

Short Term Monitoring Program

Manning, WA

Change Summary

Version 1: 31 Jul 2013		
Section/ Clause	Summary	NRFC
Figure 5 and Table 4	L90 values updated due to technical issue.	

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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.

1. Deployment Details

1.1 Deployment Purpose

Short term noise monitoring was conducted at Manning during winter following the recommendations made in the 2012 Short Term Monitoring Program Manning Report.

Manning is located to the south west of Perth airport. During the reporting period the suburb was predominately traversed by Runway 21 departures.

The purpose of this report is to provide a technical summary of the recorded aircraft noise and operational data collected at Manning 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.

1.2 Deployment Monitoring Period

10/06/2013 12:00am – 08/07/2013 12:00am

1.3 Noise Monitoring Terminal (NMT) Details

Location	30/60 Ley St, Manning, WA 6152
Latitude	32°00'53.71"S
Longitude	115°51'53.17"E
NMT Altitude	33ft above mean sea level
Capture Zone	2.5km radius with 8,000ft (above ground level) height for noise data capture
Threshold Settings	55.0 dB(A) to 59.0 dB(A) depending on time of day

2. Location Images



Figure 1: Perth Fixed EMU Locations and the Manning Short Term Monitoring Program Deployment Location

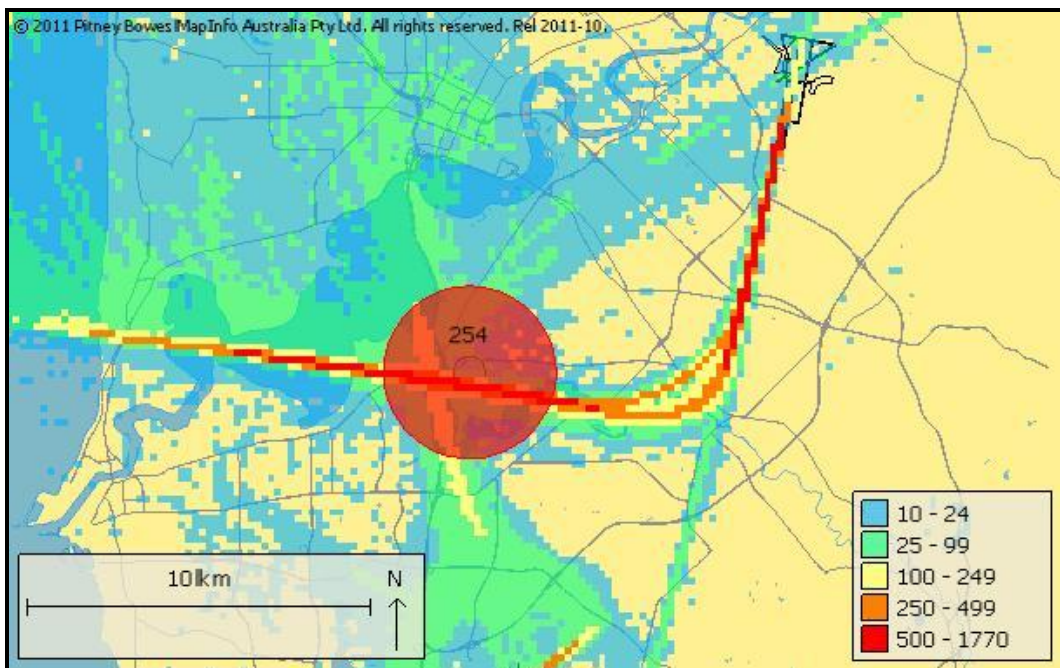


Figure 2: Total Movements Captured Track Density

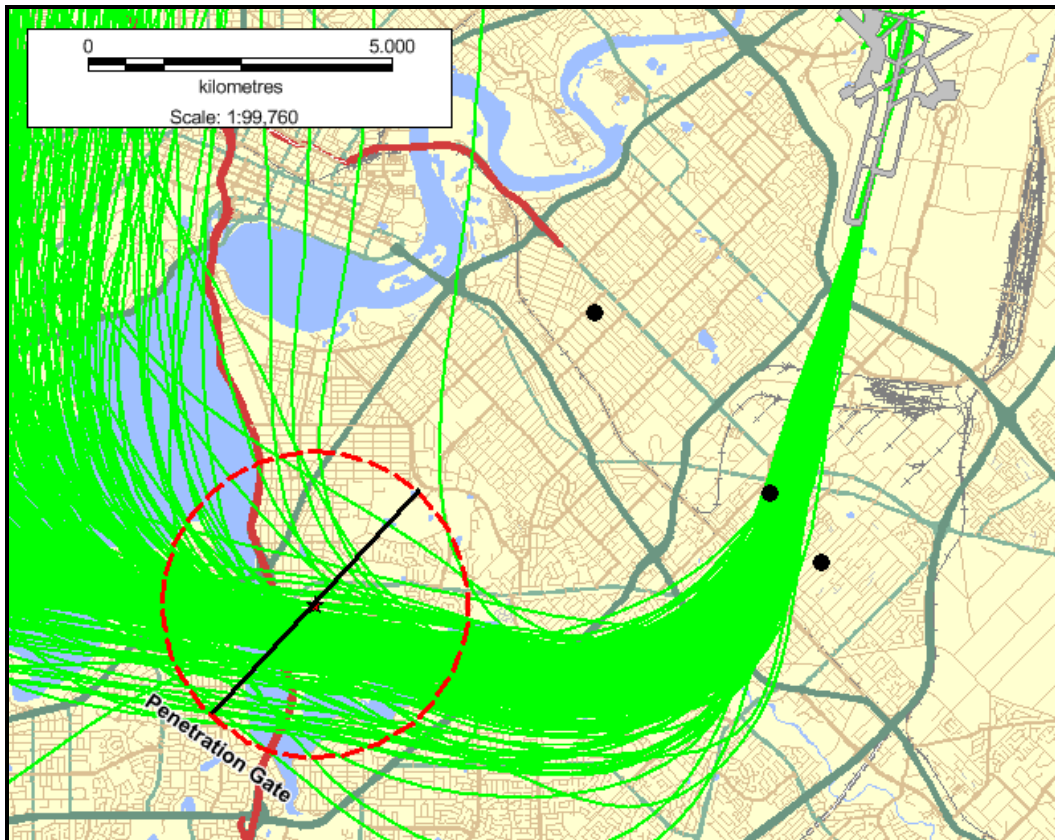


Figure 3: Perth Airport Runway 21 Jet Departure Movements Captured

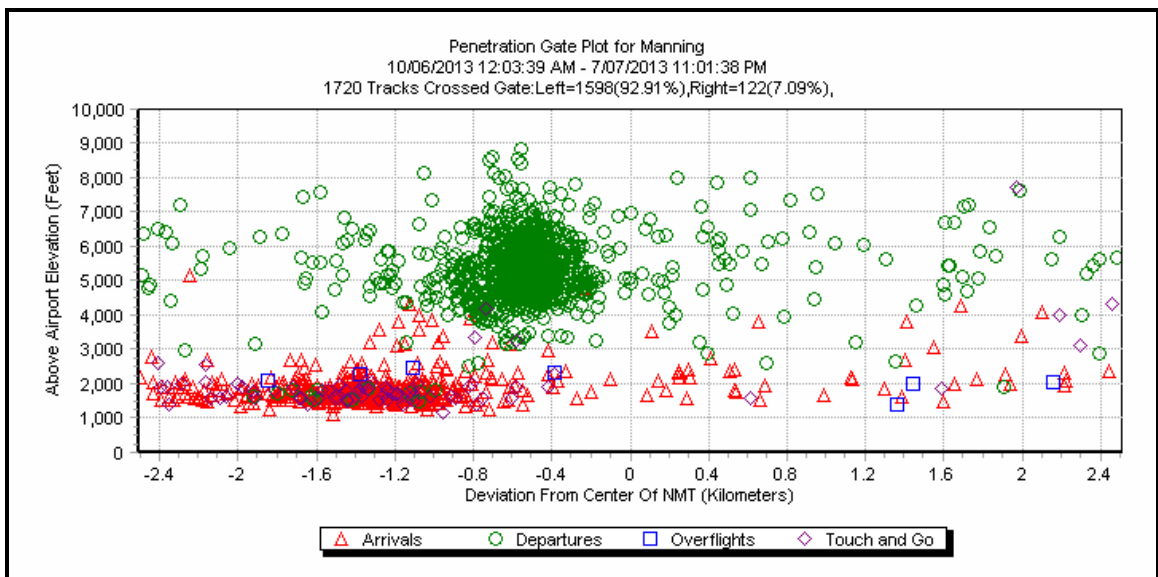


Figure 4: Manning Movements Through Capture Zone Penetration Gate

Note: Perth Airport is 67ft above mean sea level. NMT altitude is 33ft above mean sea level. The NMT 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 a 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 after having climbed to a higher altitude.

