A2

VOLUME A: BACKGROUND AND NEED

Need for the Project

Need for the Project

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SUMMARY OF KEY FINDINGS

Aircraft and Passenger Demand

- Brisbane Airport has experienced strong passenger growth of around 7.5 percent per annum over the 15 years between 1989/90 and 2004/05.
- Annual aircraft movements are forecast to grow from the existing (2005) 160,000 movements to 227,000 in 2015 and 393,000 in 2035.
- Annual passenger movements are forecast to grow from the existing (2005) 15.6 million movements to 25.3 million in 2015 and 50.0 million in 2035.
- The existing runway system has a modelled capacity of 59 movements (departures and arrivals) per hour. The existing busier peak hours have around 40 movements (departures and arrivals). Based on the forecasts of air travel growth, demand will exceed existing runway capacity around 2014.
- If no additional runway capacity was added at Brisbane Airport, it is estimated that there would be a loss of around 35 percent of regular airline movements by 2035. This equates to an annual loss of around 3.2 million international passengers and 8.8 million domestic passengers by 2035.

Economic Conditions

- Tourism is a key driver of economic activity for the Brisbane-Moreton region. The region currently has a greater proportion of tourism-driven service industries such as retail trade, accommodation, cafes and restaurants, and cultural services, compared with the rest of Australia. Those industries, along with the property and business services sectors, are expected to continue to become more important over time, continuing to increase their share of the region's employment.
- The relatively stronger emphasis on tourism over time highlights the importance of having the appropriate infrastructure in place in order to facilitate such growth.
- The Brisbane-Moreton region is also expected to experience more rapid population and economic growth than Australia as a whole will experience over the next 30 years, with population growth at around twice the national average.

Economic Assessment Methodology

- The economic assessment considers a future growth path for the Brisbane-Moreton, Queensland and Australian economies in an 'unconstrained world', then overlays on this the constraints to growth that would occur if the New Parallel Runway (NPR) were not developed.
- The key elements to the economic impact assessment methodology are analysis of the direct costs and benefits of the NPR using financial modelling and modelling of the air transport sector for the impact on airlines and passengers, and analysis of the economy-wide impacts of the NPR using general equilibrium modelling – this assesses the indirect economic impacts, including any crowding out (displacement) effects.

Direct Impacts

- The cost estimates put the construction cost of the NPR at just over $970 Million (in nominal dollars allowing for inflation). Construction takes place over the period from 2008 to 2015.
- The key benefits of the project come from avoiding constraints. Given the role of the airport in facilitating tourism to the Brisbane-Moreton region, the loss of passengers resulting from not providing additional runway capacity represents not only a loss of passengers for the airport and airlines, but a loss of other tourist spending which would otherwise have occurred. The loss of 3.2 million international passengers and 8.8 million domestic passengers equates to a direct loss of just under $5 Billion per annum in passenger spending in the wider economy (in today's dollars).

Economy-Wide Impacts

- Allowing more passengers through Brisbane Airport means more economic activity for the Brisbane-Moreton region. The region's output (as measured by Gross Regional Product or GRP) will be permanently higher. The net present value of the output gain (increase in GRP) is projected to be $4.8 Billion over the period 2006 to 2035 using a 4 percent real discount rate.
- The best measure of overall economic benefit or living standards is the increase in real private consumption which occurs – the ability of people to spend more. The net present value of the increase in economic benefit (increase in real private consumption) is projected to be just over $8.2 Billion over the period 2006 to 2035 using a 4 percent real discount rate.
- Significant economic benefits also accrue to the rest of Queensland and the rest of Australia, by ensuring that Brisbane remains accessible and uncongested for people living in these regions. The net present value of economic benefits to the rest of Queensland is estimated at $1.1 Billion, while for the rest of Australia it is $0.6 Billion.
- In the early years of the project employment increases relative to the business-as-usual case by around 2,700 at 2009 (the peak of the increase). Over time, there are some permanent gains, with employment by 2035 being around 8,000 higher than without the new runway.
- In order to check the robustness of modelling results, a range of alternative assumptions were tested via sensitivity analysis (high traffic, high/low tourism expenditure, high/low airfare price elasticity and a tight labour market). In general, the results were quite stable, indicating that the economic benefits are robust to a range of alternative assumptions.
- Allowing airport capacity to grow, avoiding congestion and bottlenecks from arising, generates considerable positive economic benefits for the Brisbane region. The results reported here are the benefits from 2006 to 2035. The NPR will have considerable additional economic life beyond 2035, resulting in further potential benefits beyond this date.

2.1 Introduction

This chapter of the Draft Environmental Impact Statement and Major Development Plan (Draft EIS/MDP) presents:

- The passenger and air traffic forecasts;
- The findings of the capacity analysis of the existing Brisbane Airport; and
- The economic effects of the NPR.

Sections 2.2 to 2.5 provide the passenger movement, aircraft movement and daily profile demand forecasts and details as to how they were determined. Factors affecting the forecasts, such as population and economic growth and sensitivity of the forecasts are provided in section 2.7.

Section 2.6 details the assessment of the capacity of the existing runway system into the future providing delays and the resulting effect of a constrained capacity on the forecasts.

Sections 2.8 to 2.14 provide the economic assessment of the effects of the NPR. This includes a review of property prices in section 2.13.

2.2 Overview of Forecasts

Forecasting growth in passenger and aircraft movements provides the basis for the long term planning of airport facilities to meet future demand for air travel. The forecasts inform the type of facilities required and the appropriate staging and timing of these facilities.

The ability of an airport's runway and taxiway system to service demand is dependent on the number of aircraft arriving and departing at the airport. In turn the number of aircraft movements is dependent on the number of passengers wishing to travel by air and the size of aircraft in operation. The travel patterns of people also govern the busier periods for aircraft movements. Therefore the number of passengers wishing to travel, and the time that they wish to travel at, are the main factors in determining the requirements for air related infrastructure.

The forecasts have been developed for two specific purposes, as follows:

- Assessment of future demand in order to identify timing for the new runway. This covers the period up to 2015 when the new runway is scheduled to open; and
- Assessment of the 20 years following opening of the runway. This is undertaken primarily for assessment purposes, such as noise modelling, road traffic modelling and to inform when staging of the construction of the complete taxiway system will be needed.

Brisbane Airport has experienced strong passenger growth of around 7.5 percent per annum over the 15 years between 1989/90 and 2004/05 (Note: This is the 'Trend CAGR' and is based on computing the Compound Annual Growth Rate (CAGR) on the trend line for the period analysed). Existing and forecast passenger and aircraft movements are summarised in **Table 2.2.**

Table 2.2: Summary of Existing and Forecast Passenger and Aircraft Movements.

Years ended 30 June	All Passenger Movements	All Aircraft Movements
2005	15.6 million	160,000
2015	25.3 million	227,000
2035	50.0 million	393,000
Compound Annual Growth Rate (CAGR)		
2005 to 2015	4.9%	3.5%
2015 to 2035	3.5%	2.8%

2.3 Passenger Demand

2.3.1 Historical Trends in Passenger Demand

When considering forecasts, it is important to analyse the trends that have occurred at Brisbane Airport. Brisbane Airport has been experiencing strong passenger growth for a number of years and has consistently been recording higher percentage growth than Sydney and Melbourne, refer **Table 2.3a.**

Table 2.3a: Average Annual Percentage Growth in Air Passengers.

Yearly Period	Brisbane	Sydney	Melbourne
2005 on 1997	5.9%	3.9%	5.3%
2005 on 1977	6.9%	5.2%	5.3%

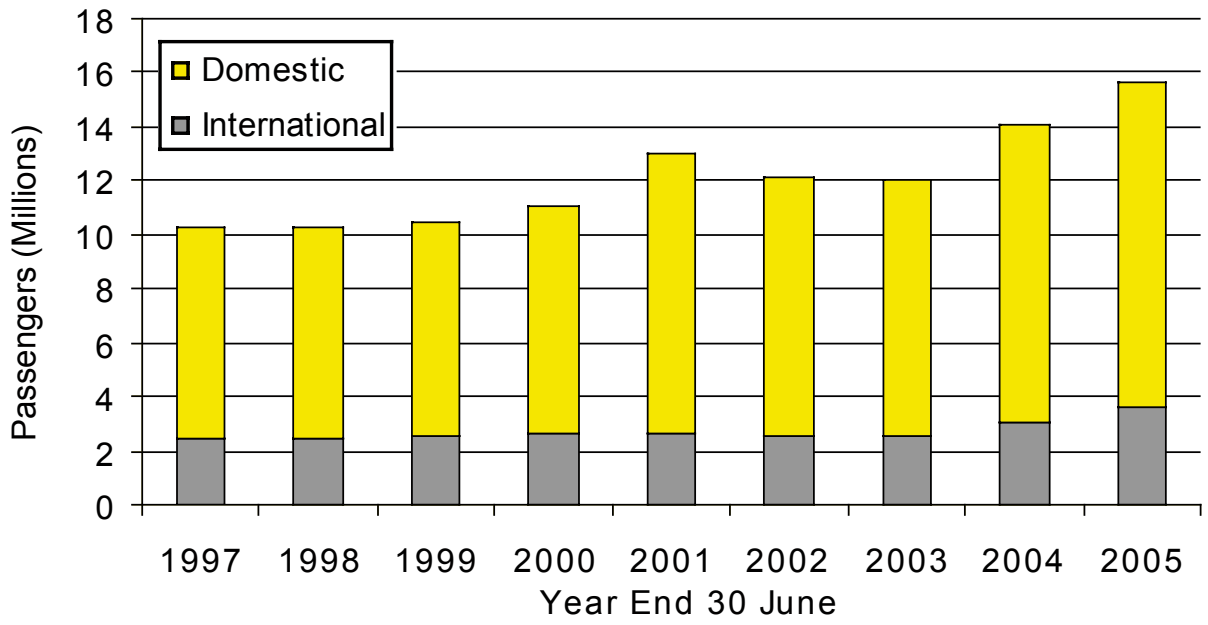
Historical annual passenger growth rates at Brisbane Airport over the past 15 years have been (all Trend CAGRs):

- 7 percent international and 6.5 percent domestic over the five years between 1999/2000 and 2004/05;
- 5 percent international and 5.8 percent domestic over the 10 years between 1994/95 and 2004/05; and
- 7.4 percent international and 7.6 percent domestic over the 15 years between 1989/90 and 2004/05.

Figure 2.3a shows the international and domestic passenger movements through Brisbane Airport since 1996/97.

In the 2003/04 and 2004/05 years, growth in air travel through Brisbane recorded double digit percentage growth in international traffic of 19 percent for both years, while domestic growth was 16 percent in 2003/04 and 9 percent in 2004/05. This followed decreases in air traffic after the September 2001 terrorist attacks in the USA, the Bali bombing in October 2002 and the Iraq war and SARS in 2003.

Figure 2.3a: *Passenger Movements through Brisbane Airport from 1996/97 to 2004/05.*



These growth rates are unlikely to be maintained over a long period of time, but do demonstrate the resilience of air travel demand to rebound after abnormal events. In terms of domestic travel, the continued growth of all three domestic airlines, Qantas, Jetstar and Virgin Blue, has resulted in air travel being increasingly used as a convenient and low cost form of travel.

2.3.2 Annual Passenger Forecasting Methodology

A large number of factors influence the growth of passenger movements at an airport. These include:

- The incomes of travellers or potential travellers. Both the level of income and confidence that these levels will be maintained and grow are important;
- The prices of air transport and the ground component of travel;
- The competitiveness (quality, product attributes and prices) of a destination compared to alternative destinations;
- The supply of airline services – frequency, reliability, quality of service;
- Tourism promotion by governments, airlines and industry bodies;
- Consumer tastes and available time for travel; and
- One-off factors such as wars, SARS, terrorism.

Whilst all of these types of factors have an influence on demand only some can be measured and factored into the type of modelling generally undertaken in forecasting.

Of the factors listed above, income (generally measured through an aggregate variable such as Gross Domestic Product (GDP)) has the largest influence on growth rates for international travel. However, forecasts of movements in the Australian and overseas economies are highly uncertain. So too are developments in domestic and international aviation. Airline alliances, code sharing, privatisation and the advent of new aircraft types can have a material impact on market outcomes. For these reasons a number of approaches have been used in constructing the forecasts, lower and higher growth cases have also been developed as sensitivity tests.

The forecasting approach is to:

- Review markets and establish trend growth rates for Brisbane Airport traffic;
- Use quantitative analysis and review other studies to establish relationships between traffic drivers, such as GDP, and traffic demand. These are undertaken at a high 'macro' level and compared with market based, or 'micro' reviews; and
- Establish the 'reasonableness' of the forecasts by reviewing other long term forecasts (economic, population and traffic), and by comparing Brisbane with other airports.

A macro approach establishes relationships between aggregate passenger numbers for Brisbane Airport and economic factors such as Australian and/or Organisation for Economic Co-operation and Development (OECD) GDP.

The approach identifies specific markets for major tourism generating countries and/or regions. The 'micro' approach provides an additional perspective on growth and is more responsive to developments in specific regions (e.g. the Asian economic crisis).

From previous research and comparable studies within Australia and overseas, estimates of various elasticities have been established, mainly for income and fares. This is used in forecasting passenger traffic by travel type and route. While these elasticity estimates are not derived from Brisbane Airport data, experience indicates that they can be valuable in preparing medium to longer term forecasts of air traffic markets, particularly when used in conjunction with trend analysis for the specific market.

The results from the micro level models are compared with macro analyses of the responsiveness of Brisbane Airport to movements in OECD and world GDP levels.

For domestic passenger forecasts a similar approach was adopted to that described above. Macro (aggregate) passenger models are developed to assess passenger responsiveness to movements in economic variables.

Available data does not allow the development of detailed models for domestic routes. Route level data by travel purpose is not available for the domestic sector. The Bureau of Transport and Regional Economics (BTRE) publishes route level data monthly for top Australian domestic routes only. This route level data was used to establish trends.

The macro and route level trend outputs provide input to the domestic passenger forecasts. In the shorter term time series analyses, airline views and schedule reviews were used to modify the forecasts. The anticipated capacity expansion by the airlines has an important influence on growth forecasts in the short to medium term.

2.3.3 Forecast Passenger Demand

Table 2.3b shows the forecast passenger demand at Brisbane Airport.

This demand assumes that growth is not constrained by the lack of available runway capacity through the provision of the NPR.

2.4 Aircraft Movements

2.4.1 Historical Trends in Aircraft Movements

For the purpose of determining when additional airfield infrastructure such as a new runway, additional taxiways and apron stands for aircraft are needed, the growth in aircraft movements through an airport is a more relevant planning parameter than passenger movements.

Aircraft movement growth is normally lower than passenger growth due to airlines upgrading their aircraft fleets to larger capacity aircraft. Air travel is not uniform over a year and the number of daily flights will fluctuate on a monthly basis to account for when passengers have a strong propensity to travel such as school holidays, Easter and Christmas periods.

Figure 2.4a shows the growth in aircraft movements through Brisbane Airport since 1998/99 and the monthly variation that occurs during the year.

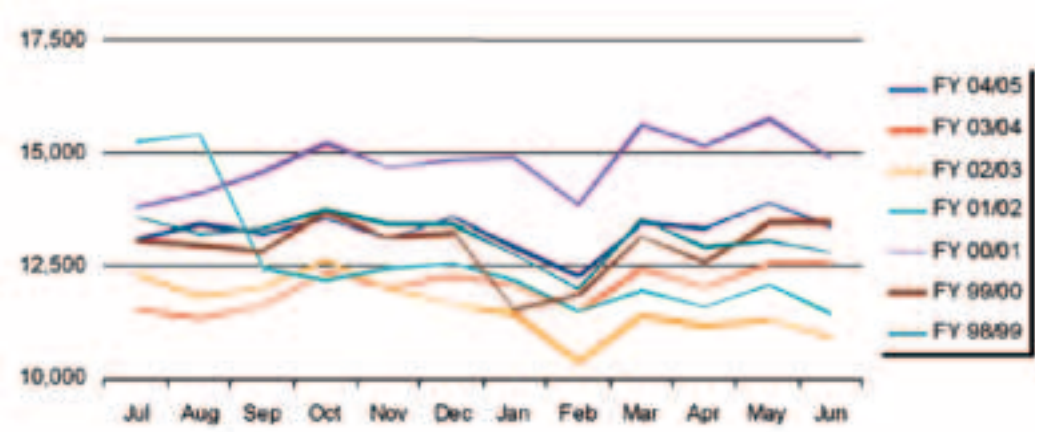
Table 2.3b: Brisbane Airport Passenger Forecasts ('000s Passengers) with New Parallel Runway.

Years ended 30 June	International				Domestic	All Passengers
	Arriving & Departing Pax	DOC[1]	Transit[2]	Total Int. (Excluding Transits)		
2005	3,601	187	250	3,788	11,846	15,635
2010	4,721	138	237	4,859	15,470	20,330
2015	6,162	138	311	6,300	18,970	25,270
2020	7,899	138	400	8,037	23,144	31,182
2025	9,946	138	400	10,084	28,151	38,235
2030	12,442	138	400	12,580	33,086	45,667
2035	14,210	138	400	14,348	35,695	50,043
Compound Annual Growth Rate (CAGR)						
2005 to 2015	5.5%	-3.0%	2.2%	5.2%	4.8%	4.9%
2015 to 2035	4.3%	0.0%	1.3%	4.2%	3.2%	3.5%

[1] DOC is Domestic On Carriage and represents domestic passengers travelling within Australia on an International Flight.

[2] Transit are international passengers who are transferring from an arriving international flight and departing on another international flight i.e. they are using Brisbane Airport as a hub.

Figure 2.4a: *Monthly Aircraft Movements at Brisbane Airport.*



International travel also varies throughout the year and is also influenced by seasonal weather at overseas destinations e.g. strong travel to and from New Zealand occurs during the winter months due to Australian tourists visiting the NZ ski fields and New Zealanders visiting Australia for warmer weather. Travel is normally higher to Europe during its summer months than winter.

Table 2.4a shows the growth trends between domestic, international and general aviation movements at Brisbane Airport.

It should also be noted that Brisbane Airport is predominantly a domestic based airport i.e. some 86 percent of movements in 2004/05 were by domestic and general aviation aircraft.

In planning for additional airfield infrastructure, an airport operator has to take into account all these variables.

2.4.2 Freight and General Aviation

The majority of freight that travels into and out of Brisbane Airport currently is carried on passenger aircraft rather than dedicated freight aircraft. Australian Air Express (AAE) and Heavy Lift are two companies that have regular dedicated freight flights into and out of Brisbane Airport. AAE and Heavy Lift have only a few jet freighter movements per day.

While BAC expects that dedicated freighter aircraft flights will increase, their percentage of total aircraft movements will remain very small.

