



Australian Government

Department of Infrastructure and Regional Development

# Future Brisbane Airport Operations

*A Review of the Need for a Curfew at Brisbane Airport*

*Final Report prepared by the Brisbane Airport Curfew Review Steering Committee to  
assess the need for night-time noise mitigation strategies at Brisbane Airport*

December 2013

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# 1. Executive Summary

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A review of future Brisbane Airport operations, including any possible need for establishment of curfew arrangements, was announced by the then Australian Government in December 2009 as part of the Aviation White Paper: *Flight Path to the Future*.

The Brisbane Airport Curfew Review Steering Committee was established to conduct the review, co-chaired by representatives of the Australian and Queensland governments, and including members from the Brisbane City Council, Airservices Australia and the Tourism and Transport Forum.

The Steering Committee has sought to report on this matter balancing the economic importance of Brisbane Airport's operations and the need to minimise the impacts of aircraft noise on Brisbane residents.

Debate about aircraft noise can be polarising. On the one hand, the aviation and tourism industries and their business and leisure customers point to the contribution air travel makes to our prosperity and lifestyle. The demand statistics are compelling with air travel more popular than ever before. In the year ended August 2013, 57.4 million people travelled on Australian domestic airlines and 30.8 million on international airlines to and from Australia. Both the domestic and international air transport figures have doubled since 1999. The flow-on benefits to our business and personal connectivity is considerable.

On the other hand, increased demand for air travel inevitably leads to increased noise impact as the number of flights increase. This is not a linear relationship, as larger aircraft can accommodate more passengers without necessarily emitting more noise. In addition, modern aircraft tend to be less noisy than the older aircraft they replace and there is some scope for modern, satellite-based air traffic management procedures to be more precise about where aircraft fly, offering the potential to overfly non-residential areas where possible. This is highly relevant in Brisbane, where flights north of the airport offer the benefit of over-flying Moreton Bay and largely having no noise impact on residents.

Therefore maximising flights to and from the north of Brisbane Airport is a key objective in the airport's noise management strategy. The Steering Committee believes that the construction of a new parallel runway will assist with this objective, and, notwithstanding the increased traffic that the new runway will facilitate, the future airport configuration offers some respite to the residents of Brisbane most affected by aircraft noise.

The review received 84 submissions in response to a discussion paper released in August 2013. The majority of these were from Brisbane residents, with the remainder from industry and business groups.

- 46 members of the public supported the introduction of a curfew;
- 28 organisations and 2 residents opposed to the introduction of a curfew; and
- 8 submissions were unclear or unstated regarding a curfew.

Those supporting the introduction of a curfew were heavily concentrated under the southern instrument approach flight path to Brisbane airport. The perspective of these residents is understandable. Aircraft must take-off and land into any significant wind for safety reasons, so when prevailing winds are from the north, aircraft need to approach the airport using the instrument approach over Brisbane's southern suburbs. In peak times, aircraft movements can, at times, occur every few minutes.

Those residents supporting a curfew generally saw this as one measure in a package of noise amelioration measures that could be considered. Some residents called for measures that are not able to be implemented, such as moving the airport or the main approach path.

In contrast, the aviation industry (both airports and aircraft operators), business (predominantly related to the tourism and mining industries), and state and local government did not support the introduction of a curfew. They provide a number of arguments that a curfew would be a poor policy approach for Brisbane Airport in terms of direct and indirect economic and operational impact and inconvenience to passengers.

Importantly, the Steering Committee considered views expressed in submissions that questioned the environmental effectiveness of a curfew at Brisbane Airport. While some flights scheduled during the 11pm to 6am period would be cancelled, others would be transferred into the late evening and early morning peaks periods. Analysis of complaints data shows that these late evening and early morning periods are also very sensitive times for residents impacted by aircraft noise. Further concentration of aircraft movements into these periods would not only create operational difficulties for airlines, but could also hamper the use of more flexible operations using over-water procedures which often require lower demand conditions.

Having considered the submissions received, the lack of support from the state and local government and industry; the significant costs a curfew would impose and the uncertain environmental benefits a curfew may deliver, the Steering Committee believes that the establishment of curfew restrictions at Brisbane Airport is not the appropriate policy response for the management of aircraft noise impacts on Brisbane residents.

There are already significant capacity constraints in the post 6am morning peak. Brisbane Airport is facing significant challenges in accommodating runway demand between now and the commissioning of its new parallel runway. A curfew would no doubt exacerbate these challenges.

The Steering Committee encourages Brisbane Airport to continue to work with airlines, governments and communities to balance community amenity and the effective operations of Brisbane Airport including through the continued pursuit and development of:

- technologies such as *Smart Tracking* – known in the industry as Required Navigation Performance - advanced satellite navigation procedures which have the potential to provide an alternative approach to the current instrument landing system concentrated over the southern suburbs;
- continued investment in modern, quieter aircraft;
- land use planning decisions and information disclosure which take into account the effects of aircraft noise on future residents;
- continuous monitoring and improvement of Noise Abatement Procedures – preferred runways and flight paths which minimise noise exposure to residents;
- the planned New Parallel Runway (NPR) to maximise movements over Moreton Bay and to lessen the relative flight concentration currently experienced under the southern approach flight path noting the requirements of the Airport's regulatory approval for the NPR which lays out specific public consultation milestones ahead of the commissioning of the runway;
- community consultation initiatives such as the Brisbane Airport Community Aviation Consultation Group, the Brisbane Airport Experience Centre and the Airport's web- based aircraft noise information which have facilitated a more informed dialogue between the Airport and the wider Brisbane community.

The Steering Committee encourages all parties to participate meaningfully in the 2014 Brisbane Airport Master Plan process and in consultation processes leading up to the delivery of the new parallel runway. Submissions received during the consultation phase of the review will be provided to Brisbane Airport Corporation for consideration during the master planning process.

A strong and growing Brisbane Airport plays a significant role in the Queensland and national economies through its importance to the tourism, mineral and resources sectors and the broader business community. A recent Deloitte Access Economics study commissioned by Brisbane Airport Corporation found that by 2033-34 the airport will generate an annual benefit of:

- \$13.4 billion in direct and indirect economic contribution to the Australian economy;
- \$7.6 billion in tourism activity; and
- more than 88,000 jobs Australia-wide.

A curfew would no doubt impact this contribution and the Steering Committee agrees that the impact would be considerable. Brisbane Airport Corporation estimates that 216,000 international passenger movements would be lost each year if a curfew were introduced. Of these, 111,000 would be international visitors to Australia. Additionally 112,000 domestic passengers would be lost each year if a curfew were imposed.

The Steering Committee is mindful that these statistics represent not only a loss to the airport, airline and tourism business interests, but also a lost opportunity to provide for the strong and growing demand for air travel from Brisbane residents and visitors to the city.

## 2. Introduction and conduct of the review

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This document is the final report of the Brisbane Airport Curfew Review Steering Committee on the formal review of the need for a curfew at Brisbane Airport.

The report was drafted by the review Secretariat (the Department of Infrastructure and Regional Development) on behalf of the Steering Committee:

- **Mr Andrew Wilson**, Deputy Secretary, Australian Government Department of Infrastructure and Regional Development (Co-chair);
- **Mr Paul Martyn**, Deputy Director-General Tourism, Queensland Government Department of Tourism, Major Events, Small Business and the Commonwealth Games (Co-chair);
- **Mr Kerry Doss**, Manager, City Planning, City Planning and Sustainability Division, Brisbane City Council;
- **Mr Ken Morrison**, Chief Executive, Tourism and Transport Forum; and
- **Mr Greg Hood**, Executive General Manager, Air Traffic Control, Airservices Australia.

The Steering Committee's terms of reference were to consider and advise on:

- the contribution of Brisbane Airport to the local, regional and national economy;
- the current and forecast night-time noise profile of the Airport;
- existing strategies to mitigate night-time noise impacts and their effectiveness, including the outcomes of Airservices Australia's review of Brisbane Airport's noise abatement procedures;
- potential practical strategies, consistent with the International Civil Aviation Organization's 'Balanced Approach', to further mitigate night-time noise impacts at the Airport, including:
  - the impact of the new parallel runway on the night-time noise profile of the Airport and the potential for the new runway to be used in managing night-time noise; and
  - the potential for advanced satellite-based technologies to reduce the night-time noise profile at the Airport;
- the operational, social, economic and environmental implications of imposing a curfew requirement on categories of aircraft operations at the Airport; and
- the need for additional night-time operational measures at Brisbane Airport and what form any such measures should take.

In December 2009 the then Australian Government committed to a review of the need for a curfew at Brisbane Airport as part of the Aviation White Paper: *Flight Path to the Future*. The review commenced in 2012 with the establishment of a high-level steering committee. On 5 August 2013 the Steering Committee released a discussion paper *Future Brisbane Airport Operations - A Review of the Need for a Curfew at Brisbane Airport* for public comment.

The discussion paper described Brisbane Airport's operations both present and projected, the associated noise impacts, the noise mitigation strategies used to date and the potential to improve those strategies in the future to better manage night-time aircraft noise at Brisbane Airport. It also

described the role of airport curfews in other cities and attempted to examine the issues that would assist in deciding whether an airport curfew is an appropriate night-time noise management strategy at Brisbane.

Submissions were invited from 5 August 2013 to 31 October 2013.

The Steering Committee has now considered all public submissions to the review and this document is its final report on the need for a curfew at Brisbane Airport. This final report together with the discussion paper reviews all the available evidence in accordance with the Steering Committee's terms of reference for the review.

This report will be presented to the Deputy Prime Minister and Minister for Infrastructure and Regional Development, the Hon Warren Truss MP, for his consideration.



# 3.About Brisbane Airport

## 3.1 History

Airline operations commenced at the site of what is now Brisbane Airport as early as 1926. Preparation for the modern Brisbane Airport began in 1971 with the reclamation of nearby Cribb Island to establish a modern airport to cater to the future needs of the city.

Brisbane Airport is situated on a 2,700 hectare site 15 km north-east of the Brisbane central business district. The Airport sits on a reclaimed portion of a river delta at the mouth of the Brisbane River. The current Brisbane Airport site was established and became operational in 1988. The location of the Airport is illustrated in Figure 1.

Brisbane Airport has a large buffer zone between the end of the existing main runway, with the nearest residence 6.7km from the runway centreline and conservation/green space and industrial land uses occupying the areas immediately surrounding the Airport. This compares favourably to other capital city airports, where the nearest residences are closer – for example, Melbourne (6km), Perth (1.8km), Sydney (0.7km) and Adelaide (0.6km).

The International Terminal Building and associated apron taxiways opened in September 1995. This was supplemented by the establishment of services and facilities for business and industry development, establishment of a range of additional operators and tenants, extension of the Domestic Terminal Building and extension of Airservices Australia facilities.

The Airport in its current configuration has been in operation since 1988, along with the current control tower and domestic terminal. The then-Australian Government anticipated that the redeveloped Brisbane Airport would operate curfew-free, a position informed by a Report of the House of Representatives Select Committee on Aircraft Noise, 'Aircraft Operations and the Australian Community', in September 1985.

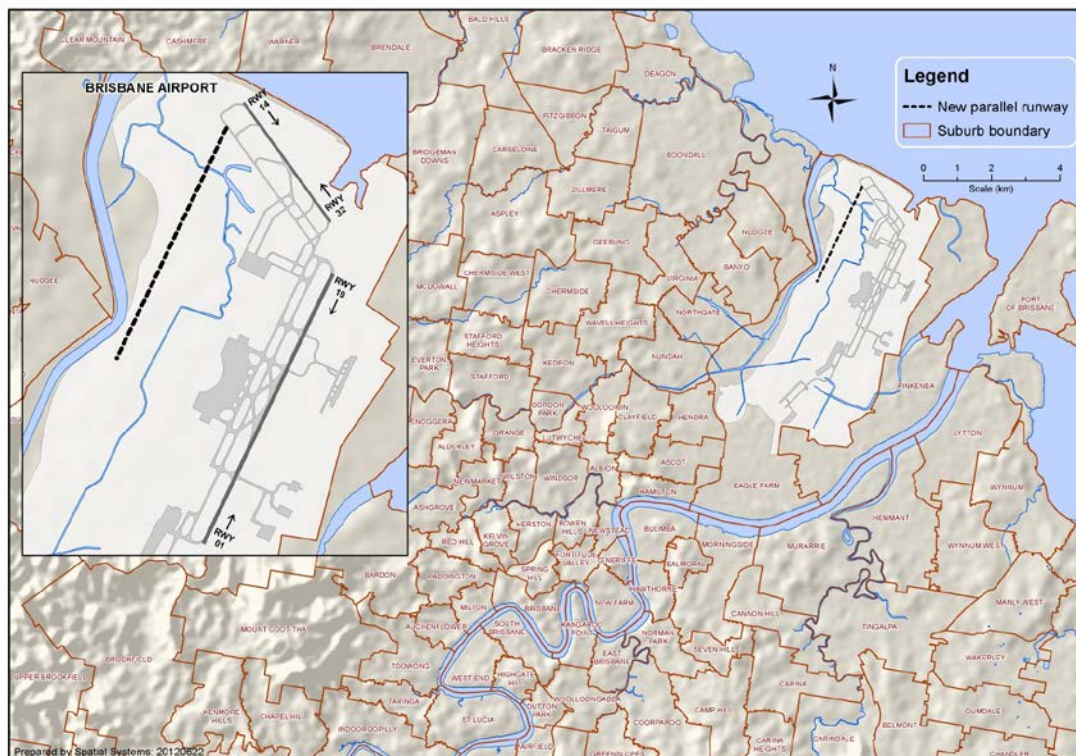


Figure 1: Location of Brisbane Airport

## 3.2 Activity and growth

Brisbane Airport is Australia's third-busiest airport, providing services to 27 airlines flying to 43 national and 29 international destinations. In 2011-12, Brisbane Airport recorded 21.0 million passenger movements: 4.5 million international and 16.5 million domestic<sup>1</sup>. There were 178,195 aircraft movements in this period<sup>2</sup>.