3. Deployment Findings

The following tables present a summary of the operations data.

Table 1 Movement Summary (10/06/2013 12:00am – 08/07/2013 12:00am)

Type of Operation	Runway 21 Jet Departure Movements	All Movements
Number of Movements Through Capture Zone*	945	1,770
Number of Correlated Noise Events (CNE)	863	1,154
Number of Movements with Correlated Noise Events (CNE)	861	1,133
Correlation Summary	91.11%	64.01%

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

Note: ** May include operations that produced multiple noise events.

3.1 Correlation Summary

An evaluation of the number of aircraft operations were matched with noise events recorded by the NMT. This is an important aspect of assessing performance of the noise monitoring installation. Ideally, all operations passing the NMT 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 64% is considered to be a relatively average result, based on reviews of fixed noise monitoring terminals nationally.

3.2 Movement Analysis

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

Type of Operation	Min*	Max*	Average*
Departures Through Capture Zone**	1,513	8,837	5,304
Arrivals Through Capture Zone**	1,121	10,754	1,943
All Operations Through Capture Zone**	1,121	16,393	4,225

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

Note: ** Includes all airports within Perth Basin.

Table 3 Captured Movements Breakdown By Airport and Aircraft Category

Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
Perth	946	159	14	0	2	1,121
Jandakot	29	318	243	32	13	635
Other	0	4	2	8	0	14
Grand Total	975	481	259	40	15	1,770

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

3.3 Background Noise Levels and Threshold Settings

At the monitoring site, background noise levels are first assessed to determine the appropriate threshold settings for the NMT. 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.

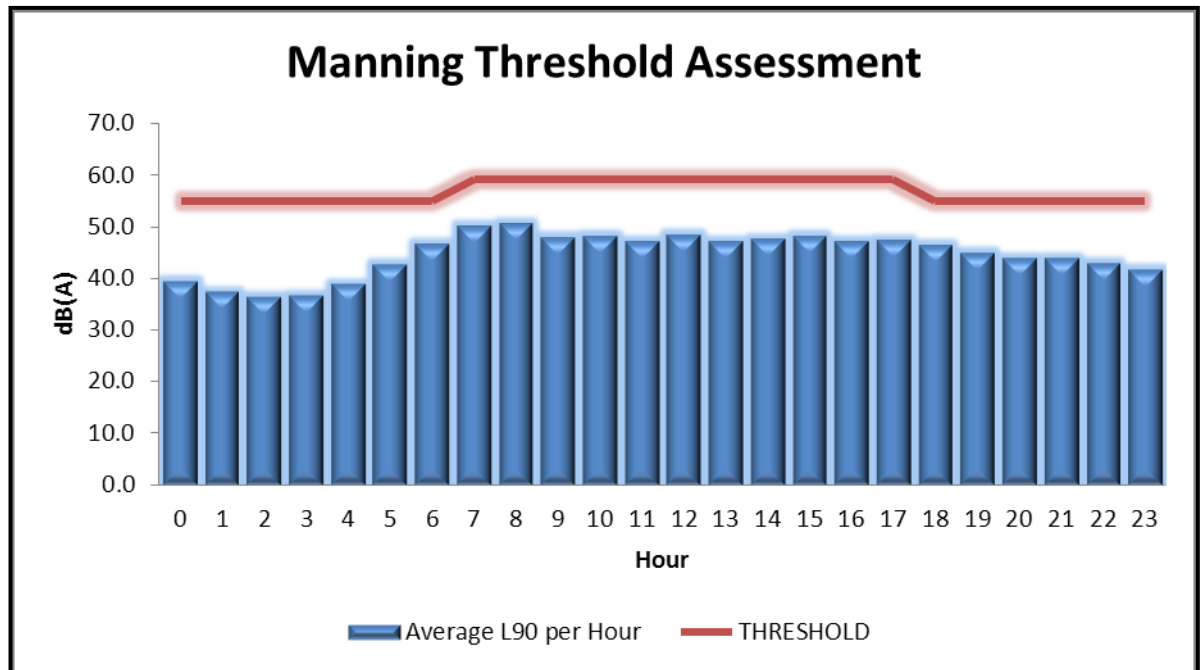


Figure 5: Background and Threshold Assessment

4. Noise Level 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 Perth Runway 21 jet departure movements that flew over the NMT, as well as all aircraft that flew over the NMT, 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	Noise Level (dB(A))
LAeq 24 hr, dB(A)	55.1
LAeq (night), dB(A)	47.1
Background Day (L90 dB(A))	47.0
Background Night (L90 dB(A))	39.1

Note: LAeq 24hr: The continuous equivalent noise level over a 24 hour period, including noise from aircraft and the wider environment.