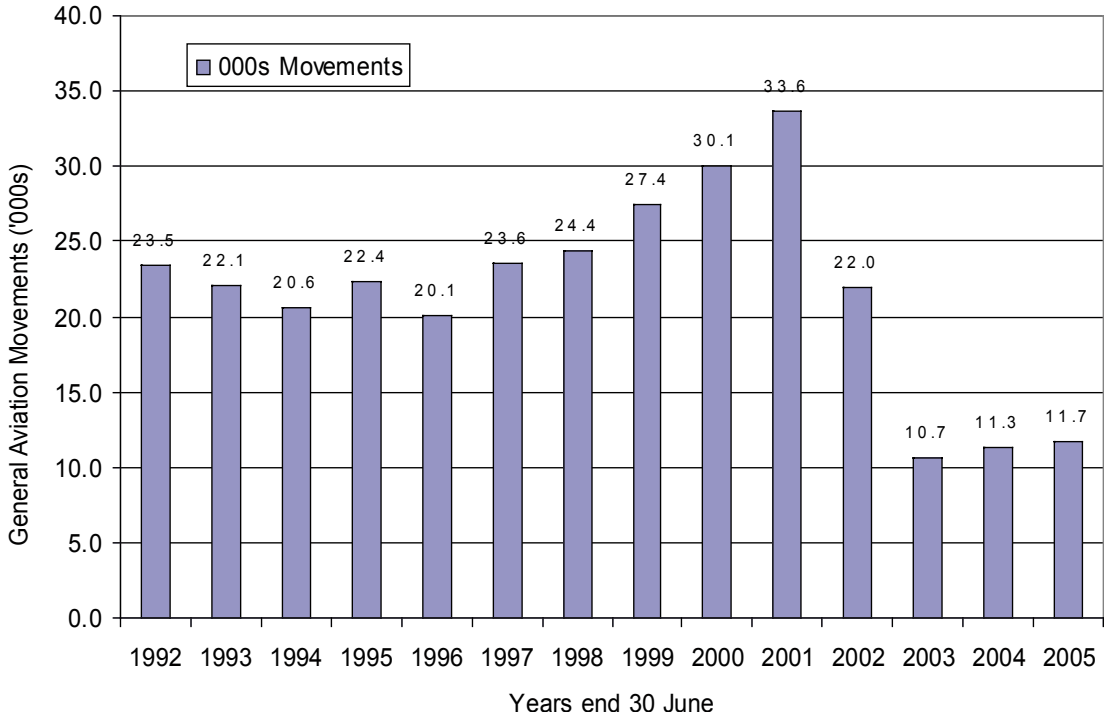
General Aviation (GA) traffic has been declining at Brisbane Airport over recent years and now represents less than 10 percent of the aircraft movements. It is envisaged that general aviation movements at Brisbane Airport will not appreciably grow over the next 20 – 30 years and its percentage share of total aircraft movements will decline even further. **Figure 2.4b** shows this decline in general aviation movements at Brisbane Airport.

Table 2.4a: Aircraft Movements Brisbane Airport 1997 to 2005 (Years end 30 June).

Years end 30 June	1997	1998	1999	2000	2001	2002	2003	2004	2005	'97 to '05 CAGR*
Aircraft Movements ('000s)										
International	19.9	19.9	19.3	19.1	18.7	18.2	17.5	19.3	23.1	1.9%
Domestic	111.7	109.8	112.0	111.6	123.5	110.5	109.6	114.1	125.1	1.4%
Other (GA)	23.6	24.4	27.4	30.1	33.6	22.0	10.7	11.3	11.7	-8.4%
TOTAL	**155.2**	**154.1**	**158.8**	**160.8**	**175.8**	**150.8**	**137.7**	**144.7**	**159.9**	**0.4%**

** Compound Annual Growth Rate (CAGR)*

Figure 2.4b: *General Aviation (GA) Movements at Brisbane Airport 1991/92 to 2004/05.*



2.4.3 Annual Aircraft Movement Forecasting Methodology

Once forecasts of passengers have been developed they become inputs to the forecasting of aircraft movements. Assumptions are developed for airline passenger load factors and forecasts of airline seats are prepared.

Assumptions as to the aircraft mix are based on discussions with airlines, reviews of the Airbus Industrie and Boeing forecasts and orders as well as detailed analyses of airline schedules for Brisbane and other Australian airports. Aircraft mix is used to determine the average number of seats per aircraft movement and landed tonnes per movement.

2.4.3.1 International Aircraft Movement Assumptions

Table 2.4b shows the key assumptions for international aircraft movements for financial years 2006, 2015 and 2035.

The aircraft mix is influenced by an analysis of airline routes and passenger growth. The main influence remains passenger growth although changes in aircraft mix can have major implications for the number of aircraft movements and landed tonnes.

The following approach was adopted for changes in aircraft mix:

- For the international market the B767 size aircraft is expected be replaced by B787 or A350 aircraft; and
- The A380 aircraft is expected to operate in the international sector from 2007/08 and is likely to operate on a regular basis to Brisbane in the period from 2009/10.

2.4.3.2 *Domestic Aircraft Movement Assumptions*

Table 2.4c shows the key assumptions for domestic aircraft movements for financial years 2006, 2015 and 2035.

As with the international sector, the domestic aircraft mix is influenced by an analysis of airline routes and passenger growth.

A conservative stance was adopted with the aircraft size for domestic mix. This results from the collapse of Ansett and the emergence of three domestic airlines and the focus on narrow body aircraft.

The growth in larger B737 aircraft and Jetstar's move from B717s (approx. 110 seat capacity) to A320s (approx. 180 seat capacity) is a significant development. Wide body movements are forecast to increase their share by 2014/15. However strong growth is expected in the larger turboprop/smaller jet aircraft over the period from 2014/15.

2.4.4 Forecast Aircraft Movements

Table 2.4d shows the international, domestic and general aviation annual aircraft movement forecasts for 2004/05 to 2034/35 at five yearly intervals.

By 2014/15 the air traffic is expected to grow to 227,000 movements at a rate of 3.5 percent per annum based on the 160,000 movements achieved in 2004/05. From 2014/15 to 2034/35 the number of aircraft movements is forecast to grow by an average 2.8 percent per annum to 393,000 movements.

Table 2.4b: Key Assumptions for International Aircraft Movements.

Years ended 30 June	2005	2015	2035
Aircraft Mix (Share of Movements)			
Large and Medium Wide Body (B777, A330, B747, A380)	51%	52%	56%
Smaller Wide Body (B767, B787, A350)	8%	16%	19%
Narrow Body (B737, A320)	41%	32%	25%
TOTAL	100%	100%	100%
Average Pax per Movement	190	195	246

Table 2.4c: Key Assumptions for Domestic Aircraft Movements.

Years ended 30 June	2005	2015	2035
Aircraft Mix (Share of Movements)			
Wide Body (B747, B767, A330, B787, A350)	6%	9%	14%
Narrow Body Jets (B737, A320, B717)	68%	64%	56%
Turboprop and Smaller Aircraft	26%	27%	30%
TOTAL	100%	100%	100%
Average Pax per Movement	95	106	112

Table 2.4d: Brisbane Airport Aircraft Movement Forecasts ('000s) with New Parallel Runway.

Years ended 30 June	Movements			Total
	International	Domestic	GA	
2005	23	125	12	160
2010	28	150	12	190
2015	35	179	12	227
2020	43	216	13	272
2025	50	261	13	324
2030	58	302	13	373
2035	62	318	14	393
Compound Annual Growth Rate				
2005 to 2015	4.4%	3.6%	0.6%	3.5%
2015 to 2035	2.8%	2.9%	0.5%	2.8%

2.5 Daily Profile

As stated previously, aircraft movements through Brisbane Airport vary on an hourly, daily and monthly basis. In terms of planning for the new parallel runway, Brisbane Airport has a particular daily profile which shows two peak periods during the day, namely a morning peak between 0700 and 1000 hours and an evening peak between 1700 and 2000 hours. It is management of the growth of these peaks that is necessitating the need for the NPR.

Brisbane Airport has a peak operating period profile that is largely controlled by the requirement of business travellers on domestic routes and by the availability of overseas airport arrival and departure slots (slots at the busy Asian hub airports at Singapore, Bangkok and Hong Kong are limited and in high demand) for international routes. Brisbane Airport's peak hourly periods in the morning and evening are reasonably balanced in proportion of arrival and departure movements allowing for a high level of system utilisation.

In terms of international travel, the morning peak does have a higher percentage of international arrivals than the evening peak. It is critical for the continued growth of Queensland's and Brisbane's tourism and commercial development that Brisbane Airport provides sufficient runway capacity to enable continued growth in this international traffic.

In considering airport (runway) capacity issues it is normal industry practice to reject those days that have the maximum number of movements and to plan around a typical or representative busy day. As stated in BAC's 2003 Master Plan, BAC adopts the 95 percentile as being relevant to aviation infrastructure capacity assessment.

Figure 2.5a shows a typical busy weekday profile at Brisbane Airport.

Figure 2.5b shows the domestic and international profile for this same busy day.

Figure 2.5a: *Typical Busy Weekday Profile Brisbane Airport.*

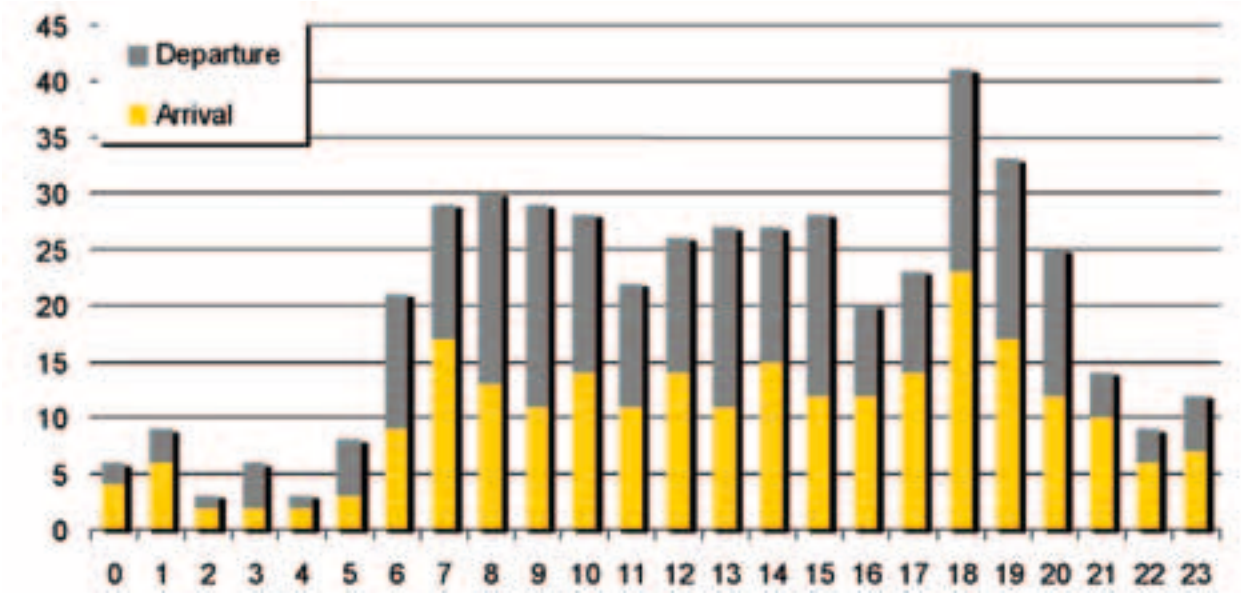
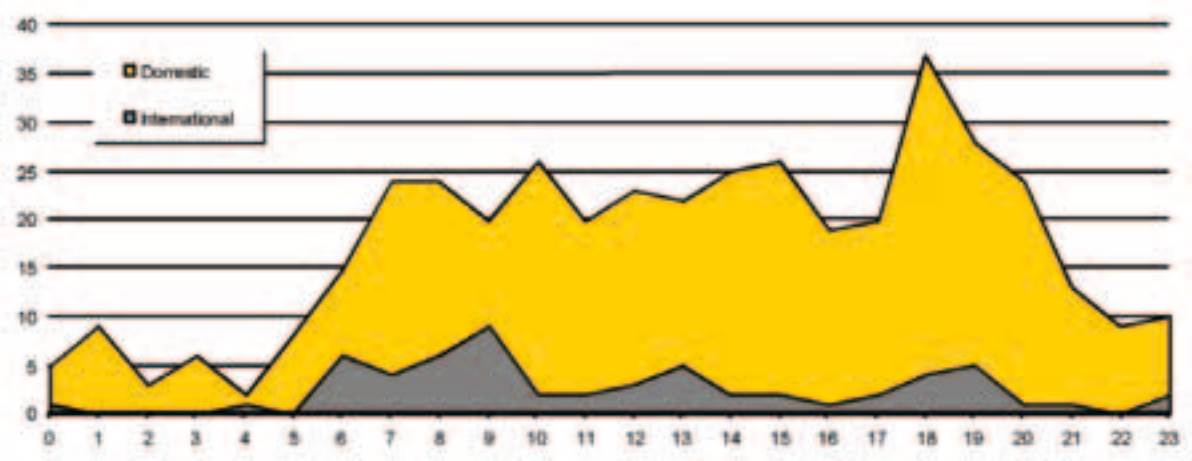


Figure 2.5b: *Typical Busy Weekday Profile for International & Domestic.*



It is evident that many airports including Brisbane have daily peaks. If the demand within these peaks could be spread across other hours of the day, the need for additional runway capacity and associated capital expenditure could be reduced. This would be ideal for airlines (as they could improve the utilisation of their aircraft and airport operators as they could increase the revenue achieved for their aeronautical infrastructure investment). However underestimating the peak can lead to congestion, delays and ultimately to capacity constraints that restrict growth and development.

The peaks arise due to passenger preferences and a number of airline operating constraints.

Domestic airline peaks arise around 7am to 9am each weekday morning and around 6pm to 8pm each evening. For airports such as Sydney, Melbourne and Brisbane these runway peaks are driven largely by domestic business traffic. It is estimated that business accounts for between 60 percent and 65 percent of the domestic traffic and that between one-third and 40 percent of domestic passengers travel from or to Brisbane and return in the same day. As Brisbane's population grows so too will its business traffic. For this reason it is reasonable to expect that the airlines will continue to serve the needs of the higher yielding business passengers with services operating at current peak times.

Further, in the case of Brisbane, a large number of regional flights from elsewhere in Queensland operate to Brisbane carrying business passengers wishing to connect to interstate flights. For this reason the regional airlines service also contribute to morning and afternoon peaks at Brisbane Airport.

International peaks result from a complex array of issues. There are a number of significant influences and constraints affecting airline schedules. These include:

- Passenger preferences to commence or complete their journey at 'friendly' times – not too early in the morning and not too late in the evening;
- Slot limitations at airports in Asia and Europe which will limit when aircraft can arrive at or depart from Brisbane; and
- The hubbing role played by some airports. This means that longer haul flights operating via Asia need to connect with flights in the hub port to carry passengers from an incoming port to their different ultimate destinations. Thus the incoming flight needs to arrive in time to catch a 'bank' of outgoing flights.

As a result of these factors, airlines cannot schedule arrivals and departures on an unconstrained 24 hour basis. Rather they are confronted with limited scheduling opportunities or 'windows'.

This is why many Asian flights arrive at Brisbane in the early morning adding to the domestic peak described earlier.

Thus whilst there are some opportunities for airlines and airports to spread their peaks there is a limit and little scope to spread traffic evenly across the operating day.

When demand starts to exceed capacity during peak periods, airlines either have to move flights into the shoulder period, change aircraft to a larger seating capacity aircraft, or simply allow passengers to alter their travel patterns (e.g. travel earlier or later, use alternative airports, or not travel by air). This is not an ideal situation as for many reasons, passengers particularly the business traveller, have a particular time when they must travel. This is discussed further in section 2.6.

2.5.1 Busy Day Profiles

Busy day air traffic movement profiles were developed from an analysis of busy days through the year. The review was completed for weekdays and weekends, and was based on a very comprehensive dataset of aircraft movements from 1998 to 2005. Profiles assessed from this comprehensive dataset included:

- Daily movements over a whole year;
- Monthly (seasonal) variations in demand;
- Hourly variation in demand across the day;
- The occurrence of busy periods – day of the week, time of the day;
- Split of hourly demand between arrival and departures;
- Split of hourly demand between international and domestic movements; and
- Split of hourly demand between aircraft types.

For airline forecasting at a major airport such as Brisbane which has a predominance of business traffic particularly during the busy periods, it is normal to analyse both week days and weekends. Additionally, for international traffic, airline schedules are set worldwide around the Northern Hemisphere winter (November – March) and the Northern Hemisphere summer (April – October).

Accordingly, four representative days were determined for Brisbane Airport representing the following:

1) Weekday summer (corresponding to northern hemisphere winter);
2) Weekend summer (corresponding to northern hemisphere winter);
3) Weekday winter (corresponding to northern hemisphere summer); and
4) Weekend winter (corresponding to northern hemisphere summer).

The following steps were followed to derive typical busy weekdays. The busy day was identified as this was then used as the representative day on which forecast airline traffic growth would be based.

1) The 30th Busy Hour (the hourly rate surpassed only by the rate of 29 other hours through the year) and the 95th Percentile Hour (the hourly rate above which 5 percent of the airports traffic is handled) were identified as they are important indicators of the busier periods at the airport.
2) Analyse the busiest 300 weekdays from this dataset. Days were chosen for further analysis if the:
    - Busy hour for the day closely matched the 30th Busy Hour, and to a lesser extent the 95th percentile hour, in size and time of day;
    - Total movements for that day were equal to or above the median of the busiest 300 week days; and
    - Aviation activity followed a ‘typical’ profile for the day. i.e. morning and afternoon peaks.

Days were omitted if they did not conform with a typical daily profile (i.e. if they had excessive peaks/troughs outside typical peak hours).

A similar analysis was used to derive the typical busy weekends.

1) Analysing all Saturdays and Sundays for the year. Days were chosen for further analysis if the:
   - Busy hour for the day was above the median and amongst the busiest 'weekend' hours of the year;
   - Total movements for that day were equal to or above the median for all weekends for the year; and
   - Aviation activity followed a 'typical' profile for the day.
2) The days chosen for further analysis were then further analysed. Days were omitted if they did not conform to a typical daily profile (i.e. if they had excessive peaks/troughs outside typical peak hours).

Table 2.5a shows the top 100, 200 and 300 hours in terms of movements for each day of the week. Monday has 23 percent of the top 100 hours. However when the top 200 and 300 hours are considered Friday becomes the busiest day.

Table 2.5b compares the top 100, 200 and 300 hours across hours of the day. The significance of the hours 0800 and 1800 is evident from this table. Some 70 percent of the top 100 hours over a year occur in the 1800 to 1900 hour time period.

The outcome of this busy day analysis is the following representative busy days on which forecasting were based:

- Weekday Brisbane summer – Friday 3 December 2004;
- Weekend Brisbane summer – Sunday 5 December 2004;
- Weekday Brisbane winter – Friday 8 April 2005; and
- Weekend Brisbane winter – Sunday 5 June 2005.

Table 2.5a: Busiest Hours by Day.

