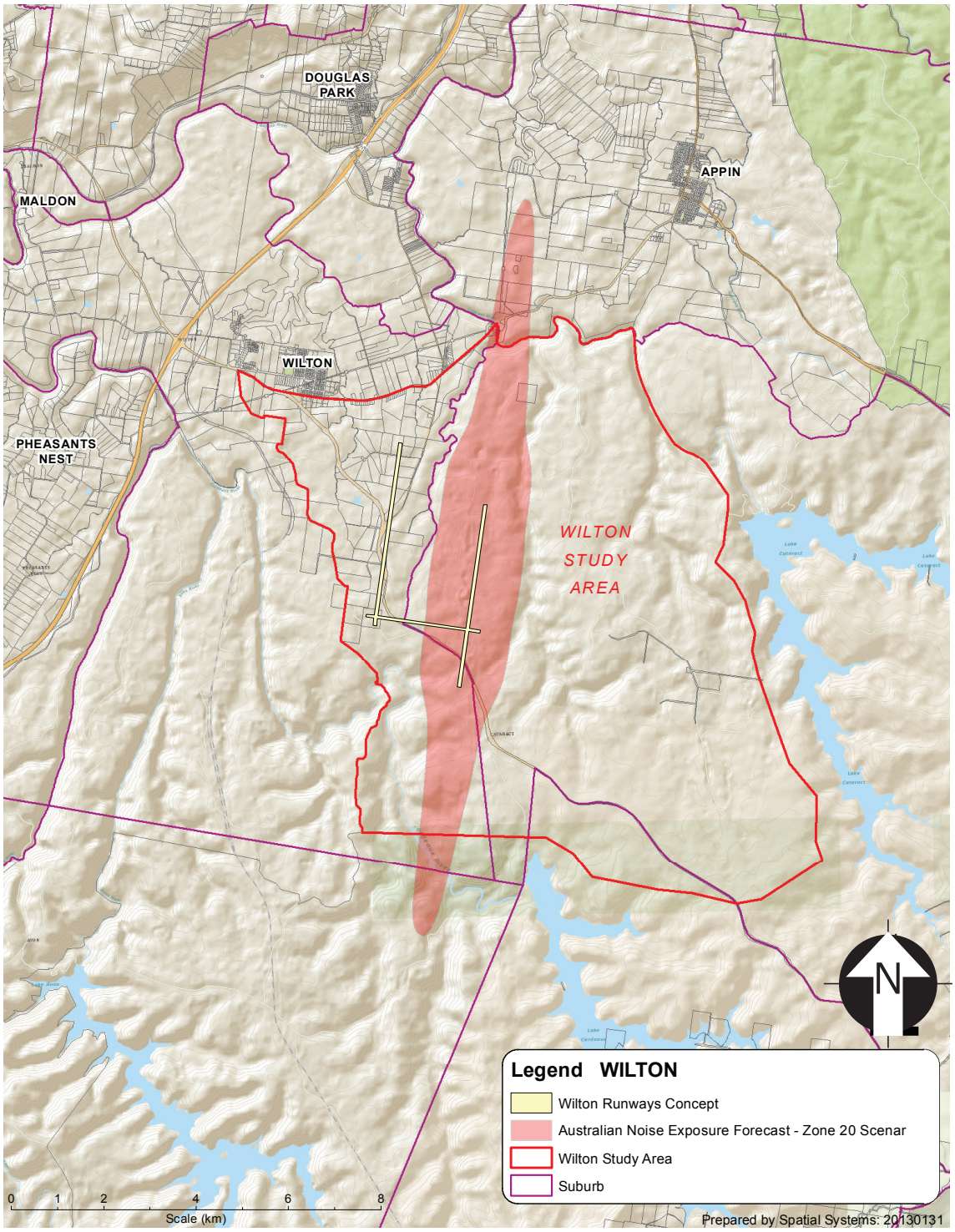
It is important to note that the noise analysis at Wilton was based on current population (2011 ABS data) and makes no assumptions about how or where the population may grow. If an airport does proceed, the expectation is that planning restrictions (as has occurred at Badgerys Creek) will limit the growth of the population in the affected areas. In addition, appropriate noise mitigation strategies will also be put in place.

To put these findings into perspective, the analysis found that under current operations at Sydney (Kingsford-Smith) Airport, approximately 130,000 people are within the current 20 ANEI contour.[50] This means the noise effects of a fully utilised airport at Wilton, which would not occur until well beyond 2060, would only be 1.2 per cent of those affected by Sydney (Kingsford-Smith) Airport today.

50 Aircraft noise exposure index differs from the aircraft noise exposure forecast (ANEF) as it is based on actual aircraft movements.

Figure 20 and Figure 21 illustrate the estimated noise impacts at an airport at Wilton over the study period to 2060 (at approximately 20 million passenger movements), and at Sydney (Kingsford Smith) as it operates today. While the area affected by noise even when Wilton reaches its maximum level of activity would be comparable between the two airports, it is clear that because Wilton is surrounded primarily by rural lands, the actual impact on residential areas (in grey) will be significantly lower.

Figure 20 **20 ANEF contour estimated for an airport at Wilton (20-million-passenger capacity)**



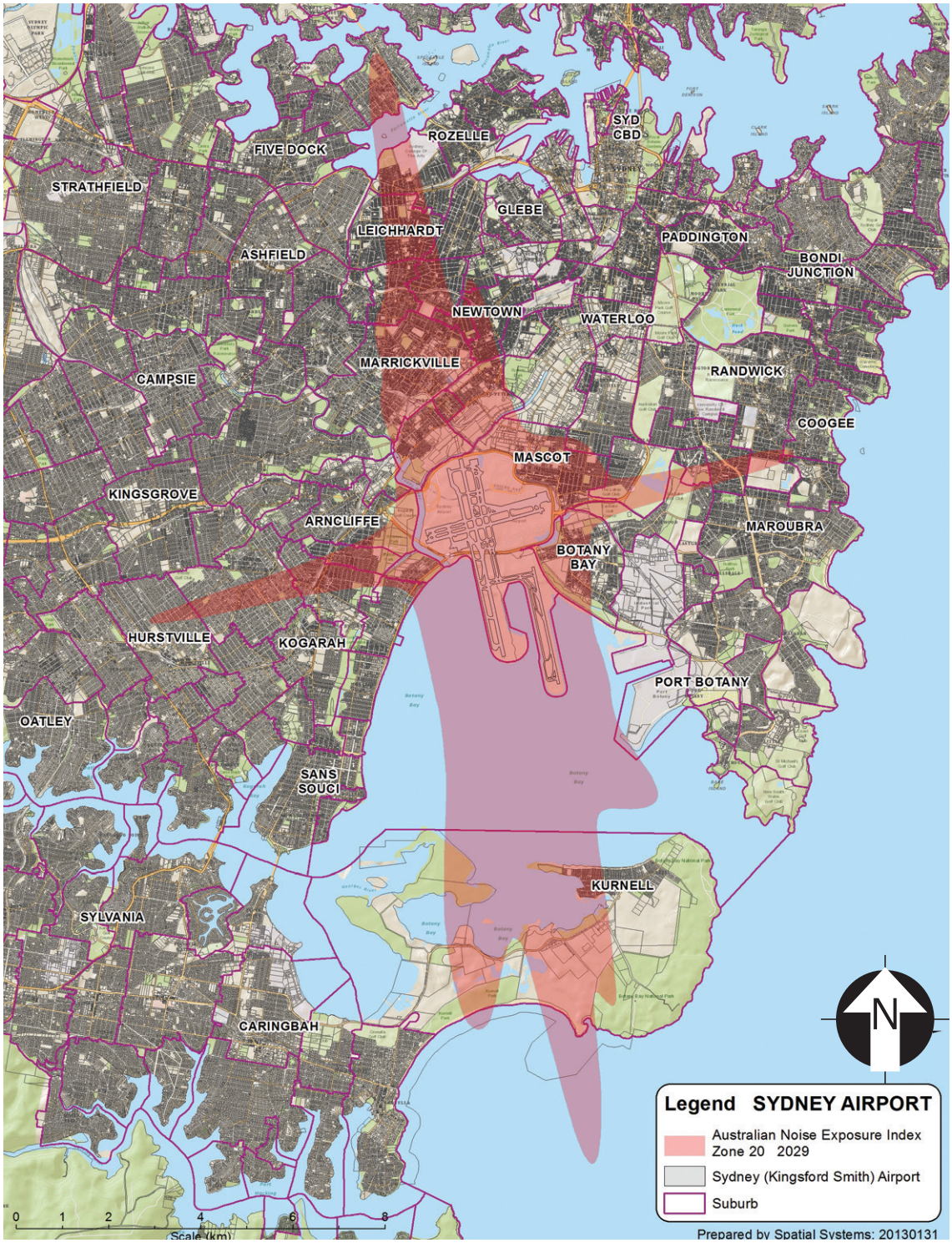
Note 1: Wilton noise contour is based on Option 1S, a 20 ANEF, estimated 20 million passenger movements or approximately 280 aircraft movements per day; accordingly only a single-runway operation is shown. Forecast to be reached in approximately 2040.

Note 2: Based on comparable hours of operation at Sydney (Kingsford-Smith) Airport.

Note 3: The grey-lined cadastral map shows land parcels and property boundaries; accordingly urban areas are reflected in darker denser property arrangements than industrial or rural areas.

Source: Department of Infrastructure and Transport.

Figure 21 20 ANEI contour for Sydney (Kingsford-Smith) Airport (36-million-passenger movements, 2011)



Note: *Sydney (Kingsford-Smith) Airport noise contour is based on Aircraft Noise Exposure Index for 2011 as recorded by Airservices Australia. Approximately 36 million passenger movements and 289,000 aircraft movements occurred at the airport in 2011.*

Note 2: *The grey-lined cadastral map shows land parcels and property boundaries; accordingly urban areas are reflected in darker denser property arrangements than industrial or rural areas.*

Source: *Department of Infrastructure and Transport.*

Working closer to home and quality of life benefits

The benefits of providing a large employment generator in an area that either has higher unemployment or requires residents to work a significant distance from their homes are extensive.

Some of these benefits include a reduction in commuter times, reduced congestion on roads and public transport, lower energy use and carbon emissions, increased workforce productivity, increased leisure times for individuals and the promotion of more active and healthy lifestyles.

Table 15 presents the employment opportunities that would be created closer to residents in Western Sydney if an airport was developed at Wilton. The analysis shows that by 2035, it is expected that up to 10,700 residents within the airport region will be able to access employment opportunities closer to their place of residence. By 2060 this figure is expected to increase to 21,900 residents.

This equates to local residents saving 3.6 million hours of commuter travel time by 2060. This will help in distributing future traffic to less congested roads and enable the local community to take advantage of the benefits of working closer to home (as outlined above).

Table 15 Benefits of working closer to home, generated by a full-scale airport at Wilton, 2035 and 2060

	2035	2060
Increase in employment opportunities closer to home	8,700 – 10,700 persons	18,800 – 21,900 persons
Commuter travel time saved	1.58 million hours	3.6 million hours

Source: Ernst & Young.

Ultimately the airport would transform the current commuting patterns of the area. For example, the 1985 Environmental Impact Statement found that Campbelltown is equidistant between Sydney (Kingsford-Smith) Airport and Wilton. Therefore, a major benefit of accessing Wilton would be its location relative to the main commuter flows. Instead of having to travel towards Sydney's central business district to access employment, residents would be able to commute in the opposite direction. This will be especially important in the peak commuter hours when it is expected aviation demand will first be accommodated at Wilton.

Increased access to aviation for local residents

An airport at Wilton will provide greater aviation services for the local community and those in Western Sydney more generally. Importantly, it is likely to:

- provide better access to business and leisure opportunities outside the region;
- assist in attracting tourism and business investment to Western Sydney and, to a lesser degree, the Illawarra region; and
- increase access to services and valuable social infrastructure that may develop around the airport site.

While Ernst & Young did not assess potential travel time saved by passengers, it is expected that an airport at Wilton would provide some passengers with improved travel times, especially where passengers are travelling to or from areas in Western Sydney. Indeed, Booz & Company's forecast demand analysis implies a level of attractiveness based on travel time, cost and location of a second airport site compared with Sydney (Kingsford-Smith) Airport.

The analysis also found that by 2035 an airport at Wilton would increase the number of flights taken by residents of south and southwestern Sydney (including Campbelltown, Liverpool,

Hurstville and Sutherland) by approximately 2.4 million flights per year.[51] This represents a 33 per cent increase in aviation travel by residents in those regions. By 2060 this is expected to increase to 8.1 million extra flights — an 89 per cent increase on today's figures.

Given its location, an airport at Wilton could also provide the people living in Wollongong and the greater Illawarra region with access to aviation passenger services.[52] These residents would be 30 to 40 minutes from aviation services as compared with 1.5 hours from Sydney.

Land value

International studies have explored the effects of an airport on land values. Most studies concluded that it was difficult to predict the effect on local property values as they are determined by several factors, including the nature of the real estate market and the operating conditions of the airport (for example, curfews and frequency of flights).

The analysis of the Wilton area, by Ernst & Young, suggests that the effect on land values will be minimal due to:

- many of the effects on land value counteracting each other. For example, the increased employment opportunities around the airport site will increase land values, while concerns about potential noise impacts may decrease values in the short term; and
- rural areas and bushland, which make up a significant share of the land type around Wilton, are not influenced by the same factors as residential property and so are likely to experience minimal or no change in value.

In addition, early decisions on land use planning should restrict housing in areas incompatible with airport's operation and development.

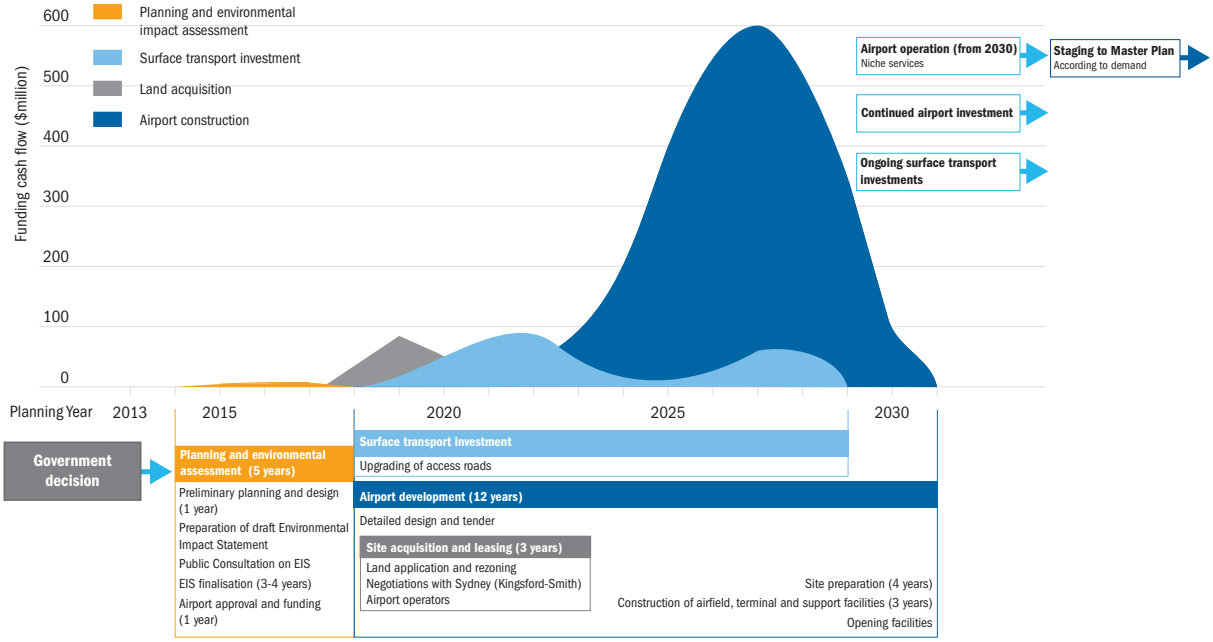
2.5. The cost and timing of construction

It is anticipated that the first stage of an airport (single runway) at Wilton with appropriate surface transport connections (primarily roads) would cost approximately $3.4 billion and take 17 years to construct (Figure 22). This estimation is based on the need for complex earthworks and construction work to enable the expansion to a full scale airport when needed.[53]

WorleyParsons found that a site for a single 4,000 metre runway can be more easily identified. However, the nature of the terrain would make it much harder to position and construct the additional runways to meet demand at a later date.

51 This includes both generated demand (as discussed earlier), and additional flights that can be realised from capacity being provided.
52 Illawarra Regional Airport stopped providing passengers services in 2008.
53 More information on this can be found in Part 8 of the Joint Study.

Figure 22 **Indicative cost and schedule for construction of an airport at Wilton**



Note: *Based on time and cost estimates for construction of an airport as identified in the Joint Study; updated for specific characteristics in terms of environmental assessment, site preparation and airport construction identified for Wilton.*

Source: Department of Infrastructure and Transport.

2.6. Options for the development of an airport at Wilton

The current analysis demonstrates the range of issues that have to be taken into consideration by the Government in determining whether or not to progress with an airport site development at Wilton. In particular, it has confirmed the information from the Joint Study and in many respects better quantified the scale of the challenges of establishing an airport at Wilton.

On the one hand, the environmental aspects are significant. WorleyParsons' analysis shows that while there is no one factor that makes building a full-scale airport prohibitive, taken together, the environmental impact and construction costs would be extensive.

However, the economic analysis demonstrates considerable benefits for the local, state and national economies. The economic benefits go a considerable way towards addressing the employment targets set by the NSW Government, and are likely to have major flow on effects to other regions, including Wollongong.

Building a single runway airport at Wilton would be simpler from an engineering/construction perspective, but would involve many of the same risks in terms of environmental impact as a full-scale airport without providing the necessary future capacity, and thereby limiting the economic benefits. It would also not meet all the forecast demand. The Department's view is that a more modest airport, with significantly lower capacity at Wilton would not represent a cost-effective alternative.

Given the sites examined were chosen to ensure a level of flexibility in design, consideration could be given to varying the type of airport to be built. To do so would require an amount of additional work, including but not limited to:

- more detailed geotechnical analysis on the potential of mine subsidence as well as the need and cost of the sterilisation of coal reserves under the airport given the preferred site/s are on coal leases;

- further analysis on cross-wind issues to identify the consequences or risk of not including a cross-runway. This could include data collection through establishing a temporary weather station in Wilton;
- further analysis on optimum site layouts to minimise the impacts on threatened species;
- more detailed analysis on the orientation of runways and airspace design. This could consider future air traffic management technologies that might provide greater flexibility in designing flight paths for approaches and departures; and
- developing airport concepts that ensured the most utilitarian design given Sydney's projected long-term demand. This could include innovative options to reduce noise impacts on local communities.

It is also imperative that a strategic approach to surface transport planning for the area is integrated into any airport proposal, given the expected growth in population in the surrounding local government areas. The purpose of this is to ensure residents, workers and airport users are provided with surface transport connections that promote opportunities for working closer to home, reduced congestion and greater productivity and liveability.[54] While the Government could progress to an Environmental Impact Statement (EIS) process on the site (albeit noting there will be a significant range of issues to mitigate or offset), it is recommended that the additional work be undertaken before committing to an EIS.

2.7. Assessing the scale of the economic and social issues and costs and benefits of a major greenfield airport development at Wilton

To enable a comparative objective basis for understanding the issues considered in the Wilton site, the Department has considered the consequences of using the alternative Commonwealth-owned Badgerys Creek site to meet projected aviation demand in the Sydney region.

Badgerys Creek at a glance

Badgerys Creek has been examined on numerous occasions as a potential site for a second airport. A site of approximately 1,700 hectares was acquired by the Commonwealth at Badgerys Creek in the late 1980s following a detailed environmental impact assessment.

The site is located adjacent to the growth areas of south west Sydney; and the key transport corridors of the M7, the future outer orbital and the rail link to Leppington. It is also close to the Western Sydney Employment Area, which the NSW Government has identified for expansion.

The population of the four local government areas surrounding the site (Bankstown, Liverpool, Fairfield, and Penrith) is 760,000, and is expected to grow to over 1 million by 2036 (an increase of 33 per cent).[55]

The site itself, however, has been zoned for special purposes and has been on a single title since the early 1990s. Planning restrictions around the site have also limited the extent of urban development.

Table 16 outlines the approximate travel time from major centres indicating its proximity to its catchment.

54 This should occur no matter which site is developed.
55 Current population was drawn from ABS, *Census of Population and Housing,* 2011. Forecast populations, from the NSW Department of Planning and Infrastructure were based in 2006.

Table 16 **Badgerys Creek – Approximate travel times to major centres**

Area	Approximate straight-line distance	Road		Rail	
		Approximate off-peak travel time	Approximate peak-hour travel time	Approximate travel time	Changes required
CBD/Central	47km	¾ hour	2 ¼ hours	1 hour	0
North Sydney	46km	1 hour	2 ½ hours	1 ½ hour	0
Parramatta	28km	½ hour	1 ½ hours	½ hour	0
Penrith	15km	½ hour	½ hour	< ½ hour	0
Blacktown	19km	½ hour	1 hour	⅓ hour	0
Liverpool	19km	½ hour	¾ hour	1 hour	1
Campbelltown	22km	½ hour	¾ hours	1 ⅓ hours	1
Castle Hill	29km	¾ hour	1 ¼ hours	No trains available	n/a
Hornsby	38km	¾ 1hour	2 hour	1 ⅓ hours	1

Note 1: These estimates are based on current surface transport levels and patterns.

Note 2: Road times were estimated on travel time from the suburb train station to the airport site; off-peak travel times were based on an estimate from Google Maps; peak hour travel times were drawn from NSW Bureau of Transport Statistics and include an estimate of congestion at peak times.

Note 3: Train times were estimated on peak hour travel from suburb train station to the station nearest to the airport (Werrington); the minimum time/changes required were cited. They do not include average wait or transfer times.

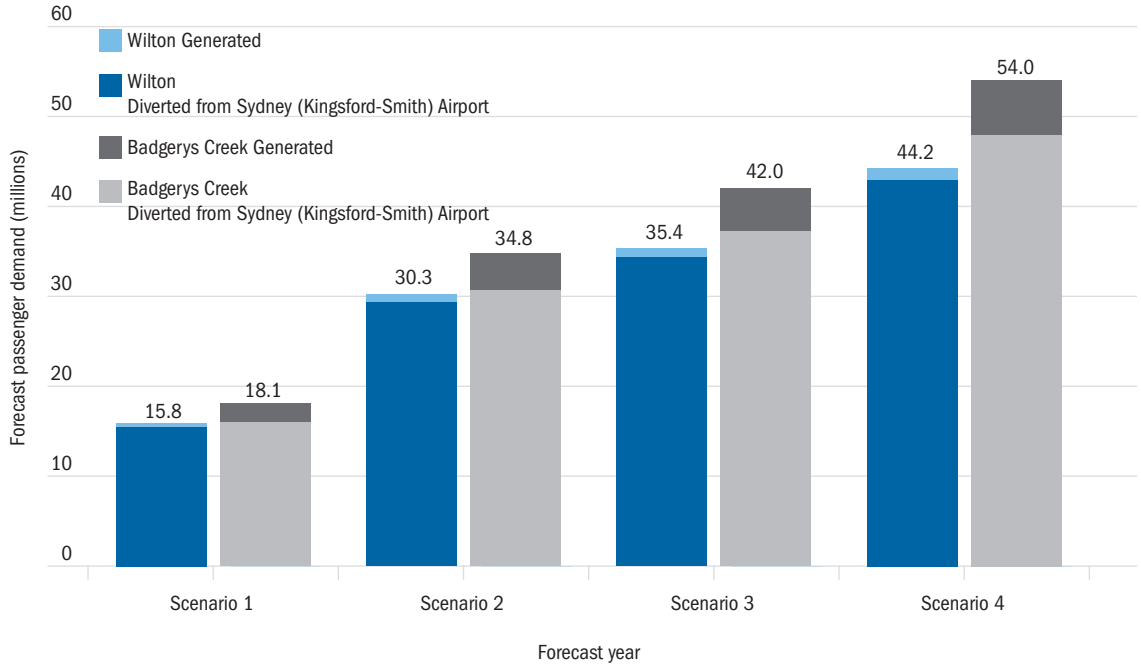
Note 4: Times may vary significantly based on the connections used, particularly in off-peak periods.

Source: Department of Infrastructure and Transport analysis from Google Maps and CityRail, Bureau of Infrastructure, Transport and Regional Economics analysis of NSW Bureau of Transport Statistics Strategic Travel Model (STM) outputs, 2011.

Proximity to passenger demand

Figure 23 below shows the comparison of forecast passenger demand at Wilton and Badgerys Creek in 2060. The comparison was made across each of the four demand scenarios (described earlier). Forecast demand at Badgerys Creek is 14 to 22 per cent higher than at Wilton in 2060 across all scenarios. The key factor for this is the higher passenger demand generated from the west and northwest of Sydney — a result of better access from these parts of Sydney.

Figure 23 **Comparing forecast passenger demand at Wilton and Badgerys Creek – all scenarios, 2060**



Note: Figures have been rounded to the nearest 0.1m.

Source: Booz & Company.

Neither Wilton nor Badgerys Creek, however, will cater for the entire unmet demand expected in Sydney. While Badgerys Creek is forecast to provide for 54 million passenger movements, 6 million of these are generated demand, leaving just over 6 million in unmet demand for aviation services by 2060.

The primary reason for this is Sydney (Kingsford-Smith) Airport's proximity to the central business district (only 8 kilometres) means that the cost and time to access the airport cannot be replicated anywhere in Western Sydney. However, an airport in Western Sydney would be able to better cater for unmet demand if transport connections are improved, and if congestion continues to increase around Sydney (Kingsford-Smith) Airport.

Economic differences between Badgerys Creek and Wilton

Like all airports, aviation services at any location come with costs and benefits for the community and economy more broadly. Stating this, the correlation between the airport's proximity to its catchment and the extent of the social and economic benefits should not be underestimated.

The analysis found that if an airport were to be built at Badgerys Creek it would generate $24.7 billion in direct expenditure by 2060. This is nearly $5 billion higher than Wilton for the same period.

