

Short Term Monitoring Program QLD, Sandgate Report

June 2013

Version Control

Version Number	Date	Detail
1.0	June 2013	Initial Release.
2.0	January 2014	CNE 60 removed due to threshold settings.

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This report contains a summary of data collected over the specified period and is intended to convey the best information available from the NFPMS at the time. The system databases are to some extent dependent upon external sources and errors may occur. All care is taken in preparation of the report but its complete accuracy can not be guaranteed. Airservices Australia does not accept any legal liability for any losses arising from reliance upon data in this report which may be found to be inaccurate.

Deployment Purpose – Sandgate, QLD

Following recommendations made in the 2012 Brisbane EMU Review Short Term Monitoring was conducted in Sandgate.

Brisbane airport movements traverse the suburb of Sandgate, these are predominately turbo propeller departures.

The purpose of this report is to provide a technical summary of the recorded aircraft noise and operational data collected at Sandgate over a four week period.

An explanation of terms used within this report can be found in the Glossary at the end of the report.

Monitoring Period

30/04/2013 12:00am – 28/05/2013 12:00am

Environmental Monitoring Unit (EMU) Details

Location	Private Residence Ibis Avenue, Deagon 4017
Latitude	27°19'33.98"S
Longitude	153°3'30.18"E
EMU Altitude	36ft above mean sea level
Capture Zone	2.5km radius with 8,000ft (above ground level) height for noise data capture
Threshold Settings	56.0 dB(A) to 61.0 dB(A) depending on time of day

Location Images

Figures 1 to 3 details the location of monitors surrounding Brisbane Airport and the flight paths used for those operations captured by the Sandgate EMU.

Figure 1 Brisbane Fixed Environmental Monitoring Unit Locations and the Sandgate Short Term Monitoring Program Deployment Location