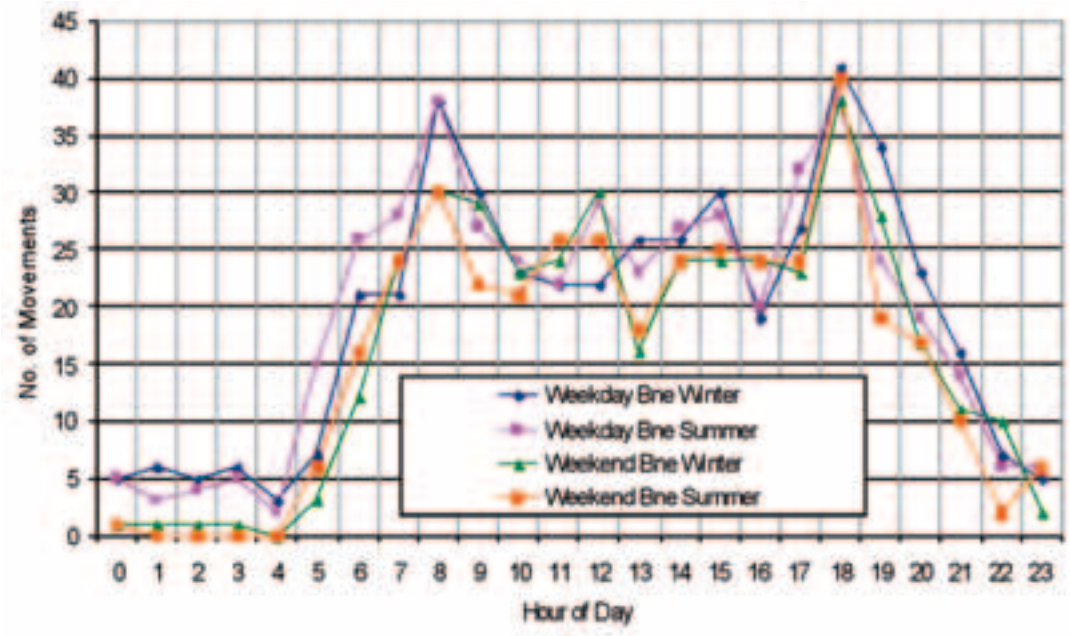
Day	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	Sun.
Top 100	**23.0%**	19.0%	15.0%	18.0%	20.0%	0.0%	5.0%
Top 200	20.0%	17.0%	13.5%	18.5%	**23.0%**	2.0%	6.0%
Top 300	19.3%	16.7%	13.7%	19.7%	**20.0%**	4.3%	6.3%

Table 2.5b: Busiest Hours by Hour.

Hour	6	7	8	9	10	11	12	17	18	19	20
Top 100			**29.0%**						**70.0%**	1.0%	
Top 200	0.5%	0.5%	**34.0%**	1.5%	0.5%	0.5%	2.0%	1.0%	**57.5%**	2.0%	
Top 300	0.3%	0.3%	**35.3%**	1.7%	0.7%	0.3%	1.3%	1.7%	**53.3%**	4.7%	0.3%

Figure 2.5c shows the hourly movement profile for these identified representative days.

Figure 2.5c: *Movement Profile by Hour, Selected Typical Days.*



2.5.2 Busy Day Profile Forecasting Methodology

The busy day profile forecasts take into account:

- The annual movement forecasts;
- The market growth for domestic and international aircraft; and
- The mix of aircraft types.

The busy day projections reflect a growing volume of movements, a representative mix of movements and a distribution across the day consistent with market and domestic business demands.

Movements are added to the base 'representative days' where the type of traffic did not exist on that day. For example, there are few freight movements that take place on Fridays with most domestic freight carried Tuesday, Wednesday and Thursday. Freighter movements were therefore added to the projected days. For the same reason General Aviation movements were also added to the daily profile.

The existing runway system has a defined peak hour capacity of up to 59 aircraft movements. This comprises 27 jet arrivals and 27 jet departures on the main runway with an additional five turbo prop arrivals on the cross runway. If no further capacity was provided (e.g. the new runway was not constructed), the number of flights able to arrive and depart would be constrained during certain times of the day. This is discussed in further detail in section 2.6.

The capacity limitations would be most reflected in later years. Therefore, two daily profiles were developed for 2034/35. The first is unconstrained and assumes that the additional runway is constructed. The second profile, constrained, is built on the assumption that no additional capacity is constructed.

2.5.3 Forecast Busy Day Profiles

Profiles for 2004/05, 2014/15 and 2034/35 (unconstrained and constrained) are provided in the figures that follow.

The constrained profile has taken the 2014/15 profile and allowed growth until capacity limits were reached.

Figure 2.5d shows the arrivals by hour for 2004/05, 2014/15 and 2034/35. **Figure 2.5e** shows the departures by hour and **Figure 2.5f** shows the aggregated arrivals and departures across hours. These figures show the base and projections for the Brisbane winter weekday.

Figure 2.5d: *Brisbane Movements – Arrivals by Hour – Forecasts.*

Figure 2.5e: *Brisbane Movements – Departures by Hour – Forecasts.*

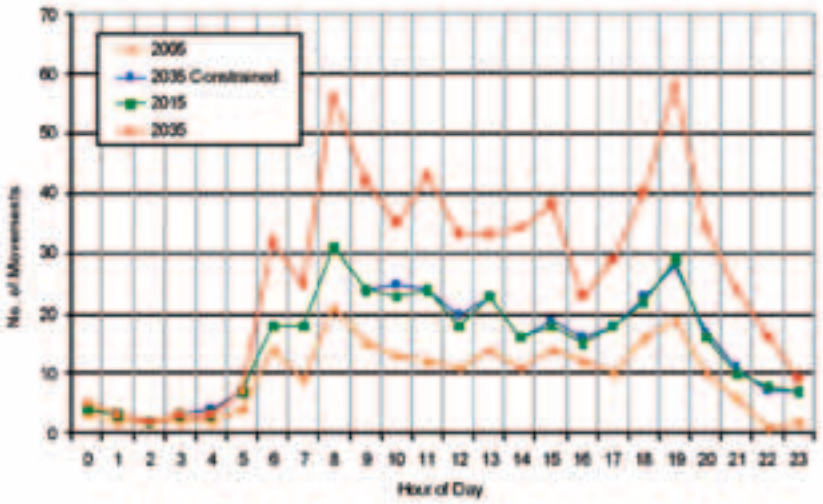
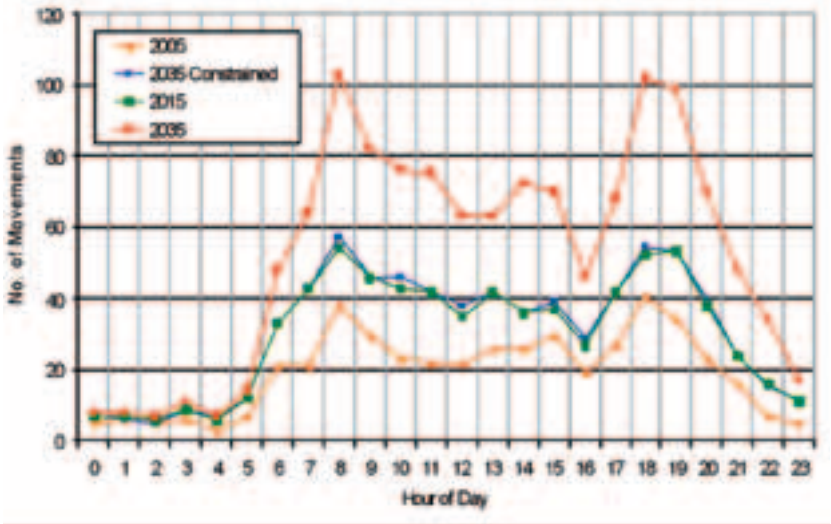


Figure 2.5f: *Brisbane Movements – Arrivals Plus Departures by Hour – Forecasts.*



2.6 Capacity at Brisbane Airport

2.6.1 Existing Capacity

Brisbane Airport currently has a single main runway of 3,600 m length that is suitable for all size of aircraft to take-off and land, including the new Airbus A380. There is a shorter (1,760 m in length) cross runway which is used predominately by smaller aircraft (typically turbo prop aircraft) operated by General Aviation and regional airlines such as Qantas Link, Sunshine Express and Macair. This cross runway also can be used under limited circumstances by B737 aircraft operating under weight restrictions. The majority of international and domestic aircraft currently operating at Brisbane Airport cannot use this smaller cross runway.

The capacity of the existing runway system at Brisbane Airport is dependent on:

- Aircraft demand and mix during the peak operating periods;
- The proportion of arrival and departure movements;
- The operating mode during the peak operating periods (meteorologically dependent) and the capacity of that mode; and
- The duration of the peak operating periods.

As previously stated, it is necessary for an airport operator and the airlines to closely monitor growth during the busy periods to determine when demand is likely to reach capacity. Once demand exceeds capacity, delays will occur.

Departures and arrivals at Brisbane Airport are handled by Air Traffic Controllers employed by Airservices Australia (AsA).

AsA has established agreed arrival rates for the Australia's three major east coast Airports (Brisbane, Sydney and Melbourne) to ensure that aircraft can be safely controlled and which enables airlines to understand potential constraints when considering scheduling additional flights.

AsA has established a Capacity and Service Improvement Forum (CASIF) with airlines and Brisbane, Sydney and Melbourne airports to set and review arrival capacity. This capacity takes into account operational limitations in terms of runways (length and layout configuration) as well as meteorological conditions. Arrival capacity is greater under visual conditions than under instrument conditions (low visibility due to rain, fog or low level cloud). Departures are usually scheduled in between arrivals.

For Brisbane Airport, the existing agreed CASIF arrival capacities are shown in **Table 2.6a.**

Under these agreed arrival rates and allowing for a departure between each arrival on the main runway, the existing capacity rates for Brisbane Airport are:

- For main runway only, 50 total movements under visual conditions;
- For main and cross-runway, 55–60 total movements under visual conditions.

In the case of when both the main and cross runways are being used, capacity varies due to the cross runway being limited to usually turbo prop aircraft only. Often these are directed to land on the cross runway but are slotted in for a departure off the main runway.

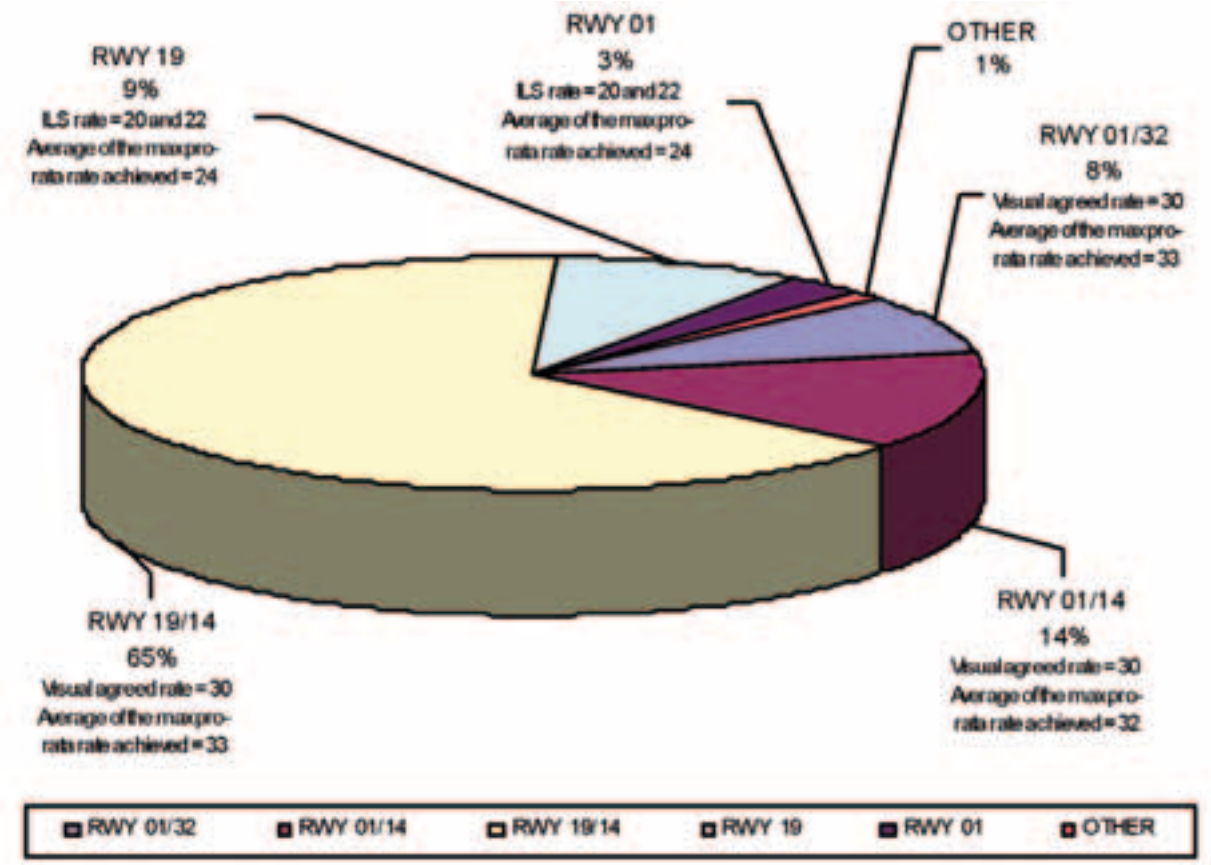
Meteorological conditions will determine when the different runway operating modes can be used. **Figure 2.6a** shows the percentage use of the various modes over recent years.

Table 2.6a: Existing Agreed Arrival Rates for Brisbane Airport.

Runway Used	Visual Conditions (movements per hour)	Instrument Conditions (movements per hour)
01 only	25	22
01A & 14A; 01D	30	Not applicable *
01A & 32A; 01D	30	Not applicable *
19 only	25	22
19A & 14A; 19D	30	Not applicable *

** 'A' denotes arrival runway;' D' denotes departure runway; * instrument landing system is available only for arrivals on main runway (01/19).*

Figure 2.6a: *Morning Peak Hour Arrivals: Runway Usage (%) at Brisbane Airport June 2002 to November 2005 (Source: Airservices Australia).*



Computer simulation modelling was also completed to assess the capacity of the existing runway and taxiway layout. This simulation uses a workstation computer software system, the Total Airspace and Airport Modeller (TAAM) which is used widely both within Australia (by Airservices Australia) as well as at overseas airports. This computer modelling by TAAM provides what can be described as the theoretical maximum capacity of the airfield system as it assumes constant flow of presenting aircraft and provides for minimum separation clearances between aircraft to be maintained at all times.

In reality, actual capacity achieved at an airport would normally be less than that predicted by TAAM as aircraft don't present in a uniform manner, pilots will be flying slightly different speeds to that assumed in the model, and air traffic controllers may provide a larger separation distance between certain types of aircraft to always ensure optimal safety. Nevertheless, TAAM has been used to assist in determining the appropriate timing for the new parallel runway. TAAM modelling was undertaken for visual conditions only as these occur for the majority of the time at Brisbane Airport and used the traffic mix for a typical busy day at Brisbane Airport.

TAAM capacity determination for the existing system is shown in **Table 2.6b**. Only the 19/14 runway combination was used (and not also 01/14) as this is the dominant mode used (see **Figure 2.6a**).

Table 2.6b: TAAM Capacity for Existing Runway System at Brisbane Airport.

Runway Used	Capacity
01 only	54 (27 arrivals and 27 departures)
19 only	54 (27 arrivals and 27 departures)
19A and 14A; 19D	63 (27 arrivals and 31 departures on runway 19, 5 arrivals of turbo props on runway 14)

As can be seen from TAAM, the modelling confirms that the agreed CASIF rates for Brisbane Airport are reasonable.

Table 2.6c shows existing movements during the morning and evening peaks at Brisbane for a typical busy day in 2005. This shows the available spare movement capacity before the existing system would reach capacity. This is indicative only as it assumes that aircraft will present uniformly across the hour. The reality is that there are often noticeable peaks within the busy hour where demand is close to existing capacity at Brisbane Airport and aircraft are already starting to incur some delays.

Based on the forecasts of air travel growth at Brisbane Airport (see section 2.5), demand will exceed existing runway capacity around 2014.

2.6.2 Impacts on Travel Without New Parallel Runway

2.6.2.1 Delays

As stated above, demand is anticipated to exceed the existing runway capacity by 2014 for the busy periods of the day. After this, delays can be expected to increase which causes disruption to the travelling public, extra costs to airlines, and ultimately a reduction in the number of people that would otherwise have travelled to and from Brisbane by air with consequent economic losses to commerce, industry and tourism of the region and State.

Delay is defined as the difference between the time taken for an aircraft to pass through the system in the unconstrained and the constrained situations.

The US Federal Aviation Administration (FAA) has shown that at jet airline dominant airports, delay increases rapidly once demand exceeds the level corresponding to an average delay of four minutes. The expected number of movements that can be performed in one hour with an average delay per movement of four minutes has therefore been defined as the practical hourly capacity. The four-minute average delay criterion is typically adopted when calculating both airport and airspace capacity within Australia.

The TAAM modelling referred to earlier was used to ascertain what happens to delay if the NPR doesn't proceed or is delayed.

Tables 2.6d to **2.6f** show the delays during the morning and evening busy periods for 2005 (current), in 2015 without the new runway and in 2035 without the new runway.

Table 2.6c: Current Movements at Brisbane Airport and Available Capacity.

Busy Hours	Current Movements				
	Aircraft Arrivals & Departures	Existing Runway Capacity (TAAM)	Spare Capacity (TAAM)	Existing Runway Capacity CASIF agreed rates	Spare Capacity CASIF agreed rates
Morning Hours					
0700	21	54	33	50	29
0800	38	54	16	50	12
0900	30	54	24	50	20
Evening Hours					
1700	27	54	27	50	23
1800	41	54	13	50	9
1900	34	54	20	50	16

Table 2.6d: Delay Results for 2005 Traffic.

2005	0700 – 1200 hours		1700 – 2200 hours	
Operating Mode	Average Delay (mins)	Maximum Observed Delay (mins)	Average Delay (mins)	Maximum Modelled Delay (mins)
RWY 01/14	1.67	7.08	1.68	10.45
RWY 19	1.62	7.19	2.98	15.15
RWY 19/14	1.44	7.73	1.38	9.29

Table 2.6e: Delay Results for 2015 Traffic (No New Parallel Runway).

2015	0700 – 1000 hours		1700 – 2000 hours	
Operating Mode	Average Delay (mins)	Maximum Observed Delay (mins)	Average Delay (mins)	Maximum Modelled Delay (mins)
RWY 01/14	4.20	18.49	2.82	18.00
RWY 19	6.16	31.56	5.18	38.06
RWY 19/14	2.92	17.54	2.50	16.18

Table 2.6f: Delay Results for 2035 Traffic (No New Parallel Runway).

2035	0700 – 1000 hours		1700 – 2000 hours	
Operating Mode	Average Delay (mins)	Maximum Observed Delay (mins)	Average Delay (mins)	Maximum Modelled Delay (mins)
RWY 01/14	22.84	149.91	63.97	248.79

For the 2035 delay scenario (**Table 2.6f**), only one model run was undertaken as it became obvious that delays of between 2.5 to 4 hours were starting to occur. No airline would tolerate such delays and would alter their schedule accordingly by either changing flight times (where possible) or by not scheduling the flights (more likely) leading to loss of airline passengers through Brisbane.

2.6.2.2 Net Passenger Loss

The hourly, daily and annual capacity constraints of traffic for 2034/35 were applied assuming no additional runway. Applying the capacity limits generates the losses in aircraft movements (compared to the unconstrained 2034/35 forecasts) shown in **Table 2.6g**.