Based on the higher expenditure effects, Badgerys Creek is also expected to generate greater levels of economic activity in the NSW and national economies. Table 17 presents the projected economic activity generated by an airport at Badgerys Creek. The analysis shows that an airport at Badgerys Creek would contribute:

- $20.3 billion increase in GSP to the NSW economy by 2060 (20.4 per cent greater than Wilton);
- $23.9 billion increase in GDP to the national economy by 2060 (19.6 per cent greater than Wilton).

Table 17 Wider economic impact generated by a full-scale airport at Badgerys Creek, 2035 and 2060

Jurisdiction and economic indicator	2035	2060
NSW GSP	$5.9 billion	$20.3 billion
Australia GDP	$6.3 billion	$23.9 billion

Source: Ernst & Young.

Employment

The analysis indicates that because an airport at Badgerys Creek is expected to cater for more passengers than at Wilton; it is also expected to generate a greater numbers of employment opportunities.

Table 18 presents a summary of the total gross employment expected to be generated as a result of an airport at the Badgerys Creek site. It shows that an airport would have a total benefit (representing both direct jobs at the airport and indirect jobs around the airport site) of approximately 35,200 jobs by 2035 increasing to 60,600 by 2060. Over the period to 2060 this equates to 49 per cent more jobs at Badgerys Creek than compared with Wilton.

Table 18 Gross employment generated by a full-scale airport at the Commonwealth-owned Badgerys Creek site, 2035 and 2060

Employment type	Up to 2035	Up to 2060
Construction	4,292	(See Note 2)
Airport operation	20,391	30,587
Indirect employment around the airport site (e.g. associated business park development)	10,540	29,998
Total employment	35,223	60,585

Note 1: Wider employment impacts unrelated to the airport site are not included in this table.

Note 2: Construction jobs were estimated only for the period originally establishing Badgerys Creek as a civil airport. Some construction work will occur up to 2060 for any additional airport development throughout the lifetime of the airport, but the bulk of jobs for this type of work will be generated prior to start-up, and so have been shown in the first column.

Source: Ernst & Young.

The analysis also shows that an airport at Badgerys Creek would generate a greater net benefit to the NSW economy when compared to Wilton (Table 19) with employment estimated to be 12,100 new jobs by 2035 rising to 33,400 by 2060.

Table 19 **Net employment impacts generated by a full-scale airport at Badgerys Creek, 2035 and 2060**

Economic Indicator	2035	2060
Net increase in jobs in NSW	12,100	33,400
Resulting decrease in Sydney's unemployment rate	0.35%	0.74%

Source: Ernst & Young.

This is equivalent to a net decrease in Sydney's unemployment rate of 0.35 per cent by 2035 and 0.74 per cent by 2060.

Working closer to home and quality of life benefits

Table 20 presents the employment opportunities that would be created for residents in Western Sydney if an airport was developed at the Badgerys Creek site.

The analysis shows that by 2035, it is expected that up to 17,000 residents within the airport region will be able to access employment opportunities closer to their place of residence. This is significantly higher than at Wilton. Much of this difference can be attributed to higher passenger numbers expected at Badgerys Creek at this time in its operation.

By 2060 the number of residents working closer to home is expected to increase to approximately 30,000. This equates to local residents saving 3.92 million hours of commuter travel time.

By the same time, however, the gap between Badgerys Creek and Wilton diminishes as Wilton will have had sufficient time to develop its operations and employment numbers.

Table 20 **Benefits of working closer to home generated by a full-scale airport at Badgerys Creek, 2035 and 2060**

	2035	2060
Increase in employment opportunities closer to home	13,900,500 – 17,000 persons	24,300 – 36,200 persons
Commuter travel time saved (per year)	1.68 million hours	3.92 million hours

Source: Ernst & Young.

Land values

As the Badgerys Creek site was already designated as an airport site two decades ago, much of the impact associated with land values is likely to have already been felt.

Planning controls implemented by the NSW Government to protect the land from incompatible uses, and by developing designated employment areas around the site, means that the impacts are likely to be relatively small, even compared to the rural land prices around Wilton.

Environmental comparisons — noise

Table 21 outlines the findings of the ANEF analysis. Badgerys Creek would start with a stronger level of demand, and would therefore reach 20 million passenger movements sooner than an airport at Wilton. Based on the current (2011) distribution of population, approximately 3,900 people would be inside the 20 ANEF for this size of airport.

By the time the airport reaches is maximum capacity (beyond 2060) the number of people within the 20 ANEF is estimated to grow to be approximately 8,200.

Table 21 Estimated current population within the 20 ANEF contour at Badgerys Creek

Annual passenger movements	Estimated daily aircraft movements	Population within 20 ANEF (persons)	Approximate year this could occur
20 million	280	3,947	2030
70 million	824	8,205	Beyond 2060

Note 1: Affected population based on 2011 population figures only.

Note 2: The 20-million-passenger capacity airport is based on a single runway operation; a full 70-million-passenger capacity airport would be based on a parallel runway operation.

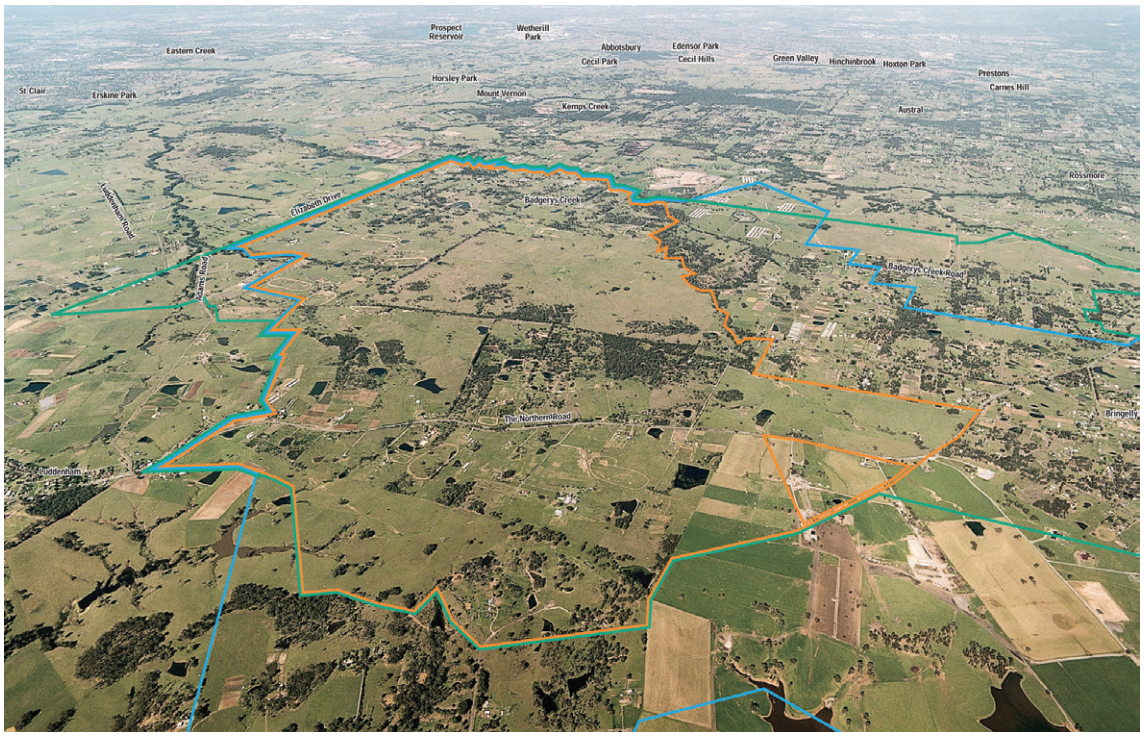
Source: Department of Infrastructure and Transport.

When compared to Wilton, the analysis indicates that the noise impacts at the Badgerys Creek site are likely to be higher because of the increased demand and because it is located closer to more densely populated areas.

However, the impacts at Badgerys Creek would be minimised as the existing planning restrictions, and the likely flight paths, which would operate over the 8,500 hectare Western Sydney Employment Area, restrict the number of people exposed to ongoing aircraft noise within the ANEF.[56] It is expected that the figures will remain stable, even as the population in the southwest increases.

The results of these planning restrictions can be seen in the following images. The photograph below shows the site when the 1999 Environmental Impact Statement was conducted (Figure 24). Figure 25 is the latest satellite image of approximately the same orientation by Google Earth. The comparison shows the limited development over the last 15 years.

Figure 24 Aerial photograph of Badgerys Creek – 1999

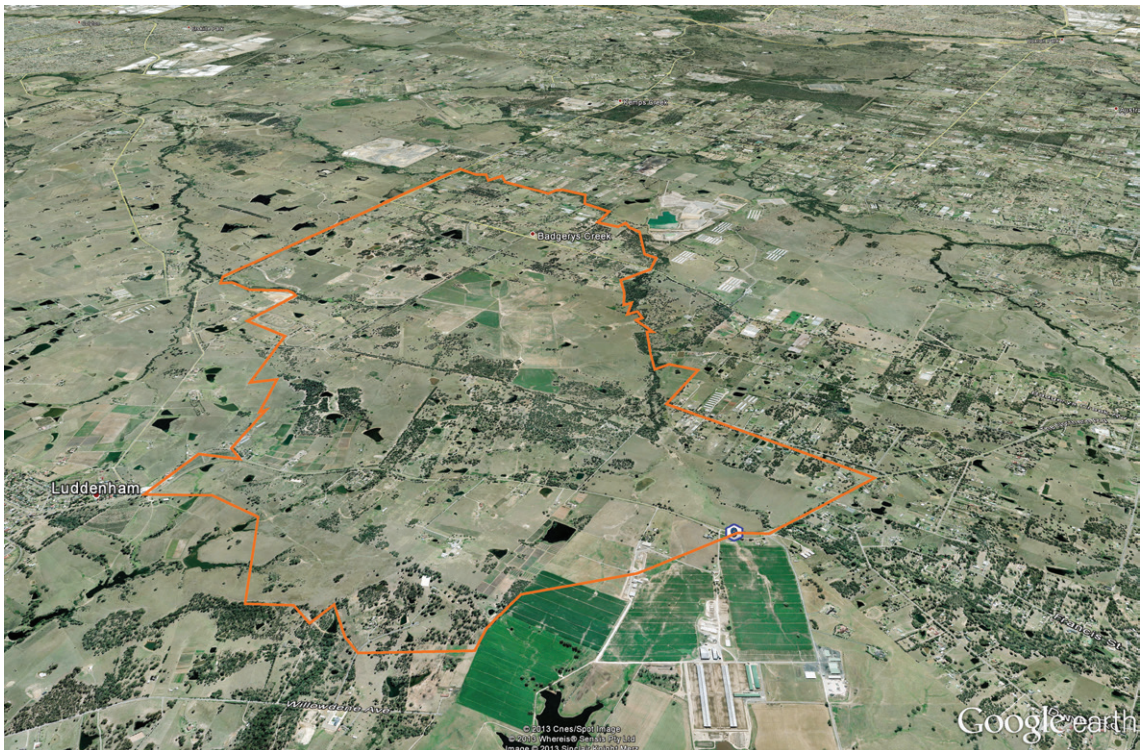


Note: Orange outline roughly represents the currently-owned site.

Source: PPK Environment and Infrastructure (1999), Environmental Impact Statement: Second Sydney Airport Proposal, Main Report prepared for the Department of Transport and Regional Development.

56 The *Draft Metropolitan Strategy for Sydney* proposes investigating an increase to the Western Sydney Employment Area by 10,000 hectares, including incorporating the Badgerys Creek site.

Figure 25 Aerial image of Badgerys Creek – 2013

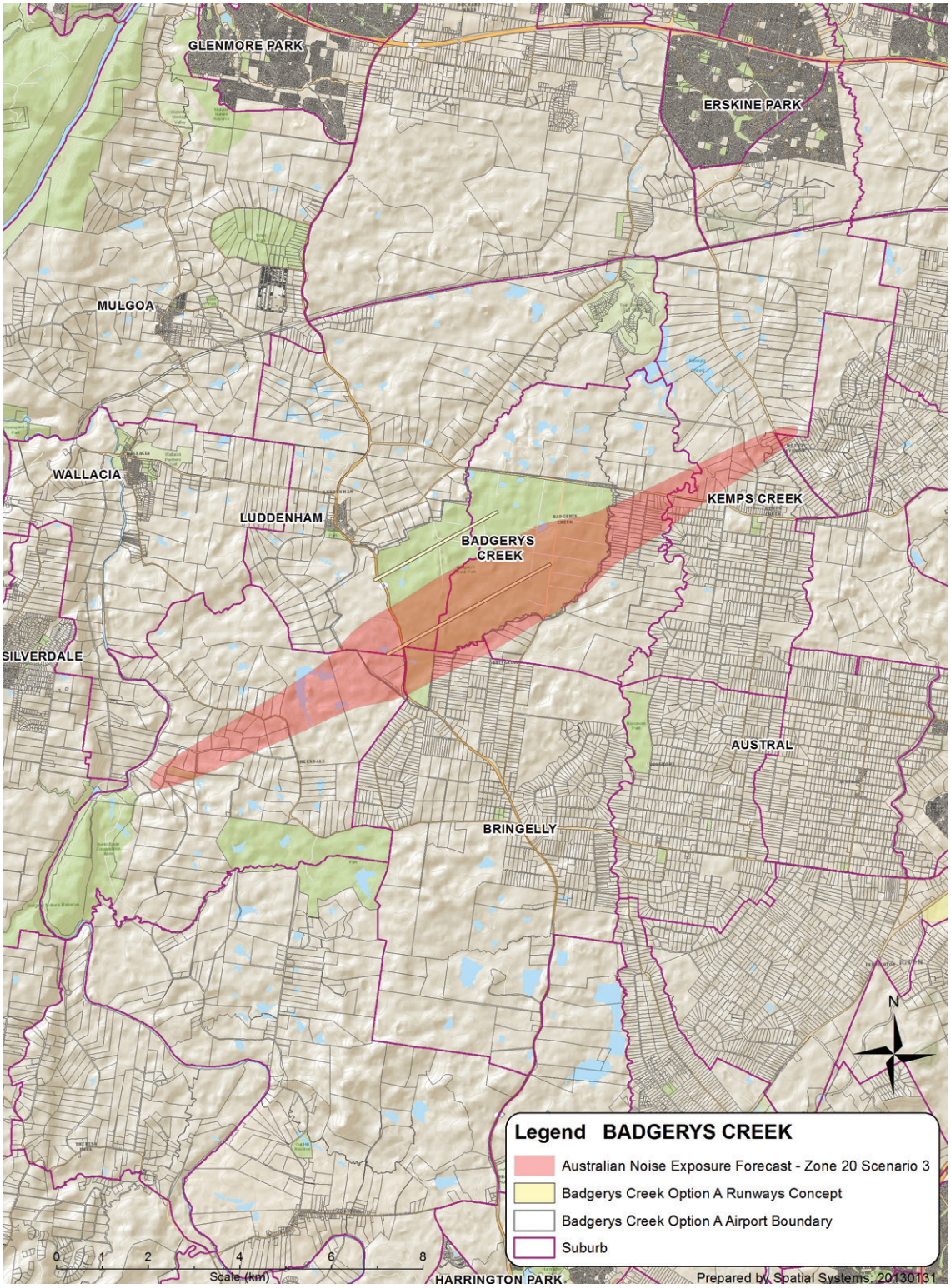


Note: Orange outline roughly represents the currently-owned site.

Source: Department of Infrastructure and Transport and Google Earth.

Figure 26 illustrates the noise contour for a potential airport at Badgerys Creek over the forecast period to 2060.

Figure 26 20 ANEF contour estimated for an airport at the Commonwealth-owned Badgerys Creek site (20-million-passenger capacity)



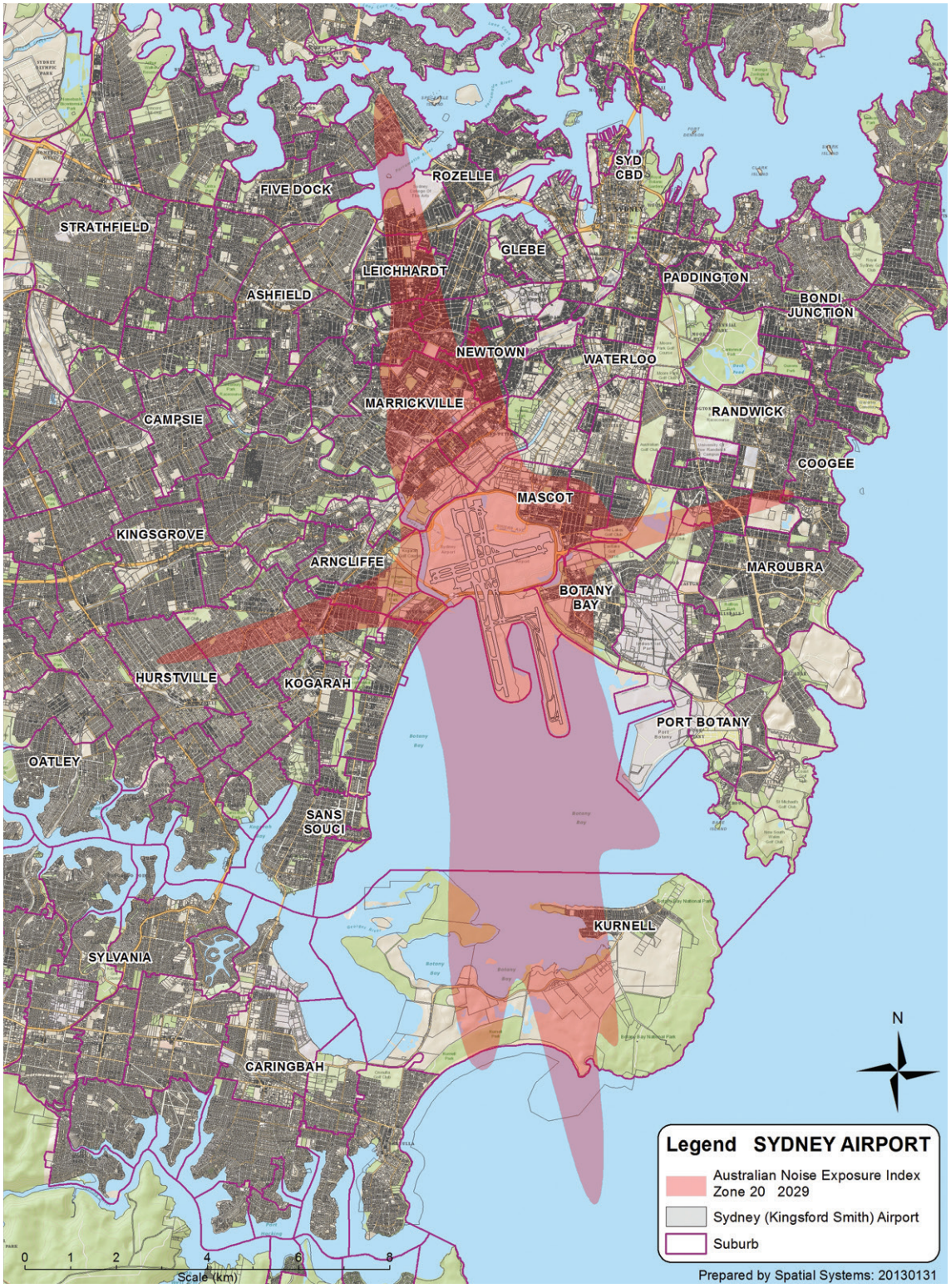
Note 1: Badgerys Creek noise contour is based on a 20 ANEF, estimated 20 million passenger movements or approximately 280 aircraft movements per day; accordingly only a single-runway operation is shown. Forecast to be reached at approximately 2030.

Note 2: Based on comparable hours of operation at Sydney (Kingsford-Smith) Airport.

Note 3: The grey-lined cadastral map shows land parcels and property boundaries; accordingly urban areas are reflected in darker denser property arrangements than industrial or rural areas.

Source: Department of Infrastructure and Transport.

Figure 27 20 ANEI contour for Sydney (Kingsford-Smith) Airport (36 million passenger movements, 2011)



Note 1: Sydney (Kingsford-Smith) Airport noise contour is based on Aircraft Noise Exposure Index for 2011 as recorded by Airservices Australia. Approximately 36 million passenger movements and 289,000 aircraft movements occurred at the airport in 2011.

Note 2: The grey-lined cadastral map shows land parcels and property boundaries; accordingly urban areas are reflected in darker denser property arrangements than industrial or rural areas.

Source: Department of Infrastructure and Transport.

Environmental comparisons – construction

It is also important to consider the environmental construction issues at Badgerys Creek.

An environmental impact statement prepared for Badgerys Creek in 1999 made a number of findings.[57] In particular:

- while the natural habitat of the area has been highly modified there were still significant parts of undulating terrain;
- a number of flora and fauna species of state or regional significance were identified, including the endangered Cumberland Plain Woodland; and
- local freshwater areas were generally degraded.

While the Environmental Impact Statement remains current, best practice would suggest that after nearly 15 years these issues be reassessed before any airport is built at the site as they are risks to construction. However, as an airport development at Badgerys Creek would have a lower ecological impact, the environmental assessment process would be expected to be less onerous than for Wilton.[58]

Cost and timing for construction

On this basis, it is expected that the costs and timing to build an airport on the Badgerys Creek site would be substantially less than at Wilton.

Estimates based on the Joint Study are approximately $2.4 billion for the first stage of the airport (single runway) with appropriate surface transport connections; and approximately 10 years for construction, including an updated Environmental Impact Statement. This compares to $3.4 billion and 17 years for construction at Wilton (see Figure 22 in Section 2.5 in this report).

Conclusion

The relationship between an airport's scale of operations and the economic and employment it generates is well established. By corollary, the success of an airport in commercial terms will translate into economic and social benefits for the surrounding community, and nationally.

The analysis presented here provides objective and quantitative measures on the extent of those benefits for the Commonwealth site at Badgerys Creek. Like the modelling of the site at Wilton, it demonstrates strong, sustained economic activity. Badgerys Creek has potentially stronger economic benefits than the Wilton site. That is for two reasons. Firstly, the modelling assumes it could commence operations around five years earlier than the site at Wilton (a reasonable assumption given the relative complexity of the two sites). Secondly, the Badgerys Creek site is nearer to its key market – the reason for its relative attractiveness to the aviation industry.

57 PPK Environment & Infrastructure, *Environmental Impact Statement: Second Sydney Airport Proposal 1999*, prepared for the Department (then the Department of Transport and Regional Services).

58 The Department's view is that where appropriate any Environmental Impact Statement undertaken prior to the current EPBC Act should be updated to ensure all environmental effects are taken into consideration.

PART 3
BETTER UTILISING RICHMOND

P3

3. Better utilising Richmond

Richmond – Key findings

Forecast demand

- Unconstrained demand for an airport located at Richmond in 2035 is estimated to be 22.8 million passenger movements across all domestic and international markets.
- This could increase to 51.4 million passenger movements in 2060.
- The higher forecast demand for Richmond compared with Wilton is largely due to the closer proximity of the site to key sources of passenger demand.

Airport capacity

- The current east-west runway is 2,134 metres and is only capable of supporting narrow-body jet aircraft up to a B737 or A320 generating a capacity of approximately 5 million passenger movements per year.
  - On this basis, Richmond could reach its capacity by the mid-2030s.
- There is scope to expand the site, with the construction of a north-south runway supporting all aircraft sizes. This could provide capacity for 186,000 to 250,000 aircraft movements (or approximately 20 million passenger movements) per year.
  - Under this scenario, the airport would not reach capacity until the late 2040s.
  - The on-airport cost would be equivalent to the construction of the first stage (single runway) of a greenfield airport. That is, in the order of $2 billion.

Economic benefits

- On its existing capacity (5 million passenger movements per year), an airport at Richmond could contribute approximately:
  - $0.7 billion additional direct expenditure in 2035 increasing to $0.8 billion in 2060.
  - $0.4 billion additional to NSW Gross State Product (GSP) by 2035, cumulating to $0.6 billion by 2060.
  - $0.6 billion additional to Australia's Gross Domestic Product (GDP) by 2035, cumulating to over $1.0 billion by 2060.
- A 20 million passenger airport could contribute between $3 billion and $5 billion in NSW GSP and between $4 billion and $6 billion in GDP by the mid 2040s.

Employment benefits

- On its existing capacity, an airport at Richmond could contribute:
  - Construction: approximately 430 full time jobs for the duration of construction phases.
  - Operational employment: approximately 3,700 jobs by 2035.
  - Indirect employment: approximately 2,400 jobs by 2035.
- Employment would be generated in a variety of industries, including passenger and freight services, supporting services (ground transport, administration, and retail), other services (such as maintenance), as well as by flow-on commercial and industrial developments near the airport and more widely across the economy.
- The employment and economic activity generated is expected to remain relatively consistent beyond 2035, as capacity will have been reached.
- An expanded airport with a capacity of 20 million passenger movements per year could contribute over 20,000 jobs.