Brisbane Airport expects passenger movements to increase to 43 million by 2028-29.

Brisbane is also Australia's third-busiest international air freight port. The Airport currently handles approximately 12 percent of Australia's international air freight and 15 percent of the country's domestic air freight. The Airport estimates that international freight volumes will almost double from 149,000 tonnes in 2008-09 to over 270,000 tonnes by 2028-29<sup>3</sup>. In coming years, the airport also expects to see a substantial increase in fly-in, fly-out (FIFO) operations related to the mining and resources industry.

Brisbane is also Australia's largest capital city airport by land size with over 420 servicing businesses and 20,000 on-site workers.

## 3.3 Economic and social contribution

Aviation contributes substantially to the national economy. In 2010-11, the gross value added by the air and space industry to the Australian economy was over \$6.8billion<sup>4</sup>. In May 2012, over 54,000 Australians were directly employed in the air and space industries, with nearly 80 per cent of them full-time employees<sup>5</sup>. The aviation industry is also of vital importance to Australia's trade and tourism industries.

A recent Deloitte Access Economics study commissioned by Brisbane Airport Corporation (BAC) found that by 2033-34 Brisbane Airport will generate an annual benefit of:

- \$13.4 billion in direct and indirect economic contribution to the Australian economy;
- \$7.6 billion in tourism activity; and
- more than 88,000 jobs Australia-wide.

In the 2009 Brisbane Airport Master Plan, it was reported that during 2008 the Airport would directly contribute an estimated:

- \$3.2 billion in output to the South-East Queensland economy;
- \$1.4 billion in spending in the wider community;
- \$840 million in total wages for people working on the Airport; and
- 16,000 Full Time Equivalent jobs.

Brisbane Airport forecasts that by 2029 employment at the Airport will increase to more than 50,000 jobs. The Airport also estimates that as a result of planned expansion, by 2029, the cumulative economic impact for the South-East Queensland region will:

- increase Gross Regional Product by \$1.2 billion;
- increase real household consumption by \$1.7 billion; and

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<sup>1</sup> Brisbane Airport Passenger Statistics, <http://www.bne.com.au/corporate/media-centre/passenger-statistics>

<sup>2</sup> 'Bureau of Infrastructure, Transport and Regional Economics, Airport Traffic Data, [http://www.bitre.gov.au/publications/ongoing/airport\\_traffic\\_data.aspx](http://www.bitre.gov.au/publications/ongoing/airport_traffic_data.aspx)

<sup>3</sup> Brisbane Airport Master Plan 2009

<sup>4</sup> ABS cat. No. 5206.0, June 2011, Table 33.

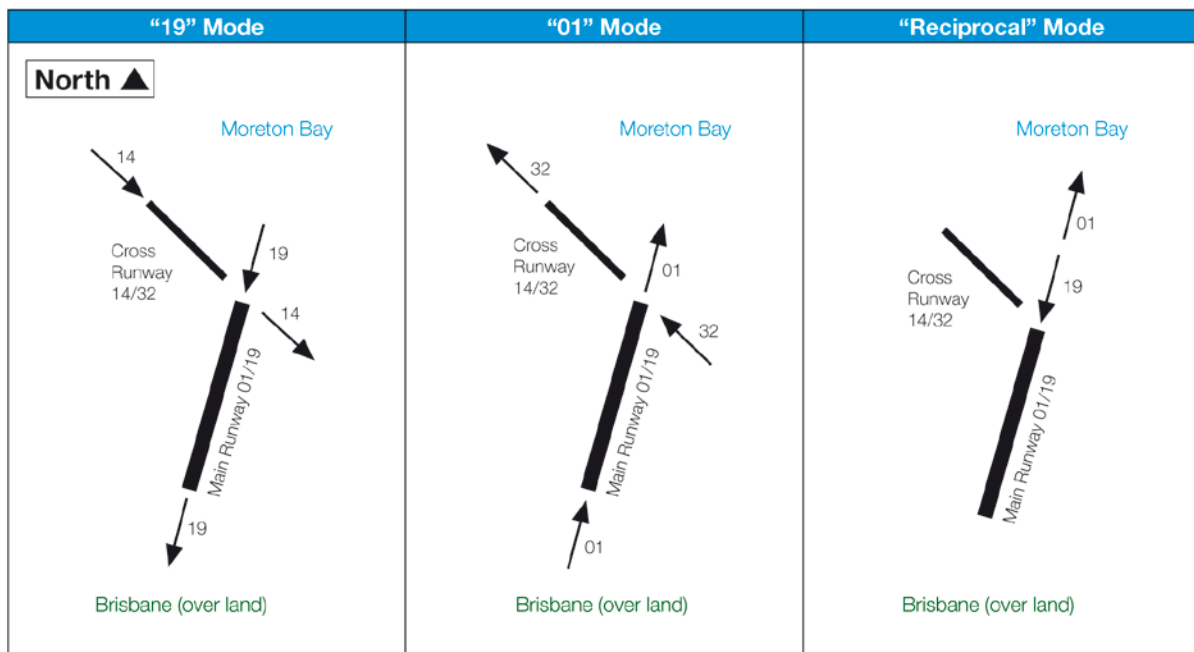
<sup>5</sup> ABS cat. No. 6291.0.55.003, Table 6.

- increase jobs in the region for approximately 11,000 workers in addition to the projected increase in jobs at Brisbane Airport<sup>6</sup>.

### 3.4 Runway layout and use

The current configuration of the airport means that, unless there is very low levels of activity (less than 10 movements per hour), it is necessary to operate all traffic in one direction to maintain aircraft separation.

When operating in a northerly direction, aircraft arrive over inner-city suburbs, including Coorparoo, Norman Park and Morningside, and depart over Moreton Bay. When operating in a southerly direction, aircraft arrive over Moreton Bay and depart over a number of southern and eastern suburbs (depending on the aircraft’s intended destination), such as Hemmant, Tingalpa, East Brisbane and West End. Figure 2 shows the existing modes of operation at Brisbane Airport.



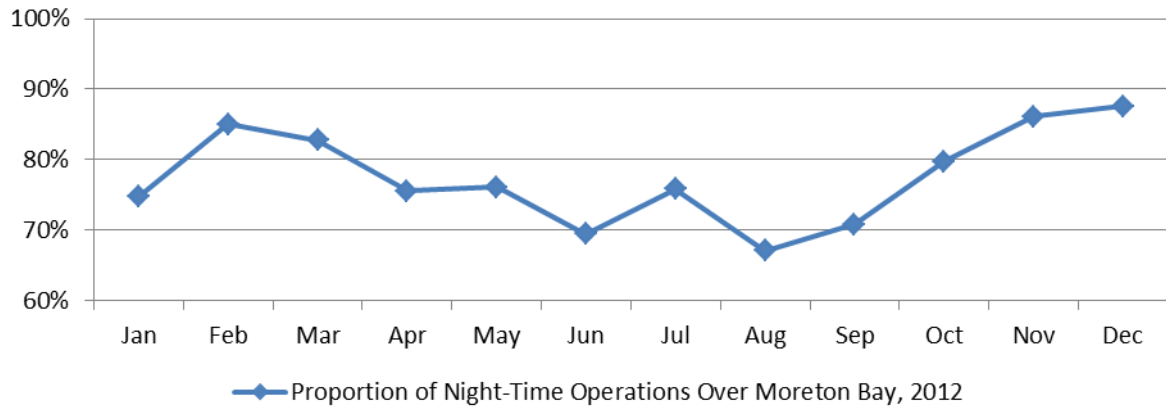
**Figure 2: Existing modes of operation at Brisbane Airport**

Wind direction and speed are important determinants of the direction from which aircraft can land or take off and the consequent exposure of communities to noise. For safety reasons, aircraft must take-off and land into the wind. Wind directions at Brisbane Airport are characterised by distinct seasonal patterns. In summer, winds at the Airport predominantly come from a north to north-easterly or south-easterly direction. In winter, they are predominantly from a south to south-westerly direction.

About 68 percent (summer) and 82 percent (winter) of all operations at night (11:00pm – 6:00am) have been directed over Moreton Bay in recent years<sup>7</sup> (see Figure 3), through the ‘Reciprocal Mode’ of operation. When the Reciprocal Mode of operation is unavailable due to weather or traffic conditions, Mode 19 or Mode 01 is used, which involves departures or arrivals, respectively, taking place over Brisbane.

<sup>6</sup> Brisbane Airport Master Plan 2009

<sup>7</sup> Airservices Australia NFPMS Data



**Figure 3: Proportion of Night-Time Operations Occurring Over Moreton Bay (11:00pm – 6:00am) 2012**

## 4. Aircraft Noise

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### 4.1 Why is aircraft noise a problem?

While not all individuals exposed to aircraft noise are negatively affected by it, evidence is available through organisations including the World Health Organization and the International Civil Aviation Organization (ICAO) detailing the impacts of night time noise on sleep, health and cognitive performance. According to ICAO, aircraft noise is the most significant cause of adverse community reaction to the operation and expansion of airports.

Reaction to aircraft noise is subjective and is influenced by a number of factors, including fear of an aircraft accident, attitudes towards the aviation industry and personal sensitivity to noise. Issues of concern to the public include the level of noise generated by individual aircraft, increasing numbers of flights and decreasing periods of respite. Particular concerns include increased movements during the sensitive night-time period and reduced respite periods on weekends. The issue of community exposure and reaction to aircraft noise is not confined to areas 'close in' to an airport.

Australian governments and the aviation industry have, over recent years, implemented a range of measures to minimise the impacts of aircraft noise, including:

- stricter aircraft noise standards on older, noisier jet aircraft at major airports;
- establishment of an Australian Aircraft Noise Ombudsman to:
  - independently review noise complaints handling procedures and make recommendations for improvements where necessary; and
  - improve Airservices' consultation arrangements and the presentation and distribution of aircraft-related information to the general public;
- improved community consultation measures; and
- a program of work with states and territories to improve assessment of aircraft noise in land-use planning decisions.

### 4.2 ICAO guidance on the Balanced Approach to aircraft noise management

ICAO is the United Nations specialised agency that serves as a forum for cooperation in all fields of civil aviation among its 191 Member States. Australia is a founding member of ICAO and sits on its Governing Council.

In 2001, the ICAO Assembly endorsed the concept of a 'Balanced Approach' to aircraft noise management. In 2007, the Assembly reaffirmed the 'Balanced Approach' principle and called upon States to recognise ICAO's role in dealing with the problems of aircraft noise.

The 'Balanced Approach' concept involves identifying the noise problem at an airport and then analysing the various measures available to reduce noise, in the most cost-effective manner, through exploration of four principal elements, namely:

1. **Reduction at source (quieter aircraft).** Much of ICAO's effort to address aircraft noise over the past 40 years has been aimed at reducing noise at source. Aeroplanes and helicopters built today are required to meet the noise certification standards adopted by the Council of ICAO.
2. **Land-use planning and management.** Land-use planning and management is an effective means to ensure that the activities nearby airports are compatible with aviation. Its main goal is to minimise the population affected by aircraft noise by introducing land-use zoning around airports. Compatible land use planning and management is also a vital instrument in ensuring

that the noise reduction gains achieved by latest generation aircraft are not negated by inappropriately locating noise sensitive land uses around airports.