It is estimated that 35 percent of aircraft movements would be lost in 2034/35.

Table 2.6g: Aircraft Movement Impacts of Capacity Constraints With No Additional Runway.

Year end June 30	Aircraft Movements ('000s)			
	International	Domestic	GA	Total
	Unconstrained Movements ('000s)			
2005	23	125	12	160
2015	35	179	12	227
2020	43	216	13	272
2025	50	261	13	324
2030	58	302	13	373
2035	62	318	14	393
	Constrained Movements ('000s)			
2005	23	125	12	160
2015	35	179	12	227
2020	42	208	6	256
2025	42	208	5	256
2030	42	209	5	256
2035	42	209	5	256
	Impact of Capacity Constraints on Movements			
2005	0.0%	0.0%	0.0%	0.0%
2015	0.0%	0.0%	0.0%	0.0%
2020	-1.6%	-3.7%	-55.1%	-5.8%
2025	-15.2%	-20.1%	-58.1%	-20.9%
2030	-27.7%	-30.8%	-61.0%	-31.4%
2035	-31.6%	-34.3%	-63.8%	-34.9%

Based on the loss of aircraft movements shown in **Table 2.6g**, the loss of passengers could be up to 35 percent. However in the event that an additional runway was not available the progressive tightening of runway slot capacity would lead the airlines to add larger aircraft where feasible and they would operate with higher average loads.

The required number of aircraft movements was estimated by dividing passenger numbers by an assumed average number of passengers per movement. **Table 2.6h** shows the assumed changes to passenger load factors and seats per movement in the no runway case compared to the 'unconstrained' forecasts for 2034/35. The result for 2034/35 is an:

- Increase in the average number of passengers per international movement from 246 to 279; and
- Increase in the average number of passengers per domestic movement from 112 to 129.

Table 2.6h: Passenger Movement Impacts of Capacity Constraints With No Additional Runaway.

Years end 30 June	International				Domestic			
	Change in Load Factors (percentage points)	Change in the Average No. Seats per Aircraft (%)	Average No. Passengers per Movement		Change in Load Factors (percentage points)	Change in the Average No. Seats per Aircraft (%) from	Average No. Passengers per Movement	
			from	to			from	to
2020	0.0%	0.0%	207	207	0.0%	0.0%	107	107
2025	2.5%	5.0%	220	240	2.5%	2.5%	108	114
2030	5.0%	5.0%	230	261	5.0%	5.0%	110	123
2035	5.0%	5.0%	246	279	5.0%	7.5%	112	129

Based on the changed assumptions the loss of passengers in the no runway case is reduced to the levels shown in **Table 2.6j.** The overall passenger loss is around 12 million passenger movements in 2035/35 or 24 percent of the unconstrained demand.

Table 2.6j: Passenger Movement Impacts of Capacity Constraints With No Additional Runaway.

Year end June 30	International (Excluding Transits)	Domestic	All Passengers
	Unconstrained Passenger Movements ('000s)		
2005	3,788	11,846	15,635
2015	6,300	18,970	25,270
2020	8,037	23,144	31,182
2025	10,084	28,151	38,235
2030	12,580	33,086	45,667
2035	14,348	35,695	50,043
	Constrained Passenger Movements ('000s)		
2005	3,788	11,846	15,634
2015	6,300	18,970	25,270
2020	7,940	22,283	30,223
2025	9,353	23,830	33,183
2030	10,332	25,629	35,961
2035	11,130	26,875	38,005
	Impact of Capacity Constraints on Passenger Movements		
2005	0.0%	0.0%	0.0%
2015	0.0%	0.0%	0.0%
2020	-1.1%	-3.7%	-3.1%
2025	-7.2%	-15.4%	-13.2%
2030	-18.0%	-22.5%	-21.2%
2035	-22.5%	-24.7%	-24.1%

Whilst some Brisbane residents conveniently located to the Gold Coast or Sunshine Airports and travelling for business may be prepared to use those airports they are not likely to find the same range of destinations and frequencies provided at convenient times.

In addition both the Gold Coast and Sunshine Coast airports can be expected to grow strongly due to the population growth in South East Queensland. The addition of peak hour traffic would increase substantially their own needs for capacity expansion.

2.6.3 Temporary Closure of 14/32 Runway

During construction of the new parallel runway, the cross runway (14/32) will need to be closed for an extended period to enable works to be carried out. This cross runway closure is likely to be in late 2008/ early 2009 for around two years. Refer to Chapter A5 for further details on construction staging.

During this period, capacity will be reduced to the single main runway. Capacity could be reduced even further below the TAAM upper limit of 54 depending on how many turbo prop aircraft are operating during the peak periods. Separation distances between a turbo prop and a large jet aircraft need to be at least five nautical miles due to the effects of wake turbulence.

The TAAM modelling considered what happens to delay when the cross runway is closed, and includes the typical aircraft mix (jets and turbo props) currently in the busy hour. These delay results are given in **Table 2.6k**.

2.7 Factors Affecting Forecasts

2.7.1 Sensitivity of Forecasts

It is recognised that the passenger and aircraft forecasts are the result of the estimation of a number of factors and how these factors will change in the future. The actual growth in the passenger and aircraft movements may vary from the forecasts. For this reason, lower and higher growth cases have also been developed to provide a sensitivity test on the forecasts.

However, it is not anticipated that a variation in the forecast growth rates would change the new runway layout or the need for the new runway. Rather, it would affect the time at which the new runway and taxiways would be required. If air traffic grows faster (higher case) than the forecasts, the new runway would be required earlier than identified. Conversely, if air traffic grows at a slower rate (lower case) than the forecast, the new runway would be required later than identified.

The existing runway configuration is forecast to reach capacity in the busier hours of the day around 2014, being one of the factors contributing to 2015 being identified as the opening year for the new runway. However, the higher growth case would result in a greater number of instances of demand exceeding capacity with additional delays experienced in the period after 2012/13 and prior to the new runway opening.

A number of assessments included in Volumes A, B, C and D of the Draft EIS/MDP are based on these forecasts. These include aircraft noise, aircraft emissions, road traffic, road traffic noise and emissions and economics. The air traffic forecasts are the main input in identifying the effect of the new runway in these assessments. Therefore, as with the timing of the need for the runway, variation in actual growth would also bring forward or delay the effects of the new runway in these other assessments.

Tables 2.7a and **2.7b** provide the passenger and aircraft movement forecasts for higher and lower cases. The forecasts previously discussed in this chapter are referred to as the 'central' forecast.

Table 2.6k: Delay results for 2009 traffic.

2009	0700 – 1200 hours		1700 – 2200 hours	
Operating Mode	Average Delay (mins)	Maximum Observed Delay (mins)	Average Delay (mins)	Maximum Observed Delay (mins)
RWY 01/14	3.00	15.74	2.82	18.98
RWY 19	4.86	21.09	3.81	25.67
RWY 19/14	2.91	14.80	2.16	17.26

Table 2.7a: Passenger Movement Forecasts for Higher and Lower Cases.

Years ended 30 June	International	Domestic	Total	International	Domestic	Total
	'000s Passenger Movements			% Above or below Central Forecasts		
	Higher Forecast Level					
2010	5,227	16,597	21,824	7.6%	7.3%	7.3%
2015	7,167	21,610	28,777	13.8%	13.9%	13.9%
2020	9,581	27,058	36,639	19.2%	16.9%	17.5%
2025	12,378	33,778	46,156	22.7%	20.0%	20.7%
2030	15,821	40,637	56,457	25.8%	22.8%	23.6%
2035	18,065	44,553	62,618	25.9%	24.8%	25.1%
	Lower Forecast Level					
2010	4,673	14,727	19,400	-3.8%	-4.8%	-4.6%
2015	5,921	17,602	23,523	-6.0%	-7.2%	-6.9%
2020	7,357	20,928	28,286	-8.5%	-9.6%	-9.3%
2025	8,922	24,804	33,726	-11.5%	-11.9%	-11.8%
2030	10,795	28,483	39,278	-14.2%	-13.9%	-14.0%
2035	12,267	30,238	42,505	-14.5%	-15.3%	-15.1%

Table 2.7b: Aircraft Movement Forecasts for Higher and Lower Cases.

Years ended 30 June	International		Domestic		Total	
	Higher	Lower	Higher	Lower	Higher	Lower
	'000s Aircraft Movements					
2010	30.4	27.6	159.7	143.6	202.2	183.3
2015	39.8	33.4	199.2	165.6	251.4	211.4
2020	49.5	38.9	243.2	195.2	305.5	246.9
2025	57.9	44.1	296.0	229.9	367.0	287.1
2030	69.6	50.2	347.6	260.5	430.6	324.2
2035	73.7	52.9	370.9	271.1	458.4	337.7

A variation in the forecast growth rates will not change the need for the new runway as the delays as shown in **Table 2.6e** and **Table 2.6f** show that growth through Brisbane Airport cannot be sustained within acceptable delay metrics without a new parallel runway. The variation in the percentage growth (the low and high scenarios) would merely affect the time at which the new runway would be needed – refer **Figure 2.7a**. Capacity is that for the existing runway system (main + cross runway) which is 32 arrivals (27 arrivals on the main runway and five turbo prop arrivals on the cross runway).

The annual growth rates for overall passenger movements for the lower and higher growth cases are 4.2 percent and 6.3 percent between 2004/05 and 2014/15. Therefore, the forecast 25.3 million passengers and 227,000 aircraft movements would be achieved in 2012/13 should the higher growth case eventuate and in 2016/17 should the lower growth case eventuate.

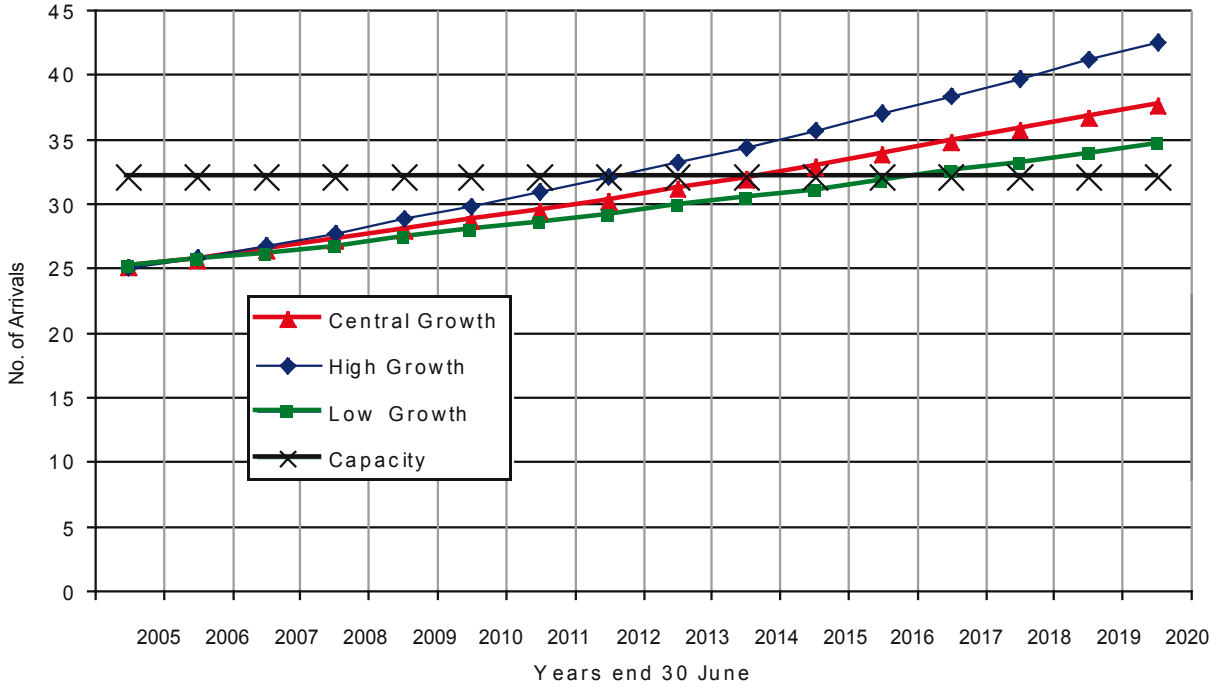
2.7.2 Population Growth

Whilst population growth is not a major short term driver of passenger demand it is an important long term influence. Population growth in Brisbane and surrounding regions will contribute to domestic and international growth (outbound travel) for Brisbane Airport. Population growth and development will also increase the infrastructure and attractions available to domestic and international tourists.

Brisbane's population is projected by the ABS to grow from around 1.9 million in 2006 to 2.9 million by 2035 (ABS range between 2.5 million and 3.3 million in 2035). This is a projected growth of around 56 percent over the period. This growth compares with 23 percent for Sydney and 28 percent for Melbourne over the same period. By 2035 Brisbane will be a city comparable to the current scale of Melbourne and Sydney.

This is an important issue for Brisbane Airport. Over the next 20 to 30 years Brisbane will evolve into a substantial international city. Brisbane currently is a major gateway to the Gold Coast and Sunshine Coast for international tourists. The addition of a range of attractions in the Greater Brisbane Region and strong population growth will add to Brisbane's medium and long term growth potential.

Figure 2.7a: *Central, High and Low Demand in Evening Peak Hour (1800 hour).*



The significance for aviation of this growth cannot be overestimated. The expected population and industry growth will drive a substantial increase in the volume of business-oriented air travel. One illustration is provided by New Zealand which is a major international market for Brisbane. Currently New Zealanders travelling to Brisbane for business comprise less than 6 percent of the total market. This share compares with the 19 percent for Sydney and Melbourne. It is reasonable to expect a growing business share for Brisbane over the next 10 to 30 years.

2.7.3 Economic Outlook

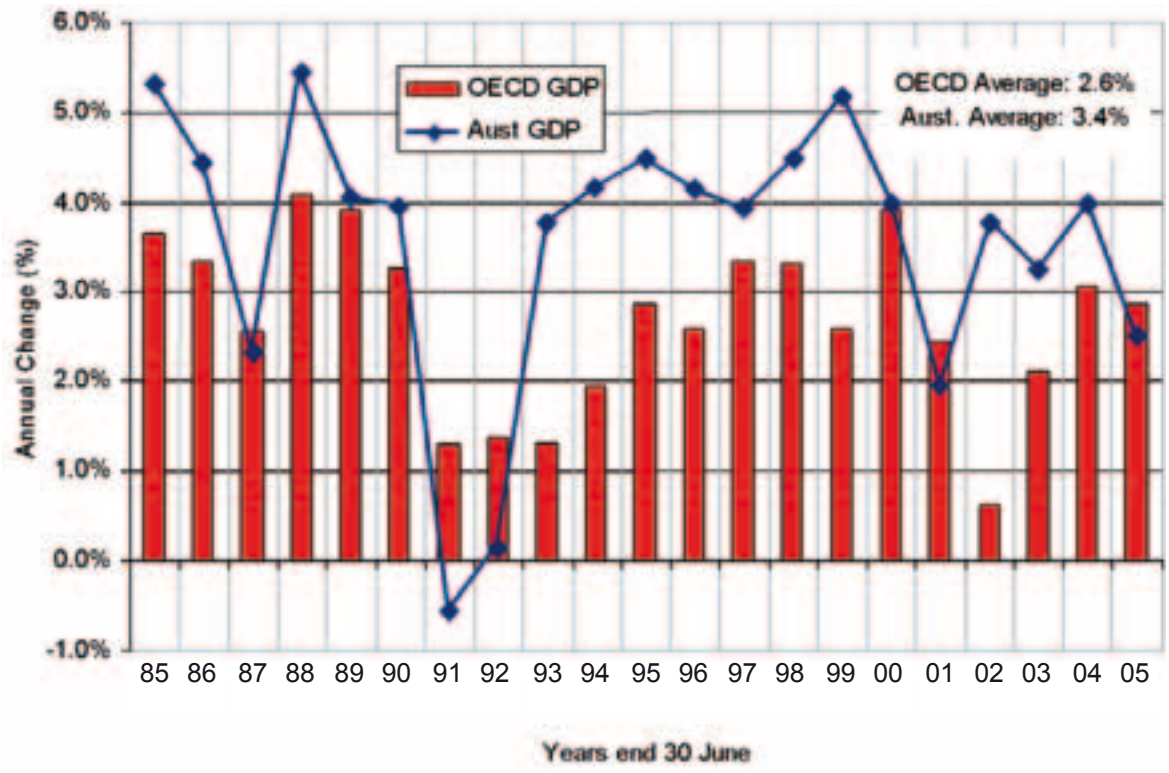
Economic growth is a key influence on traffic development. It is considered that economic growth accounts for 65 percent to 75 percent of long term growth.

The economic forecasts of Government treasuries and agencies, private banks and forecasters, international agencies such as the International Monetary Fund (IMF), the World Bank (WB), Asian Development Bank (ADB), Organisation for Economic Cooperation and Development (OECD) and the European Commission (EU) have been utilised.

The main macro drivers for growth at Brisbane Airport are the Australian and OECD GDP growth rates. Annual change in these aggregates over the past 20 years is shown in **Figure 2.7b**. Over the 20 years shown the OECD GDP has grown by an average 2.6 percent compared to the 3.4 percent for Australia.

The OECD is projected to experience annual growth of between 2.5 percent in the earlier years of the forecast period declining to 1.5 percent over the forecast period. The responsiveness of international passenger demand to GDP stimulus (elasticity) is around two for OECD GDP growth i.e. a 2 percent growth in OECD contributes to a growth of around 4 percent in international passengers at Brisbane Airport.

Figure 2.7b: *Annual Change (%) in Australian and OECD GDP, 1984/85 to 2004/05.*



Source: ABS and OECD.

For domestic passengers there is an income elasticity of around 1.2 for Brisbane. Thus a 3 percent growth in Australian GDP generates around 3.6 percent growth in passenger demand.

Note that income elasticities (which determine the passenger demand response to growth in income) used for forecasting are different from price elasticities (which determine the passenger demand response to changes in price) used in the economic assessment and discussed in section 2.11.

The relatively highly valued Australian dollar has contributed to the strong growth in outbound travel by Australians. However it has also discouraged international inbound tourism. It is expected that the exchange rate 'pendulum' will swing back in favour of the larger inbound markets in the medium term.

2.7.4 Airline Costs and Fares

If fuel prices continue to rise or even stabilise at high levels they will generate twin impacts:

a) Increasing airline fares directly depressing demand; and

b) Further slowing consumer spend and slowing world economic growth.

Oil prices have now reached levels above US$70 per barrel. Airlines are operating new-generation aircraft types that are considerably more fuel efficient than their predecessors. It has been assumed that fuel prices are unlikely to stabilise at their recent high levels.

The US Energy Information Administration (EIA) Annual Energy Outlook (AEO) 2006 reference case includes much higher world oil prices than were projected in AEO2005. In the AEO2006 reference case, world crude oil prices, expressed in terms of the average price of imported low-sulfur crude oil to US refiners, are projected to continue to increase from $40.49 per barrel (2004 dollars) in 2004 through to 2006, then decline to $46.90 per barrel in 2014 (2004 dollars) as new supplies enter the market. Prices then rise slowly to $54.08 per barrel in 2025 and to $56.97 per barrel in 2030.