Other impacts

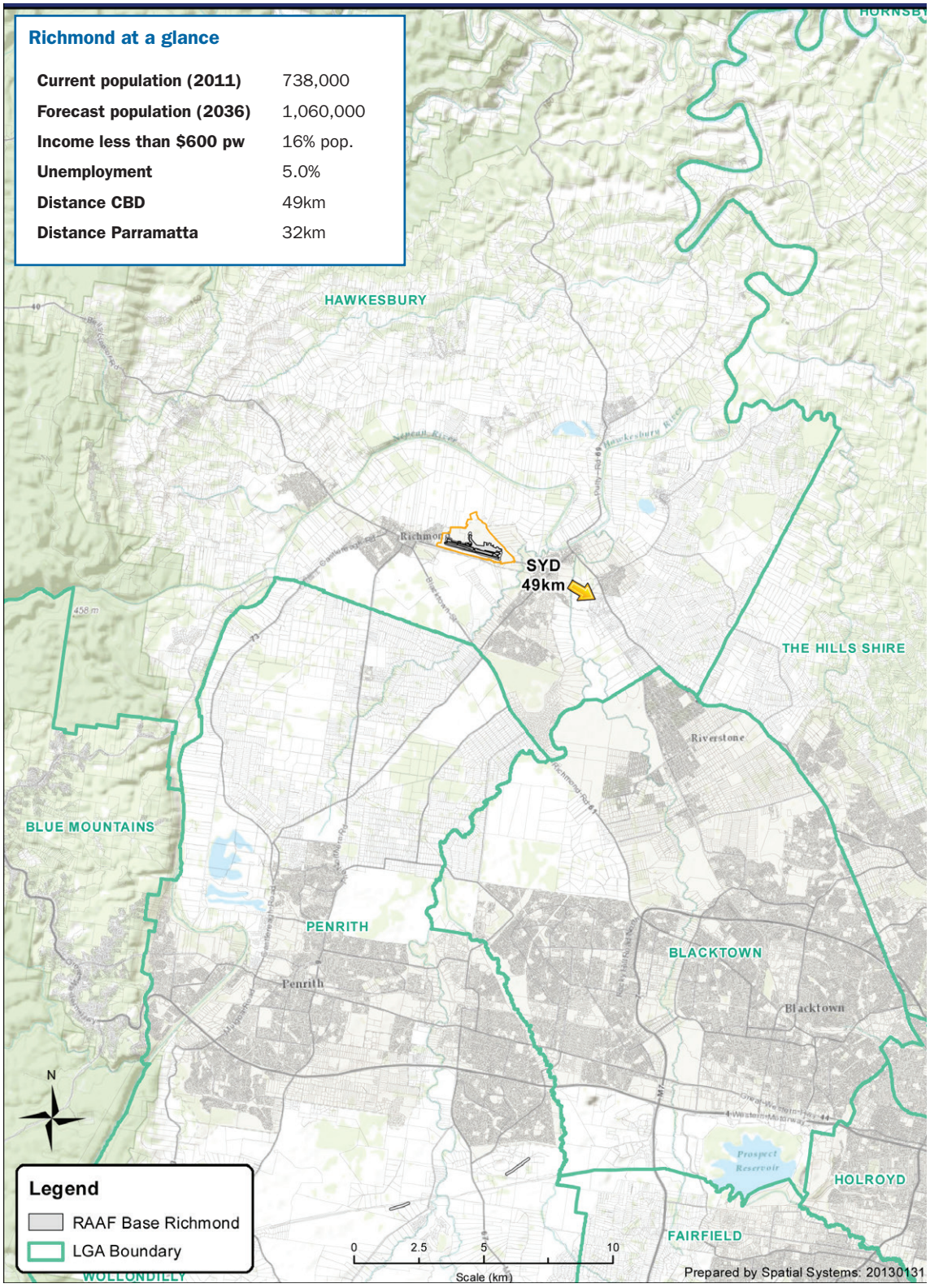
- The current population around Richmond that would be exposed to aircraft noise is 8,500 for an east-west configuration or 5,900 for an airport operating only on a north-south configuration. This is compared with the 130,000 people affected at Sydney (Kingsford-Smith) Airport today.
- Improved surface transport (particularly road and rail links) will need to be part of establishing civil airline services.

Concluding comments

- RAAF's current use of Richmond does not preclude a level of civil operations.
  - Given it is an operating airfield, such services could commence later this decade, and significantly earlier than any greenfield site.
- However, RAAF Base Richmond cannot provide sufficient capacity for Sydney's long-term aviation needs.
- A decision to expand Richmond with a north-south runway would involve significant costs and the acquisition of land from the University of Western Sydney, as well as substantially more road and rail investment.
  - Any decision to consider expanding the Richmond airfield would need to be made in the wider context of how the greenfield airport would be developed.

3.1. Background

Figure 28 Richmond region



Note 1: Population includes the surrounding local government areas of Hawkesbury, Penrith, Blacktown and Hills Shire.

Note 2: The grey-lined cadastral map shows land parcels and property boundaries; accordingly urban areas are reflected in darker denser property arrangements than industrial or rural areas.

Source: Department of Infrastructure and Transport Spatial Systems; ABS Census of Population and Housing 2011; NSW Department of Planning and Infrastructure.

Setting the scene

The RAAF Base at Richmond was commissioned in 1925. It is a compact airfield of around 280 hectares. At its operational peak from the mid-1960s to the late 1990s, Richmond was home to most of the Australian Defence Force's strategic and tactical airlift squadrons. Aircraft operated there included the variants of the C-130 Hercules, Caribou tactical aircraft and Boeing 707 aircraft that were modified for in-flight refuelling. Since then, the RAAF's force structure has evolved and with that, many of the military capabilities previously based at Richmond have been located to other airfields, including the RAAF Base at Amberley to the west of Brisbane.

The C-130J Hercules is now the only operational flying Squadron based at Richmond and is expected to remain in operational service life until around the mid to late 2020s. From 2015 the Hercules will be joined by a Squadron of ten C-27J Spartan tactical lift aircraft. The C-27J is smaller than the C-130, and roughly equivalent in payload and performance to the Dash 8-400 or ATR-72 turboprop aircraft used by QantasLink and Virgin respectively. While the C-27J will initially operate from Richmond, a decision about their home in the longer term is yet to be made.

Between 2001 and 2009 the total number of aircraft movements declined from nearly 23,500 aircraft movements to just above half this number (12,100). Of these movements, around 60 per cent have been traditionally the result of general aviation activity. The fewer movements were due to the withdrawal from service of the B707 and the Caribou, and also because of the deployment of C-130 Hercules in support of operations overseas. By 2012 the total number of movements had increased to 19,700, with military aircraft accounting for around 12,200 of this total.[59]

RAAF Base Richmond has made a significant positive contribution to the local communities of Richmond and Windsor over the years. A 2006 study commissioned by Defence[60] estimated that the Base generated:

- Over 6,100 jobs both directly and indirectly for the north western Sydney region, equivalent to 2.1 per cent of the region's total employment; and
- Economic value of around $400 million for the region, of which the RAAF Base is estimated to contribute $191 million directly with the remainder indirectly.

The RAAF's future use of Richmond is currently being considered by Defence. In the long term, Defence will need dedicated access to the Sydney region to support a number of operational tasks, including counter-terrorism and humanitarian deployments. However, access to Sydney does not in itself require RAAF to maintain a sizeable operational presence in Sydney. As Defence considers options to rationalise its bases to reduce ongoing costs without a reduction in operational capability, a plausible scenario is for RAAF to permanently relocate all flying squadrons from Richmond coinciding with the retirement of the C-130J aircraft.

With this in mind, the Joint Study Steering Committee was of the view that RAAF Base Richmond could provide a role as an interim solution to address Sydney's aviation capacity needs while Wilton was being developed. Commencing civil airline services on the east-west runway could be achieved with funding roughly an order of magnitude less than needed to establish a greenfield airport. As the Steering Committee determined that a decision on a greenfield site was required sooner rather than later, it did not view the development of a north-south runway as a feasible option. It would be costly (broadly similar to that of an initial start-up scenario at a greenfield site) and would not provide for the unmet demand expected in the longer term.

59 Department of Defence. Note: These figures represent aircraft movements, rather than runway movements used elsewhere in this report. Hence, they also included transits through Richmond's airspace, not just take-offs and landings.

60 Econtech Pty Ltd, *Modelling the economic and social impacts of various scenarios for the RAAF Base Richmond,* 2006 for Department of Defence.

Richmond at a glance

Population

The population of Richmond, Windsor and the immediately surrounding townships is approximately 37,000.[61]

In the four local government areas around Richmond (Hawkesbury, Penrith, Blacktown and the Hills Shire), the population is approximately 738,000 people. This is forecast to increase by 43 per cent to 1.06 million residents by 2036.[62] The local government areas with the greatest level of population growth in the region are expected to be Blacktown and The Hills Shire.

Education, income and employment

The Richmond site is located in close proximity to a number of employment centres in Sydney's northwest. Of the major employment centres within the region that support Richmond, Penrith, Castle Hill and Blacktown are already established 'major centres' and Rouse Hill is a 'planned major centre'. Mount Druitt is a 'potential major centre'.[63] It is also in proximity of the North West Growth Centre.

The two largest industries by employment are retail trade (15 per cent) and manufacturing (13 per cent).[64]

Similar to Wilton, and other places in Western Sydney, income levels tend to be lower than Sydney as a whole. For instance, while Sydney's median household weekly income was $1,447 in 2011, with the exception of The Hills Shire ($2,044), the surrounding local government areas were lower - Penrith ($1,398), Blacktown ($1,388) and Hawkesbury ($1,385).[65] However, on a measure of those worst off (earning less than $600 per week), the Richmond area performs better than Wilton and Sydney more generally (16 per cent compared with 22 and 19 per cent respectively).

The unemployment rate is marginally higher in Richmond at 5.0 per cent in comparison with both Sydney (4.5 per cent) and New South Wales (4.9 per cent).[66]

Forty-two per cent of people in the surrounding local government areas have no post-school qualification.

Surface transport

The Richmond region is served by a number of major road and public transport links.

Motorways in the region include the M4, providing access from the east, and the M7, which links the region from the south. Access to Richmond is provided by Blacktown Road, which links the site to the main motorways via Richmond Road and The Northern Road.

The Richmond Branch rail line connects with the Western line at Blacktown and, as a part of the North Shore and Western Line component of the network, provides direct services to the Sydney central business district via Parramatta, Strathfield and intermediate stations before continuing to the North Shore and Hornsby. The NSW Government has approved the North West Rail Link

61 Based on the SA3 of 'Richmond – Windsor', Estimated Resident Population, *Regional Population Growth,* Cat No 3218.0, 2012.
62 Current population drawn from ABS Estimated Resident Population, *Regional Population Growth,* Cat No 3218.0, 2012. Forecasts drawn from NSW Department of Planning and Infrastructure, based on ABS 2006 data.
63 NSW Government *Draft Metropolitan Strategy for Sydney,* 2013.
64 ABS, *Census of Population and Housing,* 2011.
65 ABS, *Census of Population and Housing,* 2011.
66 Department of Education, Employment and Workplace Relations, *Small Area Labour Market, Employment Research and Statistics*, September 2012.

that will see eight new stations constructed on a line northwest of Epping. Construction is expected to commence in 2013.

Approximate travel times to key centres in Sydney are in Table 22.

Table 22 Richmond – Approximate travel times to major centres

Area	Approximate straight-line distance	Road		Rail	
		Approximate off-peak travel time	Approximate peak-hour travel time	Approximate travel time	Changes required
CBD/Central	49km	1 hour	2 ¼ hours	1 ⅓ hours	0
North Sydney	48km	1 hour	2 hours	1 ½ hours	0
Parramatta	32km	40 min	1 ⅓ hours	50 min	0
Penrith	18km	½ hour	½ hour	1 hour	1
Blacktown	23km	½ hour	1 hour	40 min	0
Castle Hill	26km	40 min	1 hour	No trains available	n/a
Liverpool	38km	¾ hour	1 ⅓ hour	1 ½ hours	2
Campbelltown	52km	50 min	1 ½ hour	2 hours	2
Hornsby	33km	50 min	1 ¼ hour	1 ½ hours	1

Note 1: These estimates are based on current surface transport levels and patterns.

Note 2: Road times were estimated on travel time from the suburb train station to the airport site; off-peak travel times were based on an estimate from Google Maps; peak hour travel times were drawn from NSW Bureau of Transport Statistics and include an estimate of congestion at peak times.

Note 3: Train times were estimated on peak hour travel from suburb train station to the station nearest to the airport; the minimum time/changes required were cited. They do not include average wait or transfer times.

Note 4: Times may vary significantly based on the connections used, particularly in off-peak periods.

Source: Department of Infrastructure and Transport analysis from Google Maps and CityRail, Bureau of Infrastructure, Transport and Regional Economics analysis of NSW Bureau of Transport Statistics Strategic Travel Model (STM) outputs, 2011.

3.2. Forecast passenger demand at Richmond

Total unconstrained demand at Richmond

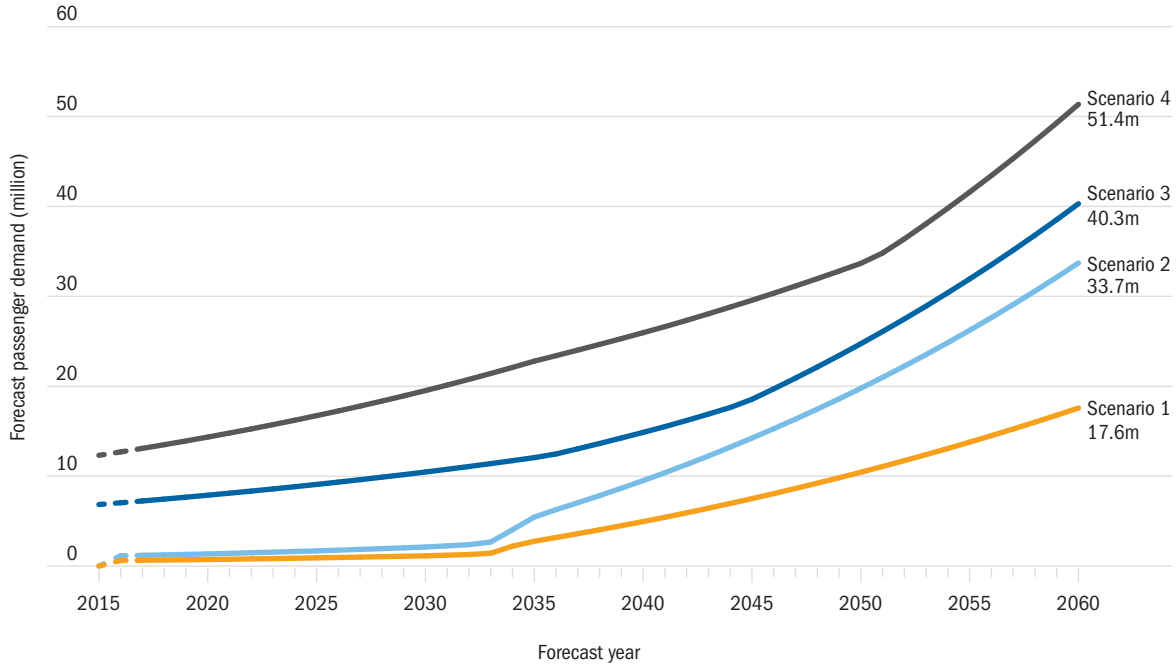
Unconstrained passenger demand for Richmond was considered assuming no impediments on the ability of passengers to access airline services. The same four scenarios as defined in Part One and Two of this report were applied:

- **Scenario 1:** short-haul domestic market (Australian east-coast);
- **Scenario 2:** short and medium-haul domestic markets (including North Queensland and Central Australia), and short-haul (trans-Tasman) international services;
- **Scenario 3:** all domestic markets, unmet regional markets, short and medium-haul international (including Asian) markets; and
- **Scenario 4:** all services – full-scale international, domestic and regional services.

Figure 29 shows the unconstrained passenger demand at Richmond for each of the scenarios. This shows there is a strong market at Richmond already. The model estimated that across domestic and international destinations (Scenario 4) there is currently unconstrained demand for 12 million passenger movements at Richmond. This could increase to 22.8 million in 2035 and 51.4 million in 2060. That is greater than the combined demand at Melbourne and Brisbane Airports today.[67]

67 Bureau of Infrastructure, Transport and Regional Economics airport traffic statistics cites Melbourne and Brisbane Airport as supporting 21 and 28 million passenger movements respectively in the financial year 2011–12.

Figure 29 **Forecast passenger demand at Richmond, 2015 to 2060**



Note: *This analysis was based on annualised capacity constraints which the Joint Study identified would become acute particularly after 2033. The Joint Study noted peak capacity pressures are already experienced at Sydney (Kingsford-Smith) Airport.*

Source: Booz & Company.

The higher demand at Richmond compared with Wilton is due to the closer proximity to its catchment as well as better access through existing transport links, including the rail line which is only 5 kilometres by road from the main entrance of the Base.

East-west runway configuration

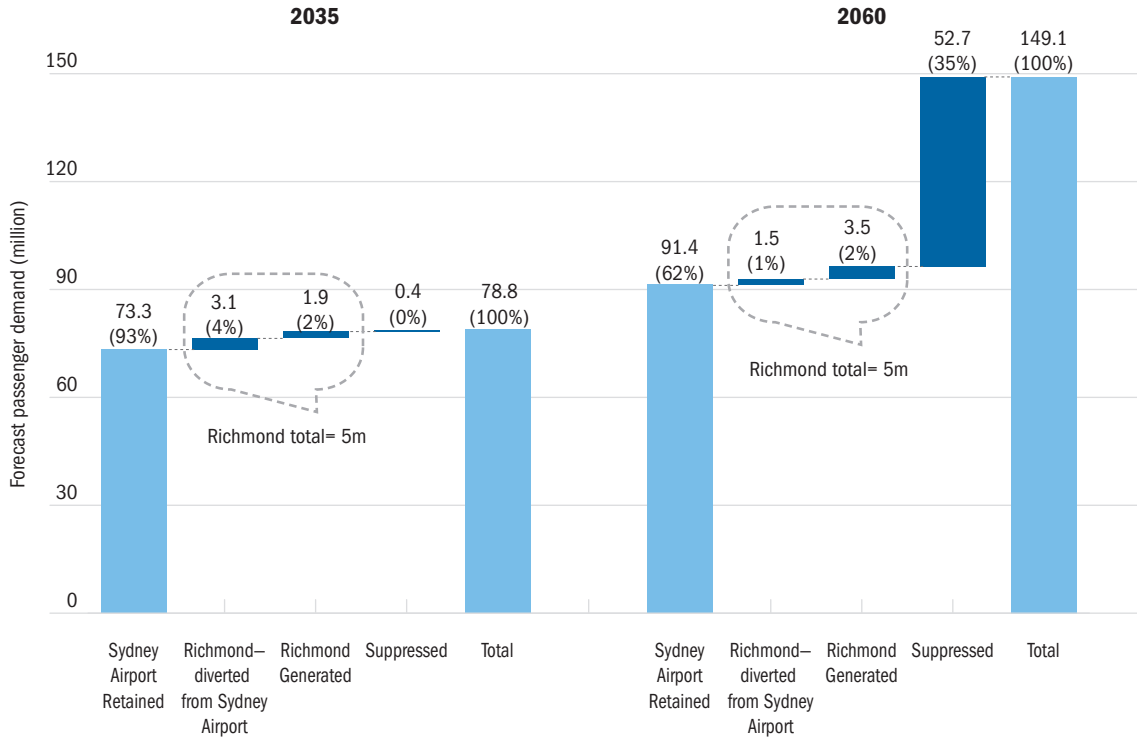
As previously mentioned in Part One, the existing east-west runway at Richmond is only expected to be able to provide a passenger capacity of 5 million passenger movements per year.[68]

Booz & Company considers that an airport of such a passenger capacity is only likely to provide short and medium-haul domestic and, potentially, trans-Tasman services (consistent with Scenario 2). On that basis, there could be demand for 1 million passenger movements per year now, reaching 5 million per year in the mid-2030s (as shown in Figure 29).

As with the analysis of Wilton, Booz & Company also considered a level of demand generated from local communities. It found that in 2035, civil airline services at Richmond would generate an estimated 1.9 million passenger movements, equivalent to 38 per cent of total capacity (Figure 30).

68 Further explanation of this issue is in the following section of this report.

Figure 30 **Distribution of forecast demand at Sydney (Kingsford-Smith) Airport and Richmond – east-west configuration, 2035 and 2060**



Note 1: Demand diverted from Sydney (Kingsford-Smith) Airport to Richmond represents both demand that finds Richmond more accessible than Sydney, and demand that could not be met due to capacity constraints.

Note 2: The total demand as shown includes the generated demand from a new airport site and, accordingly, is greater than the unmet demand forecast in the Joint Study.

Source: Booz & Company.

It is expected that generated demand would continue to be a significant source of passenger movements at Richmond. By 2060 the modelling suggests 3.5 million passenger movements per year (or 70 per cent) of Richmond's total capacity could be attributed to generated demand. This further emphasises the benefits of proximity to its potential market

It is clear Richmond's capacity under the east-west configuration severely limits its ability to support the unmet demand identified in the Joint Study. Booz & Company estimates that if Richmond was the only aerodrome used to supply additional capacity for Sydney, 52.7 million passenger movements (or 35 per cent of the 149.1 million total demand) in the region would be unmet in 2060.

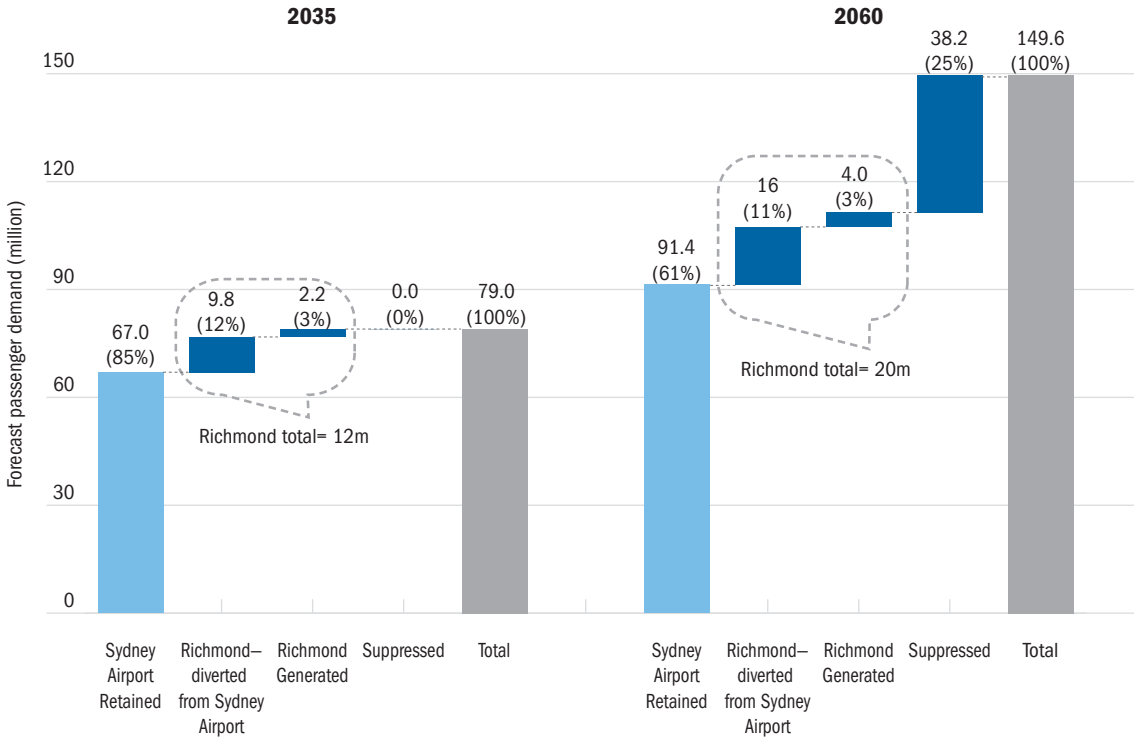
North-south runway configuration

A single runway north-south configuration at Richmond is estimated to have a capacity of 20 million passenger movements per year.[69]

Booz & Company considers an airport of this capacity would provide domestic, regional, and medium-haul international services (consistent with Scenario 3). Their forecast against this scenario suggested that Richmond could support demand for 6.5 million passenger movements now. By 2035, this could increase to 12 million passenger movements per year, of which 2.2 million would be demand generated locally (Figure 31). The airport would provide for 12 per cent (9.8 million) of total forecast demand, while Sydney (Kingsford-Smith) Airport would handle a reduced level of 67 million passenger movements (85 per cent) with approximately 6.3 million passenger movements having been diverted to Richmond.

69 Further explanation of this issue is in the following section of this report.

Figure 31 **Distribution of forecast demand at Sydney (Kingsford-Smith) Airport and Richmond – north-south configuration, 2035 and 2060**



Note 1: Demand diverted from Sydney (Kingsford-Smith) Airport to Richmond represents both demand that finds Richmond more accessible than Sydney, and demand that could not be met due to capacity constraints.

Note 2: The total demand as shown includes the generated demand from a new airport site and, accordingly, is greater than the unmet demand forecast in the Joint Study.

Source: Booz & Company.

A 20-million-passenger capacity at the airport would be reached in approximately 2047.

Accordingly, in 2060, Sydney (Kingsford-Smith) Airport is still expected to reach the Joint Study's original forecast demand of 91.4 million passenger movements. Richmond could support 16 million of its unmet demand and potentially generate an additional demand of 4 million passenger movements. Demand in the region of 38.2 million passenger movements (or 25 per cent of total demand) would go unmet.

3.3. Using Richmond for limited civil airline operations

The Joint Study recommended Richmond be considered further for 'limited' civil operations using its current configuration.

Civil airline operations at Richmond were characterised as 'limited' to recognise the restrictions caused by Richmond's size and runway orientation. For example, civil airline services would typically be able to operate aircraft up to the size of the A320/B737 commonly used on domestic services. Depending on the level of services, capacity is also constrained by its existing apron space and taxiways.

Additionally, there could also be some operational restrictions depending on RAAF needs. Any arrangements that saw civil airline operations while Richmond carried out its military role will limit the number of aircraft that can be accommodated on the ground at any point in time.[70] In the context of RAAF Base Williamtown (Newcastle Airport), shared civil and military operations have already raised concerns for airlines in terms of the reliability and timeliness of

70 Airservices advice in the Joint Study.

their commercial services. The situation for Richmond is likely to be less problematic than at Williamtown, which is the RAAF's principal fast jet base. Nonetheless, managing the different needs and expectations of civil and military users would be important in preparing Richmond for regular civil services.

Richmond's military airspace adjoins Sydney (Kingsford-Smith) Airport's airspace and the orientation of its runway means that sustained operations could be incompatible with current flight paths at Sydney (Kingsford-Smith) Airport. Consequently, the number of aircraft movements is likely to be unable to exceed around 35 per hour in visual meteorological conditions (VMC),[71] or fewer in instrument meteorological conditions (IMC).[72,73] Any rate greater than this would be expected to restrict movements at Sydney (Kingsford-Smith) Airport in order to maintain appropriate separation between aircraft operating at the two airports.