3. **Noise abatement operational procedures.** Noise abatement procedures include, for example, preferential runways and routes, particular procedures for take-off, approach and landing, or curfews. The appropriateness of any of these potential measures depends on the physical layout of the airport and its surroundings, but in all cases the procedure must give priority to safety considerations.
4. **Operating restrictions.** Noise concerns have led some States, mostly developed countries, to consider banning the operation of certain noisy aircraft at noise-sensitive airports.

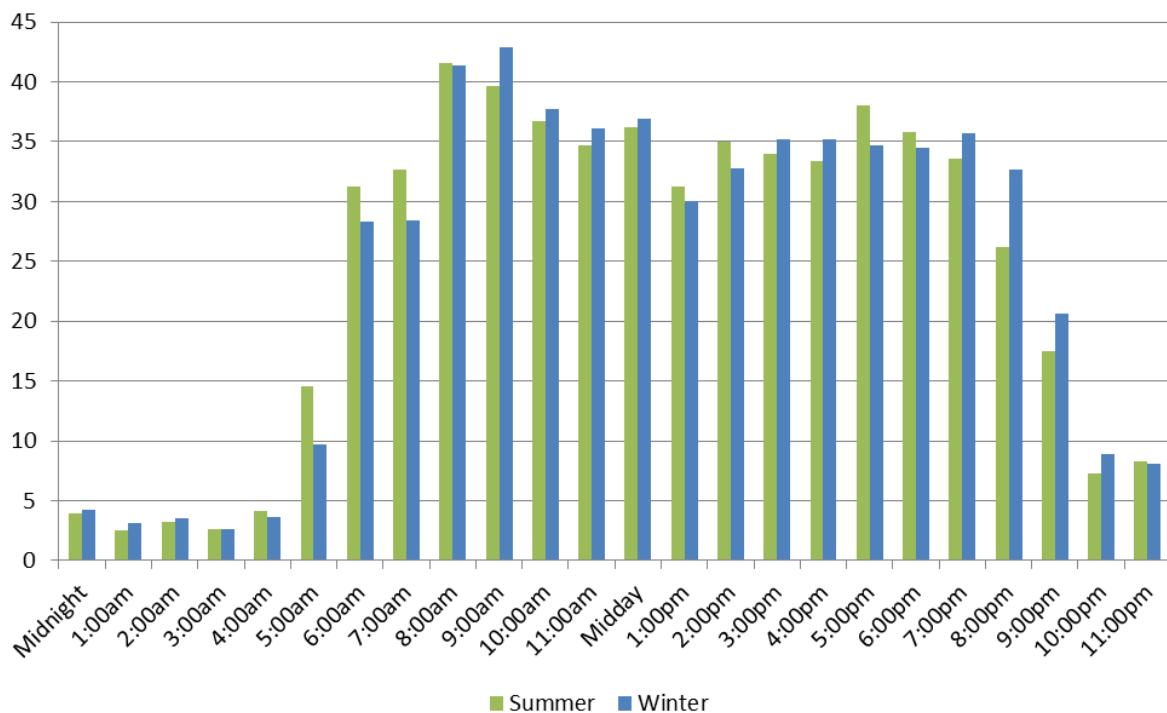
Further information about the ICAO Balanced Approach can be found at:

<<http://www.icao.int/environmental-protection/pages/noise.aspx>>.

It should be noted that the ICAO Balanced Approach recommends operating restrictions only be considered when other measures have proved to be inadequate.

### 4.3 Night-time aircraft noise at Brisbane

As a curfew-free airport, Brisbane Airport experiences aircraft movements at all times of the day and night. Figure 4 shows the average number of movements (take-offs and landings) per day in 2012, separated by time of day and season.



**Figure 4: Average Daily Brisbane Airport Aircraft Movements, Per Hour, 2012**

The vast majority of take-offs and landings at the Airport occur during the day and early evening. Less than seven per cent of all aircraft movements occur at night (11:00pm – 6:00am). The occurrence of daylight saving in other states during summer tends to result in a substantial increase in the number of aircraft movements between 5:00am and 6:00am during this time (October to March), particularly to facilitate the arrival of business travellers for a full business day in southern destinations.



Latest analysis of Airservices' data shows that, in 2012, an average of 23 jet aircraft movements (21 in winter, 25 in summer) operated between the hours of 11pm and 6am, with 17 of these operating over the bay.

### 4.3.1 Forecast future night-time noise

Table 1 below sets out the expected average day aircraft movements for 2020 (using the current runway system) and 2060 (using the parallel runway system) between the hours of 11pm-6am, according to Brisbane Airport's ultimate capacity forecast prepared for its 2014 Master Plan. The forecast reveals that certain areas south of the Brisbane River will be exposed to an average of 10 movements in this period in 2020. It should be noted that this data refers to average exposure. It could be expected that on many nights residents could expect no aircraft movements, while on some nights there would be more movements.

In 2060, with the airport forecast to be operating at full capacity using a parallel runway system, southside residents could expect an average of 9 over-flights in winter and 18 in summer. It should be noted that, with the parallel runway system, the over-flights would be spread over a wider area and that the exposure of individual residents would be approximately half the total.

	Winter			Summer		
	2012	2020	2060	2012	2020	2060
Jets (11pm – 5am)	17	27	55	15	24	50
Jets (5am – 6am)	4	9	21	10	15	30
<b>Total Jets (11pm – 6am)</b>	<b>21</b>	<b>36</b>	<b>76</b>	<b>25</b>	<b>39</b>	<b>80</b>
Over Moreton Bay (11pm – 5am)	14	23	51	11	22	44
Over Moreton Bay (5am – 6am)	3	3	16	6	7	18
<b>Over Moreton Bay (11pm – 6am)</b>	<b>17</b>	<b>26</b>	<b>67</b>	<b>17</b>	<b>29</b>	<b>62</b>

*Table 1: Average Daily Brisbane Airport Jet Aircraft Movements, Per Day, 2012, 2020, 2060*

## 4.4 Noise monitoring

Airservices Australia has established a Noise and Flight Path Monitoring System (NFPMS) at Australia's major airports, including Brisbane. It has been designed to monitor aircraft noise as measured on the ground. Brisbane's NFPMS has five strategically located Noise Monitoring Terminals (NMTs) at Tingalpa, Cannon Hill, Bulimba, Kedron and Nudgee Beach.

The information collected by the NFPMS is used for several purposes, including to assess the effects of operational and administrative procedures for noise control, and compliance with these procedures or to assist in reviewing noise complaints, with outcomes reported quarterly on the Airservices Australia website.

## 4.5 Brisbane Airport complaints data

Complaints about noise originating from Brisbane Airport demonstrate the subjective nature of reactions to aircraft noise, including how exposure to aircraft noise can be a particularly negative experience for some people. Complaints data over the past three years are characterised by a very small number of complainants accounting for a very high proportion of complaints. Between 1 September 2009 and 31 May 2012, there were 16,980 noise complaints from 915 unique complainants. However, the top four complainants accounted for over 80 per of all these complaints, with the most frequent complainant alone lodging 11,428 complaints during the period.

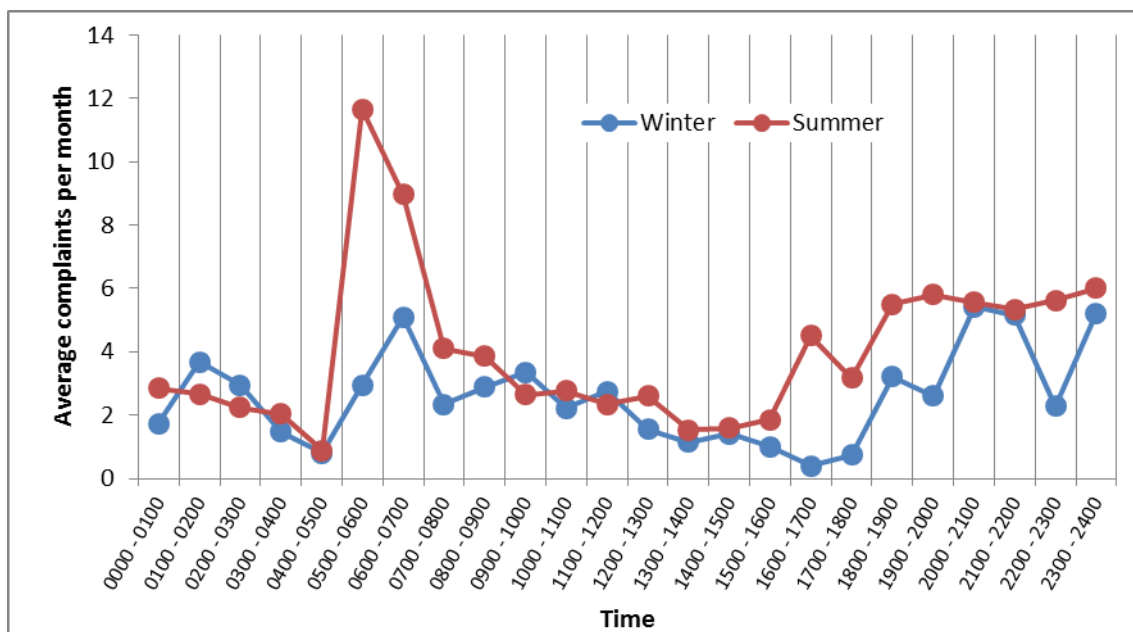
The disproportionately high number of complaints from these complainants obscures the underlying trends in the complaints data, and the top four complainants have therefore been discounted from the following analysis.

Outside of the top four complainants, the data shows that there were 3,301 complaints during this 32-month period – an average of 3.3 complaints per day. Of the 911 unique complainants, 605 lodged only one complaint. The remaining 306 complainants (who lodged multiple complaints) therefore lodged an average of 8.8 complaints each during the period.

The 3,301 complaints originated from 160 different suburbs. The top ten suburbs by number of complaints, which accounted for almost two-thirds of all complaints, were as follows (total complaints in brackets):

1. Morningside (480)
2. Tingalpa (373)
3. Cannon Hill (244)
4. Holland Park (181)
5. Seven Hills (173)
6. Murarrie (172)
7. Wakerley (159)
8. Coorparoo (148)
9. Camp Hill (140)
10. Ashgrove (65)

As noted above, the absence of daylight saving in Queensland tends to result in a substantial increase in the number of aircraft movements between 5:00am and 6:00am during summer. This is reflected in the complaints data, with Figure 5 showing how the average number of complaints per month spikes sharply during this time.



**Figure 5: Brisbane Airport noise complaints, average per month, 1 Sep 2009 – 31 May 2012**

Noise complaints can be expected to reflect the level of aircraft movements at any given time of day. Despite the significantly reduced frequency of flights, night-time hours are expected to show a



higher proportion of complaints, given the increased sensitivity of this period and lower ambient background noise levels. These trends are reflected in the complaints data, with the number of noise complaints per 1,000 aircraft movements being far higher at night than during the day (Figure 6). Interestingly, the number of complaints is generally higher during summer (October to March) than winter (April to September), perhaps reflecting the public's increased outdoor lifestyle, and consequent greater exposure to aircraft noise, during this period.

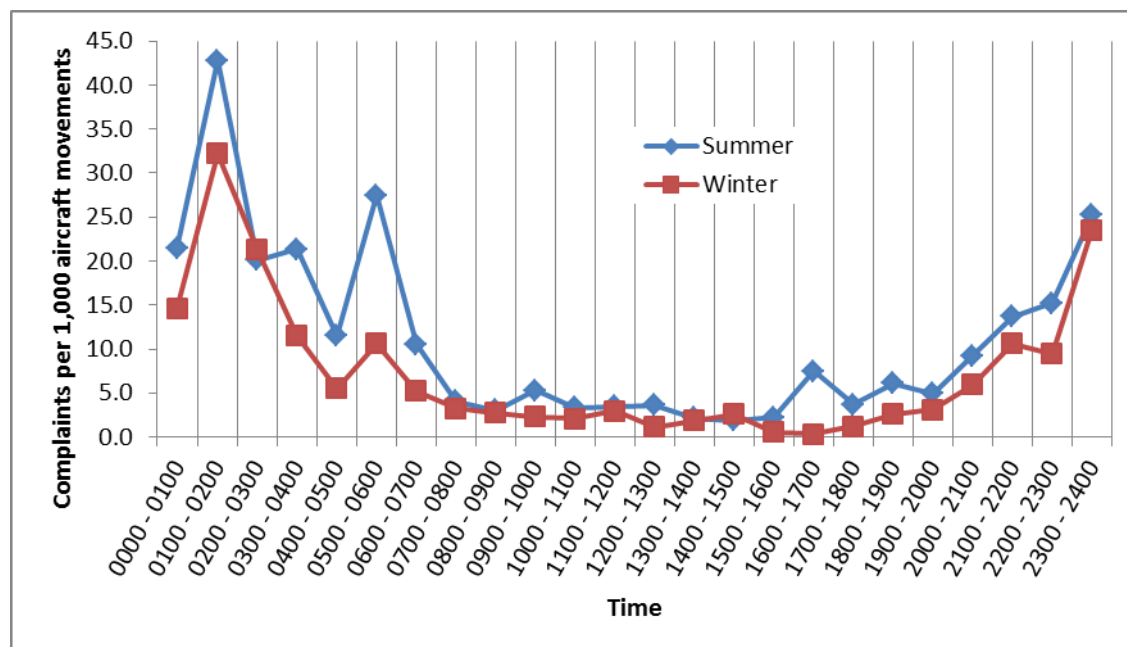


Figure 6: Brisbane Airport noise complaints per 1,000 aircraft movements, calendar 2011

#### 4.6 Australian airport noise complaint data

Table 2 sets out noise complaint and complainant data per 10,000 aircraft movements<sup>8</sup> at the five busiest Australian airports. It shows that Brisbane Airport generates the third-highest number of complaints and complainants out of these five airports.