It is apparent that oil prices have stayed higher, for longer, than expected. This is reflected in airlines instigating and then raising fuel surcharges over the past two years. These high fuel prices have slowed passenger demand. Fuel prices have been at higher levels than expected due to strong energy demand from a growing world economy and based on uncertainties associated with supply. However many analysts consider it likely that fuel prices will peak during 2006 and begin to fall into 2007 and 2008 as additional supply is provided. In addition airlines are investing heavily in new fuel efficient aircraft. For these reasons the current fuel prices and uncertainties are considered unlikely to have a significant impact on medium to longer term growth prospects.

It is considered likely that the longer-term trend for real (inflation adjusted) reductions in fares will continue. The advent of Low Cost Airlines should encourage this trend. Full service airlines are also focused on cost cutting and in many cases have themselves established low cost airline subsidiaries.

US FAA forecasts (FAA Aerospace Forecasts 2005) assume that real domestic and international passenger yields will continue their historical long term gradual downward trend (domestic down 1.4 percent annually over the 26 year period and international down 0.6 percent annually).

The overall impact of airfares on passenger traffic is likely to be positive even though in the short term the increases in fuel prices may lead to real (inflation adjusted) increases in airfares.

2.7.5 Regulatory Environment

The Australian Government deregulated the Australian domestic aviation market in October 1990. This was followed in the early 1990s by liberalisation of International Air Services Agreements and the removal of some of the barriers between international and domestic aviation.

Further liberalisation occurred with the Australian and New Zealand Governments agreeing on a Single Aviation Market (SAM) which came into effect from 1 November 1996. These arrangements mean that Australian and New Zealand carriers are free to fly anywhere within and between the two countries, without restrictions on the number of airlines that can operate, or on frequencies and fares.

The Australian and New Zealand Governments have continued to liberalise air travel between and beyond, the two countries.

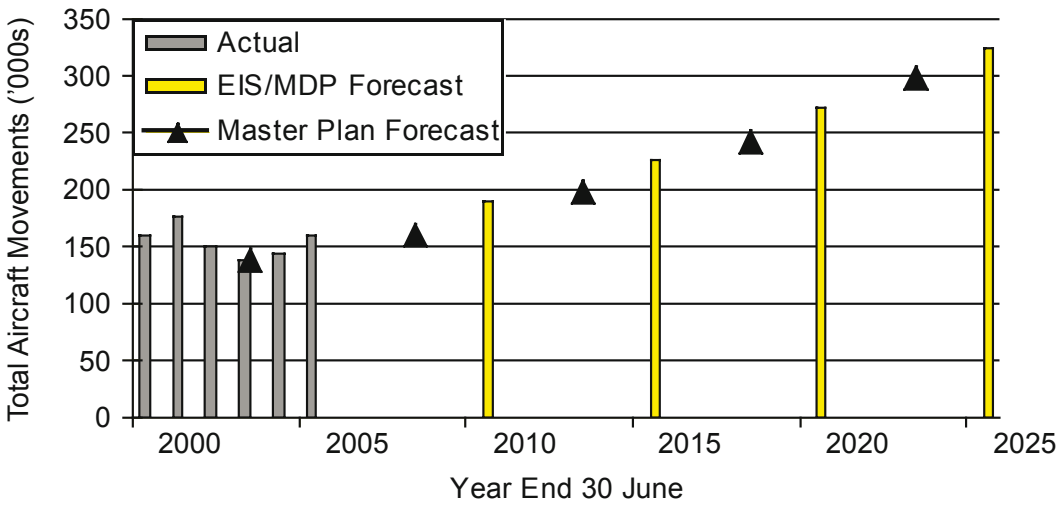
There is also liberalisation occurring within the international bilateral aviation regime. Open skies agreements are being pursued by a number of governments. These changes may affect airline route decisions with the prospect that members of the major airline alliances may operate to key Asian hub airports with greater commercial freedom than at present.

Liberalisation has provided greater commercial freedom for airlines whilst at the same time it has increased competition in many areas of airline activity. A major impact in Australia has been the change in aircraft types used on many routes across Australia. Many routes have seen domestic airline services replaced with services provided by regional airlines. Many smaller towns now rely on 'third-level' operators for air services.

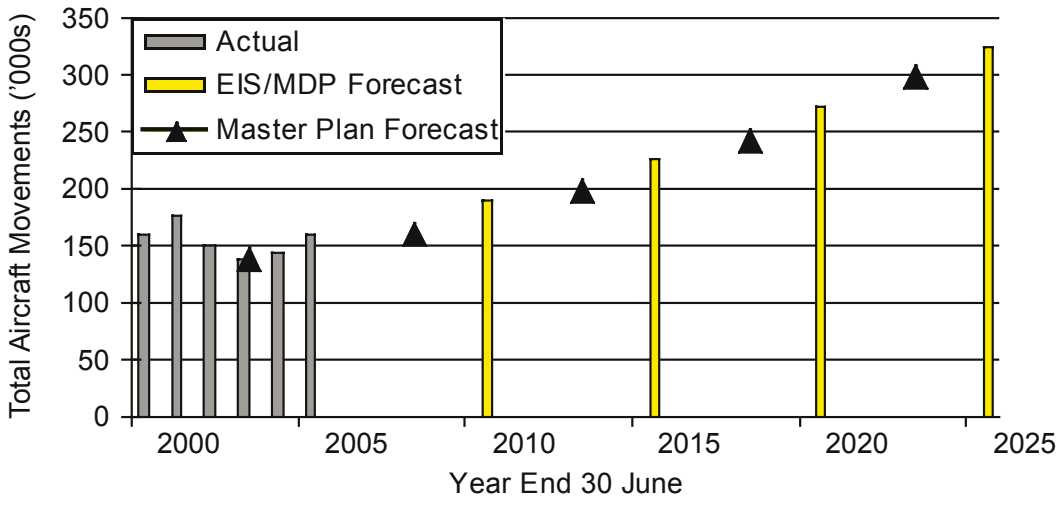
2.7.6 Comparison to 2003 Master Plan Forecasts

The last review of the long term infrastructure needs of Brisbane Airport was undertaken as part of the Master Plan in 2003. The total passenger and aircraft movement forecasts presented for assessment purposes in this document are similar to those presented in the 2003 Master Plan. This is illustrated in **Figures 2.7c** and **2.7d**.

Figures 2.7c: *Comparison of Passenger Forecasts with Master Plan 2003.*



Figures 2.7d: *Comparison of Aircraft Forecasts with Master Plan 2003.*



Figures 2.7c and **2.7d** compare the forecasts to 2025 as the Master Plan forecasts did not go beyond 2023.

The period to 2015 shows slightly increased forecast movements compared to the Master Plan, reflecting the high growth over the last two years, as discussed in sections 2.3 and 2.4. This minor difference in the forecasts reduces beyond 2020.

2.7.7 Key Assumptions

Over recent years the travel industry has witnessed a number of unexpected shocks. These include:

- The Asian economic crisis which began with the collapse of the Thai baht in July 1997 and was felt across much of Northeast and Southeast Asia;
- The September 11, 2001 terrorist attacks in New York and Washington and in the same week the collapse of Ansett occurred in Australia;
- The Bali bombing in October 2002;
- The wars with Iraq through 2003/04; and
- The SARS health scare across Asia.

The impact of these events is to reduce travel, often significantly, for varying time periods. Recovery generally follows although lost patronage is seldom fully restored in the short term. Sometimes when an event occurs in a particular country or region travel to alternative destinations is undertaken. This often opens alternative travel possibilities in the mind of the consumer and these new options remain in the future.

By definition these events are unexpected. As a result they are not explicitly taken into account in forecasting. Whilst they may reduce the longer term trend growth rates used in forecasting, they can in fact have dramatic short to medium term impacts which have not been factored into the forecasts presented in this report.

The following assumptions are key to the achievement of forecasts for Brisbane Airport:

- Economic growth will achieve the ranges suggested earlier in this section;
- Qantas, Jetstar and Virgin Blue will continue to serve the Australian domestic market;
- Airline supply side issues such as air services and airport capacity will not impede growth; and
- Airfares will fall modestly in real terms in the longer term and the higher airfares associated with the high fuel prices will abate before impacting significantly upon passenger numbers.

It has been assumed that any 'shocks' associated with terrorism, health issues and other 'unknown' factors will have only short term impact such that passenger levels will maintain their steady growth rates throughout the forecast period.

2.8 Economic Characteristics

2.8.1 Effect of the New Parallel Runway

As established earlier in this chapter, the existing Brisbane Airport is expected to reach capacity around 2015. After this time, aircraft, and hence passengers, will experience increasing delays with increasing airfares, reduced flight choice, increased inconvenience on passengers and slower passenger growth.

These impacts on airlines and passengers will lead to effects on the wider economy at the local, State and national levels. These impacts will be manifest in reduced economic activity such as tourism and employment in associated services.

This economic assessment looks at the costs and associated economic benefits that come from BAC's investment of just under $1 Billion (in nominal dollars, adjusted for inflation) in the NPR project.

2.8.2 Socio-Economic Characteristics

This section discusses the economic profile for the key areas of interest at the local, State and national level. Detailed profiles and forecasts at both the broad level and the small area local level are provided in **Appendix A2.1**.

The socio-economic profile forecasts do not specifically factor in the contribution of the additional runway (or any other specific project). There is an implicit assumption that infrastructure will be provided in an efficient and orderly manner to allow the economy to keep operating and improving its

performance (as generally measured by output or consumption per head) over time, unencumbered by capacity constraints. This is discussed further in section 2.9.

Defining the relevant 'local' region for Brisbane Airport, for the purposes of economic impacts, requires care. Those suburbs closest to the airport clearly form part of the local area and profiles of the following suburb groupings are provided in **Appendix A2.1** along with broader regional groupings:

- Pinkenba-Eagle Farm;
- Ascot, Hamilton and Hendra;
- Balmoral, Bulimba, Hawthorne and Morningside;
- City East;
- Albion, Clayfield and Wooloowin;
- Camp Hill, Coorparoo, Norman Park and East Brisbane;
- Carina and Cannon Hill;
- Hemmant-Lytton and Murarrie; and
- Brisbane City Northern Outer East

However, services provided by Brisbane Airport are regularly used not only by these residents and visitors to these areas, but also by residents of the greater Brisbane region and visitors to the greater Brisbane region. Given Brisbane Airport's role as the major international gateway and major business travel (and full service airline) airport in South East Queensland, it services a large hinterland from the Sunshine Coast to the Gold Coast and surrounds (which are both contained within the Moreton Statistical Division).

Consequently, developments at Brisbane Airport can also have a significant effect on economic activity in this broader region. Therefore, the key 'local' focus in this report is the broader Brisbane-Moreton conurbation – this is the catchment area of most relevance for considering the economic impacts of the new parallel runway. This area is defined as the Brisbane Statistical Division and the Moreton Statistical Division.

2.8.3 Current Economic Structure

The Brisbane-Moreton area dominates the overall Queensland economy, presently accounting for around two-thirds of the State's population and workforce. That share is likely to continue to grow over time rather than shrink given the attractiveness of the Brisbane-Moreton region, both in generating employment opportunities, and as a place for retirees to migrate to.

Figure 2.8a provides a profile of the employment structure of the Brisbane-Moreton region, comparing this with the employment structure for Australia as a whole.

Key features from **Figure 2.8a** are:

- The Brisbane-Moreton region has a greater proportion of tourism-driven service industries such as retail trade, accommodation, cafes and restaurants, and cultural services, compared with the rest of Australia;
- It has a higher share of employment in property and business services than does Australia as a whole, with Brisbane growing in importance as a centre of business;
- It has a higher share of employment in construction reflecting the strong levels of migration to the region, and the demand for housing and other infrastructure which that generates;
- Brisbane-Moreton is under-represented in the manufacturing sector (secondary sector activity), but only marginally so relative to Australia as a whole; and
- As one would expect for a largely urbanised area, Brisbane-Moreton is home to relatively little in the way of agriculture and mining (primary sector activity).

Figure 2.8a: *Profile of Employment by Industry, 2006, Brisbane-Moreton and Australia.*

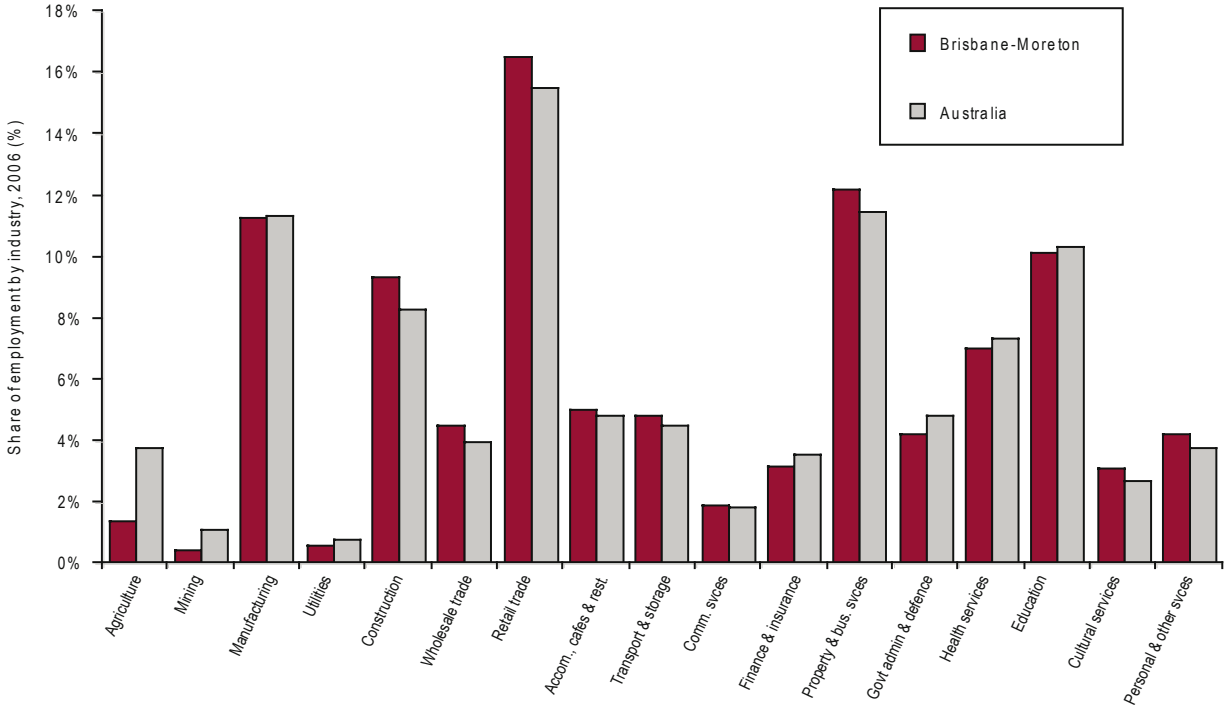
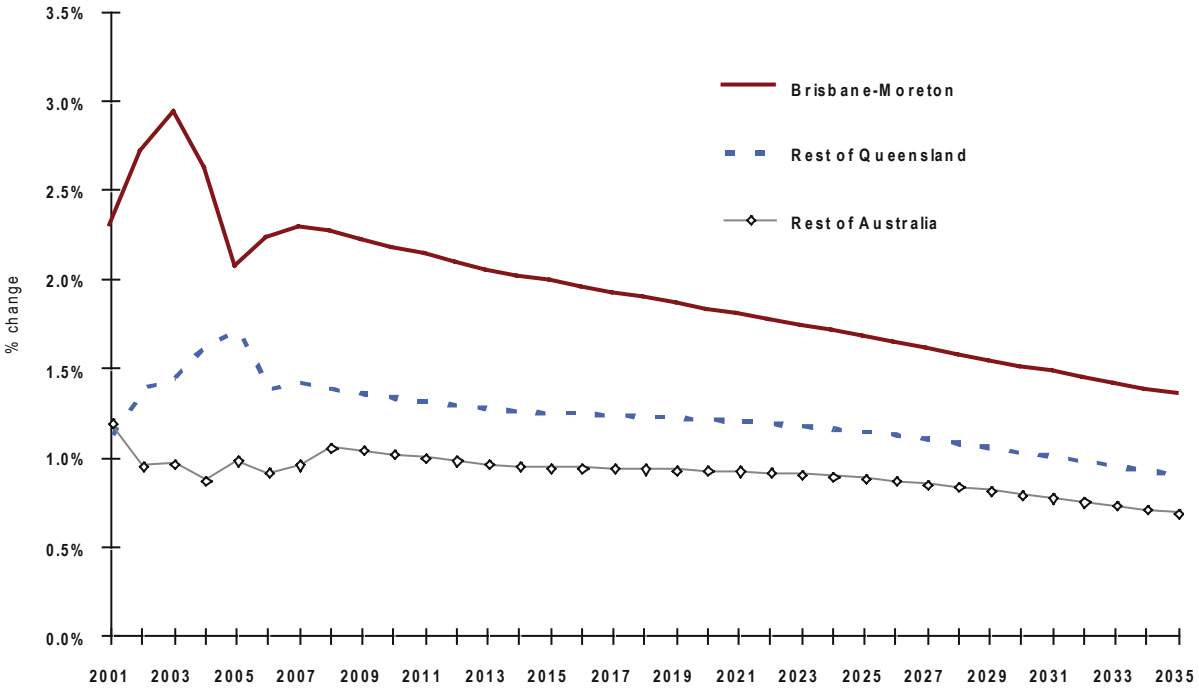


Figure 2.8b: *Projected Population Growth by Region.*



2.8.4 Projected Population Growth and Labour Force

Looking forward, it is expected that the Brisbane-Moreton region will continue to experience more rapid population and economic growth than Australia as a whole will experience. These population projections are displayed in **Figure 2.8b**. They have been formulated based on specific assumptions for fertility rates, mortality rates, and various types of migration: international, interstate and inter-regional.

A key message from **Figure 2.8b** is that rates of population growth will gradually slow over the coming three decades as the impact of lower fertility rates delivers lower levels of natural increase into the future. The baby boomer 'bulge' and continued improvements in life expectancy will see the elderly account for a rising share of the population.

The trend towards slower population growth is apparent in the Brisbane-Moreton region as it is in the rest of the country and most of the developed world. The rate of population growth in Brisbane-Moreton however is expected to remain around 0.9 percentage points above the national average.

As discussed in section 2.7.3, the Brisbane-Moreton population is forecast to increase at around twice the national average over the 2006 to 2035 period.

Projections for labour force and employment growth are based on population projections by age group and age-specific labour force participation rates.

Labour force growth in Australia is expected to slow notably from recent rates, not only for cyclical reasons, but as a key symptom of our ageing population. In particular, the retirement of the baby boomers is likely to see average labour force participation drop over time, as more people move to the age cohorts where labour force participation is lower.