Nonetheless, Richmond could handle up to 5 million passenger movements per year without extending the base or investing heavily in new airport infrastructure. Civil operations could be introduced in a relatively short timeframe, compared with the extensive site investigation, preparation and more complicated environmental assessments that would be required for a greenfield site.

By way of illustration, it is useful to compare this level of activity with other Australian airports (Table 23).

Table 23 **Passenger movements at existing Australian airports, Financial year 2011–2012**

	Passenger movements (million)			
Airport	Regional	Domestic	International	Total
Adelaide	0.56	5.77	0.62	6.95
Gold Coast	0.01	4.60	0.73	5.3
Richmond capacity would be in the order of Cairns or Gold Coast Airports				
Cairns	0.38	3.05	0.50	3.94
Canberra	0.52	2.64	0.00	3.16
Darwin	0.17	1.5	0.35	2.04
Hobart	<0.00	1.90	0.00	1.90

Note: Bureau of Infrastructure, Transport and Regional Economics defines regional services as regular public (passenger) transport provided by smaller airlines and/or aircraft (that is excluding Qantas jet operations, Jetstar, Virgin Australia and Tiger Airways).

Source: Bureau of Infrastructure, Transport and Regional Economics Airport Traffic Statistics Financial year 2011–12.

Indicative start-up costs

The Joint Study undertook preliminary estimates of the start-up costs for civil operations at Richmond, based on a variety of scenarios for various civil terminal locations on the airfield, having regard to RAAF's ongoing needs. Based on minimal works to provide apron and terminal space to accommodate up to 1 million passenger movements per year, indicative costs were estimated at $144 million. Capital costs to support the full capacity of 5 million passenger movements per year would increase the investment needed to approximately $500 million (or more) if additional land needed to be acquired, and to provide for adequate surface transport facilities (for example parking and road access, railway relocation).[74] Both of these scenarios involved constructing civil terminal facilities, taxiways and apron space physically separate from the military area.

71 Visual meteorological conditions (VMC) - a defined set of meteorological conditions permuting flight using visual reference.
72 Instrument meteorological conditions (IMC) - a defined set of meteorological conditions requiring flight using aircraft instrumentation.
73 Airservices advice in the Joint Study.
74 Further details are in Part Seven of the Joint Study, and associated technical papers.

The operation of civil aircraft would also need to be managed in the context of ordnance loading, which requires an exclusion zone to become active when this activity is undertaken. For the largest explosive devices, this zone covers the runway and taxiways and would restrict or prohibit civil aircraft operations.

Ordnance loading occurs intermittently, and in most cases would not give rise to a conflict between military activity and civil airline operations. Defence advised that it should be possible for it to schedule activity at the ordnance loading area (OLA) in a way that minimises potential disruption to civil airline operations. If ordnance loading could not be managed in this way, the alternative would be the construction of a new OLA distant enough so that OLA operations did not interfere with commercial operations. Defence noted this is a more costly solution that should be avoided if at all possible.

The Department is of the view that less costly startup investment would be plausible if the military apron were shared. This would provide for only very basic facilities, and further investment would still be needed to achieve the potential capacity of 5 million passenger movements per year. Startup operations provided through a small number of low-cost carrier services following minimal airside investment are likely to be attractive to airlines and offer a relatively low-cost, low-risk approach for the civil airport operator.

This approach may not be the preferred position of Defence, who favours separate terminal facilities. However, once Defence establishes firm plans for the future use of Richmond, it may be possible to explore more cost-effective options for civil airline infrastructure development.

Increasing capacity at Richmond – the north-south runway

The possibility of a major expansion of the Richmond site to achieve passenger and aircraft movements on the scale of Brisbane or even Melbourne Airport today (21 million and 28 million passenger movements respectively)[75] should not be overlooked. While insufficient to meet Sydney's long-term needs, this option would provide some relief to the expected level of unmet demand until the late-2040s if no other options were available.

To realise this capacity, land south of Richmond airfield (currently held by the University of Western Sydney) would need to be acquired and road and rail links would need to be realigned. A north-south runway of between 3,000 and 4,000 metres could be constructed to permit long-haul international services. This was estimated in the Joint Study to cost between $2 billion and $6.5 billion dollars, including construction, additional works on the east-west runway and surface transport costs to meet demand.[76]

This cost is therefore likely to be similar to that for establishing the first stage (single runway) of a greenfield airport and worth pursuing only if governments cannot commit to developing a greenfield airport (or a greenfield airport with a capacity much less than that envisaged in this report), and once patronage levels start to put pressure on Richmond's east-west runway operations.[77] Based on the analysis conducted by Booz & Company, a north-south runway offering a greater range of services would accelerate the demand for services at Richmond. If an expanded Richmond were to be built, it would probably be required around 15 years after services commenced on an east-west runway.

Given the constraints around the site, there is little prospect of Richmond expanding further through a parallel runway system.

75 Bureau of Infrastructure, Transport and Regional Economics, *Airport Traffic Statistics Financial Year 2011–12*.
76 Project management costs would add an additional 70 per cent.
77 The Joint Study identified a benefit-cost ratio of developing north-south runway ranging between 1.6 and 2.0.

3.4. The social and economic effects of an airport at Richmond

As with Wilton, Ernst & Young undertook an analysis of the social and economic effects of an airport at Richmond. The analysis was based on an assessment of RAAF Base Richmond in its existing layout and with a maximum capacity of up to 5 million passenger movements per year. All values are expressed in discounted 2012 dollars.[78]

Economic Benefits

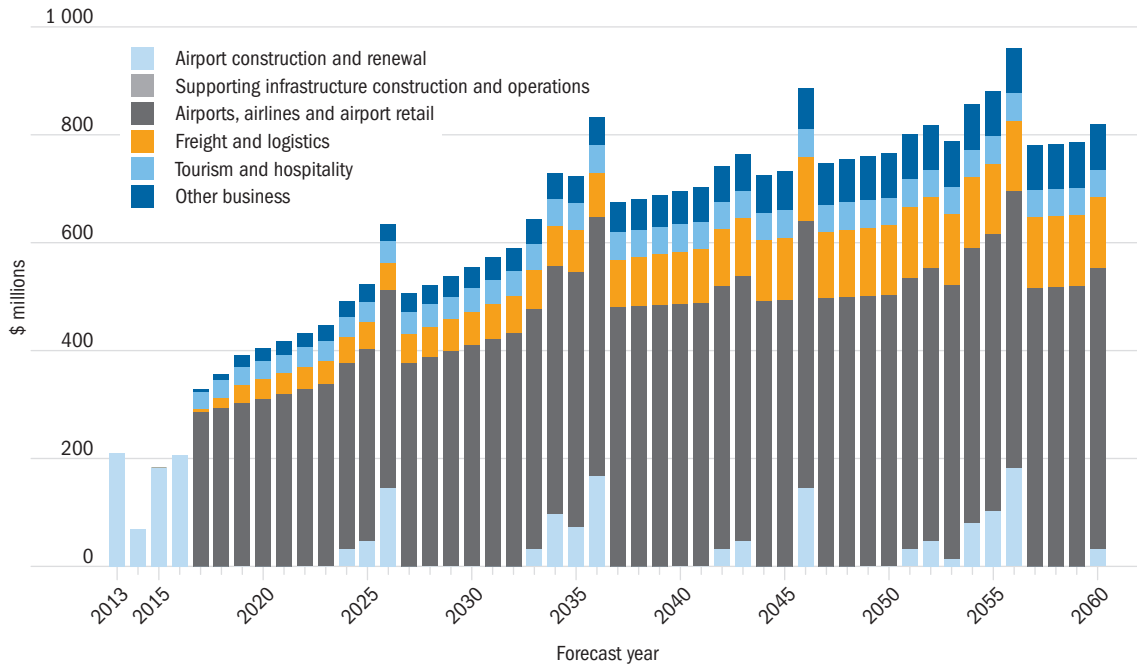
Overall the economic analysis found that an airport at Richmond would have a positive impact on the local, state and national economy. The benefits are proportional to the size of operations, and hence are considerably less than the greenfield airport modelled at Wilton.

Direct expenditure

Figure 32 presents the estimated direct expenditure resulting from a 5 million passenger capacity airport at Richmond. If operations were to commence in 2017, as assumed for the purposes of this analysis, work would need to commence immediately (noting that an environmental assessment would be needed as part of the project).

Direct economic benefits include expenditure of approximately $0.7 billion by 2035. Aviation-related retail is expected to contribute the largest share of these benefits. However, economic activity would increase only marginally (to $0.8 billion) up to 2060, as the airport would already be operating at its maximum capacity.

Figure 32 **Direct expenditure generated by an airport at Richmond (5-million-passenger capacity), 2013 to 2060**



Source: Ernst & Young.

78 Discounting is a commonly used financial technique to determine the present day value of a monetary amount that will be realised in the future.

Wider economic activity

The wider economic activity generated by an airport at Richmond is outlined in Table 24. By 2035, an airport at Richmond would result in an increase of NSW GSP by approximately $0.4 billion and an increase to Australia's GDP by $0.6 billion. By 2060, this would grow to approximately $0.6 billion for NSW GSP and $1.0 billion for Australia's GDP. The expected increase in NSW GSP is equivalent to a 0.1 per cent increase in economic growth by 2060.

Table 24 **Wider economic activity generated by an airport at Richmond (5-million-passenger capacity), 2035 and 2060**

Jurisdiction and economic indicator	2035	2060
NSW GSP	$0.423 billion	$0.563 billion
Australia GDP	$0.644 billion	$1.005 billion

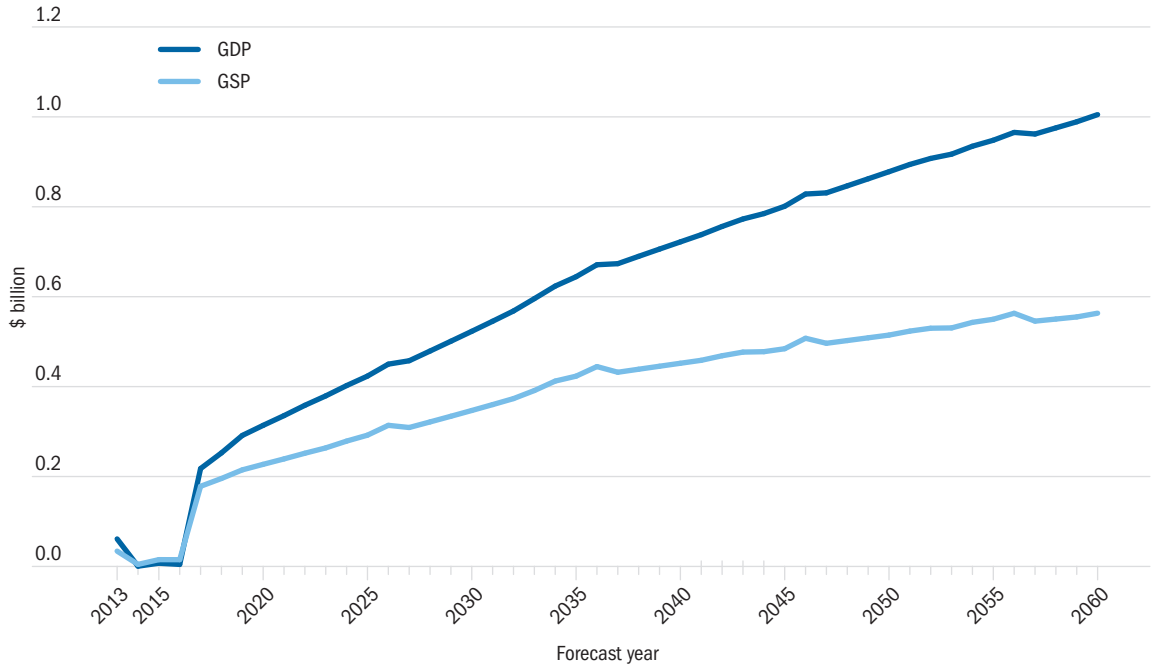
Note: Australia includes NSW.

Source: Ernst & Young.

The construction phase benefits are much more modest than at Wilton as there is relatively little engineering and construction needed compared with a greenfield airport.

The profile of changes to wider economic activity in the NSW and national economy are shown in Figure 33. The analysis shows that NSW will experience the majority of economic benefits from an airport at Richmond. In particular, NSW would benefit from the increased business activity that occurs in and around the airport site and the increased economic activity that would occur as a result of more people being employed in NSW.

Figure 33 **Increases to NSW GSP and Australia's GDP resulting from an airport at Richmond (5-million-passenger capacity), 2013 to 2060**



Source: Ernst & Young.

When compared to an airport at Wilton, it is projected that an airport at Richmond will result in a more even distribution of economic benefits between NSW and the rest of Australia. This is expected to occur for two reasons:

- the airport is not expected to cater for dedicated freight, potentially limiting the ability for NSW to benefit from the resulting economic activity;[79] and
- the limited size of the airport means that there will still be considerable amounts of unmet demand in the Sydney region resulting in NSW foregoing the economic activity that would have developed as a consequence of increased passenger movements.

Ernst & Young did not specifically model the economic effects of a Richmond airport with a north-south runway capable of handling 20 million passenger movements per year. However, it is possible to draw on the projections for Wilton and Badgerys Creek when they reach this level of activity, and make a reasonable estimation of benefits at an expanded Richmond airport.

The Department estimated that if Richmond were expanded to a north-south runway alignment, it is possible it will generate between $3 to $5 billion in NSW GSP and $4 to $6 billion in GDP by the time it reaches capacity in the mid-2040s. This is about the time it would reach capacity, and so this level of economic activity would not grow much further.

Employment

The number of full-time equivalent (FTE) jobs was also assessed for the construction and operational phases.

Direct employment

Construction employment

The construction of passenger facilities at Richmond and the associated infrastructure (such as road and rail connections) is expected to generate approximately 430 FTE jobs over the construction period. These relatively low employment figures are explained by a number of factors:

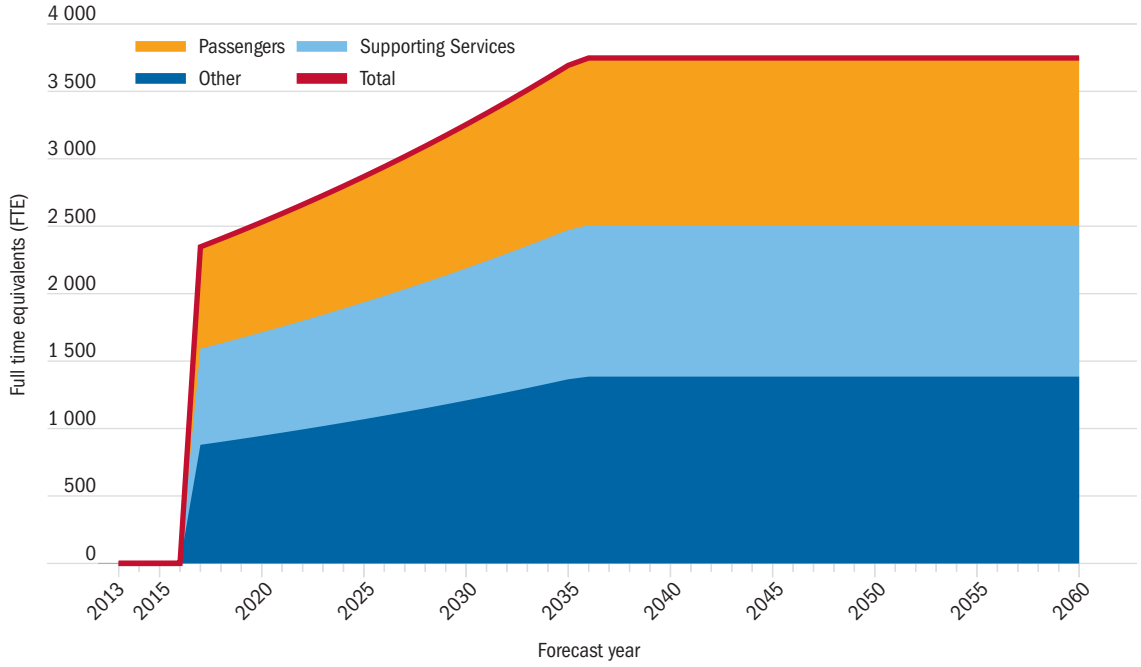
- It is assumed that it will be possible to utilise some of the RAAF infrastructure already present at the site (including the current runway, aprons and taxiways);
- Because the airport is expected to be limited to 5 million passenger movements per year, there is no requirement for infrastructure development on the scale of a greenfield airport; and
- The site is already connected to transport and utility infrastructure services, negating the need for substantial supporting infrastructure development (although it will be necessary to upgrade existing road and rail services in the area).

Operational employment

Once established the airport is expected to employ approximately 3,700 FTE persons by 2035. As the airport reaches capacity, operational employment levels are expected to remain steady beyond 2035. Figure 34 presents the expected breakdown of operational employment.

79 There is expected to be small amounts of freight carried in the belly hold of the passenger aircraft.

Figure 34 **Breakdown of operational employment opportunities generated by an airport at Richmond (5-million-passenger capacity), 2013 to 2060**



Source: Ernst & Young.

The analysis shows that passenger services (such as airline and air services employment), supporting services (such as ground transport, administration and retail employment) and other services (such as government and maintenance employment) are expected to make up equal contributions to operational employment over the life of the airport.

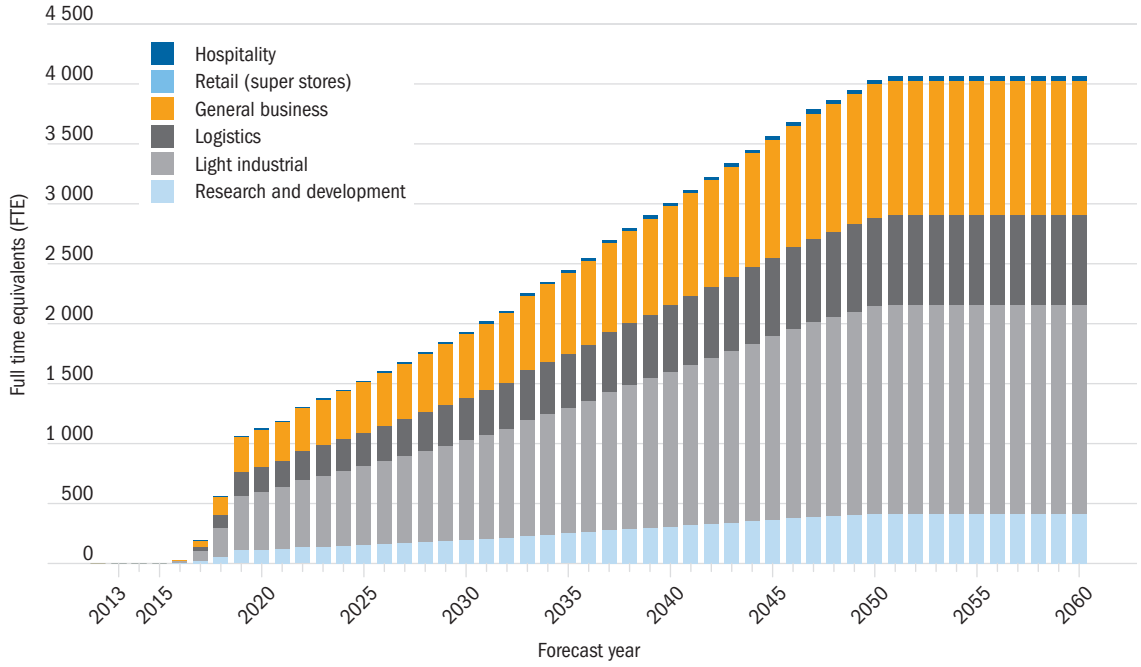
As stated earlier, the analysis assumed that the airport will not accommodate dedicated freight aircraft. For this reason freight services are not expected to make a material contribution to operational employment. However, it is possible that freight will be transported in the cargo hold of scheduled passenger services aircraft (as is commonly the practice in Australia). If this occurs, it is likely that freight services would also make some contribution to operational employment. If Richmond were expanded to a 20-million-passenger-movement facility, freight and logistics activity and employment would become considerably more important.

Indirect employment outside the airport site

As indicated previously, aviation activity also encourages other industries to develop outside of the airport site. These businesses will generate indirect employment around the airport site.

Figure 35 shows the indirect employment that is expected to develop in the area surrounding the airport. By 2035 a passenger airport at Richmond is likely to result in approximately 2,400 FTE persons being employed across a number of industry types. This is expected to increase to approximately 4,100 FTE persons by 2060.

Figure 35 **Breakdown of indirect employment generated by an airport at Richmond (5-million-passenger capacity), 2013 to 2060**



Source: Ernst & Young.

The analysis shows that the light industrial sector will have the highest employment levels. The general business and logistics industries will also be key employers. This is consistent with Wilton and demonstrates a correlation between the airport and supplementary aviation industry.

Total employment

Gross employment

Table 25 presents a summary of the total gross employment expected to occur as a result of a passenger airport at Richmond.

The analysis shows that the total employment generated (both directly at the airport and indirectly around the airport) is estimated to be approximately 6,600 jobs by 2035, increasing to approximately 7,800 by 2060. This analysis does not consider the employment generated by the concurrent Defence operations at the base, or make any assumptions about how this might change. It is expected that civil airline services would provide greater flow-on employment benefits to the wider economy.

Table 25 **Gross employment generated by an airport at Richmond (5-million-passenger capacity), 2035 and 2060**

Employment type	Up to 2035	Up to 2060
Construction	429	(See Note)
Airport operation	3,693	3,748
Indirect employment around the airport site (e.g. Associated business park development)	2,447	4,061
Total employment	6,569	7,809

Note 1: Wider employment impacts unrelated to the airport site (mentioned below) are not included in this table.

Note 2: Construction jobs were estimated only for the period originally establishing Richmond as a civil airport. Some construction work will occur up to 2060 for any additional airport development throughout the lifetime of the airport, but the bulk of jobs for this type of work will be generated prior to start-up, and so have been shown in the first column.

Source: Ernst & Young.

In addition to the employment generated at and around the airport, a number of employment opportunities will also benefit the wider region. It is estimated that the employment and economic activity generated by a passenger airport at Richmond will support approximately 3,600 jobs within the wider region by 2035.

The preliminary analysis conducted by the Department found that if Richmond was expanded to a north-south runway alignment, it could generate over 20,000 jobs in the surrounding region by the time it reaches capacity in the mid-2040s, depending on the types of services offered at the airport.

Meeting local employment growth targets

The draft Metropolitan Strategy for Sydney estimates that, in order to support the planned growth in the area, an additional 142,000 jobs must be created in the West Central and North West subregion, and 37,000 jobs in the West subregion by 2031.[80] This represents a growth of employment needs by 37 per cent and 31 per cent respectively over the period 2011 to 2031 — the second and third highest percentage growth targets after the South West subregion (Wilton's location).

As stated in the Wilton chapter, it is not possible to directly compare the employment figures. Nevertheless, that employment from an airport at Richmond equates to approximately 4.6 per cent of the employment needs in the West Central and Northwest subregion, or alternatively 18 per cent of the employment needs of the West subregion is indicative. In addition to this, a further 3,600 jobs would be supported in the wider region (as mentioned earlier). This highlights how a passenger airport at Richmond would make a valuable contribution to medium-term employment targets in the region, even though the capacity provided is relatively limited.

80 In its *Draft Metropolitan Strategy*, the NSW Government has redefined West Central and North West subregion to include the local government areas of Auburn, Blacktown, Holroyd, Parramatta and the Hills Shire. The West subregion includes the local government areas of the Blue Mountains, Hawkesbury and Penrith. Accordingly they differ from the study regions identified in this report, which include the four local government areas around the airport sites.

Social factors

Aircraft noise

RAAF Base Richmond is located between the towns of Richmond and Windsor, with residential housing up to the western edge of the airfield boundary.

Figure 36 **Richmond – current aerial photograph**

Note: The town of Richmond is to the west of the runway (left on this map) and Windsor is to the east (right).
Source: Department of Infrastructure and Transport from Google Earth.

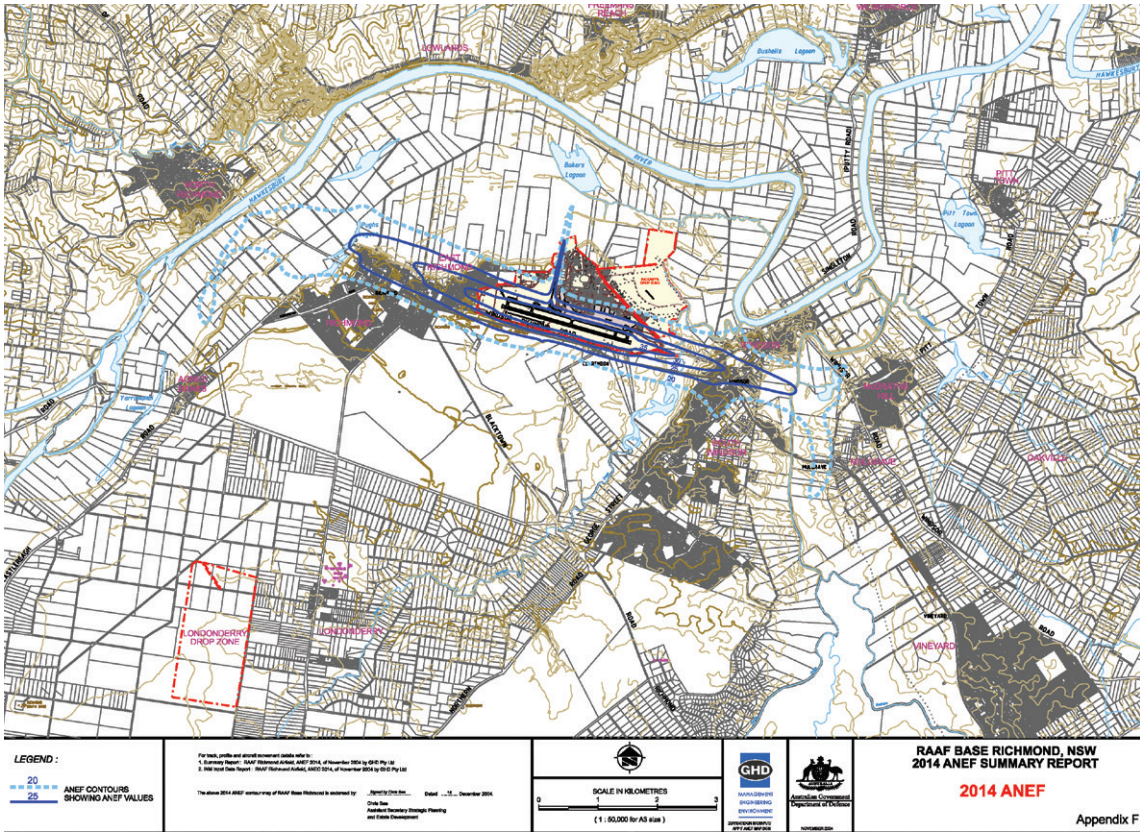
Preliminary assessments of the noise contours generated by passenger services were conducted using both the existing as well as an expanded airport design. These show that on an east-west configuration, approximately 8,500 people would be within the 20 ANEF contour (based on 2011 population data).