Note: LAeq (night): The continuous equivalent noise level over the night time period (hours of 11:00pm to 6:00am), including noise from aircraft and the wider environment.

Table 5 Correlated Noise Events Summary

	Runway 21 Jet Departure Movements	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	863	1,154
Number of Correlated Noise Events at night (CNE night)	137	196
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNE _{xx}) day/night	CNE _{xx}	CNE _{xx}
CNE ₆₀ – day	724	911
CNE ₆₀ - night	136	161
CNE ₆₅ – day	570	659
CNE ₆₅ – night	95	107
CNE ₇₀ – day	57	91
CNE ₇₀ - night	20	21
CNE ₇₅ – day	5	14
CNE ₇₅ - night	6	6
CNE ₈₀ – day	2	3
CNE ₈₀ - night	0	0

Number of Correlated Noise Events (CNE _{xx}) per 24hr period min – max	Runway 21 Jet Departure Movements	All Aircraft
CNE ₆₀	0 to 87	6 to 94
CNE ₆₅	0 to 67	1 to 72
CNE ₇₀	0 to 10	0 to 10
CNE ₇₅	0 to 2	0 to 2
CNE ₈₀	0 to 1	0 to 1
Average Number of Correlated Noise Events (CNE _{xx} Ave.) day/night	CNE _{xx} Ave.	CNE _{xx} Ave.
CNE ₆₀ Ave. – day	25.86	32.54
CNE ₆₀ Ave. – night	4.86	5.75
CNE ₆₅ Ave. – day	20.36	23.54
CNE ₆₅ Ave. – night	3.39	3.82
CNE ₇₀ Ave. – day	2.04	3.25
CNE ₇₀ Ave. – night	0.71	0.75
CNE ₇₅ Ave. – day	0.18	0.50
CNE ₇₅ Ave. – night	0.21	0.21
CNE ₈₀ Ave. – day	0.07	0.11
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.

Table 6 LAmax Summary

Min dB(A)	Max dB(A)	Average dB(A)
55.8	85.7	65.9

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

4.1 CNE Count by Hour

Investigation was undertaken on the number of correlated noise events that exceeded 70dB(A) to reveal patterns and determine what time of the day the majority of these events occurred.

Figure 6 presents daily average number of noise events 70dB(A) or above (CNE₇₀) broken down on an hourly basis.

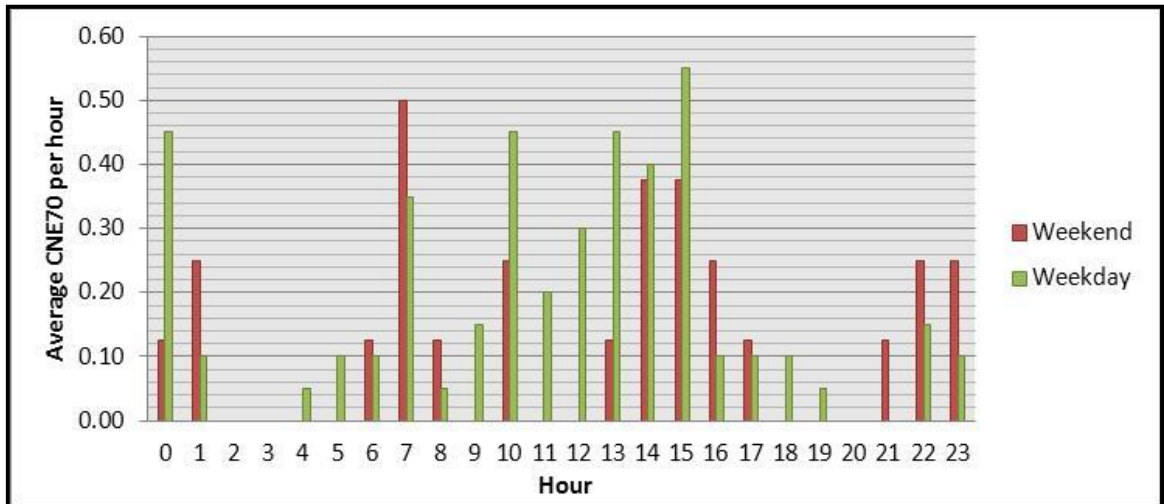


Figure 6: Average CNE70 per Hour for All Operations

The highest number of CNE₇₀ in any one hour throughout the reporting period was 3. This occurred between 3pm and 4pm on June 15th and 1pm and 2pm on June 19th.