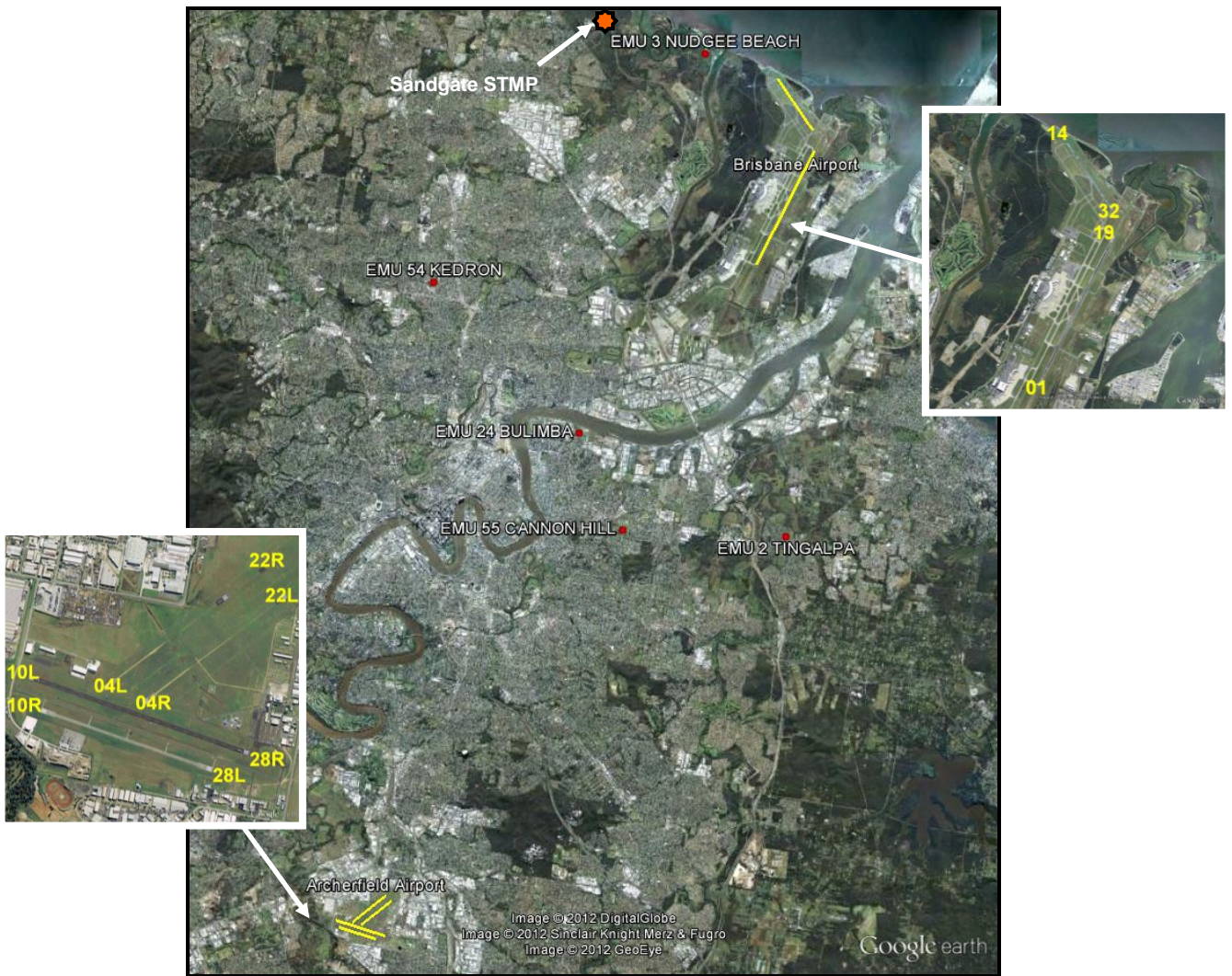


Figure 2 Total Movements Captured

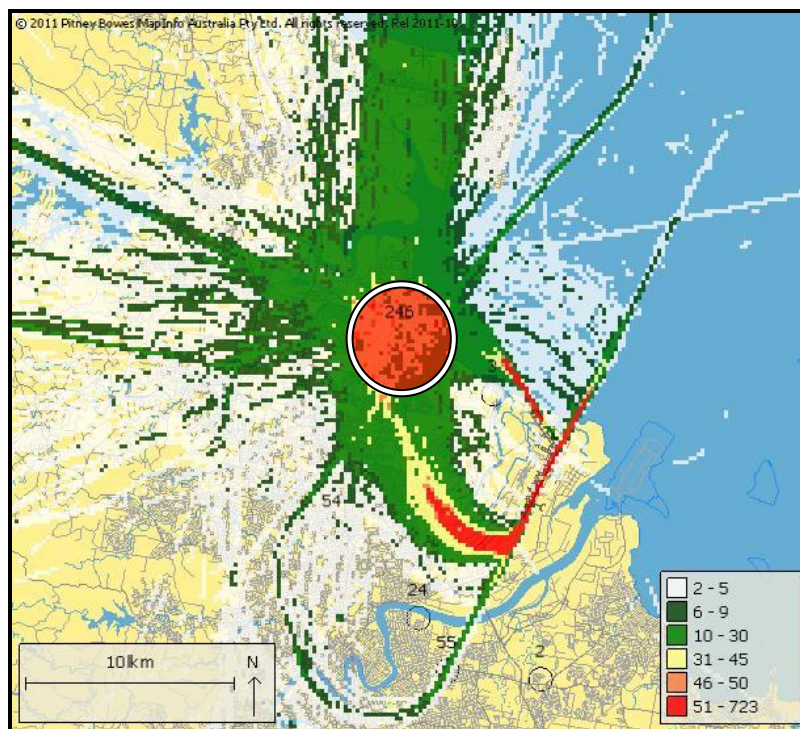


Figure 3 Brisbane Airport Movements Captured

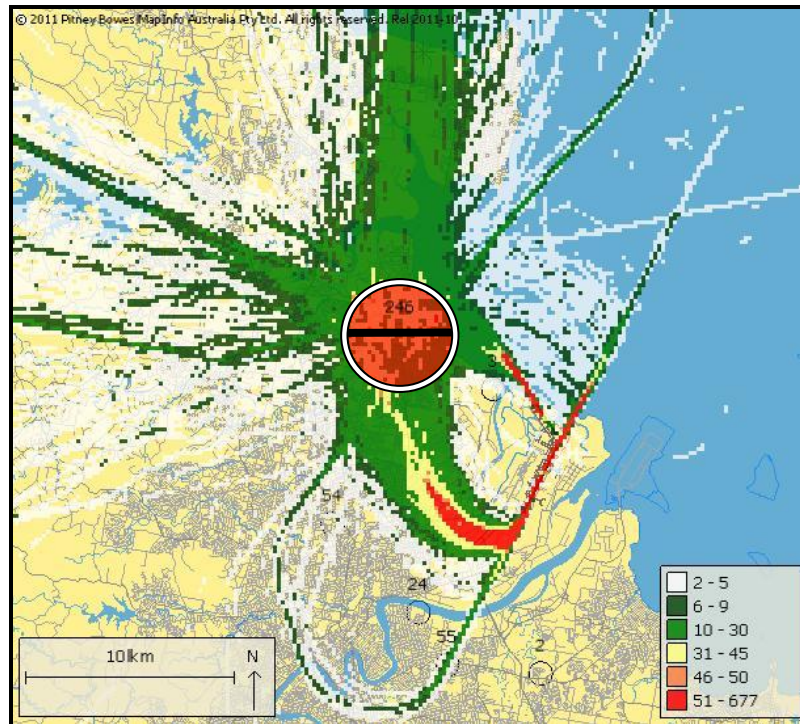
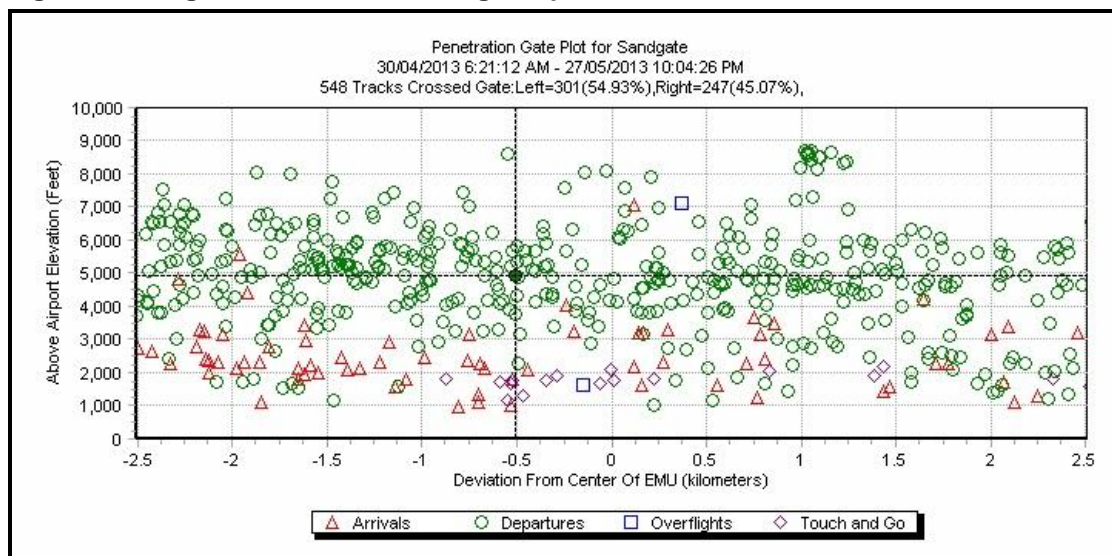


Figure 4 Sandgate Movements Through Capture Zone Penetration Gate



Note: Brisbane Airport altitude is 13ft above mean sea level. EMU altitude is 36ft above mean sea level. The EMU altitude should be adjusted from the data shown above in order to draw conclusions about height above ground of aircraft operations.

The black line through the capture zone in Figure 3 is the penetration gate, which was crossed by all the flights shown in Figure 4. Some movements within the capture zone are not shown as they did not cross the penetration gate. Some flights may cross the penetration gate more than once, at different altitudes. This may happen, for example, if a flight passes through the penetration gate at a low altitude soon after take off, then again having climbed to a higher altitude.

Findings

The following tables present a summary of the operations data.

Table 1 Movement Summary (30/04/2013 12:00am – 28/05/2013 12:00am)

Type of Operation	Brisbane Airport Movements	All Movements
<i>Number of Movements Through Capture Zone*</i>	677	721
<i>Number of Correlated Noise Events (CNE)</i>	295	322
<i>Number of Individual Movements with Correlated Noise Events (CNE)</i>	291	309
<i>Correlation Summary</i>	42.98%	42.86%

* Includes all aircraft with transponder flying through area, regardless of destination/origin airport.]