The Airport receives around half the complaints of Sydney Airport, which operates under a curfew. However, the Airport also has fewer complaints than Perth Airport, which does not have a curfew. Note that complaints data for Brisbane, Sydney and Perth Airports are all influenced heavily by a small number of complainants who lodge a very high number of complaints.

Airport	Reference Period	Complaints per 10,000 aircraft movements	Complainants per 10,000 aircraft movements	Distance (m) from runway to nearest residence
Adelaide	January – June 2012 (6 months)	52	18	600
Sydney		993	73	700
Perth		1664	96	1800
Melbourne		38	16	6000
Brisbane		477	31	6700

Table 2: Comparison of aircraft noise complaints, selected Australian airports, various time periods

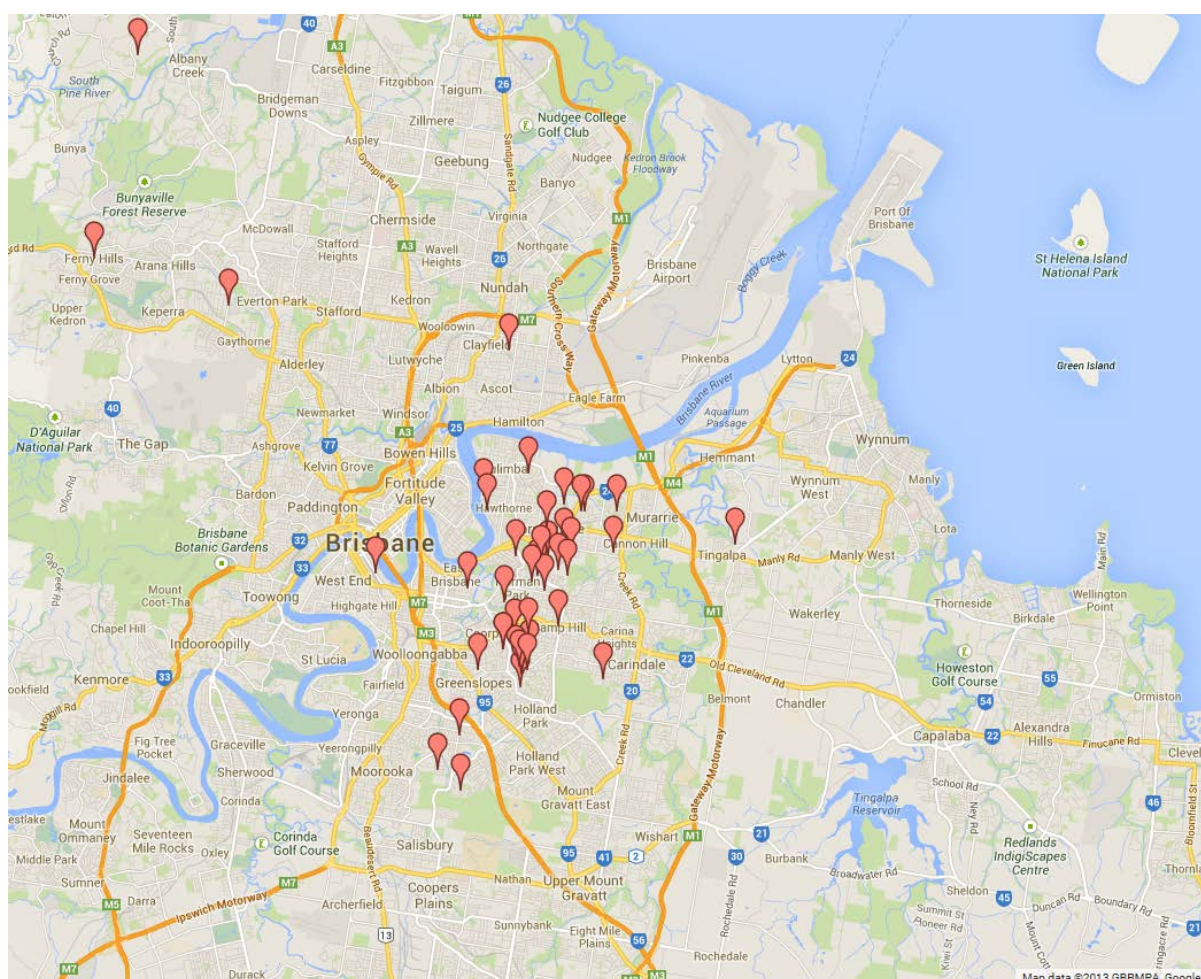
<sup>8</sup> 'Curfews at international Airports – A study of current practice summary booklet', BAC October 2010 and 'Curfews at international Airports – a study of current practice', J. Bulicke

## 5.Submissions received

In total the review received 84 submissions following the release of the discussion paper in August 2013. The majority of these were from Brisbane residents, with the remainder from industry and business groups. Broadly:

- 46 members of the public supported the introduction of a curfew;
- 28 organisations and 2 residents opposed to a curfew; and
- 8 submissions were unclear or unstated regarding a curfew.

Those supporting the introduction of a curfew were heavily concentrated under the southern approach flight path to Brisbane airport in suburbs such as Coorparoo, Seven Hills, Morningside, East Brisbane, Norman Park and Camp Hill (see Figure 7 below).



**Figure 7: Location of residents supporting a curfew**

In contrast, the aviation industry (both airports and aircraft operators), business (predominantly related to the tourism and mining industries), and state and local government did not support the introduction of a curfew. Table 3 below provides more detail on those opposed to the introduction of a curfew.

Airports	Aircraft operators	Other
Australian Airports Association	Alliance	Accor
Brisbane Airport Corporation	Board of Airline Representatives Australia	Mantra Group
BAC Holdings	Pel-Air	Meriton Group
Cairns Airport	Regional Aviation Association	Property Council of Australia
Canberra Airport	Royal Flying Doctor Service	Australian Tourism Export Council
Hobart Airport	Qantas	Queensland Tourism Industry Council
Melbourne Airport	Toll Group	Tourism & Transport Forum
Northern Territory Airports	Virgin Australia	Brisbane City Council
Sydney Airport Corporation Ltd		Chamber of Commerce & Industry Queensland
		Queensland Government
		Queensland Resources Council
		Residents

**Table 3: Submissions opposed to a curfew**

## 6. Curfew considerations

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Airport curfews are one way of managing night-time aircraft noise and providing communities around airports with some respite.

Night-time operations at Sydney, Adelaide, Essendon and Gold Coast Airports are strictly limited by curfews between 11:00pm and 6:00am. Curfew arrangements are established under the *Sydney Airport Curfew Act 1995*, the *Adelaide Airport Curfew Act 2000*, the Air Navigation (Coolangatta Airport Curfew) Regulations 1999, and the Air Navigation (Essendon Airport) Regulations 2001.

The curfew arrangements at these four airports have arisen primarily due to the proximity of residents to the end of the runway at each airport. The nearest houses to the southern end of the Brisbane Airport main runway are 6.7km away, as compared to less than 1km at Sydney, Adelaide, Gold Coast and Essendon Airports.

Curfews, however, do not restrict all night-time aircraft movements. While each airport's legislation varies slightly, all curfew airports provide exemptions for emergency operations, including air ambulance and search and rescue aircraft, and for dispensations to be granted in exceptional circumstances. Legislation also allows certain low-noise aircraft to operate unrestricted during curfew hours. Such aircraft include some small jets (less than 34,000kg), low-noise heavy freight jets (usually BAe 146 and B737 aircraft) and most propeller-driven aircraft.

Existing curfew arrangements also permit a limited number of 'shoulder' movements of passenger aircraft on a quota basis during curfew periods to address the time differences during northern hemisphere summer and to fit in with international flight schedules and other international airport curfews.

Curfews apply only to take-offs and landings at the specified airport, and do not apply to movements at any other nearby airports or to aircraft flying over or in the vicinity of the curfew airport.

### 6.1 Arguments against a curfew

The review received numerous submissions detailing the negative impacts that can arise from the introduction of legislated operating restrictions, particularly a night-time curfew.

There is significant national benefit in maintaining a national network of curfew-free airports. Curfews impact on the efficient movement of passengers and freight, not just at the airport to which the curfew applies, but to the whole network. For example, a curfew has the potential to restrict an airport's ability to recover from flight delays caused by adverse weather, which can in turn cause flow-on delays at airports across the country.

Furthermore, curfews can indirectly impact other airport regions by shifting the night-time noise problem to another region or can lead to shifted demands and new peaks during the rest of the operating day, particularly in the noise-sensitive late evening and early morning periods.

The key reasons against introducing a curfew raised in the submissions include:

1. The economic cost of lost flights - flights cannot necessarily transfer to daytime slots, often the airlines will take the aircraft asset elsewhere to maximise its use. Business flights which fly to southern capitals between 5am and 6am during the summer daylight savings period would be impacted. Flights servicing the resource sector would also be impacted.
2. The effect on available capacity at Brisbane, particularly ahead of the delivery of the new parallel runway. Brisbane Airport's runway capacity is currently constrained.

3. Doesn't necessarily deliver the environmental benefit – when flights are transferred to different times, they will tend to be late evening or early morning noise sensitive times.
4. Inconvenience to passengers imposed through curfew constraints – sometimes flights need to be cancelled at short notice when delays force them into curfew periods.
5. Brisbane Airport has a large buffer zone at 6.7 km – the noise problem needs to be seen in context and comparisons with Sydney and Adelaide do not take into account the greater proximity of residents there.
6. Survey results by Brisbane Airport Corporation found widespread opposition to a curfew from Brisbane residents, in part because of the additional pressures this would add to congestion at Brisbane.
7. Unfair regulatory impost – Brisbane Airport Corporation invested \$1.3 billion in the airport lease, an additional \$1.4 billion since then, and will invest a further \$1.3 billion in the new parallel runway. It is unclear what effect further consideration of a curfew would have on planned investments at Brisbane.

### **6.1.1 The economic cost – flights cannot necessarily transfer to daytime slots**

International flights are dependent on overseas slot constraints. Brisbane operates in a global aviation network and has little flexibility in international flight times. As a result relatively high shares of current night flights are likely to be cancelled were a curfew introduced.

Domestic flights are dependent on business demand, particularly in summer. Early morning flights are vital for inter-state business travel. This is particularly important as Queensland does not have daylight savings. During other states' daylight savings period, flights from Brisbane to Melbourne, Sydney and Canberra are required to leave prior to 6am to land in-time for the business day. The introduction of a curfew would prevent this, likely seeing these flights cancelled and significantly impeding inter-state commerce.

There are already significant capacity constraints in the post 6am morning peak. Brisbane Airport is facing significant challenges in accommodating runway demand between now and the commissioning of its new parallel runway. A curfew would no doubt exacerbate these challenges.

Fly in fly out operations are dependent on resource industry shifts. Over recent years, the resources industry has worked collaboratively with the Brisbane Airport and regional air service providers to establish regular links to resource locations, in particular to provide access for FIFO workers and key services from Brisbane. The timetables for these services are now well established and integrated with rosters at the mines. Alteration to the timing or restriction of the frequency of these services will have a negative impact on the productivity of existing operations and on growth of the resource sector.

As one of the only curfew-free international airports on the Australian east coast, Brisbane serves an important role in accommodating diverted aircraft. Aircraft delayed due to weather that cannot meet the Sydney, Newcastle or Gold Coast curfews often divert to Brisbane as an alternate destination. While Melbourne (Tullamarine) Airport does not have a curfew, it is generally beyond the range of narrow body aircraft flying on reserve fuel to be used as a diversion destination.

A curfew would prevent Brisbane Airport from accommodating diverted flights overnight. This would result in many flights unable to meet Australian curfews to be cancelled or postponed overnight as airlines would be unwilling to take the risk of having no landing site. Cancelling and overnighing flights represents a major inconvenience for passengers and a significant cost to airlines.