This means the number of residents exposed to noise is considerably higher than at Wilton. However, it is still very low compared to Sydney (Kingsford-Smith) Airport.

It would also be similar to the number of people currently exposed to noise from military traffic. The aircraft operating services to and from Richmond under the existing layout scenario would be regional turboprop and narrow body turbofan aircraft (typical Boeing 737 and Airbus A320 models). The noise impacts are not significantly different from the existing military aircraft that operate from Richmond routinely, and quieter than the military fast jet aircraft (F/A-18 and Hawk) that use Richmond occasionally and would continue to do so even with civil operations. Indeed, the RAAF Boeing 737 already operates into Richmond.

Figure 37 shows Defence's 20 ANEF for Richmond military operations (developed in 2004) representing the anticipated noise exposure for its military operations by 2014.

Figure 37 **20 ANEF contour projected for military operations at Richmond, 2014**



Note 1: The 20 ANEF contour is shown in light blue. Note that the smaller noise contour running north represents the operation of Caribou piston engine aircraft that were retired from service in 2009 and the grass strip is no longer used.

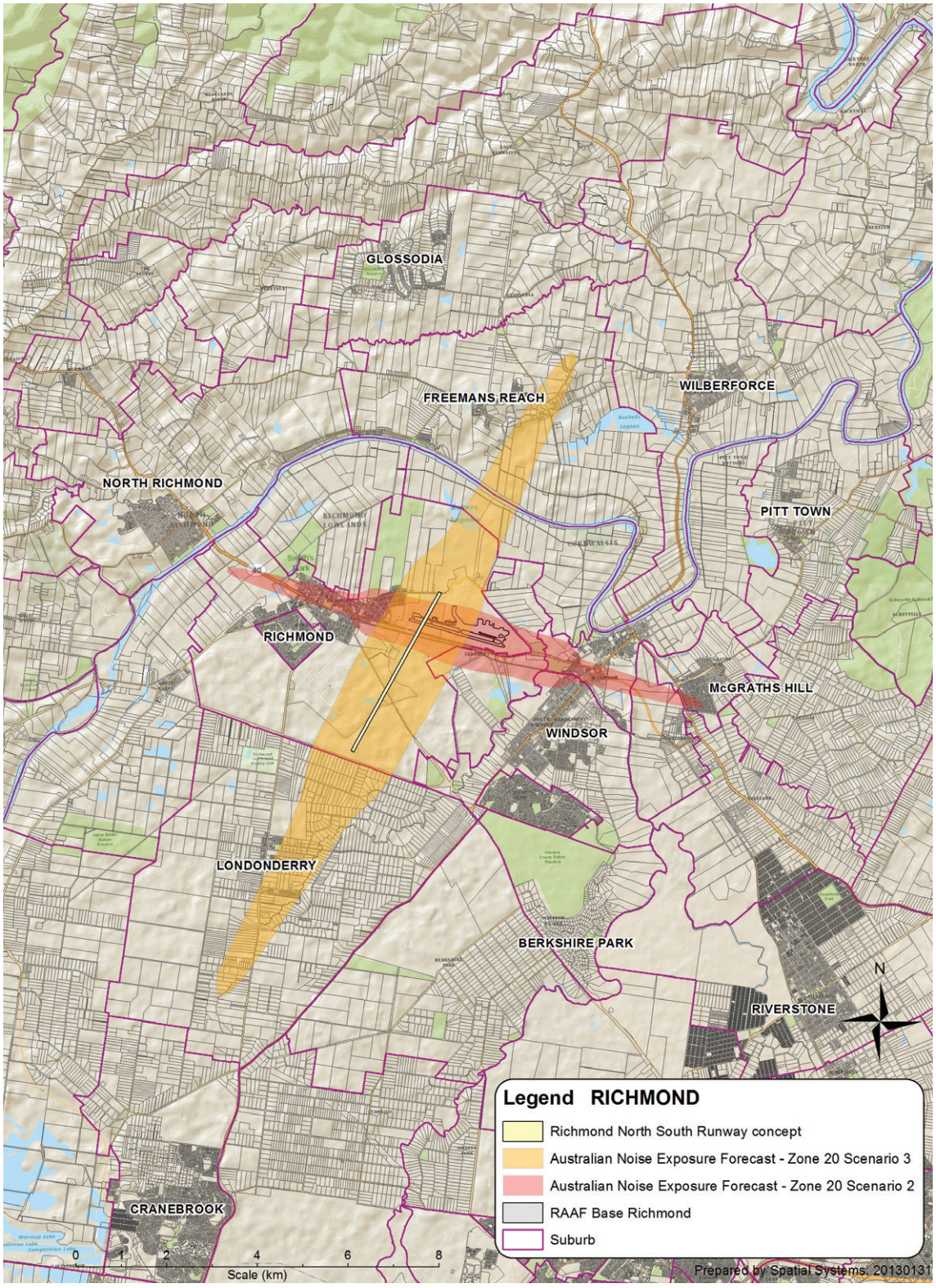
Note 2: The grey-lined cadastral map shows land parcels and property boundaries; accordingly urban areas are reflected in darker denser property arrangements than industrial or rural areas.

Source: Department of Defence.

There would be better noise outcomes for the people of Richmond and Windsor if a north-south runway operated. Under this alignment approximately 5,900 people would be within the 20 ANEF contour (based on 2011 population data), even though it represents a fourfold increase in activity.

To put these findings into perspective, the noise effects on this alignment would be approximately 4.5 per cent of Sydney (Kingsford-Smith) Airport's equivalent noise footprint. Figure 38 and Figure 39 illustrate the difference in noise impacts between a proposed airport at Richmond in east-west and north-south configurations respectively, and Sydney (Kingsford-Smith) as it currently operates.

Figure 38 20 ANEF contours estimated for a civil airport at Richmond on an east-west or north-south runway configuration (5 and 20-million-passenger capacity)



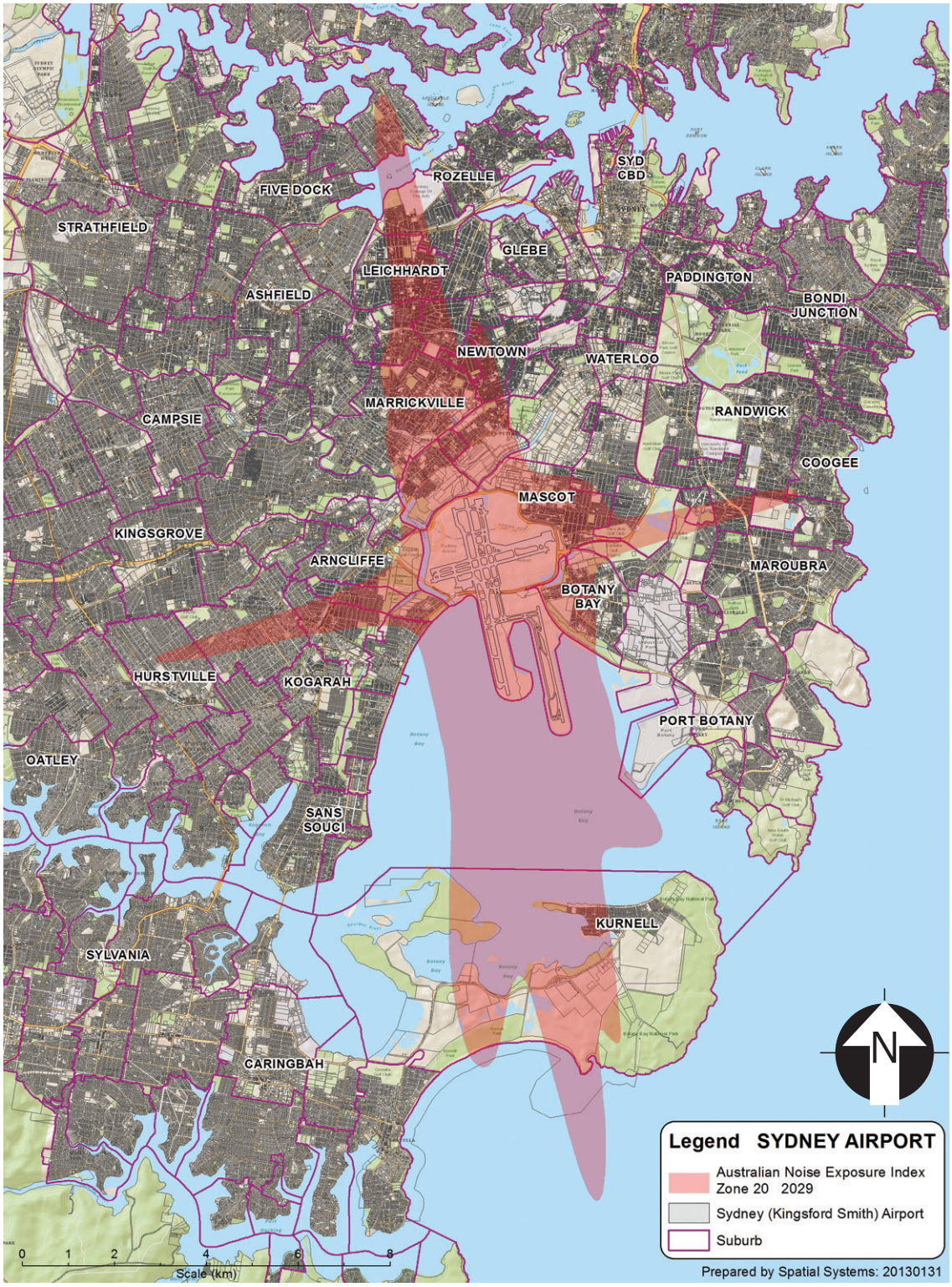
Note 1: Richmond east-west noise contour is based on a 20 ANEF, estimated 5 million passenger movements or approximately 75 aircraft movements per day. This is forecast to be reached in the mid-2030s.

Note 2: Richmond north-south noise contour is based on a 20 ANEF, estimated 20 million passenger movements or approximately 280 aircraft movements per day. This is forecast to be reached in the mid-2040s.

Note 3: The grey-lined cadastral map shows land parcels and property boundaries; accordingly urban areas are reflected in darker denser property arrangements than industrial or rural areas.

Source: Department of Infrastructure and Transport.

Figure 39 20 ANEI contour for Sydney (Kingsford-Smith) Airport (36 million passenger movements, 2011)



Note 1: Sydney (Kingsford-Smith) Airport noise contour is based on Aircraft Noise Exposure Index for 2011 as recorded by Airservices Australia. Approximately 36 million passenger movements and 289,000 aircraft movements occurred at the airport in 2011.

Note 2: The grey-lined cadastral map shows land parcels and property boundaries accordingly, urban areas are reflected in darker denser property arrangements than industrial or rural areas.

Source: Department of Infrastructure and Transport.

Working closer to home and quality of life outcomes

Table 26 presents the opportunities that would be created for residents in Western Sydney if a passenger airport were developed at Richmond. This was assessed by comparing the travel times to work at Richmond, compared with other potential locations of work around Sydney. By 2035, it is expected that between 2,700 and 3,400 residents within the airport region will be able to access jobs closer to their place of residence. By 2060 this figure is expected to increase to between 2,700 and 5,000 residents.

This equates to local residents saving 1.23 million hours of commuter travel time per year by 2060.

Table 26 **Benefits of working closer to home generated by an airport at Richmond (5-million-passenger capacity), 2035 and 2060**

	2035	2060
Increase in employment opportunities closer to home	2,700 – 3,400 persons	2,700 – 5,000 persons
Commuter travel time saved per year	0.85 million hours	1.23 million hours

Source: Ernst & Young.

Increased access to aviation services for local residents

As noted in the Wilton chapter, no specific analysis was undertaken of improved travel times in accessing an airport at Richmond over Sydney, except by Booz & Company to generate demand forecasts. However, given the majority of current users of airline services live in north and northwest Sydney, it can be expected that an airport would support improved access to aviation services for local residents. Indeed, the Department considers the high level of generated demand identified by Booz & Company as a good indication of the attractiveness of an airport for the surrounding area.

Land value

Changes in land values are difficult to forecast because Richmond has operated as an airfield over many decades. However, the commencement of civil passenger services is unlikely to make a significant difference to land values. The value of some land may appreciate where the demand for commercial land increases.

3.5. Options for the development of an airport at Richmond

Demand analysis indicates that Richmond on its current configuration is as likely to generate its own demand as much as cater for any substantial part of the unmet demand at Sydney (Kingsford-Smith) Airport and that it would reach capacity relatively quickly. However, given that it could be operational in a short time and at a limited cost, it represents a low risk option.

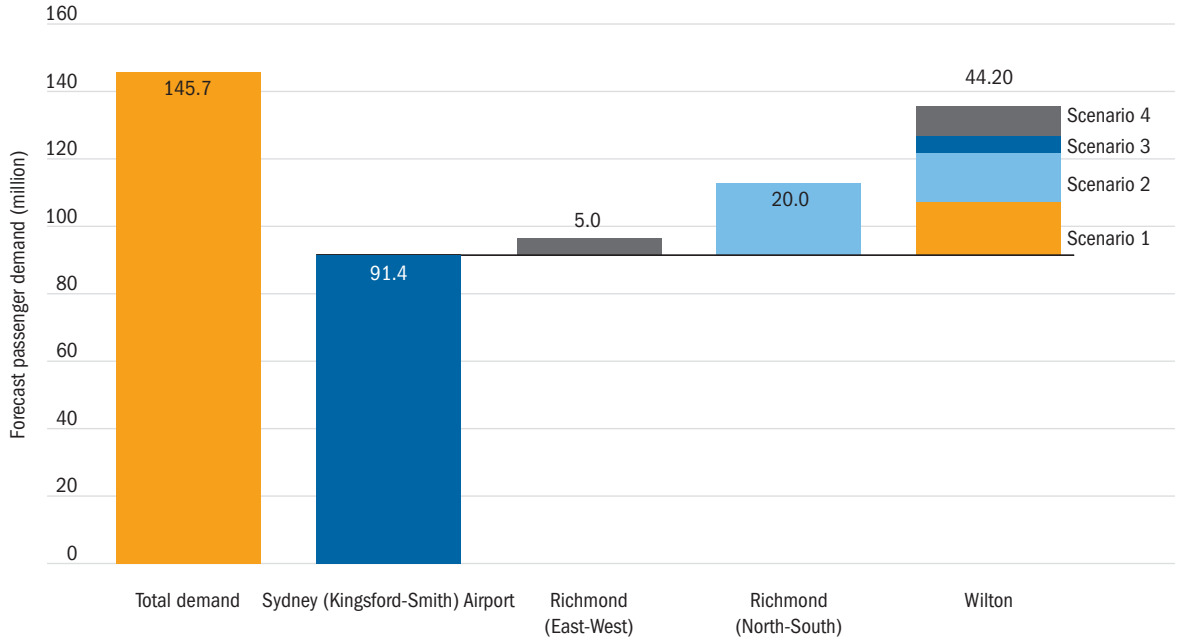
Indeed, the high proportion of generated demand from within the western region of Sydney suggests Richmond might be better characterised as Western Sydney's first airport rather than Sydney's second airport.

Such an airport would provide economic benefits for the surrounding communities matched to the scale of the airport's operations. These benefits are considered all the more important if Defence were to rationalise its services and largely withdraw from the Base, which appears a possibility sometime before 2030.

However, a greenfield airport is still required to accommodate the unmet demand forecast. This confirms the view of the Steering Committee that Richmond should be part of any solution involving the Wilton site. However, the analysis indicates that it could be more than an interim measure if Wilton proceeds to become Sydney's second airport.

From Figure 40, it is clear that neither Wilton nor Richmond is likely to provide all of the capacity that Sydney will need for the next 50 years. In the case of Wilton, it is not because it is capacity constrained, but rather that its distance from the main population centres makes it less attractive an alternative to Sydney (Kingsford-Smith) Airport. High quality transport services between Wilton and metropolitan Sydney might help to alleviate the problem of distance, though there will be limits to how much could be done before the cost-effectiveness of this strategy becomes questionable.

Figure 40 **Comparing total forecast demand at Sydney (Kingsford-Smith) Airport, with Wilton or Richmond (under the east-west and north-south configurations), 2060**



Note: Scenarios for Wilton and Richmond include generated demand at the airport. The option for Richmond north-south presumes a level of east-west services when air traffic control requires. No analysis was made of any options in combination.

Source: Booz & Company.

Booz & Company was not asked to model the operation of a three-airport system, although the demand analysis suggests that both Richmond and Wilton may be needed to accommodate long term demand, handling population centres in both the South West and North West Growth Centres. This is discussed further in the final section of this report.

Moreover, if the Government decides not to proceed with a greenfield airport, serious consideration should be given to planning and protecting the future capacity to build the north-south runway at Richmond. This will at least capture some of the unmet demand and prevent some of the costs of doing nothing identified in the Joint Study materialising. It will be important to work with the University of Western Sydney to protect the land required on the southern side of the airfield boundary.

PART 4
AIRPORT DEVELOPMENT UNDER CURRENT MARKET STRUCTURES

4. Airport development under current market structures

4.1. The consequences of economic deregulation of airline services

The last new major airport developed in Australia was Brisbane Airport. It opened in 1988 in time for the World Expo. Brisbane's new airport was built not far from the airport it replaced at Eagle Farm. At the time Brisbane's new terminals opened to domestic traffic only (international services operated from the old airport terminal for several more years), and handled just under 5 million passenger arrivals and departures.

The policy environment then was considerably different to those confronting decision makers today. The aviation system operated under a highly prescriptive regulatory regime. Domestic travel was governed by the two-airline policy – established in the post Second World War environment to nurture and protect a fragile but important new industry. By the 1980s it was clear that the regulated duopoly was no longer appropriate in the context of significant economic reform and the removal of protectionist policies elsewhere in the economy.

As a result of the economic deregulation of airlines from late 1990, the industry has prospered and the consumer has benefitted. As a proportion of average weekly earnings, domestic airfares are now around five times more affordable than they were 20 years ago.[81] Greater competition and industry innovation, such as the introduction of the low-cost carrier model and reducing foreign ownership restrictions has seen passenger numbers grow strongly. In 2012 more than 111 million passengers passed through Australia's capital city airports.[82]

4.2. Airports in the era of privatisation

The growth of air travel has brought new challenges. For example, Brisbane Airport now handles 21 million passenger movements annually, and the number is projected to reach 45 million by 2031.[83] That will be more than the combined capital city passenger traffic at the start of deregulation.

At the same time, Australia's airports are no longer owned and operated by the Commonwealth. The process of privatisation commenced in 1996, culminating with Sydney (Kingsford-Smith) Airport being leased in June 2002. The Commonwealth is no longer in the business of operating airports.

Yet many of our capital city airports are committing to new and substantial investment programs to handle the next 50 years of growth. The leasing of airports to the private sector has shown benefits in terms of investment and renewed facilities that do not make a call on the public purse. In the case of Canberra Airport, this has included a role in driving investment in new business park precincts and helping to provide better road systems adjacent to the airport, in collaboration with the Territory and Federal governments.

Non-aeronautical investment has also become an increasingly prominent feature on or around airports – both in Australia and internationally. These types of activities provide an important income stream for the airport. Their profitability is less reliant upon aviation activity, representing

81 Bureau of Infrastructure, Transport and Regional Economics analysis.
82 Bureau of Infrastructure, Transport and Regional Economics data.
83 Bureau of Infrastructure, Transport and Regional Economics, *Air Passenger Movements Through Capital and Non-Capital City Airports to 2030–31,* 2012 and Brisbane Airport Corporation, *Brisbane Airport Master Plan,* 2009.

an important diversification of revenue that can help fund other airport investment. Airports are also increasingly becoming hubs that attract businesses and generate commercial activity for the region they serve.

Although most privatised airports are operating efficiently and profitably, airports are facing a new set of challenges. The major investment needed for the expansion of Brisbane Airport is a notable example. Brisbane Airport Corporation is currently seeking funding for a new $1.3 billion runway system (parallel to the existing main runway) through 50 per cent debt, 25 per cent from equity and the remaining 25 per cent from higher charges to airlines in advance of the runway coming online.[84] It is this pre-funding component that is proving problematic. In effect, incumbents argue they are being asked to fund infrastructure that would more likely benefit future competitors (including international airlines).

This position raises questions about how a second airport for Sydney might be funded. As part of the sale agreement made in 2002, the owners of Sydney (Kingsford-Smith) Airport purchased the right of first refusal for any second Sydney airport built within 100 kilometres of Sydney's General Post Office. This clause is effective until 2032.[85]

In essence, it prevents the Commonwealth from building or operating a new airport unless Southern Cross Airports Corporation (the owners of the Sydney Airport Corporation Limited) has first considered and then rejected the government's proposal. Only then may the wider market consider the Government offer, though it must remain essentially the same. Any substantive change before going to a wider market would again trigger this right.

Moreover, the situation for Sydney is even more complex in two ways. All capital city airports with the exception of Melbourne operate as the monopoly provider of essential aviation infrastructure. In that respect, future demand is likely to be fairly predictable for airports and free of the patronage risks most usually faced by toll roads. However, patronage profiles in a two-airport market are less well understood. Irrespective of the right of first refusal clause, a second airport for Sydney would introduce competition into the market (especially during peak times), and create new commercial uncertainties.

Secondly, there are two paths to Sydney's future airport needs. One is to rely solely on the development of a greenfield airport. It would have the advantage of starting with a clean slate to build the kind of airport Sydney needs, but the disadvantages are in location, cost and timeliness. Alternatively, Richmond could be opened to passenger services with relatively little capital investment – perhaps an order of magnitude below the cost of a greenfield airport. However, it would soon exhaust its capacity and may be unattractive for airlines already established in the Sydney market. Equally the development of services at Richmond may reduce the initial demand for a greenfield airport and its viability at the outset.

The Government's role has changed since the privatisation of Australia's airports. It is no longer a question of only defining the national interest case for a new airport. The view of the market matters.

4.3. Airports through an industry lens – factors that will influence its commercial viability

As described above, Australia's airline system operates with minimal Government economic regulatory intervention. Regulation is largely confined to safety and security matters, leaving the market free to make choices about fare structures, routes and investment decisions.

Under this framework, it is not the Government's role to stipulate which airlines or services should operate from a second airport. These matters would be decided through the operation of market forces. Only in specific circumstances where the market would fail to achieve a

84 Brisbane Airport Corporation.
85 As at the time of the agreement.

public good would regulatory controls operate, such as reasonable access by regional airlines or capping aircraft movement rates to balance activity with consequences for the surrounding community.

Industry views were sought from airlines, financial analysis and other specialist aviation consultants to explore commercial attitudes to a second Sydney airport at a forum conducted by PwC. This included the relative attractiveness of a greenfield airport compared with an earlier but considerably more basic facility at Richmond. The Department sought advice on timing imperatives to commence operations and the influence of market proximity and transport links to the airport. The issues of financing and risk were also discussed.

The overall views of industry were that:

- Existing and emerging capacity constraints at Sydney (Kingsford-Smith) Airport are sufficient for the industry to take an assertive approach to the need for greater capacity in the Sydney basin. A shortage of slots during the morning and evening peaks is already creating problems for airlines wanting to commence new services or expanding existing services to Sydney. The airline industry thought that new airport capacity in Sydney would be needed well within a decade, and possibly as soon as 2015.
- For the airport to be most attractive to airlines, it would need to cater for all service types – regional, domestic and international. Initial service offerings may not include a significant proportion of international services, especially on the longest routes, but should be capable of operating to key destinations in Asia. Moreover, the capacity to expand the airport with growing demand is regarded as important.
- Proximity to the passenger market is also rated highly in any choice of airport location. In that regard the industry group consulted were overwhelmingly in favour of Badgerys Creek over Wilton.
- Airlines and investment analysts agreed that funding a greenfield airport would be challenging and that some degree of government investment would be warranted. Most attention was given to patronage risk. Investment analysts considered that private investment would be very difficult in the event that demand risk was not shared between the private sector and the government. Analysts also considered that investors have a greater appetite for other types of risk such as construction, delivery or timing risk, rather than demand risk, due to the difficulty in accurately forecasting demand for greenfield infrastructure.
- Accessibility and the connectivity of a new airport are vital components for success. A number of industry experts believe road transport links are a critical factor for new airport viability, having the ability to create and/or divert demand. It is important to plan connecting infrastructure to avoid surface transport congestion issues such as those experienced during peak times at Sydney (Kingsford-Smith) Airport.
- Ideally, transport connections would reduce perceived distance and make any supplementary airport more attractive to travellers. A travel time of less than 60 minutes during peak times is believed by most airlines and infrastructure analysts as being important to encourage use of an airport. Badgerys Creek and Richmond were rated more highly than Wilton in this regard. While the existing surface transport links to Richmond and Badgerys Creek would be inadequate to support passenger services, the necessary upgrades were considered less demanding than would be the case for Wilton.