5. Aircraft Noise Levels

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

Table 7 Top 10 Average Aircraft Noise Levels (L_{Amax}) at the Manning Noise Monitoring Terminal

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	L _{Amax} dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Airbus A340-300 (J)	Perth	D	21	9	75.4	77.0	1
Cessna C172 (P)	Jandakot	A	06L	1	75.2	75.2	1
Airbus A340-200 (J)	Perth	D	21	1	74.0	74.0	1
Fairchild Metroliner (T)	Jandakot	D	Unknown	1	73.2	73.2	1
P-2006T Tecnam (P)	Jandakot	T	24R	1	73.1	73.1	1
Socata TBM-850 (T)	Jandakot	A	24R	1	72.2	72.2	1
Bell 412 (H)	Unknown	O	Unknown	6	72.1	77.7	2
Fairchild Metroliner (T)	Jandakot	D	24R	1	71.7	71.7	1
Airbus A340-600 (J)	Perth	D	21	3	71.2	74.3	1
Fairchild Metroliner (T)	Jandakot	A	24R	10	70.5	77.3	2

Table 8 Top 10 Most Correlated Aircraft Types Over the Manning Noise Monitoring Terminal

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	L _{Amax} dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Boeing 737-800 (J)	Perth	D	21	213	66.0	85.7	22
Fokker 100 (J)	Perth	D	21	134	67.2	77.2	23
Airbus A320 (J)	Perth	D	21	101	65.2	73.9	8
Boeing 717-200 (J)	Perth	D	21	90	65.3	83.8	11
Airbus A330-300 (J)	Perth	D	21	78	68.5	72.1	6
Pilatus PC-12 (T)	Jandakot	A	06L	60	62.4	73.5	6
Boeing 777-200 (J)	Perth	D	21	58	68.1	73.5	4
Avro RJ-100 (J)	Perth	D	21	48	66.8	77.1	6
Boeing 777-300ER (J)	Perth	D	21	39	69.2	72.3	4
Pilatus PC-12 (T)	Jandakot	A	24R	36	63.2	77.1	7

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

6. Conclusions

Short term noise monitoring was conducted in Manning during the period of 10th June to 8th July 2013. This followed the recommendations made in the 2012 Short Term Monitoring Program Manning Report to conduct seasonal monitoring in winter to compare results. It was determined the most common aircraft movements to traverse the Manning community are Perth Regular Public Transport (RPT) jet departures off Runway 21.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 70dB(A) in one day was 10. Between 3pm and 4pm on June 15th and 1pm to 2pm on June 19th, 3 events exceeding 70dB(A) occurred. This was the greatest number of CNE70 in one hour during the period. Residents in the area of Manning were exposed to a correlated noise events exceeding 75dB(A) during the hours of day and night. There were 196 correlated noise events above 60dB(A) that occurred during the hours of night. The average L_{Amax} during the reporting period was 65.9dB(A), with a max level of 85.7dB(A) and minimum level of 55.8dB(A) recorded.

Noise events above 70dB(A) were most common in the weekday hours of 3pm and 4pm and weekend hours of 7:00am to 8:00am.

A review of Tables 7 and 8 indicates the loudest movements tend to be a mix of Jandakot movements and various Airbus A340-300 movements from Perth Airport. The most frequent movements to pass over and correlate and Manning are Runway 21 departures from Perth airport.

The correlation summary of 64% for all movements is considered a relatively good result based on reviews of fixed noise monitoring terminals nationally. During the reporting period Perth Runway 21 jet departures had a correlation summary of 91%.

This report should be read in conjunction with the 2012 Short Term Monitoring Program Manning Report. The results captured during the varying seasons are comparable, with the winter months having a 12% decrease in correlated noise events.

7. 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/>

8. 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.

9. 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
CNE _{xx}	Correlated noise events that are equal or greater than the noise level XX dB(A)
D	Departures
Day	6:00am to 11:00pm
H	Helicopters
Jet	Jet aircraft
LA _{eq}	Continuous equivalent noise level over a time period
LA _{eq} 24hr	Continuous equivalent noise level over a 24 hour period
LA _{eq} night	Continuous equivalent noise level over the night time period (hours of 11:00pm to 6:00am)
LA _{max}	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
N _{xx}	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
NMT	Noise Monitoring Terminal
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”.

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