** May include operations that produced multiple noise events.

Correlation Summary

An evaluation of the number of aircraft operations that were matched with noise events recorded by the EMU is an important aspect of assessing performance of the noise monitoring installation. Ideally, all operations passing the EMU within a reasonable proximity will be matched to the appropriate noise event. Whilst complete matching is not expected, a lack of matches will reveal the need to investigate the reason for anomalies. A correlation summary for all movements of 43% is a relatively low result. This result is due to the background level at Sandgate being quite high during the hours of day. Whilst the noise created from the aircraft may be noticeable, they are not loud enough to create a noise event above the determined threshold settings shown below in Figure 5.

Table 2 Height (in feet, above ground level) Above The Monitor Summary

Type of Operation	Min*	Max*	Average*
<i>Departures Through Capture Zone**</i>	961	8,674	4,861
<i>Arrivals Through Capture Zone**</i>	937	7,025	2,491
<i>All Operations Through Capture Zone**</i>	937	8,674	4,451

* Flight tracks are susceptible to an altitude error of up to 200ft which is consistent with normal radar tolerances.

** Includes all airports within Brisbane Basin.

Table 3 Captured Movements Breakdown By Airport and Aircraft Category

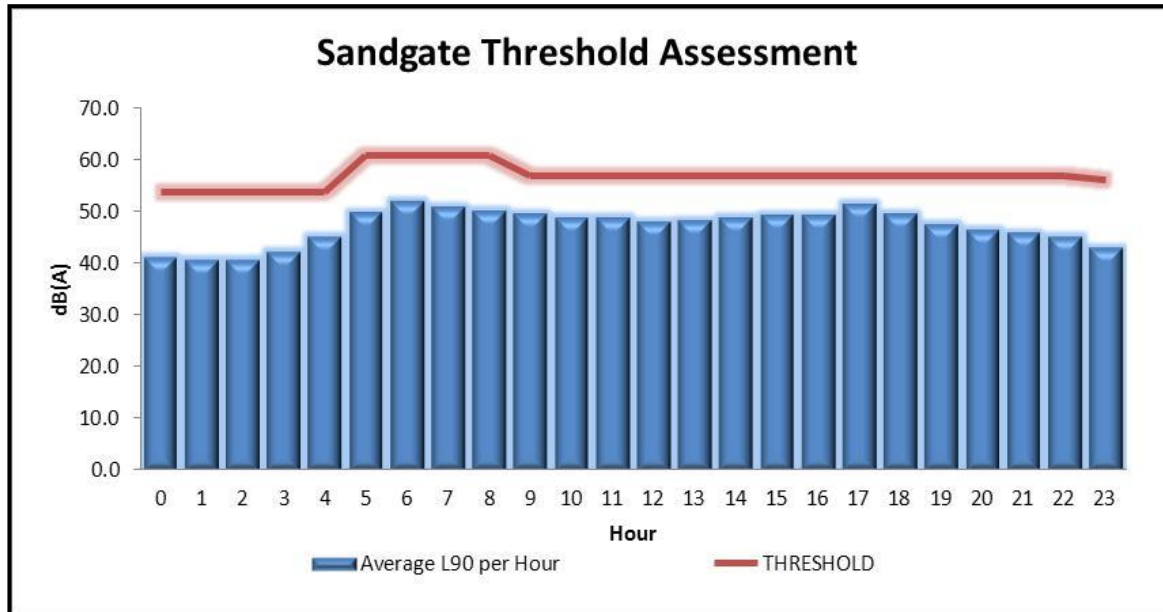
Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
<i>Brisbane Airport</i>	25	624	21	7	0	677
<i>Redcliffe Airport</i>	0	2	3	10	0	15
<i>Royal Brisbane Hospital</i>	0	0	0	10	0	10
<i>Archerfield Airport</i>	1	1	5	1	1	9
<i>Other</i>	0	0	1	9	0	10
Grand Total	26	627	30	37	1	721

*These non-flight planned operations are generally recreational aircraft conducting private flights and will account for the very low altitudes by some aircraft.

Background Noise Levels and Threshold Settings

At the monitoring site, background noise levels are first assessed to determine the appropriate threshold settings for the EMU. The threshold setting must be above the background noise level in order to clearly distinguish aircraft noise events from other noise sources. The result of background noise assessment and threshold settings are provided below in Figure 5.

Figure 5 Background and Threshold Assessment



Noise Summary

The following tables present a summary of the noise data for aircraft that flew through the capture zone and caused a Correlated Noise Event (CNE). Information is provided for Brisbane Airport movements that flew over the EMU, as well as all aircraft that flew over the EMU, noting that this area is affected by arrivals, departures and training flights, as shown in Figure 2 and Figure 3.