Overall, the industry perspective was that a greenfield site would be the most attractive to the market because of its ability to expand as demand grows. However, the factors listed above would be important in deciding the location of a greenfield airport, and for those reasons Badgerys Creek was considered superior to the more distant Wilton location.

Richmond presented both opportunities and challenges. It represented a low risk, low cost option, but with a limited capacity that falls short of addressing all market segments. Moreover, any strategy that involved Richmond as a transitional facility involved a degree of risk. The market would need a clear commitment from Government as to the longer term strategy to permit effective planning.

In all cases, the industry rated patronage risk as the key consideration for a second airport for the Sydney region. To that end it was considered likely that some form of Government partnership was needed to mitigate patronage risk to the point where the market would respond favourably to investing in new airport infrastructure. That mitigation could involve an availability payment to support the airport's early years, when activity was likely to be much lower than the airport's capacity. The profitability of an airport in the first five or so years was questionable, and non-aeronautical revenue was seen as important to compensate for lower aeronautical activity.

The factors that would influence the commercial success of any second airport will need to be taken into account in developing a proposal for the market, which under the share sale agreement, would involve the Southern Cross Airports Corporation in the first instance.

The demand analysis conducted for this work also shows that Sydney (Kingsford-Smith) Airport's market would not be undermined by bringing on additional airport capacity elsewhere in the Sydney basin, especially in the long-term. Any second airport will have modest beginnings. It will grow considerably over time, largely through either generating its own demand separate from Sydney (Kingsford-Smith) Airport, or through meeting the passenger demand that cannot be accommodated at Sydney's principal airport.

Industry at the forum specifically highlighted that a supplementary airport needed to be:

- able to offer all service types, including international;
- close to demand to limit the patronage risk; and
- accessible by fast surface transport linkages.

Both Wilton and Badgerys Creek are expected to be capable of growing into full service airports. Richmond will be limited in the number and types of services it could cater for because of the size and length of the current runway, although it could offer all service types if a north-south runway is built.

All sites, including Badgerys Creek, would require an upgrade to surface transport connections to cater for increased patronage.

However, the Joint Study found that Badgerys Creek is the best site for an airport, in part, because of its proximity to its potential market. Wilton is further from Sydney's population, although over the next 25 years population growth in the southwest corridor will reduce the disadvantages it faces today. While the Joint Study Steering Committee was of the view that it would be more difficult to establish an aviation market at Wilton in the short term, it could be possible to do so in the longer term.

Badgerys Creek was examined by Ernst & Young as a comparison with Wilton. In particular, it was important to explore if there were any different economic and social outcomes because of locating an airport nearer to its primary market.

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PART 5
TOWARDS A SECOND AIRPORT

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5. Towards a second airport

The Joint Study report, released in March 2012, set out the problem facing Sydney if additional airport capacity cannot be brought on line in a timely manner. Around $34 billion in Gross Domestic Product would be lost to Australia and around 77,000 jobs will be foregone over a 50 year planning horizon. The largest proportion of these opportunity costs will be borne by the NSW economy.

Even if construction of a greenfield airport commences within the next decade, Sydney (Kingsford-Smith) Airport will remain the city's busiest and most important airport. It will continue to grow until it reaches its practical capacity limits within the next two decades – or perhaps sooner.[86] By then it will handle over 90 million passenger movements annually. However, with no prospect of expanding further, Sydney will face a shortfall in aviation capacity of around 54 million passenger movements per year in 2060. These are people wanting to access air services either to or from Sydney, but for whom services will not be available.

Airlines and airports will invest to increase capacity to the extent that it is commercially sound to do so. One strategy that airlines will use is upgauging substituting larger aircraft to carry more passengers per flight. This will go some way towards alleviating pressures that are building at Sydney (Kingsford-Smith) Airport now. But there are no plausible scenarios where upgauging could meet all or even most of Sydney's future needs.

As the principal Australian airport, Sydney's congestion will limit growth in air services and have adverse consequences for the airline network overall. In a constrained market, Sydney will also inevitably become a more expensive city to fly to and from.

Meeting aviation demand is critical to Australia's future prosperity – whether the nations economic performance will be decided in part by the capacity and the quality of our national infrastructure. Our capital city airports are clearly among our most important transport assets.

To meet Sydney's long-term aviation requirements, it needs a second airport capable of meeting the unmet demand as well as any additional demand it generates from its nearby catchment. Sydney is likely to be experiencing unmet demand in peak hours already, as airlines struggle to secure access for new services.

The preceding sections have described the relative benefits and shortcomings of a site at Wilton and Richmond, building on the Joint Study analysis. This section proposes options for the Australian Government to decide how Sydney's additional airport capacity could be provided, and what further steps could be warranted to implement their preferred strategy.

This work, and the Joint Study that preceded it, underscores that the Sydney basin is not rich in options for sites to meet Sydney's long-term aviation needs, emphasising the need for the decision on meeting Sydney's future aviation infrastructure to be settled sooner rather than later. This urgency, however, should not impede a robust and transparent analytical approach.

86 Commonwealth Bank of Australia, *Global Markets Research Sydney Versus the World,* 2013.

5.1. Surface transport – a critical element

For an airport to succeed in commercial terms, or meet the wider socio-economic benefits, it cannot operate in isolation of the other essential transport networks.

Road congestion across Western Sydney is already a significant problem for residents, where transport networks have not kept pace with housing developments and long commuting times erode productivity and quality of life. In addition, existing public transport systems are inadequate to the long term needs of the area. An airport can be the catalyst for a positive contribution to both. Airports that create new employment hubs will reduce the level of commuting, and greater investment in quality road (and rail as demand for air travel grows) networks will have wider benefits for the community.

Better roads and public transport are integral to any airport. Where road and rail networks exist, these will require a strategic program of upgrades in advance of increasing passenger numbers to ensure congestion will not increase, but lessen because of the airport.

The task requires further detailed analysis that would be guided by a decision of where additional airport capacity will be delivered and when. Infrastructure NSW is well placed to support this work and its involvement in collaboration with Infrastructure Australia in any future planning phase would be valuable. Ultimately, the state and federal governments need to reach acceptable funding arrangements given that road and rail networks are principally the responsibility of the state government.

5.2. Developing a greenfield airport to meet Sydney's aviation needs

Sydney's long-term aviation needs can only be met through an additional greenfield airport. It needs to start operations sometime in the next decade, with its growth staged over several more decades.

If that greenfield site is at Wilton, then it is clear from the current studies that this would involve significant development and environmental challenges.

The analysis has highlighted several important issues that would need to be managed effectively if this site is to become the location for the second Sydney airport. While no single issue indicated building an airport at Wilton to be unfeasible, taken together, it shows that the preparation of the site and the airfield construction will be a complex task. The environmental analysis of Wilton conducted for this study applied the most demanding criteria for an airport layout. A less ambitious design that could still meet Sydney's longer term needs should be investigated if the Government is of the view that work should proceed towards an airport at Wilton.

The greatest uncertainty at this point is the extent to which any conditions or offsets imposed by a formal environmental assessment will be achievable within a cost that both industry and Government are prepared to contemplate. An environmental assessment of Wilton under the federal legislation under the EPBC Act would be the only means of determining this.

The appropriate next step, therefore, would be to develop detailed concept designs that aim to achieve the optimal balance of engineering and environmental solutions while still delivering substantial long term capacity growth; before subjecting those designs to the a formal assessment under the EPBC Act.

Engineering and environmental challenges aside, the analysis showed that if a greenfield airport can be built, the employment, economic and social consequences airport would have an unambiguously positive effect on the local and NSW economies. While the airline and financial

industries expressed doubts that Wilton will generate sufficient demand in the short term, its prospects in the medium and longer term were considered reasonable.

As the demand analysis indicates, Wilton would largely service the unmet demand from Sydney's (Kingsford-Smith) Airport. It will generate little of its own demand because of its relative remoteness from the Sydney population, and consequently, the length of the journey time to or from Wilton. If Wilton was brought on line before around 2030 (approximately the point when Sydney (Kingsford-Smith) Airport's existing capacity will be largely exhausted), it will struggle to generate enough demand to make it a commercially viable proposition in its early operating life.

There are two consequences flowing from this. Firstly, the Government would need to consider what financial contribution it would be willing to make to have Wilton available before its market grew enough to support its operations on a commercially sustainable basis. This might be in the form of an 'availability payment' to the airport operator to offset patronage risk.

Secondly, whether significantly enhanced surface transport links between the airport and the city, ahead of passenger demand, would be needed to improve access and encourage greater patronage than would otherwise be the case. This might involve additional investment in road and rail infrastructure, or further subsidised fare structures in the case of public transport. Such strategies would need the involvement of the NSW Government and would need to be part of an integrated strategic land use and transport plan.

5.3. What role could RAAF Base Richmond play?

RAAF Base Richmond provides a limited but important opportunity to establish supplementary airport capacity in Sydney. Understanding Richmond's advantages, and its constraints, opens various options for the Government's consideration.

With its existing configuration and its principal role as a base for the Australian Defence Force's C130 Hercules fleet, Richmond provides limited scope to offer additional capacity beyond the medium term for Sydney. Nonetheless, its advantages in terms of cost, time for implementation and proximity to a market are compelling.

Greater certainty around the RAAF's plans beyond the middle of the next decade is needed. The Department acknowledges that this involves a complex set of decisions that needs to be driven by broader national security and operational considerations. The Department also recognises that a relocation of the RAAF's remaining airlift capability from Richmond will involve direct costs for Defence initially, and have important consequences for the surrounding communities. However, the potentially adverse impact on the community of any rationalisation of Defence facilities involving RAAF Base Richmond would be more than offset by its use for civil airline services, provided the transition is made in an orderly and coordinated way.

The clear disadvantages for the current Richmond configuration are that it could only provide for a maximum of around 5 million passenger movements annually, and its noise footprint over Richmond and Windsor has community sensitivities.

It may, however, be sensible to consider planning for and protecting an expansion of the existing Richmond airfield under certain circumstances through the construction of a north-south runway. Such an expansion would at least quadruple its current capacity, while at the same time expose fewer people to aircraft noise (based on the existing population distribution). The cost of doing so would be significantly more than using the existing layout – around the cost of developing the first stage of a greenfield airport with the additional requirement to realign existing road and rail services on the southern side of the Base.

Richmond's role in providing civil airline services could, therefore, be through one of three broad options. Firstly, Richmond could operate as an interim civil airport facility, bridging the capacity gap between the introduction of services at Richmond and a more capable greenfield airport

coming on line. Assuming a greenfield airport could commence operations no later than 2030, Richmond would provide airport facilities for around 10 to 15 years. This raises questions about its economic viability and dictates that capital investment (and appropriate private sector leasing arrangements) would need to be appropriate to its longevity as a passenger airport.

A second option opens Richmond for civil airline operations in its existing configuration, and the airport remains open after a greenfield airport provides for new (and a broader range of) services. This option would work best in the case of a decision to proceed with Wilton, given the distance between the two sites is such that air traffic management is likely be managed safely and efficiently. This option would also provide greater long-term certainty for the communities surrounding Richmond than would be the case where the airport operates on a transitional basis only.

The third option is for the expansion of Richmond with a north-south runway to permit a full range of airline services by the mid-2030s. The business case for this option would be in the circumstances where the Government decides that no greenfield airport can be constructed in the Sydney basin. Richmond would provide around half of Sydney's long-term needs, and the consequence would be that a substantial proportion of the opportunity costs set out in the Joint Study would be realised.

An alternative approach to this third option is to consider alternating the strategy of RAAF Base Richmond and Wilton. The order of staging would be Richmond on the existing layout while the first stage of Wilton (a single runway facility) was constructed. This would provide capacity for around 30 million passenger movements per year between the two airports. When growing passenger demand warranted a further stage of growth, the expansion of Richmond with a north-south runway might proceed. This would provide capacity for around 50 million passenger movements, split roughly equally between Richmond and Wilton. Any subsequent expansion would then be at Wilton to provide a full-scale, parallel runway airport.

The Department did not test demand modelling of a 'three-airport system' as part of the current studies. Moreover, market attitudes to a three-airport scenario would need to be taken into account. Splitting services between three airports is certainly plausible – many major cities operate on this basis – but there are also resource consequences for the industry that would need to be explored more thoroughly.

A summary of these scenarios is at Figure 41.

Figure 41 Summary of scenarios and outcomes

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Demand, Economy and Jobs Forecasts 2060
1 Wilton	Planning and Construction			Operation	**Demand** 17.1m	**2035 Economy and Jobs:** $4.1b increase GDP $3.8b increase NSW GSP 19,500 jobs generated in region				**Demand** 44.2m	**Total Demand:** Met–135.6m Suppressed–11.3m **Economy and Jobs:** $20.0b increase GDP $16.9b increase NSW GSP 40,700 jobs generated in region
Sydney (Kingsford-Smith)					60.5m					91.4m	
2 Richmond (East-West)	Start-up	Operation		Capacity Met 2035	**Demand** 5m	**2035 Economy and Jobs:** $0.6b increase GDP $0.4b increase NSW GSP 6,100 jobs generated in region				**Demand** 5m	**Total Demand:** Met–96.4m Suppressed–52.7m **Economy and Jobs:** $1.0b increase GDP $0.6b increase NSW GSP 7,800 jobs generated in region
Sydney (Kingsford-Smith)					73.3m					91.4m	
3 Richmond (North-South)	Start-up	Operation	Construction North South runway		**Demand** 12m	**2035 Economy and Jobs:** up to $4.1b increase GDP up to $3.8b increase NSW GSP up to 14,500 jobs generated in region		Capacity Met 2047		**Demand** 20m	**Total Demand:** Met–111.4m Suppressed–38.2m **Economy and Jobs:** $4.0b to $6.0b increase GDP $3.0b to $5.0b increase NSW GSP over 20,000 jobs generated in region
Sydney (Kingsford-Smith)					67m					91.4m	
4 Badgerys Creek	Planning and Construction			Operation	**Demand** 25.1m	**2035 Economy and Jobs:** $6.3b increase GDP $5.9b increase NSW GSP 30,900 jobs generated in region				**Demand** 53.9m	**Total Demand:** Met–145.3m Suppressed–6.3m **Economy and Jobs:** $23.9b increase GDP $20.3b increase NSW GSP 60,600 jobs generated in region
Sydney (Kingsford-Smith)					55.1m					91.4m	
Sydney (Kingsford-Smith) Airport only (do nothing)			Capacity Met 2033		**Demand** 73.3m	**2035 Economy and Jobs:** $6.3b forgone GDP $1.3b forgone NSW GSP 30,900 jobs forgone in region				**Demand** 91.4m	**Total Demand:** Met–91.4m Suppressed–54.0m **Economy and Jobs:** $34b forgone GDP $17.5b forgone NSW GSP 77,000 jobs forgone in Australia

Note: Capacity limits for Richmond were considered based on passenger demand as discussed in this report. It is not expected Wilton or Badgerys Creek would reach capacity during the study period on this basis. Capacity for Sydney (Kingsford-Smith) Airport was based on a variety of issues including peak demand, slot capacity and actual aircraft movements. Further information is in Part Four of the Joint Study.

Source: Department of Infrastructure and Transport.

5.4. Working towards Sydney's additional airport infrastructure – next steps

Whereas the Joint Study clearly set out the cost of congestion for the Sydney region, this report and the technical studies that underpin it have established a detailed picture of the economic, social and employment consequences of airport developments at either Wilton or RAAF Base Richmond. Those benefits are clearly correlated to the scale of the airport.

Moreover, the environmental assessment of Wilton has provided considerably more definition to the challenges of constructing an airport at this location, and built on the work of the Steering Committee. Consequently, this report provides a basis for Government to consider the most appropriate strategy to deliver Sydney's long term aviation needs.

RAAF Base Richmond can only ever provide ancillary capacity for Sydney. Even with significant additional investment to construct a north-south runway, it would largely serve a northwest Sydney catchment. Nonetheless, it has advantages in terms of relative cost, risk and schedule. Richmond offers an early opportunity to build airport capacity and establish an airline market in Sydney's western region.

An airport at Wilton appears feasible, but with caveats. The environmental impact of a facility of the size needed to accommodate long term demand and the extent of earthworks needed to prepare the site raises questions about degree of risk, and therefore cost, involved. Many of these questions will only be answered with further detailed technical analysis, as set out elsewhere in this report.

The aviation industry is not convinced that an airport at Wilton is close enough to its primary market to make the case for the kind of investment needed to bring it into service. Sydney's southwest growth areas will eventually deliver the proximity to market that is absent now, and this suggests that an airport at Wilton would be a better commercial prospect if it is constructed later. The drawback would be that such a timeframe might be beyond the time when Sydney (Kingsford-Smith) Airport reaches a point of critical congestion, even if RAAF Base Richmond is opened to civil traffic in the meantime.

Industry's clear preference is for the development of the Commonwealth site at Badgerys Creek. The economic, employment and social impacts of an airport at Badgerys Creek analysed as part of this series of studies would be significant.

Whatever decision the Government makes on the delivery of additional airport capacity in Sydney, the role of industry is important. The Government will be required to conduct a formal consultation process with the operators of Sydney (Kingsford-Smith) Airport in preparation for any proposal to develop a supplementary airport.

To avoid unnecessary delays in bringing a new facility on line, work should commence this year on a detailed proposal for the market's consideration. In the first instance this should give priority to commencing services at Richmond before 2020. However, any prolonged delay in deciding how the Government wishes to proceed with a greenfield site will have consequences for how the market responds to Richmond. The level of initial investment warranted as well as the lease arrangements for civil services at Richmond will need to be appropriately tailored to whether the airfield is intended to operate permanently, or as an interim facility.

In addition, any of these options will need to be appropriately integrated with local and regional transport and land use planning. This is necessary to avoid creating significant congestion which would undermine many of the benefits expected to be realised.

Noting that civil operations at RAAF Base Richmond could not meet Sydney's medium to long term aviation needs and that a greenfield site will still be required, the Government might consider the following next steps to advance the development of Sydney's additional airport capacity.

To commence civil airline services at RAAF Base Richmond:

1. commission detailed airport concept designs immediately for a facility to support limited civil airline operations at Richmond;
    - the design using the current configuration should be developed in close consultation with the Department of Defence and industry, and have the objective of developing terminal and other aeronautical infrastructure such that costs are kept to a minimum, taking account of RAAF's likelihood of relocating its remaining airlift assets elsewhere before the end of the next decade;
    - this should also include appropriate surface transport linkages designed over the life of the airport's operations;
2. commence work on a proposal for the market's consideration for using RAAF Base Richmond with a view to commencing civil operations no later than 2020, or sooner if that is feasible;
3. make a referral to the Minister for the Sustainability, Environment, Water, Population and Communities for an assessment of RAAF Base Richmond under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act); and
4. give further consideration to preservation of the land south of Richmond, currently owned by the University of Western Sydney, for future aviation needs.

To proceed with a greenfield airport at Wilton:

5. conduct geotechnical analysis of the site to finalise an assessment of mine subsidence risks;
6. take account of known environmental and engineering challenges to develop a detailed design of a staged airport facility for the airport and surface transport linkages; and
7. subject to the outcomes of this work, refer the site at Wilton to the Minister for the Sustainability, Environment, Water, Population and Communities for a formal assessment under the EPBC Act.

PART 6
APPENDICES

6. Appendices

6.1. Abbreviations and acronyms

ABS	Australian Bureau of Statistics
ANEF	Australian Noise Exposure Forecast
ANEI	Australian Noise Exposure Index
BITRE	Bureau of Infrastructure, Transport and Regional Economics
CASA	Civil Aviation Safety Authority
CGE	Computable General Equilibrium
EIS	Environmental Impact Statement
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GSP	Gross State Product
LGA	Local Government Area
NSW	New South Wales
OLA	Ordnance Loading Area
PEI	Persons-Event Index
RAAF	Royal Australian Air Force
SACL	Sydney Airport Corporation Limited

6.2. Glossary of terms

Aircraft movement	One landing or one take off by an aircraft
Australian Noise Exposure Forecast (ANEF)	A system developed as a land use planning tool aimed at controlling encroachment on airports by noise sensitive buildings. The system underpins Australian Standard AS2021 'Acoustics – Aircraft noise intrusion – Building siting and construction'. The Standard contains advice on the acceptability of building sites based on ANEF zones. ANEFs are the official forecasts of future noise exposure patterns around an airport and they constitute the contours on which land use planning authorities base their controls. It takes into account the frequency, intensity, time and duration of aircraft activities and calculates the total sound energy generated at any location.
Australian Noise Exposure Index (ANEI)	Similar to the ANEF, but is the measure of actual movements at the time.
Badgerys Creek	A 1,700-hectare site purchased by the Commonwealth between 1986 and 1991 for the purpose of a second airport. It is located just outside the South West Growth Centre in Western Sydney.
Bureau of Infrastructure, Transport and Regional Economics (BITRE)	Part of the Policy and Research Division of the Department of Infrastructure and Transport, BITRE provides economic analysis, research and statistics on infrastructure, transport, regional development and local government issues to inform both Australian Government policy development and wider community understanding.
Capacity	The ability of an airport to meet aviation requirements. This can be measured in a variety of ways including airside (runway, apron, gate and taxiway) needs, airspace, regulatory requirements, or landside needs (surface transport access and other passenger needs).
Constrained forecast demand	Projections which take into account the impact of limited infrastructure availability. In the case of the Joint Study, this applies mainly to the long-term annual aviation forecasts, and the hourly aircraft movement and slot allocation forecasts.
Cumberland Plain Woodland	The Cumberland Plain Woodlands is the name for the distinct groupings of plants that occur on the clay soils derived from shale on the undulating Cumberland Plain in central New South Wales. The most commonly found trees in the woodland are Grey Box Eucalypts, Forest Red Gums, Narrow-Leaved Ironbarks and Spotted Gum. A variety of other lesser-known eucalypts as well as shrubs, grasses and herbs are also found. Both New South Wales and the Commonwealth have listed the Cumberland Plains Woodland as an endangered ecological community under their respective Legislation.
Curfew	A restriction on certain flights taking off or landing from specified airports at designated times.

Cut and fill	Earthworks and engineering term meaning an operation commonly used in road building and other rock and earthmoving operations in which the material excavated and removed from one location is used as fill material at another location. This is typically to reduce the gradient of a site on which it would otherwise be prohibitive or too costly to construct.
Domestic passenger movements	For the purposes of the Joint Study, passenger movements to and from capital cities and interstate (outside of NSW).
Environmental Impact Statement (EIS)	A detailed written statement prepared in accordance with relevant legislation which analyses the environmental impacts of a proposed action, including adverse effects of the initiative that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity and any irreversible and irretrievable commitment of resources. A period of public comment is required for an EIS to be finalised; consequently, it may be considered complete whilst the publication is draft.
Environmental Protection and Biodiversity Conservation Act 1999	Commonwealth legislation designed to balance the protection of these crucial environmental and cultural values (particularly nationally and internationally important flora, fauna, ecological communities and heritage places), with society's economic and social needs by creating a legal framework and decision-making process based on the guiding principles of ecologically sustainable development.
Expenditure	Expenditure is the broadest measure of economic activity. It includes the full (gross) level of business revenues, which pays for costs of materials and costs of labour, as well as generating net business income (profits). Because of this, it is difficult to avoid double and triple counting. For example, the expenditure of tourists is the full dollar amount spent at hotels, cafes, galleries and museums etc.
Full Time Equivalent (FTE) unit	A standardised unit equivalent to the workload of a full time employee.
Full service carrier airline	An airline service model which typically provides a price and seating structure based on varying levels of service, food and other facilities.
International passenger movements	Passenger movements to and from destinations outside Australia.
Low-cost carrier	An airline service model which traditionally has sought to pare back the benefits of all-inclusive fares in exchange for lower ticket prices.
Full-scale airport	Term used to refer to an airport with capacity to meet all (domestic, regional and international) aviation services. This is assumed to support parallel runways and the largest size of aircraft to manage air traffic efficiently. An estimated 70 million passenger movements would be supported.
Draft Metropolitan Strategy for Sydney	The draft Metropolitan Strategy for Sydney was released by the NSW Government in March 2013 and sets out a plan for the city's future (including in terms of housing and employment) over the next two decades with a view to help to put new housing and jobs in places right across the city and provide affordable housing closer to home .

Mine subsidence	When material is removed from an underground mine, the ground surface above it can shift, for example sagging into the cavity beneath. This can have consequences for built features (e.g. buildings, pipelines, dams and bridges).
North West Growth Centre	A growth area defined by the NSW Government to be located within the boundaries of three local government areas The Hills, Blacktown and Hawkesbury. It comprises 16 precincts, is approximately 10,000 hectares in size and will contain about 70,000 new dwellings for 200,000 people.
N70	The number of times on an average day that an area may experience noise levels of 70 dB (A) or more from overflying aircraft, and generally expressed as a set of contours on a map. 70 dB (A) is the external noise level threshold for an average residence with doors and windows closed.
Passenger movement	One arrival or departure of a passenger.
Regional passenger movements	Intrastate-NSW passenger movements, that is to and from destinations within NSW. For the purpose of the Joint Study, flights between Canberra and the rest of NSW are defined as regional. Flights between Canberra and Sydney (Kingsford-Smith) Airport are defined as domestic.
South West Growth Centre	A growth area defined by the NSW Government to be located within the boundaries of three local government areas Liverpool, Camden and Campbelltown. It comprises 18 precincts, is approximately 17,000 hectares and has capacity for around 110,000 new dwellings for 300,000 people.
Sydney region	For the purposes of this Report, the Sydney region is defined as far north as Williamtown in the Hunter and as far south as Canberra.
Unconstrained forecast demand	Projections which assume no capacity limitations (that is, presuming that adequate infrastructure will be available to meet demand). (see constrained demand)
Unmet demand	The difference identified between the unconstrained forecast demand and the constrained forecast demand that cannot be provided due to capacity constraints at Sydney (Kingsford-Smith) Airport. In the context of this report, it refers to the annualised unmet demand identified in the Joint Study as occurring from 2033. It is noted that there are already peak pressures which could result in demand going elsewhere in those hours. (see unconstrained demand and constrained demand)

6.3. Reference documents

Reports

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PPK Environment & Infrastructure *Environmental Impact Statement: Second Sydney Airport Proposal 1999,* prepared for the Department (then the Department of Transport and Regional Services).