Figure 2.8c: *Projected Population, Labour Force and Output Growth for Brisbane-Moreton.*

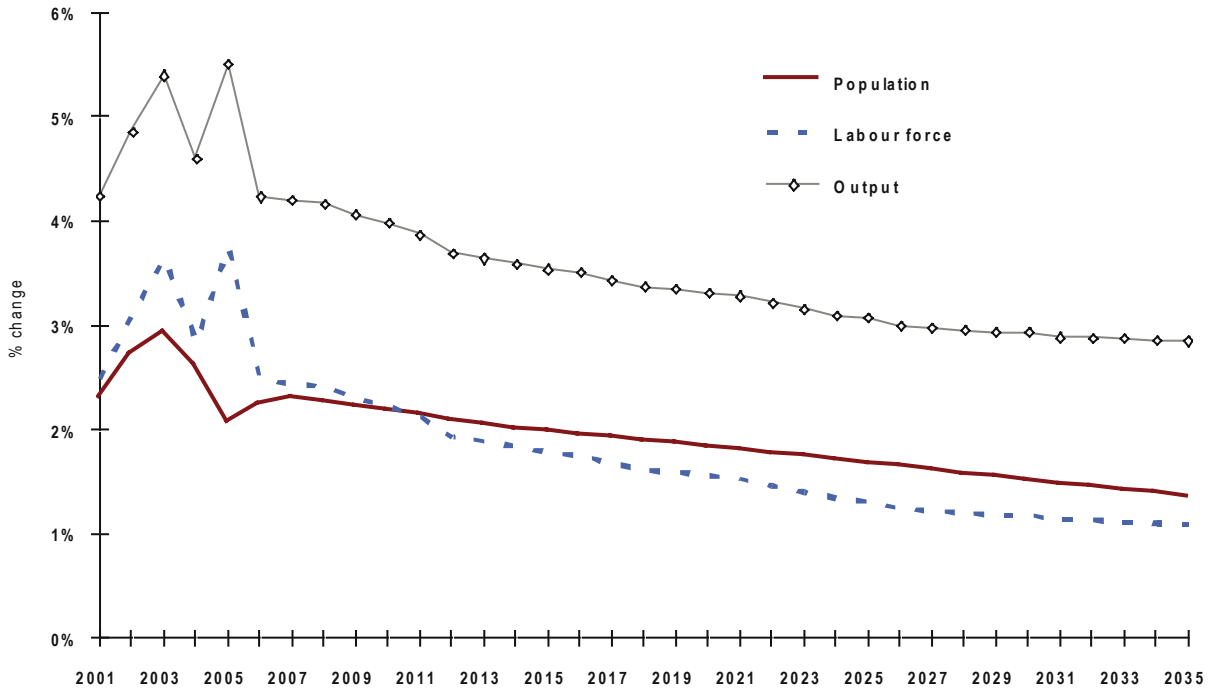


Figure 2.8c shows the projections for labour force growth in the Brisbane-Moreton region. Key points to note are:

- Labour force growth is expected to steadily decline over time as population growth slows;
- The decline in labour force growth will be more marked than the decline in population growth as more people move into the older age groups where labour force participation is lower (note the cross-over of the labour force growth and population growth projections in 2007); and
- That lower rate of labour force growth decline places a limit on how fast the pace of economic (output) growth may be for the region.

Note that these projections also assume that the unemployment rate across Australia (including the Brisbane-Moreton region) will keep around its current levels of around 5 percent nationally. That means that projected growth in employment will match projected growth in the labour force.

Figure 2.8c also shows a projection for output growth in the Brisbane-Moreton region, which is based on projected labour force growth and assumed future growth in productivity.

The Australian Government Treasury has regularly noted that there are three fundamental drivers of economic growth – population, participation and productivity. Population and participation can be multiplied together to give labour force growth, and also employment growth provided there is no change in the rate of unemployment.

2.8.5 Projected Economic Structure

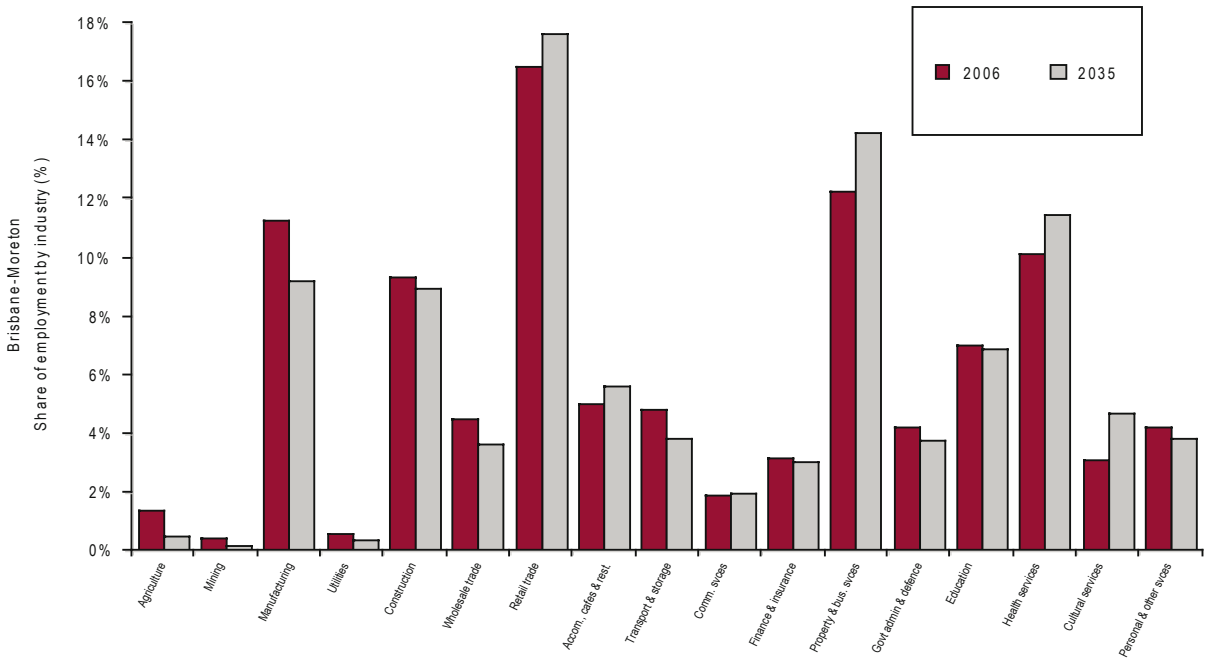
Projected changes in the industry structure of employment in the Brisbane-Moreton region are developed based on trends over recent years. The expected employment profile for the region in 2035, along with the current profile, is shown in **Figure 2.8d.**

The projected changes in employment structure see the Brisbane-Moreton region building on its strengths:

- Tourism is a key driver of economic activity for the region, and likely to become more important over time, which drives a higher share of employment in sectors such as retail trade, accommodation, cafes and restaurants, and cultural services;
- As Queensland becomes Australia's second most populous State the importance of property and business services as a generator of employment for the region is likely to continue to increase;
- The manufacturing sector is likely to continue to decline as a share of total employment, with this more so a general national decline for manufacturing rather than specific to the region;
- Similarly, employment in the primary sectors of agriculture and mining may lose ground nationally as strong productivity growth sees these sectors become even less labour intensive over time; and
- The construction sector is also likely to see productivity gains which limit the rate of employment growth required for the sector, though in addition construction activity will also be affected by a slower rate of population growth which will slow growth in demand for new housing.

The relatively stronger emphasis on tourism over time highlights the importance of having the appropriate infrastructure in place in order to facilitate such growth.

Figure 2.8d: *Profile of Employment by Industry, Brisbane-Moreton, 2006 and 2035.*



2.9 Economic Assessment Methodology

2.9.1 Overview of Methodology

The economic assessment allows for the analysis of economic activity at the local, State and national level. This requires information on both the economic structure at each of these geographic levels and the likely path for future economic growth for each of these regions. This information is important in defining the baseline scenario, which implicitly includes development of the new parallel runway.

That is, the starting point is to consider a future growth path for the Brisbane-Moreton, Queensland and Australian economy in an 'unconstrained world', then to overlay on this the constraints to growth that would occur without the NPR. There is an implicit assumption that infrastructure will be provided in an efficient and orderly manner to allow the economy to keep operating and improving its performance (as generally measured by output or consumption per head) over time, unencumbered by capacity constraints.

Against this baseline scenario, a scenario where the new parallel runway is not developed can be examined, in order to isolate the net economic impacts associated with developing the new parallel runway. The concept of interest is the Net Economic Impact of the NPR. The term 'net' refers to the difference between two possible future paths for the economy:

- Without NPR – this is the 'do nothing' scenario. This results in a future growth path for the Brisbane-Moreton economy where its major international gateway is capacity constrained; and
- With NPR – this is the proposed development scenario. This results in a future growth path for the Brisbane-Moreton economy where the major international gateway is not capacity constrained.

In determining the net economic impact of the NPR, the key elements to the economic impact assessment methodology are:

- Analysis of the direct costs and benefits of the NPR using financial modelling and modelling of the air transport sector for the impact on airlines and passengers – this assesses the direct economic impacts during the construction and operating phases; and
- Analysis of the economy-wide impacts of the NPR using general equilibrium modelling – this assesses the indirect economic impacts, including any crowding out (displacement) effects.

2.9.2 Financial Modelling

The first stage of the analysis is to produce a financial model under the With NPR scenario and the Without NPR scenario. The financial model is designed to consider the net cash flows of the particular project. In this context, outflows for capital expenditure, wages and other operating costs are offset against inflows from increased aircraft and passenger movements, and prices. The modelling is underpinned by assumptions regarding key project variables such as population growth and inflation.

The financial model has been developed with the input linkages to the next stages of the analysis (general equilibrium modelling and cost benefit analysis) in mind. Thus it includes more detailed information on capital expenditure and operating expenditure.

Specifically, the financial model sets out the direct economic effects stemming from development of the NPR. This includes detail on project development costs as well as assessment of the direct economic consequences of not developing the runway. Estimating the total economy-wide impact associated with these is discussed further in the following sections.

Simply put, the economy-wide impact is the direct economic impact:

- Plus any flow-on economic effects that development of the NPR has on downstream sectors of the economy;
- Plus inputs purchased from upstream sectors in order to develop the NPR;
- Less economic activity displaced (or 'crowded-out') by the project; and
- Less income repatriated to any foreign investors in the project.

The financial model includes annual forecasts of key measures both in the Without NPR and With NPR scenarios, including:

- Revenue, including airport charges;
- Expenses, including capital and operating expenses (by geographic source); and
- Passenger forecasts (domestic and international).

2.9.3 Air Transport Sector Modelling

A key determinant for the economic modelling is to model the impact of the With NPR scenario and Without NPR scenario on the air transport industry, specifically passengers and airlines.

The main question here is the impact on airfares of capacity constraints in the Without NPR scenario, compared with the With NPR scenario. Importantly, a congested airport with slot constraints (like Heathrow or Narita prior to its recent parallel runway construction) confers considerable market power on airlines, due to barriers to entry created by a lack of slots. This results in higher airfares for passengers and these higher airfares in turn result in lower tourism growth than would otherwise be the case.

2.9.4 General Equilibrium Modelling

The most widely accepted methodology for determining the direct and indirect economic impacts of the NPR is through the use of general equilibrium modelling. The General Equilibrium Model (GEM) captures the all important flow-on and displacement effects of the NPR.

This includes positive flow-on (or 'multiplier') effects created by the additional investment and production following the expansion, as well as any offsetting impacts through 'crowding out' (or 'displacement') effects arising from increased competition for resources. Displacement effects can be particularly important, for example, if the economy is facing skill shortages and in locations such as Queensland where unemployment is very low. The resulting multipliers are 'constrained' by the capacity of the economy.

For the general equilibrium modelling component, the project is separated into a construction and production phase. In the construction phase, the key inputs from the financial model include the:

- Absolute level of investment;
- Type of investment made (for example, machinery and/or construction services); and
- Source of investment (South East Queensland, Rest of Queensland, Rest of Australia, Rest of the World).

The level, type and source of capital expenditure is important in determining the potential flow-on effects from this phase of the NPR. For the general equilibrium component of the modelling, it is important to identify the value of expenditure on either machinery or construction as well as the likely source of major inputs. If the project relies heavily on imported machinery or foreign dredging crew, then any expected flow-on effects for the Queensland economy would be lower.

Key data required for the modelling of the production phase includes:

- Sales of outputs (in this case, aeronautical charges, duty free, car parking);
- Key input costs by type of input (capital, labour); and
- Source of inputs (South East Queensland, Rest of Queensland, Rest of Australia and/or Rest of the World).

2.9.5 Cost Benefit Analysis

The analysis of the project impacts on the airport, air transport sector and wider economy discussed cover much of the economic impacts of the proposal. That said, there may be other socioeconomic impacts over and above those able to be captured in the metrics above.

Where there are externalities (such as noise or pollution), which are not factored into the above analysis, it is necessary to allow for these to provide an assessment of the net impact on society.

Where market prices do not fully reflect the opportunity cost or willingness to pay (due to distortions caused by externalities or deadweight losses), additional adjustments may be necessary to ensure the net economic impacts reflect the full costs and benefits arising from the project.

It is important not to double-count. For example, a sand extraction royalty of $21 Million is included in the construction costs of the project, paid to the Queensland Government. To include an additional allowance for the impact of sand extraction would be double counting the already sizeable payment included in the analysis. In other words, any externalities associated with sand extraction are already internalised in this royalty payment.

2.10 Direct Economic Impacts of the New Parallel Runway – Financial Modelling

2.10.1 Project Characteristics and Construction Costs

The NPR at Brisbane Airport is scheduled to commence construction in the 2008 financial year and to be completed by 2015. That coincides with the time when capacity constraints are forecast to be reached with the existing runways.

The modelling assumes an economic life for the project of 40 years, which is appropriate for a project of this magnitude and national significance. Beyond that time it will continue to have economic value, though would require some significant capital expenditure or refurbishment at around that point. Such costs and the economic benefits of the project beyond 2055 are not included in this analysis.

While the runway pavement is modelled to depreciate fully over a 40 year period, there is no depreciation of land applied to the dredging of sand from Moreton Bay.

The cost estimates put the construction cost of the NPR at just over $970 Million (in nominal dollars allowing for inflation). Construction takes place over the period from 2008 to 2015, with the expenditure taking place during the phases discussed in Chapter A5. The key benefit to be derived from the expenditure is enabling additional passengers to travel through Brisbane Airport and at more convenient times.

The key components of the investment spending are:

- Labour costs (accounting for 24 percent of investment spending), of which some 42 percent of costs are for professional staff, and 58 percent of costs are for construction staff;
- Machinery and equipment costs (accounting for 31 percent of investment spending), with this dominated by the cost of hiring the dredging equipment;
- Materials costs (accounting for 27 percent of investment spending), including quarry materials, metal products, fuel and the manufacture of concrete pipes on-site; and
- Other costs (accounting for 18 percent of investment spending), which includes transport costs, business overheads as well as royalty payments for the sand extracted and owners' costs for BAC.

The types of labour used, goods and services purchased and sources of investment in the project are important in tracing through the economy-wide effects of the investment spending. The greater the local content of the investment, the greater the expected linkages and thus flow-on impacts to the local and State economies. **Table 2.10a** profiles the source of non-labour costs.

The table shows that some 69 percent of non-labour costs for this project are expected to be able to be sourced from the Brisbane-Moreton region. The key item which will need to be imported will be the dredging equipment. Some materials are not manufactured in Queensland, such as steel pipes and some machinery, and so are expected to be supplied from elsewhere in Australia. Due to the nature of the inputs required, there are no inputs expected to be sourced from the Rest of Queensland.

2.10.2 Passenger Forecasts

The spending of nearly $1 Billion to construct a runway helps to stimulate economic activity during the construction phase, particularly in the Brisbane-Moreton region.

With solid growth expected in passenger numbers a point will be reached where Brisbane Airport will not be able to accommodate all the passengers who want to travel through it, at least during peak times and later, as congestion continues to increase, at most times of the day. In the absence of developing the new runway, passengers would face consequences in three potential ways:

- Some passengers who could not be accommodated at their preferred time would decide not to travel at all (or at least not travel through Brisbane Airport);
- Some passengers would change their travel from their preferred time to shoulder periods or less convenient times; and
- Passengers during peak and other times would likely experience an increase in delays and other congestion costs as the airport operates more often at a higher level of capacity (and which tends to mean greater consequences if things go wrong, with compounding congestion and delays).

This is also discussed in section 2.6.

Table 2.10a: Profile of the Source of Non-Labour Costs During Investment, Nominal $ Million.

Activity	2008	2009	2010	2011	2012	2013	2014	2015	Total
Brisbane-Moreton	27	161	1	1	1	60	120	119	490
Rest of Queensland	0	0	0	0	0	0	0	0	0
Rest of Australia	4	27	0	1	0	9	19	19	79
Rest of World (imported)	0	133	1	2	1	0	0	0	137
Total	**31**	**321**	**2**	**4**	**2**	**69**	**139**	**138**	**706**

All of these consequences would grow over time in the absence of the runway, starting small as capacity is initially reached, but increasing over time as passenger demand grows with the growing economy. Some moderate level of congestion is always going to be present in any airline system – it is not possible to always have a seat available at the exact time every person wants to travel. The quantity of interest here is the congestion caused in the Without NPR scenario, over and above the congestion caused in the With NPR scenario due only to normal airline operational considerations.

As discussed in section 2.6.2.2, if no additional runway capacity was added at Brisbane Airport, it is estimated that there would be a loss of around 35 percent of regular airline movements by 2035. Taking into account the various passenger capacity aircraft that international, domestic and regional airlines would be operating (and some movement towards higher capacity aircraft if there were no additional runway capacity), this equates to an annual loss of around 3.2 million international passengers and 8.8 million domestic passengers by 2035. This is a total annual loss to Brisbane of 12 million passengers.

Given the role of the airport in facilitating tourism to the Brisbane-Moreton region this represents not only a loss of passengers for the airport and airlines, but a loss of other tourist spending which would otherwise have occurred. Estimates of this flow-on loss in tourist spending are discussed in section 2.11.3.

The second of the effects discussed above; the change in travel patterns through the day in the absence of the runway as capacity is reached; is shown in **Figure 2.5f**. This illustrates the reduction in the number of aircraft movements as the peaks are constrained by the capacity of the existing runway and the resultant loss of passengers in these hours.

2.10.3 Revenues and Operating Costs

In examining a scenario where the new runway is developed (and comparing that with a scenario without the runway) there are two streams of additional revenue which accrue:

- Direct aeronautical charges, which are to be levied on flights (and/or passengers) through Brisbane Airport to pay for the NPR; and
- Aeronautical related revenues which vary depending on the number of passengers travelling through the airport, and therefore will be higher in the scenario where the NPR is developed because that can accommodate more passengers. These revenues include landing charges, parking, duty free, other retail spending and landside transport such as car rentals.

For the purpose of this modelling, an indicative level of aeronautical charges has been assumed. These charges are naturally commercially sensitive and a final price is yet to be negotiated with airlines. Hence, this analysis is for the purpose of illustrating the likely economic benefits, rather than specifying an exact charging regime.

The direct charge will form the dominant component of additional revenues initially (particularly as there is expected to be relatively little difference in passenger numbers between the two scenarios initially). But the difference in passenger numbers in the two scenarios will ramp up over time and the additional aeronautical related revenues will become more important.

Direct operating expenses (specifically relating to the NPR which would not have been required in the absence of the runway) are expected to be in the order of $11 Million in 2016, and then escalate over time in line with CPI movements. This additional operating expense covers labour and materials, with all additional materials required expected to be able to be sourced from within the Brisbane-Moreton region.