Table 4 Noise Summary

NOISE PARAMETERS	
L _{Aeq} 24 hr, dBA	53.6
L _{Aeq} (night), dBA	49.2
Background Day (L ₉₀ dBA)	48.9
Background Night (L ₉₀ dBA)	43.4

Table 5 Correlated Noise Events Summary

	Brisbane Airport Movements	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	295	322
Number of Correlated Noise Events at night (CNE night)	3	5
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNE _{xx}) day/night	CNE _{xx}	CNE _{xx}
CNE ₆₀ – day	N/A	N/A
CNE ₆₀ – night	N/A	N/A
CNE ₆₅ – day	83	90
CNE ₆₅ – night	0	0
CNE ₇₀ – day	16	18
CNE ₇₀ – night	0	0
CNE ₇₅ – day	0	1
CNE ₇₅ – night	0	0
CNE ₈₀ – day	0	0
CNE ₈₀ – night	0	0
Number of Correlated Noise Events (CNE _{xx}) per 24hr period min – max		
CNE ₆₀	N/A	N/A
CNE ₆₅	0 to 11	0 to 11
CNE ₇₀	0 to 3	0 to 3
CNE ₇₅	0 to 0	0 to 1
CNE ₈₀	0 to 0	0 to 0
Average Number of Correlated Noise Events (CNE _{xx} Ave.) day/night	CNE _{xx} Ave.	CNE _{xx} Ave.
CNE ₆₀ Ave. – day	N/A	N/A
CNE ₆₀ Ave. – night	N/A	N/A
CNE ₆₅ Ave. – day	2.96	3.21
CNE ₆₅ Ave. – night	0.00	0.00
CNE ₇₀ Ave. – day	0.57	0.64
CNE ₇₀ Ave. – night	0.00	0.00
CNE ₇₅ Ave. – day	0.00	0.04
CNE ₇₅ Ave. – night	0.00	0.00
CNE ₈₀ Ave. – day	0.00	0.00
CNE ₈₀ Ave. – night	0.00	0.00

Note: Day period is from 6:00am to 11:00pm. Night period is 11:00pm to 6:00am.

Note: The count of CNE₆₀ events are not applicable due to the threshold settings of 56-61dB(A) as depicted in Figure 5.

Short Term Monitoring Program

Table 6 LAmix Summary

Min dB(A)	Max dB(A)	Average dB(A)
57.3	75.9	63.3

Note: Summary for operations that passed through the correlation zone (2.5km radius with 8,000ft height AGL)

CNE65 Count by Hour

The highest number of CNE₆₅ in any one hour throughout the reporting period was 3 on the 10th May 2013 between 8am and 9am.

Aircraft Noise Levels

Table 7 presents the top 10 noisiest aircraft types captured by the noise monitor during the reporting period. Table 8 shows the 10 most correlated aircraft types that flew over the noise monitor.

Table 7 Top 10 Average Aircraft Noise Levels (LAmix) at the Sandgate EMU

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmix dB(A)		Highest No. CNE in One Day
					Average	Maximum	
AgustaWestland AW139 (H)	Unknown	O	Unknown	1	75.9	75.9	1
Dash 8 Q100 (T)	Brisbane	A	14	1	74.6	74.6	1
Dash 8 Q300 (T)	Brisbane	A	14	2	70.9	71.8	1
ATR 72-600 (T)	Brisbane	A	01	1	69.3	69.3	1
Boeing 747-400 (J)	Brisbane	D	19	2	69.0	69.3	1
Piper PA-31 Navajo (P)	Brisbane	D	32	5	68.7	72.7	1
ATR 72-600 (T)	Brisbane	D	32	1	68.6	68.6	1
Eurocopter AS-350 (H)	Mt Cootha	A	H	3	67.6	73.7	1
BAe-146-200 (J)	Brisbane	D	32	2	67.4	72.8	1
Cessna 182 (P)	Redcliffe	D	07	2	67.2	68.5	2