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Statistical resources

Aircraft movements through capital city airports to 2029–30, Research Report 117, April 2010, Bureau of Infrastructure, Transport and Regional Economics http://www.bitre.gov.au/publications/55/Files/Report%20117.pdf.

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BITRE Information Sheet 46, *Employment generation and airports,* February 2013. ABS *Census of Population and Housing 2011*.

ABS *Estimated Resident Population (ERP) Regional Population Growth,* Cat No 3218.0 (2012).

Department of Education, Employment and Workplace Relations (DEEWR) 2012, *Small Area Labour Market,* Employment Research and Statistics, DEEWR, Canberra.

ABS, *Australian National Accounts: State Accounts 2011–12.* Cat No: 5220.0.

Other

Commonwealth Bank of Australia Global Markets Research *Sydney Versus the World* 2013.

6.4. Australian Government response to recommendations made in the Joint Study on aviation capacity in the Sydney region

The Joint Study includes 20 recommendations that aim to address the various elements of the Sydney region's capacity constraints. In its response to the Joint Study, the Australian Government has agreed to a three part strategy:

a. Optimising the operation and capacity of Sydney Airport, including addressing surface transport congestion (road and rail) in the areas around the airport;

b. Protecting and better utilising existing airport infrastructure in the region; and

c. Establishing and protecting the site for a supplementary airport in the Sydney region to address the longer term demand for aviation service that cannot be accommodated by Sydney Airport.

The Joint Study's specific recommendations and the response by Australian Government are set out below.

Steering Committee Recommendation		Australian Government Response
OPTIMISE USE OF SYDNEY AIRPORT		
Program of Investment for additional infrastructure at Sydney Airport		
R. 1	The Committee recommends that the Minister for Infrastructure and Transport (C'wth) exercise the power under the *Airports Act 1996* to require that a new master planning process be immediately initiated to ensure a firm program for upgrade works be resolved without unnecessary delay.	The Australian Government supports the recommendation. Sydney Airport Corporation Limited (SACL) is now required to provide its Master Plan by 2 December 2013.

Steering Committee Recommendation	Australian Government Response
Surface Transport Links to Sydney Airport	
R. 3 The Committee recommends that the NSW Government, in consultation with the Australian Government and SACL, develop a strategy for increasing the patronage of the airport rail system which includes removing the existing access fee to the two airport rail stations. — Consideration should be given to the appropriate long term funding arrangements for this measure, with costs of removing the station access fee to be met by the airport operator and the costs recovered from airport users. R. 4 The Committee recommends that the Australian and NSW governments should develop an agreed program of surface transport works, in consultation with SACL, for improving the connections to the airport. This should include: — A commitment by the governments to the investment in rolling stock and train paths to enable the airport rail link to provide at least 20 peak hour trains per hour by 2020, with a long term investment plan for increase of an additional ten trains per hour by 2035; — A program to upgrade roads and intersections in the locality of the airport. This should include road widening and traffic flow measures to reduce congestion around the domestic terminal precinct and to provide additional bus lanes and capacity for improved bus services; and — Expansion of the Sydney bus network to the airport, in particular to link the airport directly to the CBD, Parramatta, St George/Sutherland area and the Lower North Shore region.	The Australian Government supports the recommendation in principle. The Department of Infrastructure and Transport will work with relevant NSW agencies and SACL to advance this recommendation taking into consideration other infrastructure and transport priorities.

Steering Committee Recommendation		Australian Government Response
Changes to Regulatory Measures		
R. 5	The Committee recommends amendments to the *Sydney Airport Demand Management Act 1997* to lift the statutory movement cap from 80 to 85 per hour in the peak hours of 6.00 to 10.00 and 15.00 to 20.00 each weekday.	The Australian Government rejects any changes to the movement cap.
R. 6	The Committee recommends that arrangements for implementing and monitoring the Sydney Airport Slot Management process and movement cap be reviewed to ensure they are effective in preventing movements beyond the levels set, but are workable and consistent with the safe and efficient operation of the airport.	The Australian Government supports the recommendation in principle. The Government is committed to noise sharing through the Long Term Operating Plan (LTOP) and will examine measures necessary to protect it. The Department of Infrastructure and Transport will continue to work with the Slot Manager and industry to address adjustments to the Slot Management Scheme as appropriate, subject to compliance with the movement cap and curfew.
R. 7	The Committee recommends that the Australian Government takes action including amendments to the Slot Management Scheme to further limit access to new runway slots for smaller aircraft types, to maximise passenger throughput at the airport. — The Committee supports preventing the allocation of slots for new services operated by aircraft of less than 50 seats from 2015, increasing to 70 seats from 2020. — Recognising that the main use of aircraft up to 70 seats is for regional air services, slots allocated for services that are already operating should be grandfathered.	The Australian Government reaffirms its position that it is committed to retaining the current level of guaranteed access by regional airlines to Sydney Airport. The Department of Infrastructure and Transport will consult with industry on the implications of this recommendation and report back to the Government.

Steering Committee Recommendation	Australian Government Response
Aircraft Noise and the Long Term Operating Plan (LTOP)	
R. 8 The Committee recommends that the LTOP for Sydney Airport be reviewed with the aim of determining new, more effective measures of aircraft noise impacts and respite than the current runway end movement numbers. — International experience should be examined in alternative approaches such as determining "noise budgets" and setting operating parameters for aircraft operations based on noise intensity and frequency of operation in noise sensitive hours, with a view to setting achievable noise reduction targets for the airport based on the use of new generation quieter aircraft types.	The Australian Government rejects this recommendation. The Government is committed to noise sharing through the LTOP for Sydney Airport, and will examine measures necessary to protect it. The LTOP will continue to be monitored through Sydney Airport Community Forum (SACF) and Implementation Monitoring Committee (IMC).
Protecting Airspace around Sydney Airport	
R. 9 The Committee recommends that the Australian and NSW government agencies undertake an audit of Procedures for Air Navigation Services – Aircraft Operations (PANS-Ops) and obstacle limitation surfaces (OLS) for Sydney Airport to identify all existing and potential breaches of the protected surfaces. An agreement should be developed on statutory provisions in Australian and NSW government legislation to protect operations to and from the airport, and on the administrative arrangements to support the implementation of those provisions, with a view to preventing future breaches.	The Australian Government supports this recommendation. The Department of Infrastructure and Transport will work with relevant Commonwealth and state agencies to develop a framework for implementation.
Air Traffic Management Enhancements	
R. 2 The Committee recommends that SACL, Airservices Australia and airlines accelerate plans for the implementation of advanced technologies and air traffic management practices including satellite based systems at Sydney Airport. These do not significantly change the capacity of the airport, but help to maintain traffic handling rates and efficiency of operations as capacity pressures build.	The Australian Government supports this recommendation. Airservices Australia will work with SACL and industry to examine and identify a program of Air Traffic Management enhancements for Sydney Airport and provide advice back to Government. It is expected that any enhancements would be funded by industry.

Steering Committee Recommendation	Australian Government Response
BETTER PROTECT AND UTILISE OTHER EXISTING AIRPORTS IN THE SYDNEY REGION	
Canberra Airport	
R.10 The Committee recommends that the Australian, ACT and NSW governments should work together to ensure that Canberra Airport is protected from encroaching noise-sensitive urban development, which would be incompatible with 24-hour jet aircraft operations and could restrict the expansion of the airport over time into a major domestic and international aviation centre for both passenger and freight services for south-eastern Australia. In particular, the current undeveloped approach and departure corridors to the north and south of the airport should be protected from residential or other noise-sensitive development.	The Australian Government supports the recommendation. The Department of Infrastructure and Transport will continue to work with state and territory representatives through National Airports Safeguarding Advisory Group (NASAG) processes to secure protections for airports.
RAAF Base Williamtown (Newcastle Airport)	
R.11 The Committee recommends that the Australian and NSW governments develop a joint strategy for accommodating growth in aviation demand for the Hunter and Central Coast regions, addressing short and longer term needs. – As an initial step, RAAF, Newcastle Airport Limited and the aviation safety agencies should conduct a study to examine strategies to assist in meeting demand in the short-term, such as lifting the arrival rate permitted from six to eight per hour in defined peak periods. – For the longer term, the Australian and NSW governments, in consultation with RAAF and Newcastle Airport, should initiate a study to reach a clear assessment of whether the Williamtown site can meet the future needs of civil operations for the region north of Sydney, with regard to the forecast growth in the Hunter Valley and Central Coast.	The Australian Government supports this recommendation. Defence and the Department of Infrastructure and Transport will develop options and advice for the Government. Note that longer-term action on this item depends on outcomes of this initial step.
R.12 The Committee recommends that the NSW and Australian governments should develop a strategic land use strategy, in consultation with Newcastle Airport Limited, RAAF and the local councils, for land use and statutory protections in the areas around Newcastle Airport and its flight-paths.	The Australian Government supports this recommendation. The Department of Infrastructure and Transport, with Defence will work with NSW Government and relevant local councils to provide advice to Government.

Steering Committee Recommendation	Australian Government Response
Bankstown Airport	
R.13 The Committee recommends that Bankstown Airport Limited and the Australian Government use the Master Plan process to resolve a strategy to allow Bankstown Airport to accommodate regular public transport (RPT) operations by turbo-prop aircraft, with the following issues to be explored: – The extent to which RPT operations might be permitted at Bankstown and any conditions which might be imposed on the operation of RPT services. – The extent to which the main runway and associated infrastructure might be extended or upgraded to accommodate RPT aircraft, freight aircraft and business jets. – Any implications arising from the operation of RPT aircraft, freight aircraft or business jets for airspace and air traffic management in the region. – The adequacy of existing ground transport links to allow RPT passengers to travel between Bankstown Airport and Sydney Airport or the Sydney CBD. – Any implications for congestion affecting roads and intersections around the airport from the commencement of RPT services. – An investment plan to support the changes required to accommodate RPT operations. – A surface transport investment plan for the upgrade of airport road links and key intersections to improve access between Sydney Airport and Bankstown Airport.	The Australian Government noted this recommendation as any increase of provisions for RPT services would need to meet Master Plan requirements, including being subject to full public consultation. It also reiterated its position that Bankstown Airport cannot perform the function of a second Sydney airport.

Steering Committee Recommendation	Australian Government Response
RAAF Base Richmond	
R.14 The Committee recommends that the Australian Government initiate action to progressively open RAAF Base Richmond to a level of civil traffic using the existing east-west runway alignment. The civil traffic would be operated in parallel with continued defence operations and under conditions agreed with the RAAF. – As a first step, the Australian Government should undertake an environment assessment process for the opening up of civil operations based on the investment and traffic scenarios set out in this report for operations on the existing runway configuration. – Following the assessment the Australian Government should move to formalise the arrangements for joint civil and RAAF use of the site, drawing on the example of the other federal leased airports which accommodate both civil and military activity. – The civil facility could be leased and operated under the *Airports Act 1996* with arrangements similar to the lease for Canberra Airport with RAAF's long term access to the airfield and the facilities it requires on the base and the civil airport lessee taking responsibility for the balance of the site. – The arrangements should include development obligations to ensure provision of facilities for General Aviation (GA) operations and RPT capacity without undue delay.	The Australian Government supports the recommendation in principle. The Department of Infrastructure and Transport will commission further work on the introduction of civil flights, including consideration of the social, economic and environmental impacts.

Steering Committee Recommendation	Australian Government Response
IDENTIFY AND ESTABLISH A SUPPLEMENTARY GREENFIELD AIRPORT	
R.15 The Committee recommends that the Australian and NSW governments commit to establishing a supplementary airport for the Sydney region. – The site selected for a supplementary airport should be one which is capable of accommodating a full service airport serving all market segments and with a parallel runway layout (a "Type 1" airport in the terms of the assessment conducted for this study). This would allow staged development as aviation activity develops, with a single runway operation initially and parallel runways in the longer term. – The sites in the Nepean region were assessed as clearly the best sites on cost-benefit analysis. If, in light of this analysis, the Australian and NSW governments are prepared to re-consider the Badgerys Creek site in the Nepean region as a potential site, that should be the preferred site. The site has been protected from encroaching development and given that the Commonwealth owns the land it would be less costly and disruptive to the community as a development site than other options. – If governments are not prepared to embrace Badgerys Creek as the site for a supplementary airport, the other Nepean sites which are all close to the South West Growth Centre, would also seem to be excluded. – If the Nepean sites are not accepted, the Wilton site in the Cordeaux-Cataract locality should be the preferred site.	The Australian Government has determined the need for a supplementary airport in the Sydney basin. The Department of Infrastructure and Transport will undertake further detailed analysis of: – The social, environmental economic impacts of airport operations (for example, examining factors such as the direct employment generated; changes to land and surface transport usage and needs; and noise and other impacts); and – assessment of the airport development concepts from the planning, construction and operational perspective taking into account both the potential on-site and off-site impacts. Once this work is completed the Department will provide further advice to the Australian Government. It is anticipated that this will occur within the next year.
R.16 The following initial steps should be taken in the next 12 months with regard to Wilton: – An Environmental Impact Statement and preliminary land acquisition; and – A Supporting infrastructure plan (including surface transport and connections to utilities) should be developed between the Australian and NSW Governments. R.17 The Committee recommends, if Wilton is selected as the site for a supplementary airport, it is important that action proceed in the interim to open RAAF Base Richmond to a level of RPT operations. R.18 The Committee recommends that when a firm decision is reached to proceed with development of a supplementary airport and the preferred site, the decision should be locked in as an ongoing commitment of both governments through legislative actions in both the Australian and NSW Parliaments.	

Steering Committee Recommendation	Australian Government Response
R.19 If governments confirm that the Badgerys Creek site is not to be used as an airport, an agreed approach should be developed for future use of the site, recognising its potential contribution to the supply of employment lands, affordable housing and community amenity facilities. – The Australian and NSW governments should immediately agree to a detailed planning and zoning strategy for the site which effectively preserves the site for future employment lands for the South West Growth Centre and western Sydney. – The Australian Government should, in consultation with the NSW Government, undertake a scoping study of the future land disposal and sale options, to determine the optimal timetable for the land to be brought to the market. – The Australian and NSW governments should consider a suitable public-private partnership land development joint venture for the site to provide an optimal strategy for infrastructure provision, land release and financing for urban development of the site. – The NSW Government, in consultation with the Australian Government, should plan infrastructure investment and programming for the site, including possible extension of the South West Rail Line from Leppington to the site. – The current state and local government restrictions on land surrounding the site, which were put in place to protect the site for a future airport development, could be removed.	The Australian Government notes this recommendation. The Department of Infrastructure and Transport will continue to work with the NSW government to determine the best use of the land.
GOVERNANCE, MONITORING AND REPORTING	
R.20 The Committee recommends that the Australian and NSW governments establish a joint process for managing and monitoring implementation of the strategy, with access to a broad-based reference group.	The Australian Government supports this recommendation. The Government notes the importance of a bipartisan approach to ensuring the significant shortfall in aviation infrastructure capacity can be met. The Minister for Infrastructure and Transport has written to his NSW counterparts proposing a joint process.

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
SITE CHARACTERISTICS	Location	West	West	West	East	East	East	West	West
	Site Area	1,930hectares	2,077hectares	2,084hectares	1,988hectares	1,727hectares	2,209hectares	2,022hectares	1,823hectares
	Local Government Area	Wollondilly	Wollondilly	Wollondilly	Wollondilly Wollongong	Wollondilly	Wollondilly Wollongong	Wollondilly	Wollondilly
AIRPORT DESIGN PARAMETERS	Airport Type	Full service airport capable of serving all market segments							
	Runways	Independent, wide spaced parallel runways: 4,000m x 60m, 4,000m x 60m; Cross runway: 2,500m x 60m							
	Main Runway Heading	18/36	18/36	16/34	17/35	15/33	08/26	03/21	11/29
	Cross Runway Heading	08/26	09/27	06/24	05/23	08/26	16/34	12/30	18/36
	Main Runway Separation	2,000m	2,000m	2,000m	2,400m	1,650m	2,000m	2,000m	2,000m
	Runway slope	1%	1%	1%	1%	1%	1%	1%	1%
	Business Parks	239	457	276	244	180	359	450	234
	Overall airport layout efficiency	Efficient	Efficient	Efficient	Less Efficient	Less Efficient	Less Efficient	Efficient	Efficient
	The Site Areas vary as the nominated Business Park areas are variable sizes								
	Terminals have been located between parallel runways: Domestic terminal floor space is 250,000 sq. m with 15,000 parking spaces. Aircraft gates 63 Code E and C. International terminal floor space is 500,000 sq. m with 10,000 parking spaces. Aircraft gates 56 Code F, E and C and 3 Code E freight								
	Runway capacity – 100 movements per hour								
	Taxiways – two single direction taxiways parallel to each runway								
	Apron stand dimensions of: Code F 11,200 sq. m; Code E 8,190 sq. m; Code C jet and turboprop 3,050 sq. m								
	Airport Layout Efficiency - based on the general layout for each option and the placement of airport support, freight and business parks relative to the terminals and aprons (which are located between the main runways)								

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
LAND USE PLANNING	Current land uses within airport site	Rural residential Picton Road Local Roads Metropolitan Catchment Area Coal mining 330 kv power line	Rural residential Picton Road Local Roads Metropolitan Catchment Area Coal mining 330 kv power line	Rural residential Picton Road Local Roads Metropolitan Catchment Area Coal mining 330 kv power line	Metropolitan Catchment Area Coal mining 330 kv power line	Metropolitan Catchment Area Coal mining 330 kv power line	Metropolitan Catchment Area Coal mining (and headworks of Gujarat NRE Wonga West) 330 kv power line	Metropolitan Catchment Area Picton Road Local Roads Coal mining 330 kv power line	Rural residential Picton Road Local Roads Metropolitan Catchment Area Coal mining 330 kv power line
	Zoning under relevant Local Environmental Plan (LEP)	RU2 Rural Landscape E2 Environmental Conservation SP2 Infrastructure Wollondilly LEP 2011	RU2 Rural Landscape RU4 Rural Small Holdings E2 Environmental Conservation SP2 Infrastructure Wollondilly LEP 2011	RU2 Rural Landscape RU4 Rural Small Holdings E2 Environmental Conservation SP2 Infrastructure Wollondilly LEP 2011	E2 Environmental Conservation Wollondilly LEP 2011 Wollongong LEP 2009	E2 Environmental Conservation Wollondilly LEP 2011	E2 Environmental Conservation Wollondilly LEP 2011 Wollongong LEP 2009	RU2 Rural Landscape RU4 Rural Small Holdings E2 Environmental Conservation SP2 Infrastructure Wollondilly LEP 2011	RU2 Rural Landscape RU4 Rural Small Holdings E2 Environmental Conservation SP2 Infrastructure Wollondilly LEP 2011
	Zoning on which development for the purpose of an 'airport' is permissible with development consent	RU2 – yes E2 – no SP2 – no Wollondilly LEP 2011	RU2 – yes RU4 - no E2 – no SP2 – no Wollondilly LEP 2011	RU2 – yes RU4 - no E2 – no SP2 – no Wollondilly LEP 2011	E2- no Wollondilly LEP 2011 Wollongong LEP 2009	E2- no Wollondilly LEP 2011	E2- no Wollondilly LEP 2011 Wollongong LEP 2009	RU2 – yes RU4 - no E2 – no SP2 – no Wollondilly LEP 2011	RU2 – yes RU4 - no E2 – no SP2 – no Wollondilly LEP 2011
	Approximate number of allotments within airport concept site	69	88	102	4	4	4	106	102
	Estimated population within airport concept site (ABS)	69	109	138	Nil	Nil	Nil	145	149
	Approximate number of allotments within airport concept site zoned RU2 Rural Landscape	48	63	73	Nil	Nil	Nil	77	77

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
LAND USE PLANNING (continued)	Approximate number of allotments within airport concept site zoned RU4 Rural Small Holdings	Nil	2	2	Nil	Nil	Nil	2	2
	Approximate number of allotments within airport concept site zoned E2 Environmental Conservation	21	23	27	4	4	4	27	23
	Approximate number of allotments within airport concept site zoned SP2 Infrastructure	Macarthur Dr Picton Rd	Macarthur Dr Picton Rd	Macarthur Dr Picton Rd	Fire Rd	Fire Rd	Fire Rd	Macarthur Dr Picton Rd	Macarthur Dr Picton Rd
	Runway footprint within Protected Lands (National Park, State Conservation Area, RAMSAR)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	Airport concept site within Protected Lands (National Park, State Conservation Area, RAMSAR)	Upper Nepean State Conservation Area (part of High Intensity Approach Lighting)	Upper Nepean State Conservation Area (part of High Intensity Approach Lighting)	Upper Nepean State Conservation Area (part of High Intensity Approach Lighting)	Nil	Nil	Nil	Upper Nepean State Conservation Area (part High Intensity Approach Lighting)	Upper Nepean State Conservation Area (part of High Intensity Approach Lighting)
	1. Under the provisions of Wollondilly LEP 2011, development for the purpose of an 'airport' is permissible with consent on land zoned RU2 Rural Landscape 2. Under the provisions of the Wollondilly LEP 2011, development for the purpose of an 'airport' is prohibited on land zoned RU4 Rural Small Holdings, E2 Environmental Conservation, SP2 Special Infrastructure 3. Under the provisions of the Wollongong LEP 2009, development for the purpose of an 'airport' is prohibited on land zoned E2 Environmental Conservation 4. Options 3, 4 and 5 which are primarily located entirely on land zoned E2 Environmental Conservation impact the least number of allotments (<5) 5. Options 2, 6 and 7 impact the greatest number of allotments (>100)								
METEOROLOGY	Meteorological Conditions: 95% runway useability	Complies	Complies	Complies	Complies	Complies	Complies	Complies	Complies
	Mechanical Turbulence: Propensity for wind shear	Moderate	Moderate	Moderate	Moderate	Moderate	More severe	Moderate	Moderate
	1. The east - west alignment Option 5 is likely to have a greater propensity to wind shear as it is closer to the Illawarra escarpment (the distance from the escarpment being 9 km (4.8 nautical miles)). 2. An Automatic Weather Station (AWS) in the Wilton area should be established as a matter of urgency to enable better estimates of runway usability and the requirements for a cross runway. 3. Further research and analysis on the likely impacts of mechanical turbulence/wind shear in relation to the proposed runway layouts should be undertaken by a specialist company with the objective of helping inform a siting decision. It is recommended that this be undertaken immediately.								

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
AIRSPACE MANAGEMENT	Difference to Airservices' preferred runway directional range of 280 to 300 degrees (100 to 120 degrees) (plus or minus degrees)	60	60	40	50	30	10	70	20
	Optimal for segregation from Sydney (Kingsford-Smith) Airport operations	Most complex	Most complex	Complex	Complex	Complex	Complex (assuming vertical separation with northerly flow to Sydney (Kingsford-Smith) Airport is possible)	Most complex	Complex
	Compatibility with Holsworthy R555 with aircraft crossing at greater than 3000 feet	Potential conflict as Northerly departures overfly. Compatible in southerly direction	Potential conflict as Northerly departures overfly. Compatible in southerly direction	Compatible	Compatible	Compatible	Compatible	Major conflict as Southwest direction flight track overflies	Compatible
	1. Airservices' comments outlined in their Joint Study on Aviation Capacity for the Sydney Region – Further Assessment of Wilton Sites, from an air traffic management perspective a NW/SE parallel runway configuration is optimal for segregation from Sydney (Kingsford-Smith) Airport operations. The runway directional range should be within 280 to 300 degrees (100 to 120 degrees). 2. With the potential for concurrent Regular Passenger Transport operations occurring at all four airports in the Sydney region, i.e. Sydney, Wilton, Bankstown and Richmond at some point in the future, Airservices' identified need for an integrated airspace operating plan for Sydney, Bankstown and Richmond may equally apply to the integration of Wilton airspace as part of this overall plan. 3. A detailed airspace modelling exercise (using e.g. TAAM (Total Airspace and Airport Modeller) with inputs from Airservices and Defence is recommended. 4. Identification of the aircraft operating costs/costs of delay and adding a factor for complexity and a range of extra costs say +10% and +20% for increasing levels of complexity, could be considered further. 5. The primary existing airspace constraint is R555 series (Holsworthy) artillery range activity in the circuit area, which is not compatible above 3000 feet (i.e. potentially involving significant changes to the types of activities and/or the coordination of activities that can occur at the Defence facilities at Holsworthy). Relocation would be at significant cost. The preliminary flight tracks for all options overfly R555C and R555D. If Defence NOTAMs any height greater than 3000 feet, there is complete incompatibility with landings in the southwest direction for Option 6 (which is 6.1 nm distant), unless Holsworthy is relocated. Relocation would be at significant cost. 6. There are a number of residual impacts to existing aviation facilities/activities arising from airspace changes for a Wilton airport, including loss of Sydney region GA capacity due to aerodrome closures and some reduced operational capabilities of Bankstown and Camden Airports.								
AIRPORT SAFEGUARDING	Presence of terrain obstacles penetrating the lowest Obstacle Limitation Surface (OLS)	Moderate	Moderate	Moderate	Moderate Off-site earthworks required	Moderate	Moderate Off-site earthworks required	Moderate	Moderate
	1. Through CASA, Obstacle Assessment Surfaces (OAS) is assessed and specific aircraft operating procedures may be applied if necessary.								