2.11 Direct Economic Impacts of the New Parallel Runway – Air Transport Sector

2.11.1 Effects of Congestion

A key driver of the economic benefits of the NPR is the consequence on the air transport sector if Brisbane Airport becomes congested.

Without the NPR, passenger growth will be slower than with the NPR, but growth will not be zero. Airlines can mitigate runway capacity constraints to some degree by utilising larger aircraft and by spreading out the schedule of flights into shoulder periods, which are less preferred by passengers. This imposes some inconvenience on passengers by forcing them to fly at a less preferred time of day and tends to have the effect of reducing the frequency of flights. These mitigators are not without cost and represent a saving once capacity constraints are lifted by the opening of the NPR.

A lack of capacity also creates barriers to entry. At an unconstrained airport, existing airlines can increase services and new airlines can enter the market. When capacity is reached, typically the incumbent airlines' slots are grandfathered and new entrants have difficultly entering the market.

The slots, particularly at peak times, become valuable. Airlines are able to increase airfares without threat of other airlines entering to compete away these higher prices.

2.11.2 Flight Demand Profile

Based on the reduction in demand predicted in the Without NPR scenario, it is possible to estimate the percentage increase in travel costs necessary to cause this reduction in demand compared with the With NPR scenario.

Domestic travel is heavily dominated by business travel and people visiting friends and relatives. These travellers have relatively inflexible travel needs – typically, they either have a business meeting or a family wedding or some other such immovable commitment.

Based on the consensus of estimates in the Bureau of Transport and Regional Economics Transport Elasticities Database and other research, price elasticities have been determined as follows:

- An own-price elasticity of demand of -0.75 for domestic travel. That is, for every 1 percent increase in price, a 0.75 percent reduction in demand occurs. Conversely for every 1 percent reduction in demand forecast in the Without NPR scenario, it implies an increase in travel costs of 1.33 percent must have occurred to ration demand back to the available capacity.
- An own-price elasticity of demand of -1.2 is used for international travel. That is, for every 1 percent increase in price, a 1.2 percent reduction in demand occurs. Conversely for every 1 percent reduction in demand forecast in the Without NPR scenario, it implies an increase in travel costs of 0.83 percent must have occurred to ration demand back to the available capacity.

The relatively inelastic nature of domestic air travel is due to the high share of work and visiting friends and relatives (VFR) travel as described in **Table 2.11a.**

International travel is more skewed towards leisure travel, particularly in Queensland. **Table 2.11b** summarises the purpose of trips for international travellers at Brisbane Airport.

Table 2.11a: Purpose of Trip, Domestic Air Travellers.

Purpose of trip	Business, employment or Education	Leisure	Visiting Friends and Relatives
Domestic air travel	50.2%	29.7%	20.1%

Source: Tourism Research Australia

Table 2.11b: Purpose of Trip at Brisbane Airport, International Air Travellers.

Purpose of trip	Business, Employment or education	Leisure	Visiting Friends and Relatives
Visitor arrivals	13.8%	67.6%	18.6%
Resident departures	20.4%	50.0%	29.6%

Source: Australian Bureau of Statistics, Overseas Arrivals and Departures, data extract for Brisbane Airport

2.11.3 Origin and Destination of Air Travellers

Brisbane and the surrounding Brisbane-Moreton catchment area is a prime tourism destination of global standing. Based on Overseas Arrival and Departures data, 64 percent of all international passenger movements at Brisbane Airport relate to foreign visitors coming and going, while the remaining 36 percent of international passenger movements at Brisbane relate to Australian residents going overseas or returning. An Australian going overseas represents an import of tourism services while a foreign visitor coming to Brisbane represents an export of tourism.

That is, for every 100 international passenger movements at Brisbane, 64 movements relate to tourism exports and 36 relate to tourism imports for the Brisbane region, a net figure of 28 per 100 movements. Therefore, for every 100 international passenger movements at Brisbane displaced in the Without NPR forecasts gives a reduction in net tourism exports of 14 tourists (allowing an arrival and departure movement for every overseas passenger).

For domestic travel, there is less data available as, unlike international travel, there is no requirement to fill out passenger cards on domestic flights. Some origin-destination data for all modes of domestic transport (road, rail and air) is available at the State level from Tourism Research Australia (TRA) reports. Based on this information, it is estimated that for every 100 domestic passengers movements at Brisbane Airport, there are approximately 30 visitors (60 movements) from outside the Brisbane-Moreton region and 20 residents (40 movements) from within the Brisbane-Moreton region. This results in a net inter-regional export of 10 tourists for every 100 domestic passenger movements at Brisbane Airport.

Based on TRA estimates of visitor expenditure by category of expenditure, for each net export of international tourism, there is additional off-airport spending of $885. For each net export of inter-regional (domestic) tourism there is additional off-airport spending of $226. The relatively low spending figure of $226 per visitor for domestic reflects a number of day trips, where expenditure is low.

It is forecast that there will be a loss of 3.2 million international passengers and 8.8 million domestic passengers. By 2035 that would mean a direct loss of just under $5 Billion per annum in passenger spending in the wider economy (in today's dollars).

As Brisbane becomes congested, another consideration is the extent to which airlines will utilise the Gold Coast (Coolangatta) Airport and Sunshine Coast (Maroochydore) Airport. Traffic at these airports has been growing rapidly recently over the same period that double digit growth has been experienced at Brisbane. As discussed in Chapter A3, the strong growth across the Gold Coast-Brisbane-Sunshine Coast conurbation is expected to be maintained with limited rerouting of services away from Brisbane Airport.

2.11.4 Benefits to the Rest of Queensland and the Rest of Australia

A less congested airport and lower airfares makes it easier to travel to and from Brisbane, improving the living standards of people at both ends of the city pair air route. While the benefits accruing to foreign tourists fall outside the boundary of the benefits being given weight to, the benefits accruing to the Rest of Queensland and the Rest of Australia are still relevant and are valued as part of the overall socioeconomic benefit of the project accruing to Australians.

For example, on the Sydney-Brisbane route, the Brisbane region will benefit from less congestion in the With NPR scenario, and the Sydney region (part of the Rest of Australia region in the modelling) will also benefit from having more accessible flights to Brisbane.

Based on BTRE data for 2004-05, of 11.9 million domestic passenger movements, 3.6 million were intra-State routes (within Queensland) and 8.3 million were inter-State routes (beyond Queensland). Hence, the modelling confers 30 percent of the benefit occurring at the other end of each city pair to the Rest of Queensland and 70 percent accrues to the Rest of Australia. The benefits accruing to the other end of Brisbane's international city pairs disappears is not measured, as they are outside our social welfare framework and are not tracked any further.

2.11.5 Impact of Reducing Congestion

Ultimately, all the costs of congestion fall on passengers, whether this is through higher airfares or non-price congestion such as inconvenience and delays. The exact breakdown between how much of any level of congestion is incurred as higher airfares or as inconvenience, depends on how well airlines are able to price-ration demand to the available supply. While this is of interest in terms of airline profitability at a congested airport, either way passengers ultimately bear the cost of capacity constraints.

It is estimated that in the Without NPR scenario, there is a $14 mark up over the real per passenger expenditure on domestic air transport services in 2035 of $140 accruing to the Brisbane-Moreton region with the other half accruing to the other end of the city pair.

With the new runway, the $14 mark up (a combination of increased airfares and congestion costs imposed on passengers) is replaced by a modest runway charge to cover the cost of construction. The lower cost of travelling encourages more people to travel (based on the own-price elasticity discussed above), resulting in 35.8 million domestic passenger movements in 2035 in the With NPR scenario compared with 27.0 million domestic passenger movements in 2035 in the Without NPR scenario.

By 2035, it is estimated that there will be an additional cost of around $28 (two way) to domestic passengers and $26 (two way) for international passengers as a result of not providing additional runway capacity at Brisbane.

This equates to an annual cost to passengers in excess of $500 Million in 2035, based on the capacity constrained forecasts of 27.0 million domestic passenger movements (13.5 million two way) and 11.0 million international passenger movements (5.5 million two way).

2.12 Economic Impacts

2.12.1 Multiplier Effects

The total economic impact of the NPR is a combination of the direct impacts, discussed above, as well as the flow on effect of an unconstrained airport in the With NPR scenario, versus a constrained airport in the Without NPR scenario. The indirect economic impacts are sometimes called 'multiplier' effects. The effects reported here are constrained multiplier effects (net of displacement effects). This is different to Input-Output multipliers, which are unconstrained, in the sense they do not capture displacement effects. The indirect impacts reported here are based on general equilibrium modelling, net of crowding out or 'displacement' effects. These are considered a superior methodology than the (often exaggerated) unconstrained multiplier effects reported in some studies.

In order to assess the economic impact on the regional, State and national levels, a four-region general equilibrium modelling was created for specific industry sectors for:

- The Brisbane-Moreton regional economy;
- The Rest of Queensland (adding this region to Brisbane-Moreton gives the State economy);
- The Rest of Australia (adding this to Brisbane-Moreton and Rest of Queensland gives the national economy); and
- The Rest of the World (the global economy).

Data for the Brisbane-Moreton region and the 'Rest of Queensland' are based on the regional input-output tables published by Queensland Treasury Office of Economic and Statistical Research.

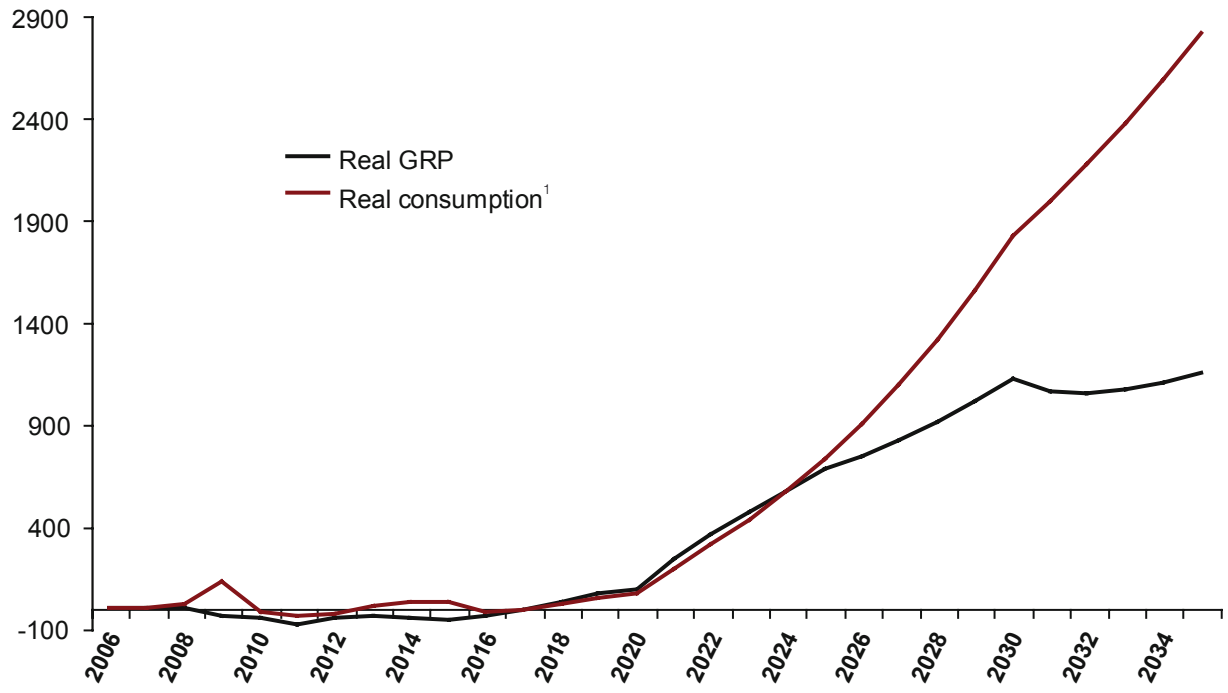
To assess the economic impacts of the NPR, four issues were considered:

1. An increase in investment expenditure in the Brisbane-Moreton region in the construction phase of the project;
2. The impact of the NPR on congestion costs in the Brisbane-Moreton region resulting in an increase in passenger numbers;
3. Any flow-on effects to congestion costs in the Rest of Queensland and the Rest of Australia; and
4. The projected impact of increased passenger numbers on tourism expenditure in Brisbane-Moreton.

The projected impact of the NPR on economic output (measured by Gross Region Product) and welfare measured by real consumption[1] of the Brisbane-Moreton region is shown in **Figure 2.12a**. In the short term, before the project generates benefits and costs depends on two countervailing influences. On the one hand, increased investment stimulates economic activity leading to an increase in welfare (noting the peak years of 2009 and again in 2014 and 2015). On the other hand, the increase in charges levied before 2015 tend to dampen economic activity and welfare. Over the longer term, as the NPR relieves congestion, the impact of the NPR on both output and welfare is positive.

The employment impacts are comprised of two components. First, the short term increase in employment due to the construction phase of the project is estimated to increase employment by 2,700 in 2009, the peak year for construction.

Figure 2.12a: *Projected Change in Key Macroeconomic Variable, Brisbane-Moreton ($ Million).*



[1] *Real consumption refers to real private household consumption in AE-GEM. It is that proportion of income spent by households on goods and services. The remainder of income is spent by the government and in savings. While other welfare measures can be used, such as equivalent variation, these can be difficult to explain and tend not to produce considerably different results than real consumption. Therefore, real consumption is generally considered the most appropriate practical welfare measure in applied general equilibrium modelling of this type.*

Over the long term, the reduced congestion at the airport that stimulates economic growth through more air transport activity and more business activity, particularly tourism, results in greater employment opportunities being created. For example, by 2035 the NPR is projected to increase employment by around 7,800 full time equivalents.

Allowing more passengers through Brisbane Airport means more economic activity for the Brisbane-Moreton region. The region's output (as measured by Gross Regional Product or GRP) will be permanently higher. The net present value of the output gain (increase in GRP) is projected to be $4.8 Billion over the period 2006 to 2035 using a 4 percent real discount rate.

The best measure of overall economic benefit or living standards is the increase in real private consumption which occurs – the ability of people to spend more. The net present value of the increase in economic benefit (increase in real private consumption) is projected to be just over $8.2 Billion over the period 2006 to 2035 using a 4 percent real discount rate.

2.12.2 Crowding Out (Displacement Effects)

In project evaluations of this type, two key issues tend to emerge: the extent of 'crowding in/out' and reason for the projected welfare result being higher than output. The results show that there is an element of crowding out during the construction and production phases of the project. During the construction phase, which ends at 2015, real investment is projected to be nearly 0.4 percent higher than business-as-usual levels (**Table 2.12a**). To accommodate this increase in investment, resources are diverted away from other sectors of the economy to construct the NPR. The increase in demand for construction services and manufacturing has the effect of increasing both employment and wages.

The increase in wages feeds through to the consumer price index that is projected to increase by around 0.09 per cent relative to business as usual levels at 2015. The projected increase in prices is felt across the whole of Brisbane-Moreton region during this period, manifesting in the projected deterioration in the real balance of trade at 2015. That is, a reduction in international competitiveness results in a fall in export volumes and an increase in imports. A similar, albeit smaller, crowding out effect is evident in the long term. However, this is not because of increased construction, rather an increase in services associated with increased tourism.

Table 2.12a: Key Brisbane-Moreton Macroeconomic Results from Constructing NPR.

Variable	2015	2035
	%	%
Real GRP	-0.07	0.68
Real consumption	0.04	2.5
Real investment	0.39	0.12
Export volumes	-0.27	-0.19
Import volumes	0.16	1.22
Consumer price index	0.09	2.07
GSP deflator	0.19	3.91
Terms of trade	0.16	0.19
Employment	0.02	0.36

Table 2.12b: Key Brisbane-Moreton Macroeconomic Results ($) from Constructing NPR.

Variable	2015	2035
	$ M	$ M
Real GSP	-61	1,150
Real consumption	29	2,809
Real investment	140	75
Export volumes	-96	-118
Import volumes	120	1,301
Employment (Persons)	286	7,809

2.12.3 Australia Wide Economic Impacts

Australia wide economic impacts in terms of output and welfare are shown in **Figure 2.12b**. The projected economic impacts on the Rest of Queensland and the Rest of Australia are relatively small as measured by the NPV of economic benefits (real consumption) over the period 2006 to 2035.

The net present value of economic benefits to the rest of Queensland is estimated at $1.1 Billion, while for the rest of Australia it is $0.6 Billion – that compares with an equivalent benefit to the Brisbane-Moreton region of $8.2 Billion.