There is an economic cost to the flights that would be lost through curfew constraints. Airlines will go to other locations, including overseas destinations, rather than reschedule to other hours at



Brisbane. Adverse economic development impacts of a curfew include job creation, investment attraction, foregone expenditure, increased costs of flights and limiting low cost operations.

24-hour operations at Brisbane Airport are critical to Queensland's visitor economy. Uninterrupted operations allow aircraft use to be maximised, and provides optimal schedules for international flights. If a curfew were imposed, services to key international growth destinations including Hong Kong, Singapore, Dubai and Malaysia would be jeopardised. This would risk losing 328,000 passenger movements each year, including more than 160,000 international visitors and domestic holidaymakers<sup>9</sup>.

The economic contribution of Brisbane Airport outlined in section 3.3 of this report would be impacted if a curfew were introduced. BAC estimates that 216,000 international passenger movements would be lost each year if a curfew were introduced. Of these, 111,000 would be international visitors to Australia. Additionally 112,000 domestic passengers would be lost each year if a curfew were imposed.

Around the clock operations at Brisbane Airport are vital for Queensland's competitiveness as an international tourism destination. International flights to and from Brisbane Airport operating between 11pm and 6am account for 13,000 seats every week. As many major international airports have extremely limited landing windows, if a curfew were established during this time, many of these flights could not be rescheduled. A result of which is a dead-weight loss for the state's \$22 billion visitor economy<sup>10</sup>.

Brisbane Airport's curfew-free status is also crucial for freight operations. Overnight flights allow reduced freight costs, more efficient delivery of perishable goods and permits early morning deliveries. This has assisted Brisbane Airport in becoming one of the country's prime air freight hubs, now accounting for nearly 15 per cent of Australia's international total.

In its 2009 Master Plan, Brisbane Airport Corporation estimated that the cumulative economic benefit of curfew free operations would reach \$13.6 billion by 2033-34.

### **6.1.2 Regional impacts and inconvenience to passengers imposed through curfew constraints**

Brisbane Airport plays a critical role in connecting regional Queensland. In 2012 Brisbane Airport carried around 1.4million passengers to and from regional destinations, more than twice the number of Melbourne (Tullamarine) Airport.

Brisbane Airport's role as a regional connector is significant and rapidly expanding. Approximately 33 per cent of international visitors to Queensland's region arrive via Brisbane Airport. Further, growth of mining and gas operations has led to unprecedented demand for air access to regional Queensland. Over the past three years, intra-state flights to and from Brisbane Airport have increased by almost 60 per cent. Further, charter flights in and out of Brisbane have risen from around 18,000 to 29,000 this year alone.

Brisbane Airport's curfew free operations remain central to its role as a major regional dispersal airport. Early morning flights for fly-in fly-out and business travellers to regional Queensland are highly important, given the varied and often 24-hour operations of the mining and gas industries. The introduction of a curfew would cause significant inconvenience to business travellers.

A curfew prohibits the movement of flights between the designated time period. Flights that are due to depart around the start or finish times of a curfew are vulnerable. If the flights are delayed for legitimate and unforeseen events, it may extend their departure time past the curfew. This often leads to the cancellation of the flight resulting in significant passenger inconvenience.

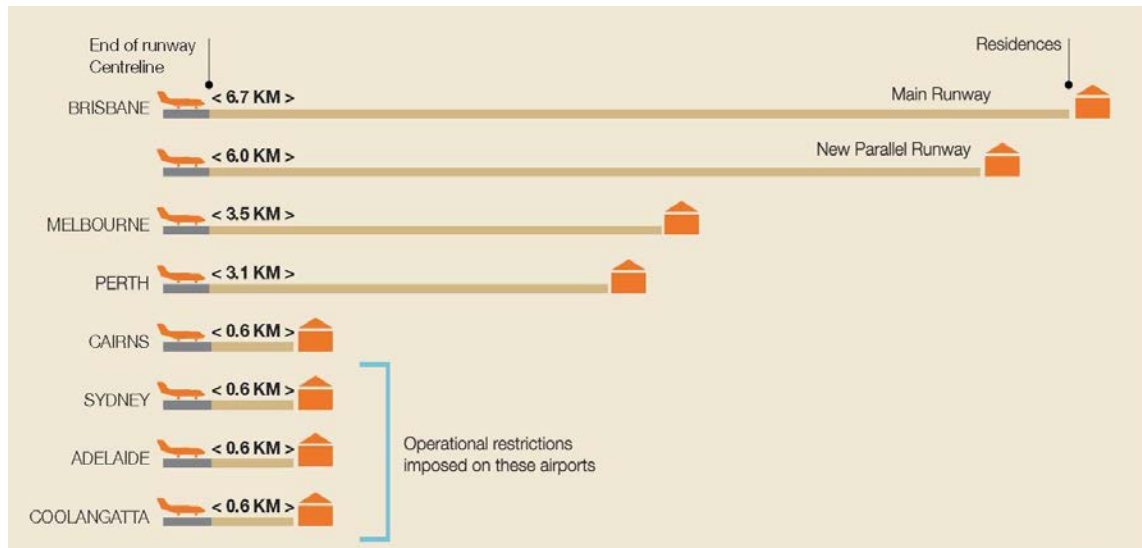
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<sup>9</sup> TTF submission to Discussion Paper: Future Brisbane Airport Operations

<sup>10</sup> TTF submission to Discussion Paper: Future Brisbane Airport Operations

### 6.1.3 Brisbane Airport has a large buffer zone

Brisbane Airport has been able to retain its curfew-free status due to effective land preservation in the broader airport precinct. Brisbane Airport has the largest noise buffer zone of any capital city airport in Australia at 6.7km. Even with the new parallel runway, Brisbane Airport's tarmac will still be more than 6km away from homes, 2.5km further than Melbourne. By comparison, Sydney, Gold Coast, Cairns and Adelaide have buffer zones of only 600 metres (Figure 8).



**Figure 8: Comparison of Australian airport noise buffer zone across**

### 6.1.4 Survey results by BAC found widespread opposition to a curfew

Aircraft noise is an inevitable concern for any airport and remains an important issue for many Brisbane residents. To better understand the perceptions of the local community, regarding aircraft noise, in 2012 BAC commissioned an independent survey of 1,400 local residents regarding the airport's curfew-free status.

The results of the survey indicated;

- 71 per cent of residents do not support the introduction of a curfew at Brisbane Airport;
- 74 per cent of residents believe a curfew would make Brisbane Airport busier in peak times;
- 69 per cent of residents believe a curfew would create problems for international travelers;
- 64 per cent believe a curfew would impact on freight and other business related traffic; and
- 61 per cent believe a curfew would impact on the Queensland tourism industry.

These findings indicate that aircraft noise remains far less of a concern in Brisbane when compared with other airports around Australia. Importantly, it also indicates the considerable value local residents place on the airport's operations, with the vast majority opposing the introduction of a curfew. It is also consistent with submissions to this review where calls for a curfew are clearly very local (Figure 7).

The opposition from many in the community to a curfew is understandable, given that its introduction would not only reduce local economic opportunities but could also exacerbate some existing noise concerns. Most noise complaints for Brisbane Airport are generally received between 6pm and 9pm, and 6am and 8am. A curfew at Brisbane Airport would increase the number of aircraft movements during these peak times, when the impact of aircraft noise is greatest.

As a result, the introduction of a curfew at Brisbane Airport would be unlikely to adequately address aircraft noise concerns.

### 6.1.5 Unfair regulatory impost

A significant regulatory impost such as a curfew would be unfair, considering that BAC paid \$1.3 billion for the 99 year lease of Brisbane Airport and has invested significantly in capital including the next phase of the \$1.3 billion New Parallel Runway project.

Operational and regulatory certainty over the coming decades is central to BAC shareholders' ongoing support for the capital investment program required for the airport's future growth. Any change to Brisbane's 24-hour operational status would damage its competitiveness and compromise future investment.

## 6.2 Arguments for a curfew

46 community members supported the introduction of a curfew at Brisbane Airport. The overriding reason given was the detrimental effect that night-time aircraft noise has on resident's sleep and the flow-on impacts for health, lifestyle, performance and social outcomes. These costs are unquantified.

Scientists believe noise levels could be linked to more stress, sleep deprivation and high blood pressure in people

Two recent international studies published in the British Medical Journal found that aircraft noise may be leading to a rise in heart and lung disease. The Imperial College London worked on one study that investigated millions of people living near Heathrow.<sup>11</sup> The Heathrow study found that people living around the major international airport had a 3.5 per cent higher rate of hospital admissions for cardiovascular disease.

A similar study, conducted by academics at the Boston University School of Public Health and Harvard School of Public Health<sup>12</sup>, looked at six million people aged 65 or more living around major airports in the United States. The results of this US study are consistent with the UK findings, with a 2.3 per cent higher rate of hospital admissions.

The Steering Committee notes this research but makes two observations. Firstly, the observed correlation is small with the aircraft noise effect raising risk levels by 3.5 per cent in the Heathrow study. Secondly, and most importantly, there is no comparable population in Brisbane that would be regarded as living close to a major international airport as defined by these studies. The Brisbane residents most supportive of a curfew are outside the 20 ANEF zone and have not been shown by this research to exhibit a statistically significant correlation with any adverse health impacts.

This review has highlighted the concentration of noise over the southern instrument approach to Brisbane Airport Runway 01. The concentration of aircraft movements in the approach phase of flight is clearly of concern to these residents. Submissions argued that this concentration of noise impacts unfairly on residents of those suburbs.

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<sup>11</sup> Aircraft noise and cardiovascular disease near Heathrow airport in London: small area study *BMJ*2013;347doi: <http://dx.doi.org/10.1136/bmj.f5432> (Published 8 October 2013)

<sup>12</sup> Residential exposure to aircraft noise and hospital admissions for cardiovascular diseases: multi-airport retrospective study *BMJ*2013;347doi: <http://dx.doi.org/10.1136/bmj.f5561> (Published 8 October 2013)



The perspective of these residents is understandable. In certain weather conditions, approaches to the airport are very much concentrated on the southern instrument landing system approach, whereby aircraft fly a very controlled flight path over a narrow corridor. During peak periods the flights can occur every few minutes. Considering the length of time it takes for an aircraft to pass overhead, residents can have lengthy periods without respite from the noise.

Over recent years there has been a noticeable increase in frequency due to increased demand for air travel and the resultant traffic growth. Furthermore, the heavy traffic has necessitated relatively more use of the instrument landing system than in previous years in order to safely separate aircraft, further adding to the concentration over the affected suburbs. While the new parallel runway and improved technology offers potential for improvements, these are likely to be some time away.

Many of the submissions in support of a curfew argued that it should be one of several initiatives that should be pursued. Other actions that were supported included mandatory flights over Moreton Bay, a longer curfew period, a new airport further from residential areas, noise sharing and home insulation.

While the Steering Committee agrees that efforts to over-fly Moreton Bay should be used whenever possible, it notes that it is not possible to implement some suggestions. For example, the option of building a new airport in Brisbane would be very costly, and the environmental and commercial viability of any potential site has not been established.

The Steering Committee agrees that efforts to improve noise-sharing should be continued, noting the importance of effective communication with both current and potentially newly affected communities.

Home insulation is not necessarily an appropriate noise amelioration measure in these circumstances. The Steering Committee notes that the criteria for establishment of noise insulation programmes in Sydney and Adelaide targeted homes inside the 30 ANEF contour. There are no homes in Brisbane that would meet this criterion.

Additionally, the traditional high-set timber Queenslander-style of housing is quite common in these areas. It is not certain that acoustic insulation would be an effective noisepolution for such homes or in Brisbane in general given the outdoor lifestyle preferred in the sub-tropical climate.

A number of submissions in support of a curfew also argue that opposition to a curfew is overstated. They point to the success of Sydney and continued viability of other curfew airports around Australia as evidence that the economic costs of a curfew are not as significant as some have argued. They also argue that the relatively low number of aircraft movements at night described in section 4.3 means that the economic impact of a curfew is overstated.

Submissions also made the following points:

- noise complaint data does not reflect true magnitude of problem; and
- even a handful of flights at night is enough to produce the negative health consequences and stress.

## 7. Existing and further strategies

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The Discussion Paper released by the Steering Committee in August 2013 contains a detailed description of existing and further potential measures to manage night-time noise impacts at Brisbane Airport. These are summarised below.