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
ROAD AND RAIL	Primary Existing Road Access from Sydney and Canberra	F5 and Picton Road	F5 and Picton Road	F5 and Picton Road	F5 and Picton Road	F5 and Picton Road	F5 and Picton Road	F5 and Picton Road	F5 and Picton Road
	Secondary Existing Road Access from Sydney and Wollongong	F6 and Picton Road	F6 and Picton Road	F6 and Picton Road	F6 and Picton Road	F6 and Picton Road	F6 and Picton Road	F6 and Picton Road	F6 and Picton Road
	Tertiary Existing Connecting Roads	Picton Road, Wilton Road and Appin Road	Picton Road, Wilton Road and Appin Road	Picton Road, Wilton Road and Appin Road	Picton Road, Wilton Road and Appin Road	Picton Road, Wilton Road and Appin Road	Picton Road, Wilton Road and Appin Road	Picton Road, Wilton Road and Appin Road	Picton Road, Wilton Road and Appin Road
	Alternative New Primary Access Point	Through Douglas Park	Through Douglas Park	Through Douglas Park	Through Douglas Park	Through Douglas Park	Through Douglas Park	Through Douglas Park	Through Douglas Park
	Proximity to Sydney Market	Closer	Closer	Closer	Further	Further	Further	Closer	Closer
	Differential Primary road distance from Wilton timing point to Airport (from Sydney)	6.5 km	3.5 km	2.5 m	8 km	6.5 km	18.5 km	6 km	2.5 km
	Proximity to Canberra and Regional South-Western NSW	Closer	Closer	Closer	Further	Further	Further	Closer	Closer
	Differential Primary road distance from Wilton timing point to Airport (from Canberra)	6.5 km	3.5 km	2.5 km	8 km	6.5 km	18.5 km	6 km	2.5 km
	Differential Road Distance to the Illawarra and South Coast	Further	Further	Further	Much further	Much further	Closer	Further	Further

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
ROAD AND RAIL (continued)	Primary Airport Road access tunnel under runway	No	No	No	No	No	No	No	No
	Picton Road (Route 88) under Runway End Safety Area (RESA)	Yes	Yes	No	No	No	No	No	No
	Move or tunnel existing Picton Rd (Route 88)	Yes	Yes	Yes, but minor	No	No	No	Yes	Yes
	Availability of Alternative Access Road	Yes	Yes	Yes	No	No	No	Yes	Yes
	Primary Existing Rail Access from Sydney and Canberra	Main Southern Railway	Main Southern Railway	Main Southern Railway	Main Southern Railway	Main Southern Railway	Main Southern Railway	Main Southern Railway	Main Southern Railway
	Distance to Central Railway Station	83 km	83 km	83 km	91 km	91 km	86 km	83 km	83 km
	Travel Time to Central Railway Station	65 minutes	65 minutes	65 minutes	69 minutes	69 minutes	67 minutes	65 minutes	65 minutes
	Potential Secondary Rail Access from Sydney & Wollongong	Unfinished Maldon –Dombarton Line	Unfinished Maldon –Dombarton Line	Unfinished Maldon –Dombarton Line	Unfinished Maldon –Dombarton Line	Unfinished Maldon –Dombarton Line	Unfinished Maldon –Dombarton Line	Unfinished Maldon –Dombarton Line	Unfinished Maldon –Dombarton Line
	Distance to Wollongong Railway Station	44 km	44 km	44 km	52 km	52 km	47 km	44 km	44 km
	Travel Time to Wollongong Railway Station	34 minutes	34 minutes	34 minutes	38 minutes	38 minutes	36 minutes	34 minutes	34 minutes
	Alternative New Primary Access Point (a)	Via prospective Wentworth Railway Alignment	Via prospective Wentworth Railway Alignment	Via prospective Wentworth Railway Alignment	Via prospective Wentworth Railway Alignment	Via prospective Wentworth Railway Alignment	Via prospective Wentworth Railway Alignment	Via prospective Wentworth Railway Alignment	Via prospective Wentworth Railway Alignment
	Distance to Central Railway Station (a)	79 km	79 km	79 km	87 km	87 km	82 km	79 km	79 km

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
ROAD AND RAIL (continued)	Travel Time to Central Railway Station by high performance train (a)	52 minutes	52 minutes	52 minutes	54 minutes	54 minutes	53 minutes	52 minutes	52 minutes
	Alternative New Primary Access Point (b)	Transect of Main Southern Railway and prospective Wentworth Railway Alignment from Douglas Park	Transect of Main Southern Railway and prospective Wentworth Railway Alignment from Douglas Park	Transect of Main Southern Railway and prospective Wentworth Railway Alignment from Douglas Park	Transect of Main Southern Railway and prospective Wentworth Railway Alignment from Douglas Park	Transect of Main Southern Railway and prospective Wentworth Railway Alignment from Douglas Park	Transect of Main Southern Railway and prospective Wentworth Railway Alignment from Douglas Park	Transect of Main Southern Railway and prospective Wentworth Railway Alignment from Douglas Park	Transect of Main Southern Railway and prospective Wentworth Railway Alignment from Douglas Park
	Distance to Central Railway Station (b)	74 km	74 km	74 km	82 km	82 km	77 km	74 km	74 km
	Travel Time to Central Railway Station by high performance train (b)	50 minutes	50 minutes	50 minutes	52 minutes	52 minutes	51 minutes	50 minutes	50 minutes
	Primary Airport Rail access tunnel under runway	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
	Relocation of existing transport infrastructure	No	No	No	No	No	No	No	No
	Possible to link to potential High Speed Rail link via purpose built airport connection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

1. Major upgrading of Sydney Regional road network, primarily F5/M5 and M7 to accommodate road traffic drawn to the Wilton study area is common to all options.
2. Major upgrading of the existing rail network, to accommodate an airport express service, is common to all options.
3. "Wentworth Railway" – refers to the prospective high speed railway alignment running from Glen Alpine (South of Campbelltown) to Aylmerton (South of Mittagong).
4. Travel times are inclusive of 5% recovery plus typically 2 minutes station stops at Wolli Creek, Glenfield, and Campbelltown.
5. It is assumed for all options that there would be connections to suburban rail services to reach the Eastern Suburbs, North Shore, Illawarra and Main Western Lines.
6. Rail access to Canberra is being dealt with by the Commonwealth in their current High Speed Rail Study Phase 2

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
UTILITIES	Relocate 330 kV Line 17	Move least line 8 km E	Move least line 8 km E	Move least line 8 km E	Move least line 8 km W	Move less line 8 km W	Move more line 5 km W	Move more line 7 km E	Move less line 9 km E
	Impact of 330 kV Line 17 move to the west	N/A	N/A	N/A	Least entry Conservation Area	Less entry Conservation Area	More entry Conservation Area	N/A	N/A
	Relocate 66 kV Line	Not significant impact	Not significant impact	Not significant impact	Less impact than Options 1, 2, 6 & 7	Less impact than Options 1, 2, 6 & 7	Less impact than Options 3 & 4	Not significant impact	Not significant impact
	Relocate 11 kV Lines	Not material	Not material	Not material	Not material	Not material	Not material	Not material	Not material
	New airport power supply	All options similar cost	All options similar cost	All options similar cost	All options similar cost	All options similar cost	All options similar cost	All options similar cost	All options similar cost
	Wilton - Wollongong Gas Pipeline	Move west approximately 8 km	Move west approximately 8 km	Move west approximately 8 km	No issue	No issue	No issue	Move west approximately 8 km	Move west approximately 8 km

1. There is likely to be a need to relocate approx. 20 km of TransGrid's 330 kV transmission line 17 Avon-Macarthur to avoid airport footprints / meet the assumed OLS requirements for all options;
2. There is likely to be a need to relocate a 66 kV distribution line, remove some 11 kV and 415 V distribution lines and potentially relocate others, all of which are owned by Endeavour Energy;
3. There is likely to be a need to provide two 66 kV distribution lines from secure bulk supply points each capable of supplying an estimated load of 80 MVA for all options;
4. There is likely to be a need to reduce the OLS requirements for Options 3, 4 and 5 if it is not possible to route the above transmission line (Line 17) through the State Conservation Area; and
5. The environmental impacts of utility changes should be manageable under the normal planning processes with the possible exception of relocating transmission Line 17 through the State Conservation Area for Options 3, 4 and 5.

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
EARTHWORKS	Cut + Fill per ha (000 m3/ha)	59	49	70	84	63	62	53	60
	Modelled Cut (000 m3)	-52,000	-45,000	-69,000	-78,000	-49,000	-60,000	-50,000	-49,000
	Modelled Fill (000 m3)	52,000	46,000	67,000	79,000	49,000	66,000	48,000	50,000
	Modelled Balance (000 m3)	0	1,000	-2,000	1,000	0	6,000	-2,000	1,000
	Modelled Cut + Fill (000 m3)	104,000	91,000	136,000	157,000	98,000	126,000	98,000	99,000
	Max cut depth (m)	18	21	23	36	30	23	20	25
	Max fill depth (m)	40	41	51	63	65	66	43	50
	Additional infrastructure required	Nil	Nil	Drainage conveyance under runway fill structure along Lizard Creek	Nil	Nil	Drainage conveyance under runway fill structure along Wallandoola Creek	Nil	Nil

1. The topography at Wilton is undulating with many incised creeks. Whilst in many options, the runways have been aligned parallel to the contours and between the creek lines a high volume of fill is still required to fill the creeks between the runways in order to create a pad for the terminal buildings and car parks.
2. In the majority of airport options, filling across the creeklines has been limited to the upper regions of the catchments which means conveyance structures are not required to allow creeks to flow from one side of the fill to the other. However, Option 3 fills across Lizard Creek and Option 5 fills across Wallandoola Creek. As these crossings are lower down in the reach of the creek then conveyance structures will be required.
3. Option 1S has the lowest amount of earthworks (cut + fill) per hectare and Option 3 the highest. The primary reason for the difference in volumes between the options is the extent of the existing incised creek lines that need to be filled to allow construction of an airport.

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
LAND CLEARING REQUIREMENTS	Site Area (ha)	1,930	2,077	2,084	1,988	1,727	2,209	2,022	1,823
	Site Area + Bushfire Buffer (ha)	2,131	2,293	2,263	2,198	1,901	2,395	2,201	2,012
	Additional Area for Retarding Dam (ha)	29	0	56	0	0	0	0	0
	Electrical Easement (ha)	95	120	120	60	60	60	120	120
	Road and Rail Easements (ha)	156	179	154	143	135	108	170	161
	Total Clearing Required (ha)	2,411	2,592	2,593	2,401	2,096	2,563	2,491	2,293
	Clearing of Trees in Obstacle Limitation Surfaces (OLS) Required	No	No	No	Yes	No	Yes	No	No

1. Preliminary investigations have shown that clearing of trees for OLS requirements outside of the site boundary is likely to be required for Options 3 and 5 only.
2. All options include an allowance for Business Parks – note that the site area of each business park is variable.
3. Other than options 1 and 2 all other options can accommodate stormwater infrastructure within the currently defined site boundaries.

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
REGIONAL GEOLOGY AND GEOTECHNICAL MATTERS	Possible minor expansive soil potential (Wianamatta Shale)	Yes	Yes	Yes	No	No	No	Yes	Yes
	Site underlain by known geological structure	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
	Site underlain by coal	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Site covered by current mining lease	Yes > 50%	Yes >50%	Yes 50%	Yes 100%	Yes 100%	Yes 100%	Yes 100%	Yes 50%
	Site subject to a mining investigation licence	Yes	Yes	Yes	No	No	No	Yes	Yes
	Past or Active mining	No	No	No	Yes	Yes	Yes	No	No
	Proposed mining beneath airport site	No	No	Yes partial	Yes	Yes	Yes	Yes partial	No
	Potential for airport site to subside	No	No	Yes partial site	Yes entire site	Yes entire site	Yes entire site	Yes partial site	No
	Scale of mining subsidence expected	Unlikely	Unlikely	Up to 1.5m	Up to 2.5m	Up to 2.5m	Up to 2.5m	Up to 1.5m	Unlikely
	Additional design cost for infrastructure	Less likely	Less likely	Very likely	Very likely	Very likely	Very likely	Very likely	Less likely

1. Options 1, 1S and 7 are the least likely to be affected by subsidence in the foreseeable future.
2. In the case of Option 1, it would be significantly better because the cross runway, as currently positioned, is basically above what would always remain as a barrier of unmined coal between the BHP Bulli Seam operations in the north, and the possible Gujarat NRE colliery holdings to the south. In addition, the western NS runway is above what would have to be a barrier pillar between the Gujarat holdings and the Exploration area to the west. Option 1 could be considered as in effect sterilising only the coal from midway between the parallel north - south runways and the eastern footprint of the easternmost north - south runway. This could reduce the degree of sterilisation to about 5 - 6 sq. km.
3. The footprint of Option 7 would similarly create a reduced degree of sterilisation. However, in all cases, this degree of reduced effect requires more detailed assessment.
4. In addition to the economic cost of sterilisation there may be compensatory costs in some form required to be paid to the mining companies for their loss of sections of their existing mining leases.

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
DRINKING WATER CATCHMENT, HYDROLOGY AND DRAINAGE	Watercourses impacted by the footprint of the airport	Allens Creek, Cascade Creek and tributaries	Allens Creek, Cascade Creek and tributaries	Allens Creek, Cascade Creek and tributaries	Lizard Creek and tributaries of Wallandoola Creek	Tributaries of Wallandoola and Lizard Creeks	Wallandoola Creek, Lizard Creek	Allens Creek, Cascade Creek	Allens Creek, Cascade Creek
	Area of lost drinking water catchment (ha)	1,530	1,570	1,600	1,990	1,730	2,210	1,420	1,210
	Financial cost to Sydney Catchment Authority of lost water p.a.	$0.7M	$0.8M	$0.8M	$1.0M	$0.8M	$1.1M	$0.7M	$0.6M
	Long term economic cost to SCA of lost water p.a.	$19.4M	$19.9M	$20.4M	$25.2M	$21.9M	$28.0M	$18.0M	$15.4M
	Discharge of treated stormwater and effluent	Direct to Allens Creek	Direct to Allens Creek	Direct to Allens Creek	To Allens Creek via 5 km pipe/tunnel system (~$1.0B)	To Allens Creek via 5 km pipe/tunnel system (~$1.0B)	To Allens Creek via 6 km pipe/tunnel system (~$1.2B)	Direct to Allens Creek	Direct to Allens Creek
	Alternative strategies to avoid discharge of treated effluent and stormwater to drinking water catchment	NA	NA	NA	3 km pipe/tunnel to downstream of Broughtons Pass off-take (~$600M) Move the water supply off-take upstream to Cataract Dam (~$1.2B) Water supply augmentation (~$5.0B)	3 km pipe/tunnel to downstream of Broughtons Pass off-take (~$600M) Move the water supply off-take upstream to Cataract Dam (~$1.2B) Water supply augmentation (~$5.0B)	8 km pipe/tunnel to downstream of Broughtons Pass off-take (~$1.6B) Move the water supply off-take upstream to Cataract Dam (~$1.2B) Water supply augmentation (~$5.0B)	NA	NA
	Flood retarding dam operation (during storms up to 100 yr. ARI event)	Low flow outlet and spillway flow	Low flow outlet and spillway flow	Low flow outlet and spillway flow	Pipe outflow only	Pipe outflow only	Pipe outflow only	Low flow outlet and spillway flow	Low flow outlet and spillway flow
	Size of retarding dam	~5,000 ML	~5,000 ML	~5,000 ML	~8,000 ML	~7,000 ML	~9,000 ML	~5,000 ML	~5,000 ML

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
DRINKING WATER CATCHMENT, HYDROLOGY AND DRAINAGE (continued)	Discharge of excess stormwater in extreme rainfall event (>100 yr.)	to Allens Creek	to Allens Creek	to Allens Creek	Spillage to drinking water catchment	Spillage to drinking water catchment	Spillage to drinking water catchment	to Allens Creek	to Allens Creek
	Flow conveyance structure required for local waterway(s)	No	No	No	Yes, at Lizard Creek (1.5 km)	No	Yes, at Lizard Creek (4 km)	No	No

1. The Wilton Study Area is within the Metropolitan Special Area of the Sydney Drinking Water Catchment. Under the SWCM Act, public agencies must first give notice to SCA of their intention to exercise their functions within a Special Area, and those agencies may not exercise those functions contrary to any representations that SCA makes except with 28 days' notice (see s. 47 SWCMA).
2. Issues relating to the discharge of treated effluent and stormwater from an airport development at Wilton with respect to the boundary of the Sydney Drinking Water Catchment include:
   The discharge of treated effluent from the airport site into creeks and rivers that form part of the direct water supply route is not permitted.
   Airport options located to the west (Options 1, 1S, 2, 6 and 7) will be able to drain to Allens Creek, which is located outside of the water supply route / drinking water catchment.
   Airport options located to the east (Options 3, 4 and 5) will require additional works to ensure that discharges up to the 100 year ARI flow are drained back to Allens Creek via a pipe/tunnel system. Alternative strategies have been considered, including moving the Sydney water supply off-take location and thereby, effectively moving the boundary of the drinking water catchment.
3. All options will result in a loss of catchment area that drains to the water supply route, thereby posing a cost to SCA for the lost water.

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
FLORA, FAUNA AND ECOLOGICAL VALUES	Previously cleared land	Yes (approx. 10%)	Yes (approx 10%)	Yes (approx 15%)	No (except for access roads)	No (except for access roads)	No (except for access roads)	Yes (approx 15%)	Yes (approx 15%)
	Clearing of Endangered Ecological Community	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Clearing of Protected Fauna Habitat	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Clearing of Koala Habitat	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Cumberland Koala Linkage Impacted	Yes	Yes	Yes	No (not impacted directly by airport footprint but may be impacted by noise)	No (not impacted directly by airport footprint but may be impacted by noise)	No (not impacted directly by airport footprint but may be impacted by noise)	Yes	Yes
	Location within Metropolitan Special Area	1,348 ha (70%)	1,496 ha (72%)	1,510 ha (72%)	100%	100%	100%	1,346 ha (67%)	1,111 ha (61%)
	Aquatic Habitat Impacted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

1. A large number of threatened flora and fauna species have been identified to occur in the Wilton Study Area. The high incidence of threatened species at the Wilton Study Area is due to its location in and adjacent to the Metropolitan Special Area (drinking water catchment) which has been relatively undisturbed
2. Five endangered ecological communities were found to occur.
3. The Cumberland Koala Linkage and two Priority Fauna Habitats were also found to occur.
4. All options require substantial clearing of native vegetation including endangered ecological communities and priority fauna habitat. This would impact a large number of threatened flora and fauna.
5. Options 1, 1S, 2, 6 and 7 would impact the Cumberland Koala Linkage. Options 3, 4 and 5 would not impact this linkage however these options would impact Koala habitat (as well as other threatened species).
6. Each option is likely to significantly impact watercourses and aquatic habitat containing threatened aquatic fauna (frogs and fishes).
7. Due to the large area required for clearing, residual impacts to terrestrial and aquatic flora and fauna are likely to be significant. Environmental offsets are therefore likely to be required.

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
NOISE	Population exposed to greater than 20 N70 events per day	512	483	1,456	1,692	245	1,986	1,707	3,287
	Person-Events Index (PEI) greater than 20 N70 events per day	42,162	41,431	150,016	221,431	16,509	72,976	331,727	194,188
	Average Individual Exposure (AIE) greater than 20 N70 events per day	82	86	103	131	67	37	194	59
	Properties within ANEC 40	10	6	7	1	NA	NA	4	10
	Properties within ANEC 35	16	15	18	2	NA	1	11	16
	Properties within ANEC 30	31	27	70	2	1	2	35	27
	Properties within ANEC 25	73	66	144	8	11	2	444	66
	Total properties in ANEC 40, 35, 30 and 25	130	114	239	13	12	5	494	119
	Population within ANEC 40	0	0	0	0	0	0	0	0
	Population within ANEC 35	0	4	2	0	0	0	0	0
	Population within ANEC 30	18	20	98	0	0	0	27	4

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
	Population within ANEC 25	77	77	205	9	11	0	952	51
	Total population within ANEC 40, 35, 30 and 25	95	101	305	9	11	0	979	55
	Potential for ANECs to impact on Landowner Nominated Site	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
	1. The option with the most number of properties impacted is Option 6 with approximately 494 properties located within all ANEC contours 40, 35, 30 and 25. 2. The airport option with the least amount of properties impacted is Option 5 with approximately 5 properties located within all ANEC contours 40, 35, 30 and 25. 3. Notwithstanding the above, the Australian Standard AS2021 provides guidance to regional, local authorities and others associated with urban and regional planning and building construction on the acceptable location of new buildings in relation to aircraft noise. Zones that are described as “conditionally acceptable”, i.e. 20-25 ANEF, may be approved as building sites provided that any new construction incorporates sound proofing measures. 4. There are five landowner nominated sites being assessed by the Department of Planning and Infrastructure for potential residential release within the vicinity of the Wilton study area. These sites are Bingara Gorge, Wilton West, Wilton South, Brooks Point and Appin Vale. With the exception of Option 5, all other options impact with varied ANEC contours, the landowner nominated sites.								
INDIGENOUS HERITAGE	Indigenous heritage sites within footprint	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
	Number of Indigenous heritage sites within footprint	20	13	19	1	8	Nil	18	15
	Indigenous heritage sites within immediate vicinity of footprint	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Number of Indigenous heritage sites within vicinity of footprint	22	21	18	6	7	2	20	16
	1. There are heritage sites located within the footprints of the options and in the vicinity of the sites. 2. There are 22 heritage sites within the area within which the footprints of all airport options are located. Most of them lie within Options 1, 1S, 2, 4, 6 and 7. 3. It is possible that at least 9 heritage sites would be directly impacted on by the current location of the business parks located in the northwest of the airport layouts for Options 1s, 2, 3, 6 and 7. 4. Approximately 31 heritage sites are also within the vicinity of Options 1, 1s, 2, 6 and 7. 5. Approximately 35 further sites lie within the north to west segment beyond the heritage sites stated above as being in the vicinity of the footprints of Options 1, 1s, 2, 6 and 7. 6. Resolution of mitigation of impacts, on the heritage sites will relate to consideration of design resolution, and context and setting of the sites in relation to both the proposed airport itself and the “Business Park” component in the footprints of those Options.								

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
EUROPEAN HERITAGE	Heritage item within footprint	No	No	No	No	No	No	No	No
	Number of heritage items within footprint	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	Heritage item within immediate vicinity of footprint	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Number of heritage item within immediate vicinity of footprint	2	4	4	Nil	Nil	2	4	4
	1. All listed Heritage Items identified in the area are outside the footprints of all of the airport options. Therefore, consideration of impacts, if any, relate to "development in the vicinity of heritage items". 2. Impacts, if any, will arise from the construction and operation of the airport through enlargement or removal of existing infrastructure (e.g. roads) or through new infrastructure (e.g. new roads and suggested rail options, both passenger and freight). 3. The proposed 'Business Park' in the northwest corner of Options 1S, 2, 6 and 7 is likely to intensify vehicular activity and have a more direct effect on two heritage items in the vicinity of those footprints, namely, the Cottage at No. 1090 and St Luke's Church at Nos. 1096-1099 Argyle Street, Wilton. 4. Resolution of mitigation of impacts, if any, on the two heritage items in Argyle Street, will relate to consideration of context and setting of the items in relation to the proposed "Business Park" component in the northwest footprints of those Options.								
HAZARDS	Flooding hazard	No	No	No	No	No	No	No	No
	Bushfire hazard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Numbers of people –exposed to risk to third parties due to aircraft crash	Nil	20	44	Nil	Nil	Nil	2	2
	Numbers of allotments exposed to risk to third parties due to aircraft crash	3	10	33	1	1	Nil	10	9
	1. Desktop analysis on the potential for flooding and bushfire in the area found that all sites are on undulating topography ensuring that there is no risk of flooding at any of the airport options. 2. All options are situated within historic bushfire prone lands, with the western most sites being less susceptible to bushfire given they are not situated deep within the forest area. 3. All sites are will be adversely effected by smoke from bushfire given the close proximity to forested areas. 4. 4. Numbers of allotments exposed to risk to third parties due to aircraft crash does not include the allotments within the airport footprint								

Wilton options – summary matrix		Option 1	Option 1S	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
WATER AND WASTEWATER MANAGEMENT	Close to access roads	Yes	Yes	Yes	No	No	No	Yes	Yes
	Close to Allens Creek	Yes	Yes	Yes	No	No	No	Yes	Yes
	Close to Drinking Water Catchments	No	No	No	Yes	Yes	Yes	No	No
	Close to town for sharing water services	Yes	Yes	Yes	No	No	No	Yes	Yes
	Next to Retarding Dam	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	1. Option 1 and to a lesser extent Option 2 would be the most preferred locations for preventing effluent generated on site to gravitate into the Drinking Water Catchment streams and rivers. 2. Options 6 and 7 could also work, although not as effectively as the first two options. The other options, although possible to execute, would be less preferable from a water treatment perspective as they are far from Allens Creek which would be the receiving waters of excess effluent that cannot be reused on site. 3. Water treatment technologies exist to treat all the effluent generated on site (no matter how highly polluted the water is) to a class better than drinking water standards. As the water demand and hence the volume of polluted effluents generated would be fairly low the cost of treatment compared to the total capital cost of the project would be minimal. 4. All waters generated on the site could be contained and treated on site with beneficial outcomes by reusing the water for purposes of irrigation and toilet flushing in the airport and surrounds. Mitigation strategies can be put into place to prevent any pollution to the sensitive streams and rivers at Wilton.								
AIR QUALITY	Produces air pollution impacts as a function of runway option	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	1. The high level of assessment performed in this study does not allow the air quality impacts for each option to be assessed. Notwithstanding this, it is expected that there would be no discernible difference in the air quality impacts of each option, and that each option would result in the same reduction in air quality. 2. The key factors affecting air quality are the numbers of annual vehicle and aircraft movements. It is expected that each option will result in the same level of vehicle and aircraft movements and therefore the same level of air emissions. 3. There may be local issues with drainage of air flows down the various gullies and canyons leading into the Cordeaux, Cataract and Nepean Rivers. This could affect the transport of pollutants from the site into the local and the Sydney metropolitan regions. Only high resolution pollution dispersion modelling can address these local issues in the context of regional air quality.								

Source: WorleyParsons.

6.6. Index of technical papers

Technical Paper	Author	Volume
Modelling of alternative airport sites	Booz & Company	1
Economic and social analysis of potential airport sites	Ernst & Young	1
Examining viability factors for a supplementary airport in the Sydney region	PwC	1
Further assessment of airport development options at Wilton	WorleyParsons	2
These technical papers can be accessed individually at the Departments website <www.infrastructure.gov.au/aviation/sydney_av_cap/>		

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