Figure 2.12b: *Projected Real Household Consumption-Welfare Net Present Value in 2006 ($ Million).*

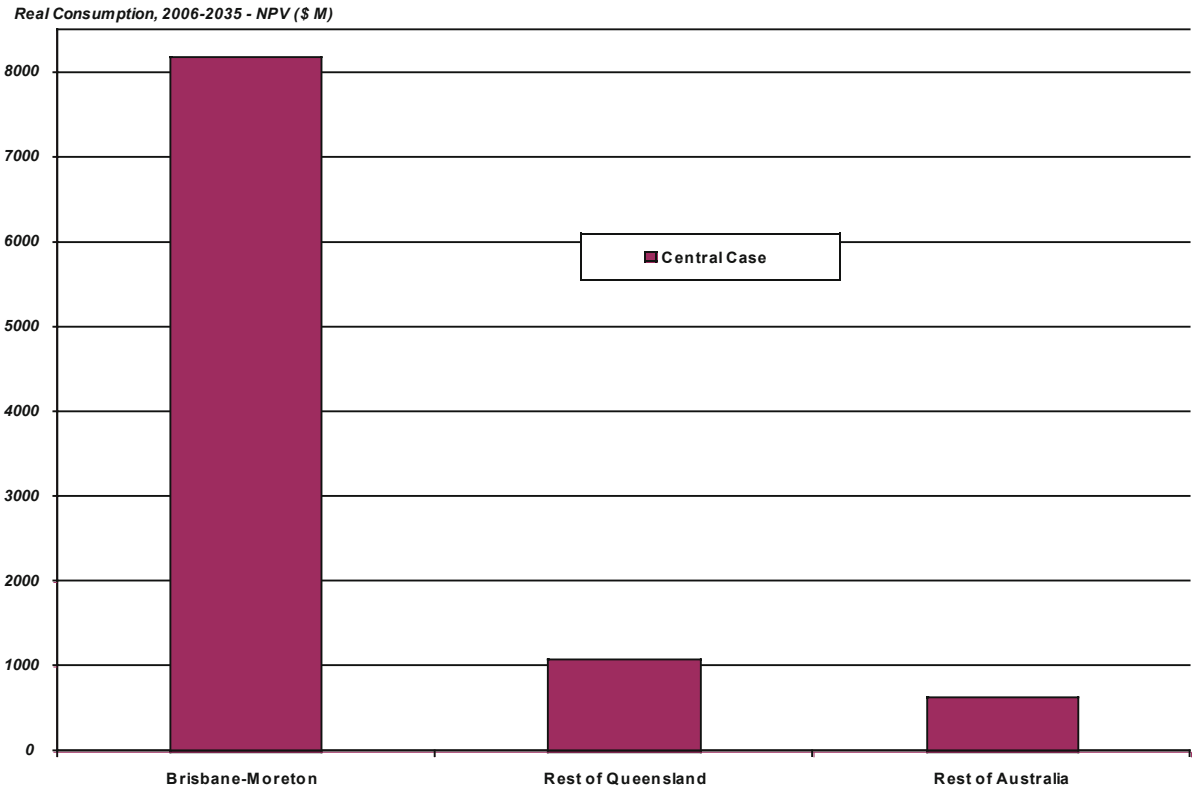
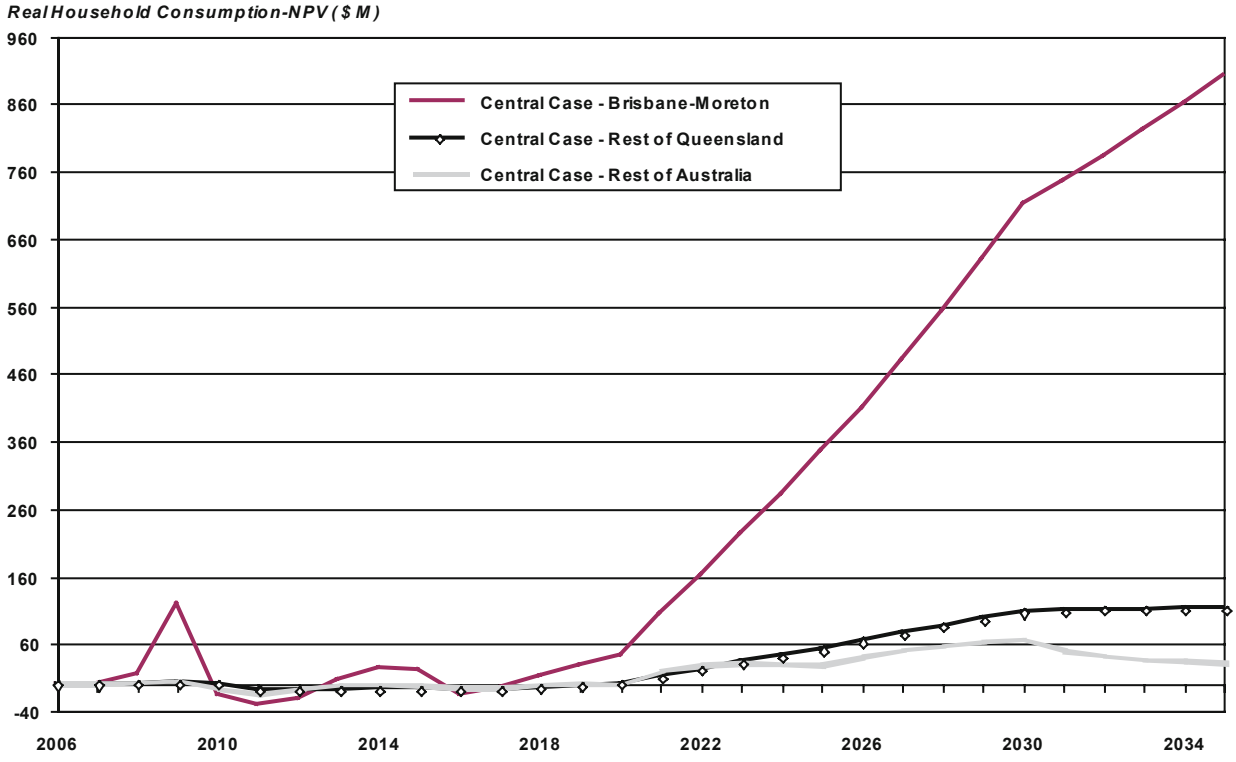


Figure 2.12c: *Projected Real Household Consumption-Welfare Impacts against 2006 ($ Million).*



2.13 Property

2.13.1 Area Profile

An assessment was completed into the effect of the new parallel runway on the values of properties within a 10 km radius of Brisbane Airport.

The suburbs within a 10 km radius of Brisbane Airport are a mixture of:

- Prestige, well-established residential suburbs such as Hamilton, Ascot and Clayfield;
- Traditional residential suburbs such as Camp Hill, Carseldine and Wavell Heights;
- More modestly-priced residential suburbs such as Geebung and Boondall; and
- Light-industrial areas such as Eagle Farm, Northgate and Pinkenba.

The 10 km radius also includes a number of suburbs which have in recent times been subject to gentrification (such as Wooloowin) and several suburbs such as Fortitude Valley, New Farm and Newstead which have benefited from comprehensive urban renewal programs. Several suburbs such as Balmoral, Bulimba, Norman Park and Hawthorne have experienced recent price growth due to their proximity to the Brisbane River.

The suburbs within 10 km of Brisbane Airport are located in close proximity to Brisbane's CBD and other major employment centres and have good access to significant transport infrastructure.

The focus of the assessment was on property values in suburbs located within a 10 km radius of Brisbane Airport, assessed in two areas:

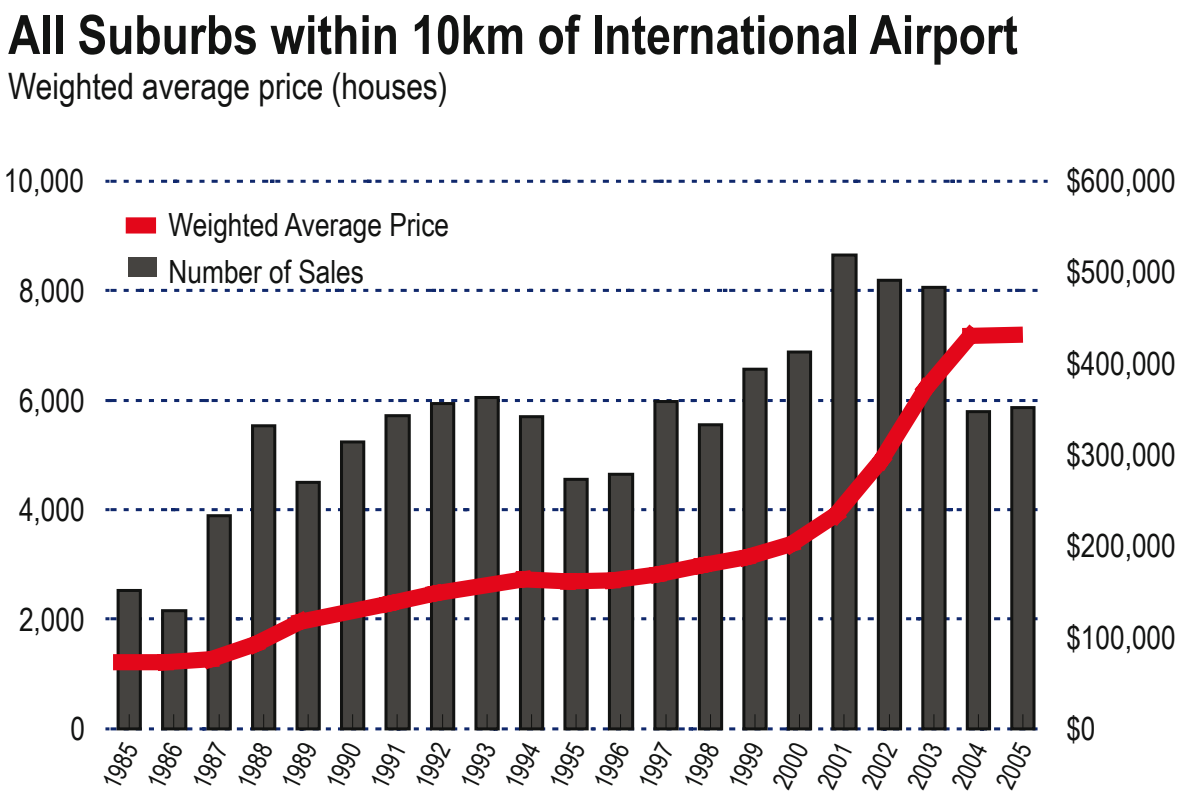
- Study Area 1 – all the suburbs within this 10 km radius that are either immediately adjacent to the airport or within range of the current N70 noise contours; and
- Study Area 2 – all the other suburbs within a 10 km radius of the Brisbane Airport but which are outside the current N70 noise contours.

The assessment was completed using historical sales data obtained from the Queensland Department of Natural Resources and Water (DNRW) dating back to 1985. Due to the format in which this data is presented the only measure of house price attainable is weighted average price (as opposed to the more commonly used median price). For comparative purposes, 'weighted average price' serves as an equally reliable measure of price growth.

2.13.2 Property Values

In 1985, the average house price across those suburbs within a 10 km radius of Brisbane Airport was $63,500. In 2005, the average house price was $422,000. This reflects an average annual capital gain of 9.9 percent per annum although as noted in **Figure 2.13a** below, this average has been raised by the quite significant price growth experienced since 2001 as opposed to the more modest but steady increase from the late 1980s to 2000.

Figure 2.13a: *Weighted Average House Price for All Suburbs Within 10 km of Brisbane Airport.*



Matusik Property Insights, *April 2006. Source: Qld DNRW and Matusik database.*

Table 2.13 summarises the results of the analysis of average prices and price growth for those suburbs within the N70 noise contours and those outside of the N70 noise contours.

Table 2.13: Comparison of Average Prices and Annual Price Growth.

Study Area	Average House Price (1985)	Average House Price (2005)	Average Annual Capital Growth
Within Current N70 Noise Contour (Study Area 1)	$64,500	$508,000	10.9%
Outside Current N70 Noise Contour (Study Area 2)	$63,000	$370,000	9.3%
Total 10 km Area	$63,500	$422,000	9.9%

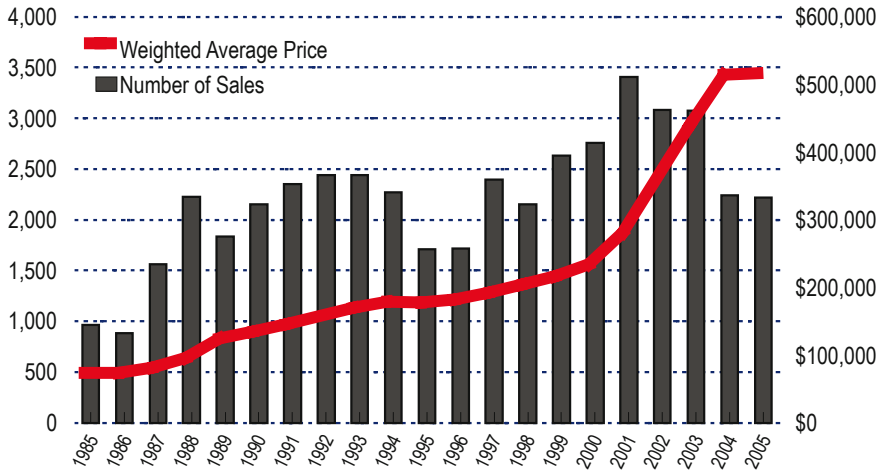
Source: Qld DNRW. Weighted average sale price for detached houses.

Figure 2.13b and **Figure 2.13c** provide details of sales volumes and average prices for suburbs within the 10 km radius of Brisbane Airport and within (Study Area 1) and outside (Study Area 2) the N70 noise contours. Refer to Volume D for further details on airspace and N70 contours.

Figure 2.13b: *Weighted Average House Price for Suburbs Within Current N70 Noise Contour.*

Suburbs Inside N70 Noise Impact Boundaries

Weighted average price (houses)

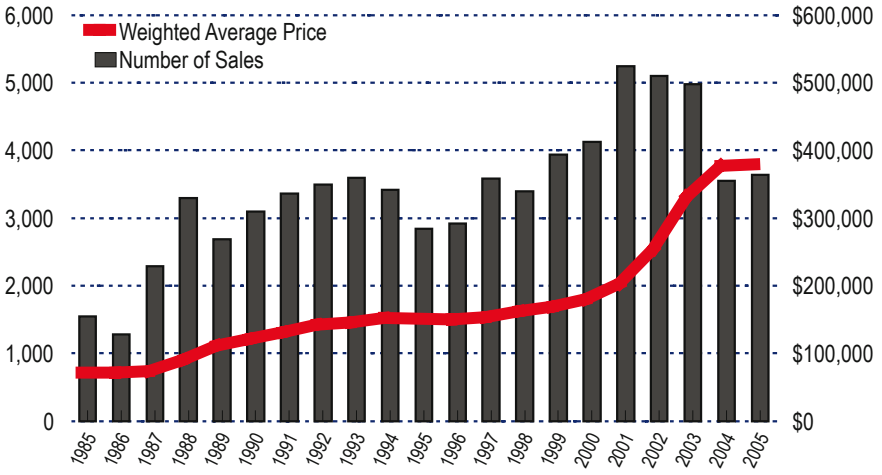


Matusik Property Insights, *April 2006. Source: Qld DNRW and Matusik database.*
Suburbs within the noise impact boundaries consist of Albion, Ascot, Balmoral, Banyo, Bowen Hills, Bulimba, Camp Hill, Cannon Hill, Carina, Clayfield, Eagle Farm, East Brisbane, Hamilton, Hawthorne, Hemmant, Hendra, Lytton, Morningside, Murrarie, Newstead, New Farm, Norman Park, Northgate, Nudgee, Nudgee Beach, Nundah, Pinkenba and Tingalpa.

Figure 2.13c: *Weighted Average House Price for Suburbs Within 10 km of Brisbane Airport and Outside Current N70 Noise Contour.*

Suburbs Outside N70 Noise Impact Boundaries

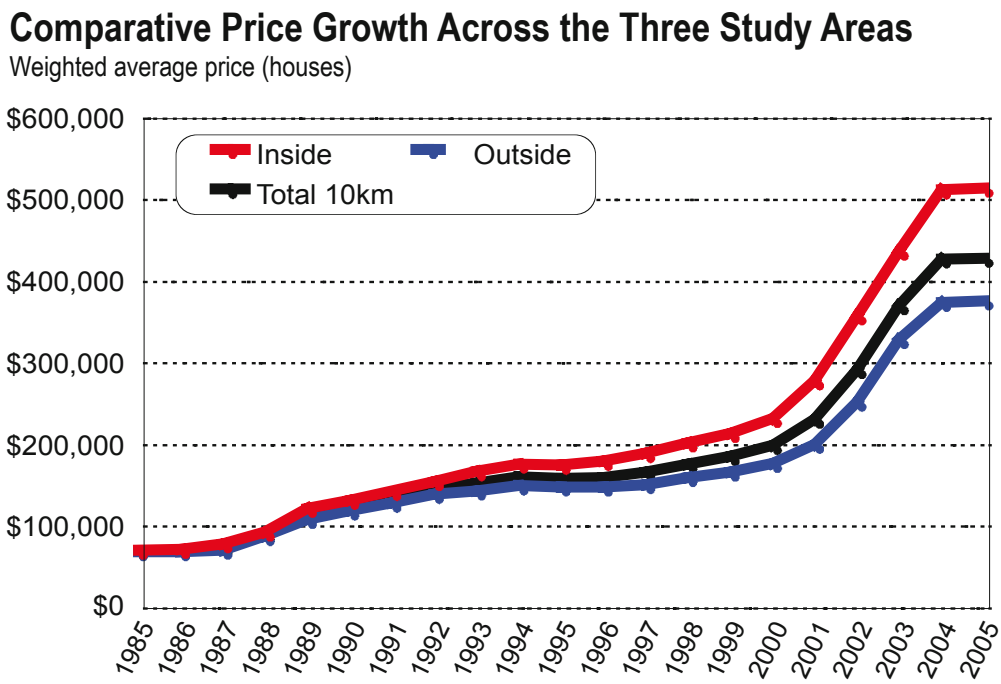
Weighted average price (houses)



Matusik Property Insights, *April 2006. Source: Qld DNRW and Matusik database.*
Suburbs outside the noise impact boundaries consist of Alderley, Aspley, Boondall, Bracken Ridge, Brighton, Carseldine, Chermside, Chermside West, Deagon, Fortitude Valley, Fitzgibbon, Geebung, Grange, Herston, Kedron, Lota, Lutwyche, Manly, Manly West, Newmarket, Sandgate, Shorncliffe, Taigum, Virginia, Wakerley, Wavell Heights, Wilston, Windsor, Wooloowin, Wynnum, Wynnum West and Zillmere.

As shown **Figure 2.13b** and **Figure 2.13c** and summarised in **Table 2.13**, those suburbs within the noise contour not only had a higher average price in 1985 ($64,500 compared to $63,500) but this price differential has increased over time, as outlined in **Figure 2.13d**.

Figure 2.13d: *Comparative Price Growth for Suburbs Within 10 km of Brisbane Airport.*



Matusik Property Insights, *April 2006. Source: Qld DNRW and Matusik database.*

In 2005, those suburbs within the 10 km boundary that are within the N70 noise contours recorded an average house price of $508,000. This is some 20 percent higher than the average across all 10 km suburbs and is due to the higher average annual capital gain (10.9 percent).

Whilst in 1985, those suburbs within 10 km of the Brisbane Airport but outside the N70 noise contours had an average house price of $63,000 (only 1 percent lower than for the entire 10 km area), by 2005 the average house price was 12 percent lower than the total suburbs within 10 km ($370,000 compared to $422,000). This is a result of a lower average annual gain of 9.3 percent.

More significantly, whilst the difference between the average house price in suburbs within the N70 noise contours and suburbs outside the N70 noise contours was only 2.4 percent in favour of the suburbs within the N70 noise contours in 1985 ($64,500 compared to $63,000), by 2005 this differential had increased to 37.3 percent ($508,000 compared to $370,000).

The findings of the above research indicate that being subject to N70 overflight noise is not a major determining factor of residential price growth, particularly compared to the macro-level effects that population growth, job creation, infrastructure investment and dwelling supply have on the price growth of residential property. It is therefore forecast that the NPR at Brisbane Airport will not have a noticeable effect on prices of residential properties within the suburbs subject to N70 overflight noise.

The long term performance of Brisbane's residential property market is forecast to remain strong with 26 percent (130,000) of the 500,000 new dwellings needed to cater for the next 20 years growth expected to be housed in Brisbane City. According to the Queensland Government's 'South East Queensland Regional Plan', over 80 percent of the new residential development within Brisbane City is to be "infill" in nature, meaning mainly medium-density (and higher-density development where it is allowed) in existing urban areas.

Furthermore, there is no reason to believe that:

- Suburbs such as Hamilton, Ascot, Clayfield will cease being highly sought-after addresses;
- The attraction of inner-city apartment living will wane substantially; and
- Water (river, bay, and ocean) will cease to be a major driver of residential prices and demand.

For ratepayers, development of the NPR will have no real effect outside of increases related to increases in property prices and CPI/inflation generally.

2.14 Conclusions of Economic Assessment

The proposed expansion is projected to increase South East Queensland output (real GRP) and produce an increase in the standard of living for the Brisbane-Moreton community (as measured by real private consumption) above the level that would have occurred in the Without NPR scenario. The net present value of the output gain (increase in GRP) is projected to be $4.8 Billion over the period 2006 to 2035 using a 4 percent real discount rate. The net present value of the increase in economic benefit (increase in real consumption) is projected to be just over $8.2 Billion over the same period.

In the early years of the project employment increases relative to the business-as-usual case by just over 2,700 at 2009 (the peak of the increase during construction) with an ongoing increase in employment (net of displacement effects) of 7,800 by 2035 during operations.