### 7.1 Existing measures

#### 7.1.1 Reduction of noise at source

Today's aircraft are 75 per cent quieter than the first jet aircraft of the 1960s (measured by amount of noise energy emitted). This trend will continue over the coming decades. There are new aircraft types such as the advanced composite Boeing 787 Dreamliner and Airbus A350 serving long haul flights with significantly reduced noise contours. Additionally, the existing narrow body workhorses of Australian domestic aviation, the Airbus A320 and Boeing 737, are now available with far quieter engines. Both the A320 New Engine Option (NEO) and the Boeing 737 Max are around 15 per cent quieter than today's variants.

Many major airlines flying to Brisbane Airport have large numbers of these quieter, new generation aircraft on order. Major international airlines such as Air India have committed to operating new generation aircraft to long-haul destinations, which could include Brisbane. Jetstar Airways has recently taken possession of the first of 14 787s. Qantas has an option for 50 from 2016. Similarly, innovation in smaller aircraft will help deliver a quieter fleet for regional flights. Models such as the ATR 72 and the Q400 (Dash-8) will result in reduced noise profiles as they replace older turbo-propeller aircraft.

In February 2013, ICAO's Committee on Aviation Environmental Protection recommended the adoption of a new "Chapter 14" aircraft noise standard for jet and propeller driven aircraft as an amendment to *Annex 16 – Environmental Protection, Volume I – Aircraft Noise*. The new Chapter 14 noise standard will be quieter by 7 Effective Perceived Noise Decibels (EPNdB) compared to the current Chapter 4 Standard, which took effect from 2006.

The new Chapter will be applicable to new, large aircraft types submitted for certification on or after 31 December 2017. It will apply to smaller aircraft types of less than 55 tonnes from 31 December 2020.

#### 7.1.2 Land-use planning and management

Brisbane Airport has a large buffer zone between the end of the existing main runway, with the nearest residence 6.7 km from the runway centreline and conservation/green space and industrial land uses occupying the areas immediately surrounding the Airport. This compares favourably to other capital city airports, where the nearest residences are closer – for example, Melbourne (6km), Perth (1.8km), Sydney (0.7km) and Adelaide (0.6km).

The Queensland Government's former State Planning Policy 1/02 - Development in the Vicinity of Certain Airports and Aviation Facilities has now been incorporated into the single Queensland State Planning Policy (SPP).

<http://www.dsdip.qld.gov.au/about-planning/state-planning-policy.html>

The Strategic Airport and Aviation Facilities component of the SPP sets out the State's approach to safeguarding (through land use planning mechanisms) those airports considered essential for the State's transport infrastructure, including Brisbane Airport.

The supporting SPP guidance material states that local planning instruments should ensure that the location of sensitive land uses, in areas affected by aircraft noise are consistent with the requirements of the SPP and the provisions of AS2021 (as at July 2000). Local government (in this case, Brisbane City Council) are required to develop and implement the current draft Brisbane City Planning scheme to ensure compliance with the SPP.

The SPP provisions work in conjunction with the application of the Australian Standard AS2021 (as endorsed July 2000) and Australian Noise Exposure Forecast (ANEF) contour mapping. The SPP facilitates controls over appropriate building types and construction standards within the relevant ANEF contours.

The SPP guidance also encourages local governments to use both ANEF system and alternative aircraft noise metrics such as single event contours (e.g. N70) to inform strategic land use planning decisions about use of land affected by aircraft noise. The SPP clearly states that alternative aircraft noise metrics should not be used as a substitute for ANEF system information; rather they are a complementary tool that can assist local government in communicating the nature of aircraft noise exposure at a specific location.

The SPP has drawn upon the direction and guidance included within the National Airports Safeguarding Framework (the Safeguarding Framework), as endorsed in May 2012 by the Australian Government and State and Territory governments. The Safeguarding Framework provides guidance to States/ Territory governments when developing State policies that are intended for dissemination to local governments <http://www.infrastructure.gov.au/aviation/environmental/nasf/index.aspx>.

Noise disclosure is critical in allowing prospective home buyers and renters to assess aircraft noise information ahead of purchasing or renting decisions. With this in mind, Brisbane Airport Corporation and the Real Estate Institute of Queensland (REIQ) announced in November 2012 a partnership to help property buyers and agents through education about current and future flight paths over Brisbane.

The partnership, which is believed to be the first of its kind in Australia, is the result of a desire to minimise the risk of buyers making an investment without fully understanding if that property may be subject to aircraft noise.

Through this partnership BAC and the REIQ collaborate to promote online tools that outline current flights paths and noise levels, in addition to future flight paths and areas of higher aircraft noise.

In May 2013 Standards Australia agreed to a limited review of AS2021 and the development of an information document on impacts in change of aircraft noise exposure, the nature and extent of aircraft noise impacts, and an appreciation of aircraft noise impact in areas designated as 'acceptable' under AS2021.

### **7.1.3 Noise Abatement Operational Procedures (NAPs)**

NAPs for Brisbane Airport specify preferred flight paths that facilitate maximum use of over-water tracks and specify minimum altitudes over land as far as practicable. They also specify additional requirements for minimum altitudes for those portions of flights that must be carried out over land.

Brisbane Airport adapts operations to assist in noise abatement efforts. This includes:

- restrictions on flight training schedules;

- prescribing preferred runways and flight paths in a way that minimises noise;
- heavy category jet aircraft taking off from Runway 19 towards the CBD are required to begin take-off from the furthest end of the runway to minimise noise over the city; and
- restrictions over altitude for aircraft movements during noise sensitive periods.

Better use of these procedures is essential to manage night time noise due to the positive economic, social and environmental implications. This includes use of simultaneous opposite-direction parallel runway operations (SODROPs) over Moreton Bay with the NPR and a similar over bay procedure with the existing runway. When weather conditions impact on the capacity to use SODROPs, jet aircraft use over bay procedures and quieter aircraft overland procedures.

The NAPs are attached at Appendix 1. NAPs are not always able to be applied and are subject to weather and traffic considerations and urgency (e.g. emergency) of operations.

On Sunday through to Friday nights (10pm to 6am) and on Saturday nights (9pm to 6am), the preferred mode of operation is Reciprocal Mode over Moreton Bay, with landings on Runway 19 and take-offs on Runway 01. If weather conditions are unfavourable, the preferred mode is to have aircraft arrive over the city (Runway 01) and depart over Moreton bay (Runway 01). During daylight saving period in the southern states, Runway 01 is the preferred runway for all jet arrivals and departures between 5am – 6am Monday to Friday (local time), while Runways 14 and 32 are equally preferred for all non-jet arrivals.

All jet aircraft landing on Runway 19 will normally be routed east of the coast to avoid noise-sensitive areas. Descent for these aircraft is such that they need to be above 5000ft until after they cross the coastline for landing at Runway 19 between 10pm – 6am.

For aircraft departing from Runway 01, the altitude for departures before crossing the coast is 5000ft. In the case of jet aircraft arriving from the north for landing on Runway 01 using the River Track, descent below 3000ft is not permitted during night-time until aligned with the Runway.

Jet Noise Abatement Climb Procedures refer to different combinations of power/thrust settings and flap retractions at specific heights to minimise noise exposure on the ground. Jet aircraft taking off from Runway 19 over the city must adhere to the Jet Noise Abatement Climb procedures. This procedure applies 24 hours a day for Runway 19.

Airservices Australia has recently reviewed Brisbane Airport's NAPs. The review found a high level of compliance with procedures by airlines and made a number of recommendations for potential areas of improvement, including:

- addressing instances where there is a low level of compliance with procedures;
- implementing reciprocal runway operations earlier when possible; and
- improved community consultation.

The Steering Committee notes the intent of Airservices to regularly review NAPs and encourages further review ahead of the commissioning of the new parallel runway that considers operations both under the current runway system and the parallel runway system.

#### **7.1.4 Operational restrictions**

Movement quotas, engine run-up restrictions, reverse thrust restrictions or noise level limits are also potential operating restrictions that could apply at night.

ICAO encourages States not to apply operating restrictions as a first resort, but only after consideration of the benefits to be gained from the other three principal elements of the Balanced

Approach (set out above). In 2010, the Australian Government amended the Air Navigation (Aircraft Noise) Regulations to ban the operation of older, noisy jet aircraft at many Australian airports.

Older aircraft such as the Boeing 727-200 and Boeing 737-200 models were originally noise-certified to ICAO Annex 16, Volume I, Chapter 2 noise standards (introduced by ICAO in 1970). Following the introduction of stricter Chapter 3 noise standards in 1977 and the commencement of a phase-out of Chapter 2 aircraft operations by ICAO in 1995, some Chapter 2 aircraft were modified (or ‘hush kitted’) in order to achieve re-certification to Chapter 3 standards, and thereby prolong their operating life.

In July 2010 the Australian Government introduced the Air Navigation (Aircraft Noise) Amendment Regulations 2010, which restrict the operation of marginally-compliant Chapter 3 (MCC3) aircraft at Australian airports where they contribute to unacceptable levels of aircraft noise. The noise emitted by these aircraft was for some time a source of concern to communities surrounding airports where they operated. This was further aggravated by the fact that the aircraft were mainly used for freight purposes and often operated during noise-sensitive night-time periods.

The new Regulations (under the Air Navigation Act 1920) were phased in between 1 July 2010 and 1 September 2010 and prohibit services by MCC3 aircraft at Brisbane, Sydney, Melbourne, Perth, Adelaide, Hobart, Canberra, Darwin, Cairns, Gold Coast, Newcastle (Williamstown), Essendon and Avalon Airports.

There were 471 movements by MCC3 aircraft at Brisbane Airport in 2008/09 prior to the new regulations.

The Steering Committee encourages regular review of the appropriate minimum noise standards for night-time operations, particularly following introduction of the new ICAO Chapter 14 noise standard in 2017.

### **7.1.5 Community engagement and communications**

Brisbane Airport Community Aviation Consultation Group has been effective in responding to aircraft noise concerns and land use planning issues from the local community and other key stakeholders. This committee has successfully examined both the technical aspects of noise exposure and the community concerns arising from this issue in consultation with industry. This has resulted in a number of noise management initiatives designed to minimise the impact of noise exposure through alterations to noise abatement departure procedures and the introduction of alternative landing protocols.

The continued work of the Brisbane Airport Community Aviation Consultation Group remains critical to addressing noise concerns and preserving the airport’s operations.

The Brisbane Airport Experience Centre and the Airport’s web- based aircraft noise information have facilitated a more informed dialogue between the Airport and the wider Brisbane community.

The Steering Committee also encourages Brisbane Airport’s continued use of targeted community forums where local issues can be appropriately addressed.

## **7.2 Further measures**

### **7.2.1 New Parallel Runway (NPR)**

The NPR is a particularly significant development and the single largest investment in Australian aviation infrastructure over the last 20 years.

Brisbane Airport will construct and operate a new 3,300m runway west and parallel to the existing 01/19 runway and staggered in a northerly direction towards Moreton Bay. The new runway will be sufficiently separated from the existing runway to allow the simultaneous, independent operation of both runways (Figure 10). The project will also include associated taxiways, navigational aids and land-based access infrastructure.



**Figure 10: Over Bay operations with New Parallel runway**

The necessary Australian Government approvals for the project were issued on 18 September 2007. The Airport commenced works for the NPR in 2012 and expects the runway to be operational by 2020. The location of the NPR was shown in Figure 1.

The primary proposed modes of operation for night-time operations following the opening of the NPR at Brisbane Airport are set out in Appendix 2, along with the conditions of availability for each of these modes.<sup>13</sup> Appendix 3 sets out the percentage use of operating modes in 2035 as estimated by Brisbane Airport.

The Environmental Impact Statement and Major Development Plan for the NPR project that the opening of the NPR will see a decrease in the area exposed to more than two aircraft noise events per night greater than 70dB(A). This is because of the potential that the NPR offers to direct both arriving and departing aircraft over Moreton Bay in low to medium traffic demand periods. Depending on weather conditions, this would be done by using one runway solely for arrivals and the other solely for departures, either:

- simultaneously – known as SODPROPS (simultaneous opposite-direction parallel runway operations); or
- alternately – known as DODPROPS (dependent opposite-direction parallel runway operations).

This could be particularly important during the morning 5am to 6am period, which is a departure peak when daylight saving is in effect in other states.

As these modes are predominantly useful during times of low flight movements, the noise mitigation benefit will primarily be felt during the night. As a result, the parallel runway is expected to significantly reduce aircraft noise when a potential curfew would be in effect. Given this, the introduction of a curfew would be an expensive and likely irreversible solution for a problem that will at least in part be shortly be addressed.

<sup>13</sup> New Parallel Runway Draft EIS/MDP D5-105



BAC has developed strategies to minimise noise exposure to residents when preferable modes of operation are unavailable, including:

- the use of over-Bay operations for jet aircraft, with the quieter turbo-prop aircraft taking off from the NPR in the city direction. This allows the maximum opportunity for jet aircraft to remain operating over the Bay whilst minimising delays; and
- when weather conditions do not allow for all flights over the Bay, to use only the existing runway for operations over the city at night (11:00pm – 6:00am).

