

Brisbane Airport parallel runway lateral noise study

March 2005

Brisbane Airport Corporation

Awards won in 2003



Winner
Engineering
Excellence Award
Category: Project Management

Highly Commended
Engineering
Excellence Award
Category: Project Management



Winner
National and Queensland
Case Earth Award
Category 3: Environmental
Excellence - projects over
\$10 million



Stormwater
INDUSTRY ASSOCIATION INC.

Highly Commended
Queensland Stormwater
Industry Association
State Award
Category: Major WSUD Project
>\$1.0 million



Minister's Grand Prize
Healthy Waterways Awards
Category: Industry Award

Finalist
Healthy Waterways Awards
Category: Industry Award



Commendation
Public Domain Awards
Category: Bridges



Parsons Brinckerhoff Australia Pty Limited ACN 078 004 798 and
Parsons Brinckerhoff International (Australia) Pty Limited ACN 006 475 056
trading as Parsons Brinckerhoff ABN 84 797 323 433

*12th floor, IBM Centre
348 Edward Street
Brisbane Qld 4000
GPO Box 2907
Brisbane Qld 4001
Australia
Telephone +61 7 3218 2222
Facsimile +61 7 3831 4223
Email brisbane@pb.com.au*

ABN 84 797 323 433
NCSI Certified Quality System ISO 9001

Executive summary

Parsons Brinckerhoff (PB) were engaged by Brisbane Airport Corporation (BAC) to assess the difference in lateral noise impacts on the developed areas west of the Airport site, due to aircraft movements on the proposed parallel runway. The construction of a parallel runway is part of Brisbane Airport's 2023 Airport Development Strategy.

The use of a parallel runway will enable the Brisbane Airport to function in an Opposite Direction Parallel Runway Operations (ODPROPS). The ODPROPS system will allow low level phases of aircraft operation (departures and arrivals) to occur over Moreton Bay – thereby providing maximum potential for amelioration of aircraft noise to communities affected by aircraft flight paths.

The parallel runway studied in this investigation is shown on the 2003 Brisbane Airport Master Plan. The investigation compared the runway shown on the Master Plan (referred to in this investigation as the "Master Plan Runway") against a runway displaced 475m east of the Master Plan runway (referred to as the "displaced Runway").

This comparison was undertaken by measuring actual aircraft noise events on the existing runway and transposing the results to the Master Plan runway and the displaced runway to determine the noise level difference between them.

The offset of the actual aircraft noise events was achieved by modelling the arriving/departing aircraft as a series of point noise sources. The point source methodology was effective in producing an "acoustic snapshot" of the aircraft suspended in time and space.

The noise event data collection was focused on selected aircraft that are typified as being the most common aircraft types to enter/exit Brisbane Airport. They were also selected to represent the technological changes between older and newer model aircraft types.

The sound power levels of the modelled aircraft were calculated from the measured aircraft noise levels of actual flight events. The modelled aircraft were assigned a directivity pattern aligned with the direction of the arriving/departing aircraft.

To supplement the capture of actual aircraft noise events, data collected by the Noise and Flight Path Monitoring System (NFPMS) (operated by Air Services Australia) was used to collate the actual flight tracks with the corresponding noise measurements.

For the investigation, three discrete areas were chosen as being typical noise-sensitive receivers on the western side of the Airport. The receivers were nominated as Banyo residential (Noise Receiver 1), the Australian Catholic University (Noise Receiver 2) and the Nudgee Beach community (Noise Receiver 3).

The results of the lateral noise study are summarised in Tables 1 and 2 below. It is important to note that the outputs of this investigation are only valid in quantifying:

- a) the noise level difference between the two proposed location of the Master Plan parallel runway; and the displaced runway, and
- b) the noise level difference due to varying meteorological conditions

Table 1.1: Summary of the outcomes of the lateral noise study

Scope Item / Study Output	Result
Effect of wind speed & direction	Ground based aircraft movements: up to 8dB(A) increase Aerial based flight movements: up to 6dB(A) increase
Effect of shielding	Negligible – no significant amelioration of noise at distances greater than 50m from the noise barrier
Average ambient noise level for Banyo residential area	52.7dB(A)
Average ambient noise level for ACU/College area	47.9dB(A)
Average ambient noise level for Nudgee Beach area	42.7dB(A)

Table 1.2: Summary of noise level difference between Master Plan parallel runway and displaced runway.

Range of noise level difference between the proposed location of the Master Plan parallel runway and the displaced runway	
Runway Operation	Difference Between Master Plan Parallel Runway and displaced Runway.
taking off over the city from the new runway	0.3 dB(A) to 2.7 dB(A) ("Not detectable" to "barely detectable")
landing over the city onto the new runway	0.6 dB(A) to 4.2 dB(A) ("Not detectable" to "just detectable")
taking off over Moreton Bay from the new runway	0.5 dB(A) to 3.1 dB(A) ("Not detectable" to "just detectable")
landing over Moreton Bay onto the new runway	0.3 dB(A) to 3.3 dB(A) ("Not detectable" to "just detectable")

As shown in Table 2 above, for take-offs and landings over Moreton Bay, the difference in noise level at noise-sensitive receivers from aircraft movements on the Master Plan parallel runway compared with aircraft movements on the displaced runway is expected to be 3.3 dB(A) or less, which would be just detectable.

For take-offs and landings over the city, the difference in noise level at noise-sensitive receivers from aircraft movements on the Master Plan parallel runway compared with aircraft movements on the displaced runway is expected to be 4.2 dB(A) or less, which would be just detectable.

The scope of this study was limited to the comparison of the proposed Master Plan parallel runway against a displaced runway in terms of the difference in noise level of aircraft noise events. It is important to note is that this study does not attempt to quantify the noise impact of the operation of a parallel runway at Brisbane Airport. This needs to be assessed under a full Environment Impact Study.