Table 8 Top 10 Most Correlated Aircraft Types Over the Sandgate EMU

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmix dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Dash 8 Q400 (T)	Brisbane	D	19	36	61.6	72.2	6
Beechcraft Super King Air 200 (T)	Brisbane	D	32	33	65.4	70.8	4
ATR 72-600 (T)	Brisbane	D	19	31	63.4	74.0	3
Dash 8 Q300 (T)	Brisbane	D	19	22	61.3	65.0	3
Beechcraft Super King Air 200 (T)	Brisbane	D	19	18	63.5	70.6	2
ATR 72-500 (T)	Brisbane	D	19	16	62.6	64.8	2
Robinson R44 (H)	Redcliffe	T	H	12	62.0	64.1	7
Dornier Do 228 (T)	Brisbane	A	19	10	62.8	66.7	3
Dash 8 Q400 (T)	Brisbane	D	32	10	64.7	67.5	3
Beechcraft Super King Air 200 (T)	Brisbane	A	19	8	61.3	66.7	2

Aircraft Category: Jet (J), Turboprop (T), Propeller (P), Helicopter (H), Unknown (U)

Conclusions

Following recommendations made in the 2012 Brisbane EMU Review, Short Term Monitoring was conducted in Sandgate during the period of 30th April to 28th May 2013. It was determined the most common aircraft movements to traverse the Sandgate community are turbo propeller departures operating from Brisbane Airport.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 65dB(A) in one day was 11. On May 10th 2013 during the period of 8am and 9am, 3 events exceeding 65dB(A) occurred, this was the greatest number in one hour during the period. Residents in the area of Sandgate were exposed to a correlated noise events exceeding 70dB(A) during the hours of day. There were no correlated noise events above 65dB(A) that occurred during the hours of night. The average LAmax during the reporting period was 63.3dB(A), with a max level of 75.9dB(A) and minimum level of 57.3dB(A) recorded.

A review of Tables 7 and 8 indicates the Regular Public Transport (RPT) turbo propeller aircraft operating to and from Brisbane Airport feature in both the loudest average and most correlated aircraft types.

The correlation summary of 43% is due to the background level at Sandgate being quite high during the hours of day. Whilst the noise created from the aircraft may be noticeable, they are not loud enough to create a noise event above the determined threshold settings.

Due to the distinctive flight paths and distance from Brisbane Airport, it is not expected the ratio of arrival and departure flights over Sandgate will change due to seasonal variation over a twelve month period.

Further Information

Further information about Airservices noise monitoring program is available on the Airservices website, including reports of the noise and operational data collected by the Noise and Flight Path Monitoring System, as well as fact sheets about topics related to aircraft noise. The website is available at:

<http://www.airservicesaustralia.com/aircraftnoise/>

Contact us

To lodge a complaint or make an enquiry about aircraft operations, you can

- go to WebTrak (www.airservicesaustralia.com/aircraftnoise/webtrak/)
- use our online form (www.airservicesaustralia.com/aircraftnoise/about-making-a-complaint/)
- telephone 1800 802 584 (freecall) or 1300 302 240 (local call –Sydney)
- fax (02) 9556 6641 or
- write to, Noise Complaints and Information Service, PO Box 211, Mascot NSW 1460.

Glossary of Terms

A	Arrivals
AGL	Above Ground Level
Background noise level (L90)	The sound level in dB(A) that is exceeded 90% of the time
CNE	Correlated noise events - noise events which are matched with aircraft movements
CNExx	Correlated noise events that are equal or greater than the noise level XX dB(A)
D	Departures
Day	6:00am to 11:00pm
EMU	Environmental Monitoring Unit
H	Helicopters
Jet	Jet aircraft
LAeq	Continuous equivalent noise level over a time period
LAeq 24hr	Continuous equivalent noise level over a 24 hour period
LAeq night	Continuous equivalent noise level over the night time period (hours of 11:00pm to 6:00am)
LAmx	Maximum sound level in dB(A)
Local	Operation that departs and arrives at the same airport. Local movements include circuits and training flights.
Movement	An aircraft operation, such as a take-off or landing
Nxx	Average daily number of correlated noise events equal to or greater than XX dB(A)
Night	11:00pm to 6:00am
NFPMS	Noise and Flight Path Monitoring System
Noise Event	A noise that exceeds the threshold sound level for longer than the threshold time that is set
Non-Jet	Non-jet aircraft
O	Overflight i.e. an aircraft movement that flew over the area but did not arrive or depart from the airport of concern
T	Local Operation (Departure & Arrival)

Note:

For further information on the metrics used in this report refer to Australian Standard 1055.1–1997 “Acoustics – Description and measurement of environmental noise”.

Airservices welcomes comments about this report. Please contact us via e-mail at community.relations@airservicesaustralia.com if you would like to provide feedback.