In summary, the NPR provides some opportunities to further mitigate night-time noise impacts on the Brisbane community. However, these opportunities are dependent on weather and traffic conditions.

The Steering Committee encourages all parties to participate meaningfully in 2014 Brisbane Airport Master Plan process and in the lead up to the delivery of the new parallel runway noting that the Government's approval of the NPR included detailed conditions about keeping the community informed. A community awareness programme is required to commence at least one year prior to operations starting on the NPR including noise contours and flight path information.

## 7.2.2 Noise abatement technology

Aircraft noise abatement efforts for Brisbane Airport will continue improve due to technological advancements in the aviation sector.

A range of modern air traffic control technology exists to minimise aircraft noise and are constantly evolving. These include:

- Required Navigation Performance (RNP) uses computer systems to plot flight paths more precisely. This allows noise footprints to be directed more accurately over non-residential areas.
- Continuous Descent Arrival (CDA) - allows landing aircraft to descend in a continuous slope, instead of progressing down a series of steps in altitude. This allows aircraft to 'glide' with minimal engine use for the final 20 minutes of flight.
- Automatic Dependent Surveillance – Broadcast (ADS-B) - broadcasts the exact location of aircraft using satellite technology. By increasing accuracy of air traffic control positioning, flight paths can be made more efficient.

Brisbane Airport's large size, effective design and significant distance from residential areas have made it an ideal location to trial new noise abatement technology. Brisbane was the world's first busy international airport to integrate RNP approaches and departures. Further, in September this year Brisbane Airport was also host to an Emirates trial of continuous descent approach via Smart Tracking.

Satellite navigation offers potential for flights to follow more precise noise corridors, avoid noise sensitive areas and traverse waterways, industrial or non-residential areas. There is a growing number of aircraft now fitted with this technology. A growing number of modern aircraft are now fitted with navigation systems that use satellite-assisted guidance. These systems offer the potential for flight routes to follow existing noise corridors (e.g. highways) or to avoid noise-sensitive areas and instead traverse water, industrial or non-residential areas. Airservices Australia refers to this technology as *Smart Tracking*. It is also known as RNP.

The potential benefits of Smart Tracking are threefold:

1. Smart Tracking equipped aircraft are able to fly certain flight paths that they would otherwise be unable to use at night or in poor weather conditions. This has the potential to

provide respite to noise-affected communities by allowing the use of flight paths and noise-sharing procedures that would normally only be possible in high-visibility, daytime conditions.

2. Smart Tracking aircraft can be flown with greater accuracy, with only a small variation in the actual tracks flown from one aircraft to another. Smart Tracking aircraft can adhere to a lateral path of plus or minus 70 feet, which is less than the wingspan of the aircraft. This has the benefit of minimising the overall noise footprint; however, it can also concentrate noise impacts underneath the RNP track. Noise-sharing arrangements could be implemented as a means of providing respite to those directly under a Smart Tracking path.
3. Smart Tracking facilitates the use of CDA arrivals. Landing procedures traditionally involve aircraft descending in successive steps from cruising altitudes to the runway, with additional power required each time the aircraft levels out at the next step down in altitude. In a CDA, the aircraft flies from cruise altitude to the runway in one smooth and uninterrupted descent. Under ideal circumstances, a plane can glide into the airport with engines idling for up to 20 minutes. The application of CDA has been shown to reduce community noise on average by about 4dB(A) to 6dB(A)<sup>14</sup>.

Smart Tracking technology is fitted in most new aircraft and can be retrofitted into some older aircraft. It is anticipated that the technology should be available in most aircraft by 2015.

Smart Tracking has been trialled at Brisbane Airport since 2007 and in early 2012 became a permanent measure for all aircraft using the Airport that have this capability. Figure 11 shows the Smart Track routes used by aircraft at Brisbane Airport, which are all within existing and long-standing flight path corridors.

Airservices Australia has undertaken an analysis of the projected noise impacts arising from the permanent introduction of Smart Tracking in Brisbane as follows<sup>15</sup>:

#### **Runway 01 arrivals**

- *Track 1* is the approach for traffic arriving from the north. The level of noise of any individual flight is not expected to change for most communities under this route. A few locations may experience decreases of up to 6dB(A) or increases of up to 5dB(A). The 24-hour average noise level may decrease by up to 4dB(A).
- *Track 2* is the overland straight-in approach. There should be no change to the maximum noise exposure of any individual flight to any community. A few areas at the southern end of this route may experience increases of up to 5dB(A) in average noise level over a 24-hour period. Most areas are expected to experience no change.
- *Track 3* is the approach from the south. It is used by about two-thirds of flights arriving in Brisbane. While there should be no change to the maximum noise exposure of any individual flight to any community, the final segments of the Smart Tracking route are offset slightly from the centre of the current flight path corridor. Some areas close to the airport may experience more noise events. Other areas will experience less noise events than they do now. No perceptible change is expected to the average noise level over a 24-hour period.

#### **Runway 19 arrivals**

- *Track 4* is initially over land but at high altitude (above 5000 ft or 1500 metres). There is unlikely to be any change in aircraft noise that is noticeable by the community.

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<sup>14</sup> New Parallel Runway Draft EIS/MDP D5

<sup>15</sup> <http://www.airservicesaustralia.com/projects/smart-tracking/environmental-analysis-brisbane/>



- *Track 6* takes aircraft further away from residential areas on North Stradbroke Island. The noise impact to residents from aircraft is already very low and will reduce further.
- *Tracks 5, 7 and 8* are over Moreton Bay and will not result in any changes to noise impacts on communities.

In summary, Airservices Australia is of the view that Smart Tracking has the potential to reduce the overall night-time noise footprint of Brisbane Airport, both through the adoption of CDA landing procedures and through a higher degree of accuracy in flight paths over non-residential areas.



**Figure 11: Brisbane Smart Track Routes (Source: Airservices Australia February 2012)<sup>16</sup>**

<sup>16</sup> <http://www.airservicesaustralia.com/projects/smart-tracking/environmental-analysis-brisbane/>

# Conclusions and recommendations

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## 7.3 Conclusion

The Steering Committee has closely examined the issues related to night-time aircraft noise management at Brisbane Airport.

Firstly, having considered the submissions received, the lack of support from the state and local government and industry, the significant costs a curfew would impose and the uncertain environmental benefits a curfew may deliver, the Steering Committee believes that the establishment of curfew restrictions at Brisbane Airport is not the appropriate policy response for the management of aircraft noise impacts on Brisbane residents.

There are already significant capacity constraints in the post 6am morning peak. Brisbane Airport is facing significant challenges in accommodating runway demand between now and the commissioning of its new parallel runway. A curfew would no doubt exacerbate these challenges.

A strong and growing Brisbane Airport plays a significant role in the Queensland and national economies through its importance to the tourism, mineral and resources sectors and the broader business community. A recent Deloitte Access Economics study commissioned by Brisbane Airport Corporation found that by 2033-34 the airport will generate an annual benefit of:

- \$13.4 billion in direct and indirect economic contribution to the Australian economy;
- \$7.6 billion in tourism activity; and
- more than 88,000 jobs Australia-wide.

A curfew would no doubt impact this contribution and the Steering Committee agrees that the impact would be considerable. Brisbane Airport Corporation estimates that 216,000 international passenger movements would be lost each year if a curfew were introduced. Of these, 111,000 would be international visitors to Australia. Additionally 112,000 domestic passengers would be lost each year if a curfew were imposed.

The Steering Committee is mindful that these statistics represent not only a loss to the airport, airline and tourism business interests, but also a lost opportunity to provide for the strong and growing demand for air travel from Brisbane residents and visitors to the city.

## 7.4 Recommendations

The Steering Committee recommends:

1. The Australian Government confirm that Brisbane Airport remain free of legislated curfew provisions.
2. Airservices Australia should continue to lead the aviation industry in the take-up of Smart Tracking – known in the industry as Required Navigation Performance - advanced satellite navigation procedures which have the potential to provide a more precise level of control over aircraft flight paths. In the case of Brisbane Airport this may maximise the ability to use alternative landing approaches to the current instrument landing system which concentrates flights over certain southern suburbs.
3. Airlines should continue with plans to invest in new, quieter aircraft, and as purchasers of aircraft, continue to encourage manufacturers to target improved noise performance in their product development.

4. The Queensland State Government and Brisbane City Council should continue to be mindful of aircraft noise impacts when considering land use planning and assessment decisions.
5. Brisbane Airport Corporation should actively continue its partnership with the Real Estate Institute of Queensland to facilitate disclosure of aircraft noise impacts to Brisbane residents.
6. Airservices Australia should continue with monitoring and improvement where possible of Noise Abatement Procedures, the preferred runways and flight paths which minimise noise exposure to residents. To assist, Brisbane Airport Corporation should continue to facilitate the investigation of these issues through regular Technical Noise Working Group meetings.
7. Brisbane Airport Corporation should ensure the Brisbane community is kept informed of the development of the new parallel runway and to provide information on aircraft related noise from existing operations from the present to one year after commissioning of the new parallel runway. Such information should include:
  - a. growth in aircraft movements and how this relates to forecasts provided in the draft major development plan for the runway approved in 2007;
  - b. changes as a result of new generation aircraft;
  - c. changes in air traffic control departure and arrival procedures; and
  - d. any changes due to the closure of the cross runway during the new parallel runway construction.
8. Brisbane Airport Corporation should conduct a community awareness program at least one year prior to operations commencing on the new parallel runway that includes, as minimum, information on the airport operating plan, N70 noise contour data and flight path information in similar levels of detail to that provided in the draft major development plan for the runway approved in 2007.
9. Brisbane Airport Corporation should maintain community consultation initiatives such as the Brisbane Airport Community Aviation Consultation Group, the Brisbane Airport Experience Centre and the Airport's web- based aircraft noise information which has facilitated a more informed dialogue between the Airport and the wider Brisbane community.

The Steering Committee encourages all parties to participate meaningfully in the 2014 Brisbane Airport Master Plan process and in consultation processes leading up to the delivery of the new parallel runway. Submissions received during the consultation phase of the review will be provided to Brisbane Airport Corporation for consideration during the master planning process.

Finally, the Steering Committee wishes to thank all of those interested parties who considered the issues raised in the discussion paper and provided their comments towards this review.

# APPENDICES

## Appendix 1: Noise Abatement Procedures at Brisbane Airport

**APPENDIX 1  
TO SUP H101/13**

NOISE ABATEMENT PROCEDURES

PAGE 1  
BRISBANE, QLD

### **NOISE ABATEMENT PROCEDURES BRISBANE**

Airservices Air Traffic Control will facilitate over water operations and maximise the use of preferred flight paths wherever possible.

#### **Day Operations**

Day Operation times are 0600-2200 Local Monday to Friday and 0600-2100 Local Saturday and Sunday.

#### **Night Operations**

Night Operation times are all other times.

#### **Reciprocal Runway Operations**

Reciprocal Runway Operations require:

- Downwind component does not exceed 10 knots (including gusts) and
- Runway surface completely dry.

During Night Operations, Reciprocal Runway Operations are the preferred runway mode. Traffic Management - airborne holding and start clearances - will be employed to enable Reciprocal Runway Operations where safety requirements permit.

Noise abatement will not be determining factor in runway selection at Brisbane under the following circumstances:

1. During Thunderstorms and Low Visibility Procedures
2. MEDEVAC priority aircraft
3. Where traffic management procedures are required to safely manage ATC workload.

Where noise abatement procedures are prescribed, and ATC traffic management safety requirements permit, the following runway nomination provisions will be applied.

#### **1. - PREFERRED RUNWAYS**

Jet Noise Abatement climb procedures apply H24 RWY 19.

(a) For Day Operations, when Reciprocal Runway Operations are not possible, the preferred runways are:

LANDING	TAKE-OFF
RWY 01	RWY 01
RWY 14/32	RWY 14/32
RWY 19	RWY 19

(b) For Night Operations, the preferred runways are:

LANDING	TAKE-OFF
RWY 19	RWY 01
RWY 32	RWY 14
RWY 14	RWY 32
RWY 01	RWY 19

Intersection departures on RWY 19 are not permitted for aircraft exceeding 30,000KG MAUW during (a) and by all aircraft during (b) - exception: jet aircraft not exceeding ICAO Code letter C aerodrome reference code are permitted to depart from A1 or Intersection A3 during (a).

## Appendix 1: Noise Abatement Procedures at Brisbane Airport (cont'd)

### APPENDIX 2 TO SUP H101/13

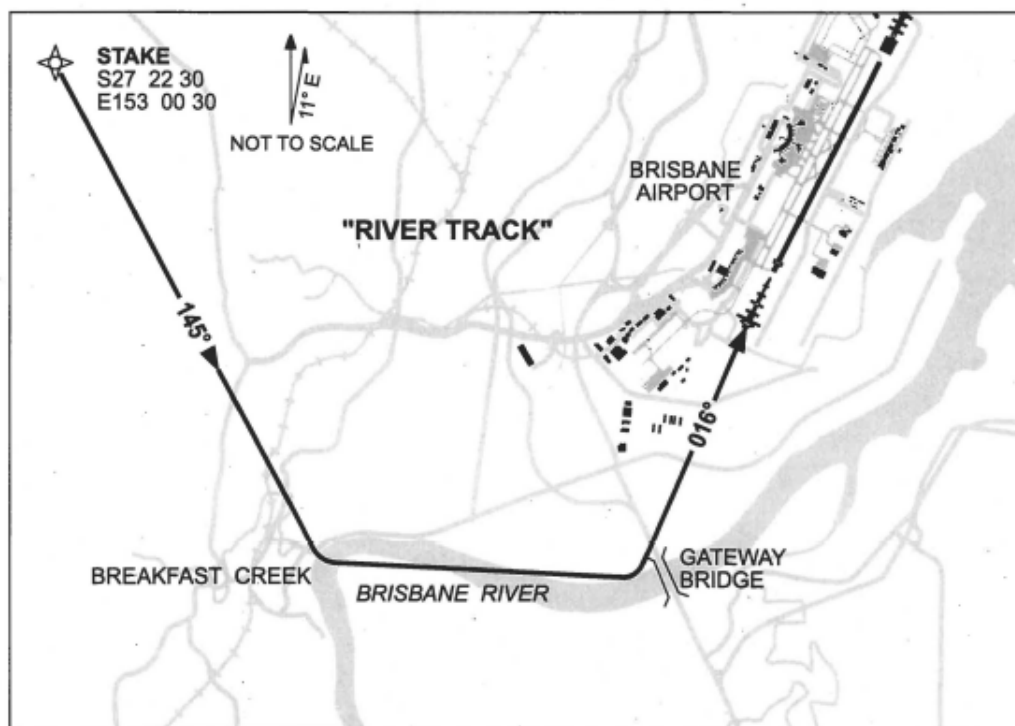
### NOISE ABATEMENT PROCEDURES

PAGE 2  
BRISBANE, QLD

## 2 - PREFERRED FLIGHT PATHS

### 2.1 - Arriving Aircraft.

1. Landing runway 19:
  - All JET aircraft will not normally be descended below 3000FT until east of the coast to avoid noise sensitive areas.
  - During Night Operations, descent below 5000FT is not permitted for all JET aircraft until east of the coast.
  - During Night Operations, descent below 3000FT is not permitted for all NON-JET aircraft until east of the coast.
2. Landing runway 32:
  - During Night Operations, all aircraft will be normally tracked for right base.
3. Landing runway 14:
  - During Night Operations, all aircraft will be normally tracked for left base.
4. Landing runway 01:
  - Jet aircraft arriving from the north on the SMOKA V ARRIVAL will be routed via "RIVER TRACK" from waypoint STAKE for a visual approach. (See depiction below)
  - During Night Operations all aircraft shall not descend below 3000FT until aligned with the runway.



**Note:** To satisfy the requirement of 2.1(1) and (3) for aircraft tracking from the south, ATC will radar vector or direct aircraft to track JCW-POODL-BN.



## Appendix 1: Noise Abatement Procedures at Brisbane Airport (cont'd)

### **2.2 - Departing Aircraft.**

1. Departing runway 19:
  - JET aircraft will normally be assigned a procedural SID.
  - NON-JET aircraft will normally be assigned a SID RADAR.
2. Departing runway 14/32:
  - All aircraft will be assigned a SID RADAR.
  - JET aircraft will normally be contained within a sector 360°-120°, over water until above 5000FT.
  - During Night Operations, all aircraft will be contained within a sector 360°-120°, over water until above 5000FT.
3. Departing runway 01:
  - JET aircraft will normally be assigned a procedural SID.
  - NON-JET aircraft will normally be assigned a SID RADAR.
  - During Night Operations, all aircraft will be contained within a sector 360°-120°, over water until above 5000FT.

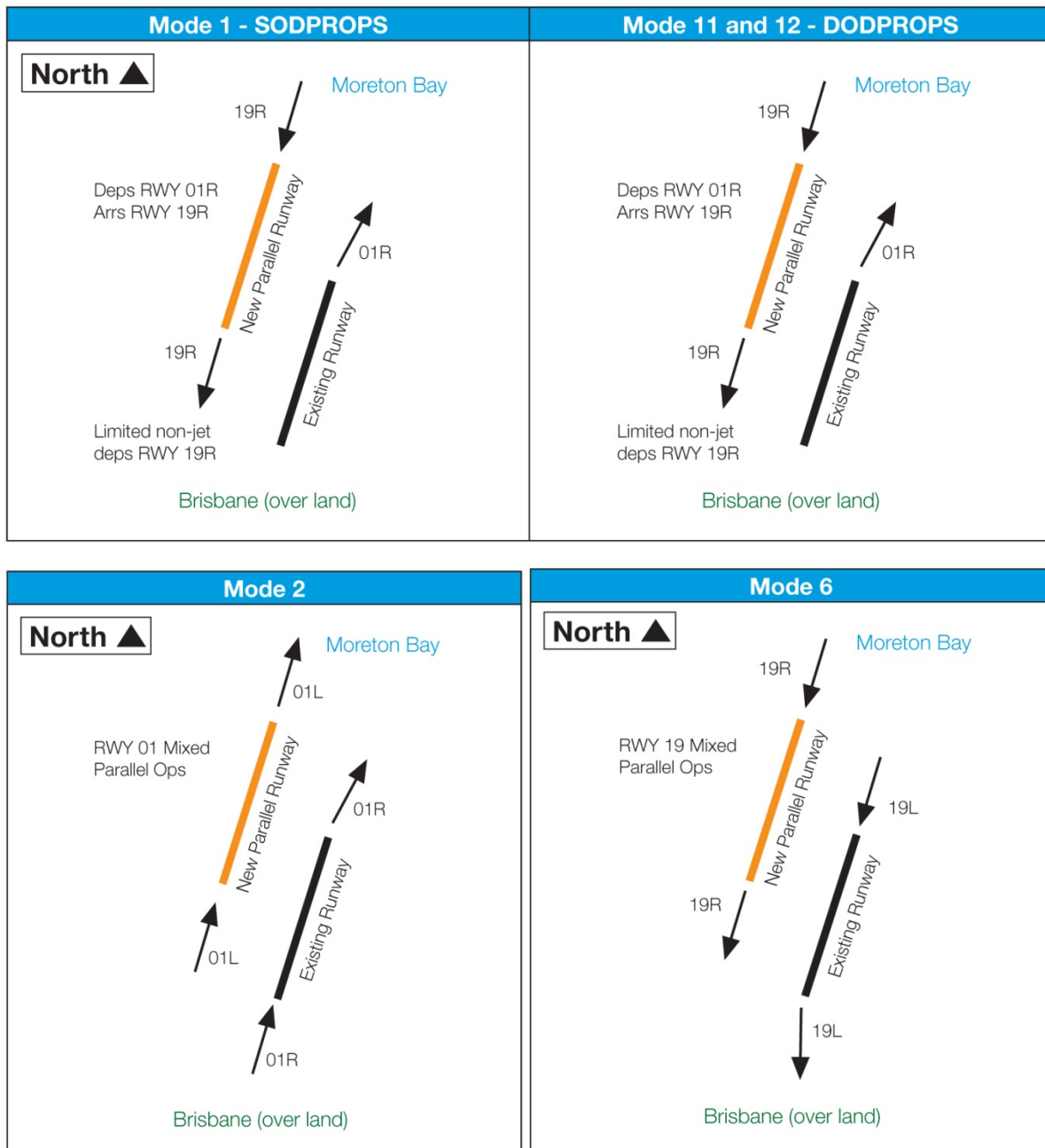
**NOTE 1:** *In the above procedures the term "all aircraft" applies to all aircraft categories described in AIP ENR 1-5, Para 9.1.1 and all other aircraft having two or more engines.*

**NOTE 2:** *Procedural SID's issued to JET aircraft all have preferred noise abatement procedure flight paths.*

**NOTE 3:** *JET aircraft may be cleared via a SID RADAR when required for weather or traffic management. When this occurs, they will be processed as closely as possible to comply with the applicable Day or Night Operations NAP.*

### **3 - TRAINING FLIGHTS - See AIP/ERSA**

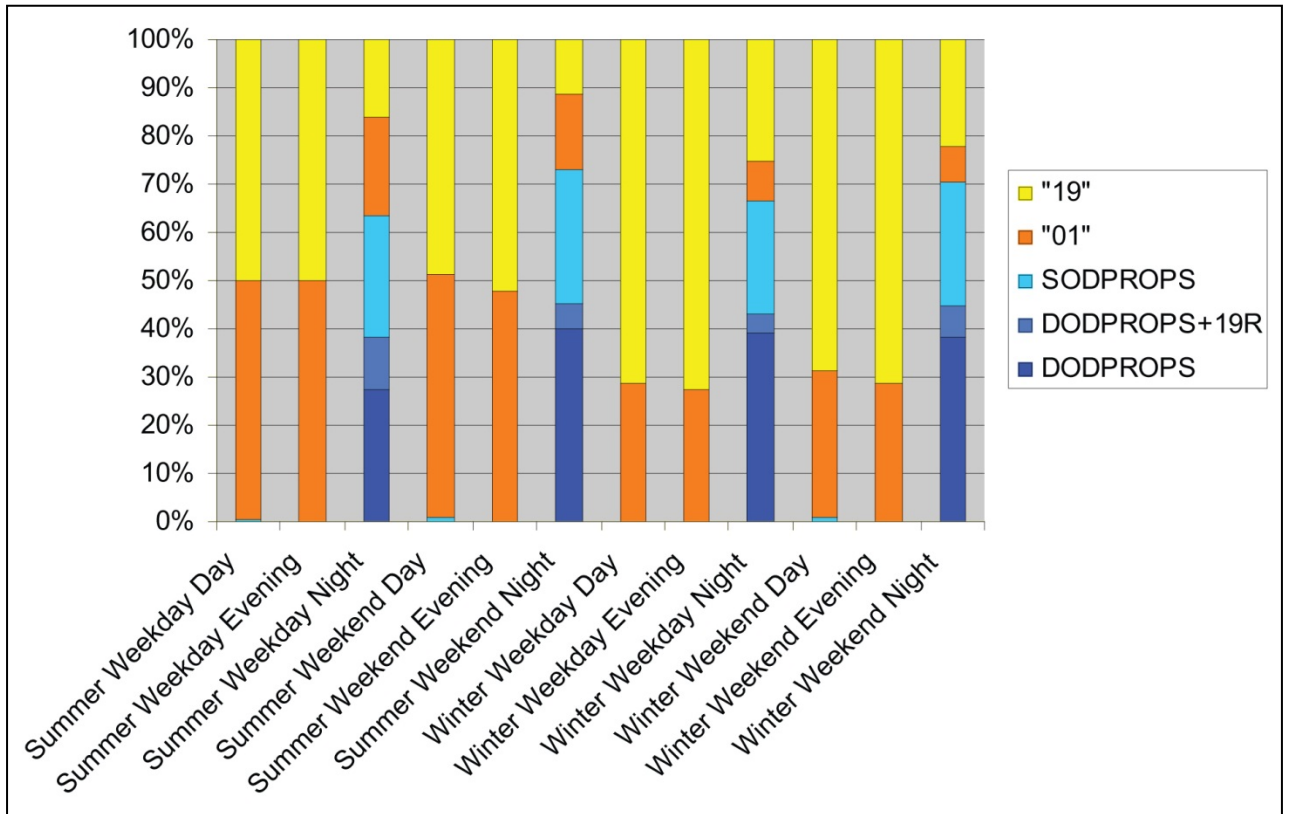
## Appendix 2: Proposed Modes of Operation for the NPR



Note - Mode 2 and 6 are supported with a number of variations of semi-mixed parallel operations. Mode 1 (SODPROPS) requires visual flying conditions with a maximum 5 knots downwind and a dry runway only. Aircraft movements must not exceed 55 in a single hour. Mode 11 and 12 DODPROPS requires visual flying conditions with a maximum 10 knot downwind and a dry runway only. Aircraft movements must not exceed 20 movements per hour.

Source: Extracted from New Parallel Runway Draft EIS/MDP, D3.

### Appendix 3: Percentage Usage of Modes, 2035 (including NPR)



Source: Extracted from NPR Draft EIS/MDP, D5.