

Short Term Monitoring Program WA, Canning Vale Report

May 2013

Version Control

Version Number	Date	Detail
1.0	May 2013	Initial Release.
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Deployment Purpose – Canning Vale, WA

Following recommendations for noise monitoring around Jandakot Airport made in the 'Review of the Perth Environmental Monitoring Units' undertaken by Airservices in 2011, Canning Vale was selected as a Short Term Monitoring location.

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

10/11/2012 12:00am – 08/12/2012 12:00am

Environmental Monitoring Unit (EMU) Details

Location	Brookside Square, Canning Vale 6155
Latitude	32°5'23.88"S
Longitude	115°55'14.08"E
EMU Altitude	102ft above mean sea level
Capture Zone	2.5km radius with 8,102ft (above ground level) height for noise data capture
Threshold Settings	54.0 dB(A) to 56.0 dB(A) depending on time of day

Location Images

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

Figure 1 Perth Fixed Environmental Monitoring Unit Locations and the Canning Vale Short Term Monitoring Program Deployment Location

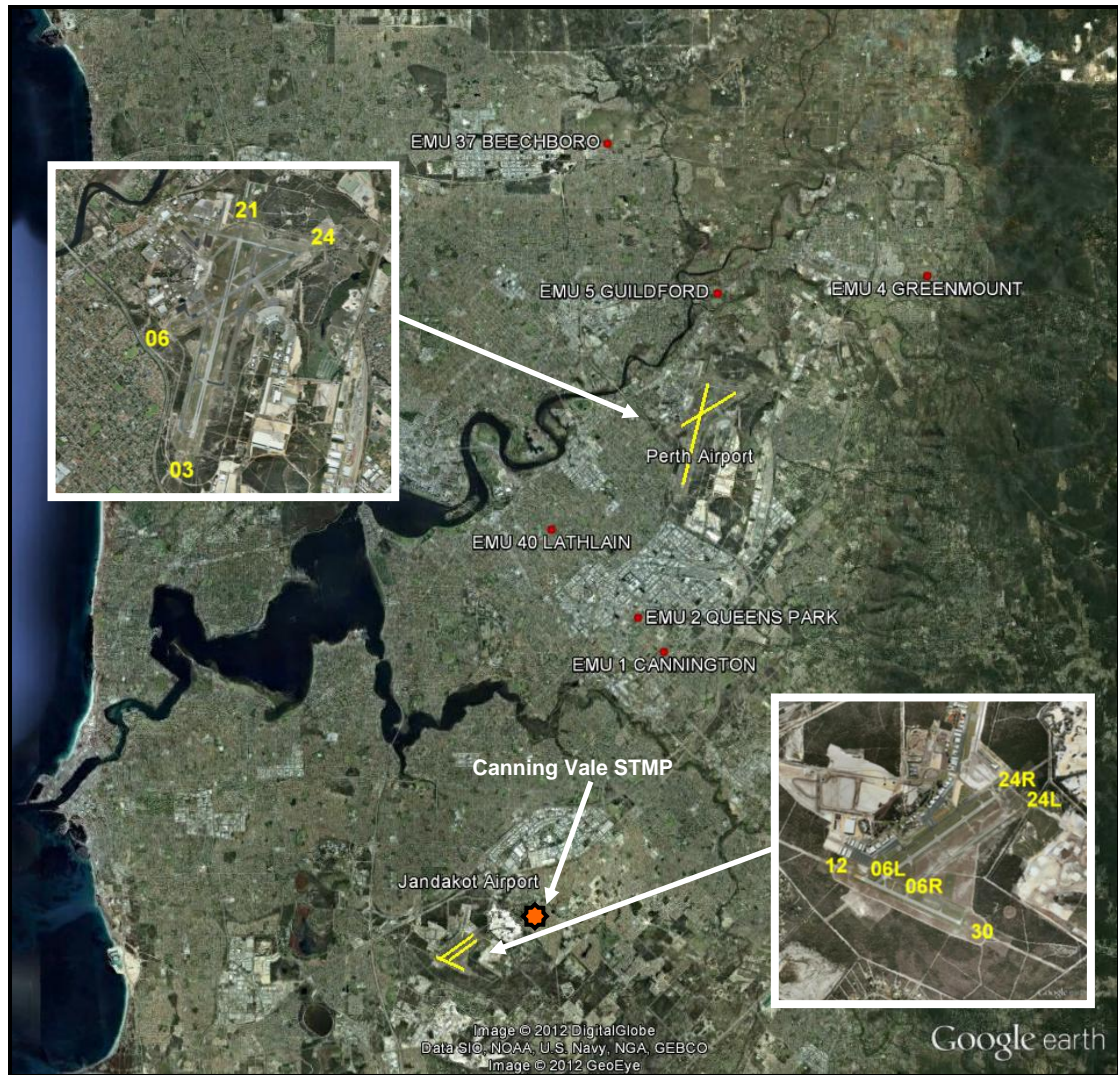


Figure 2 Total Movements Captured

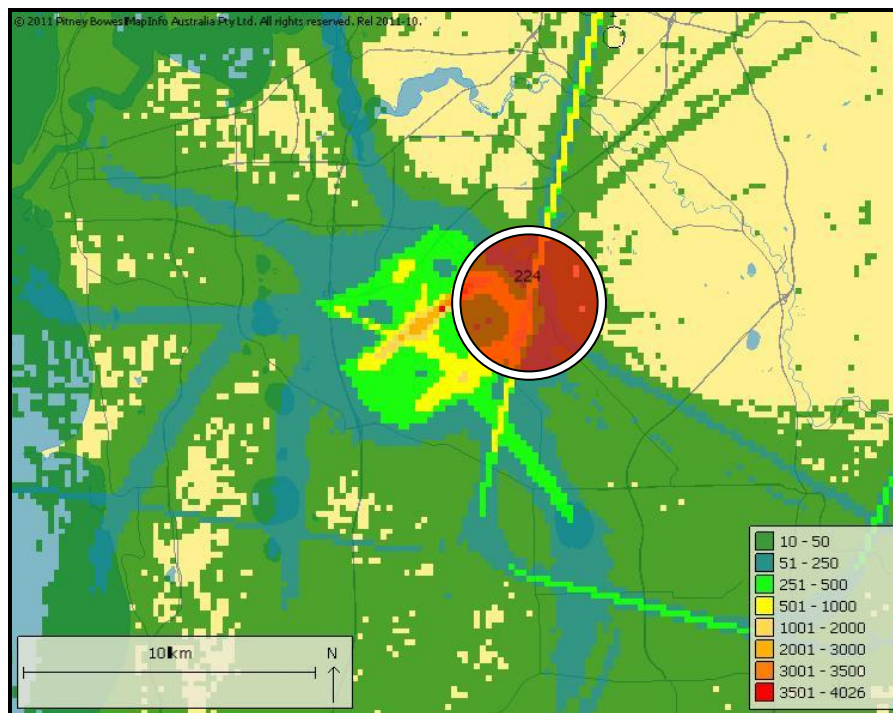


Figure 3 Jandakot Airport Movements Captured

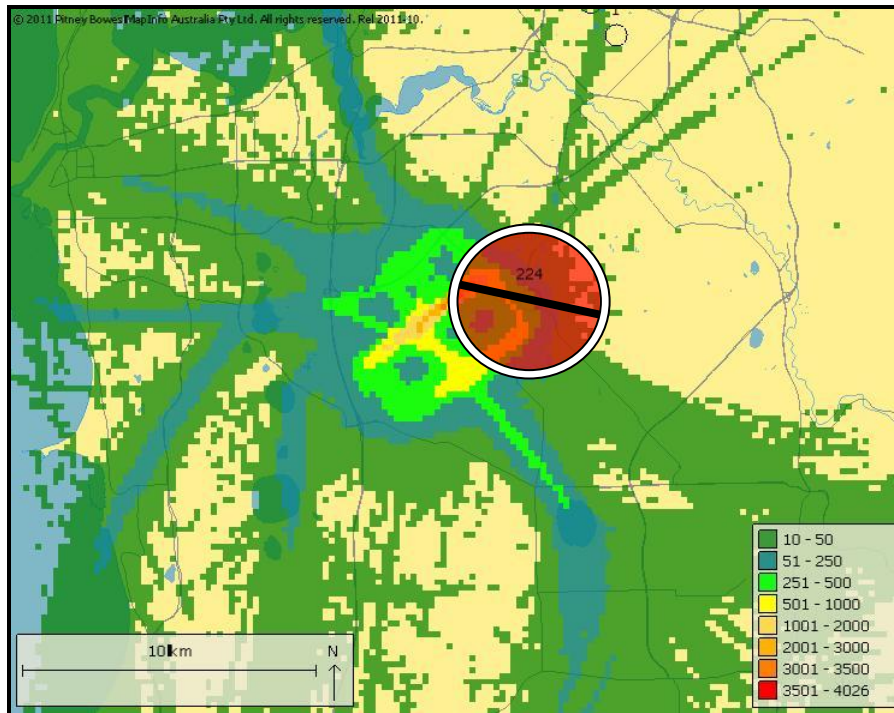
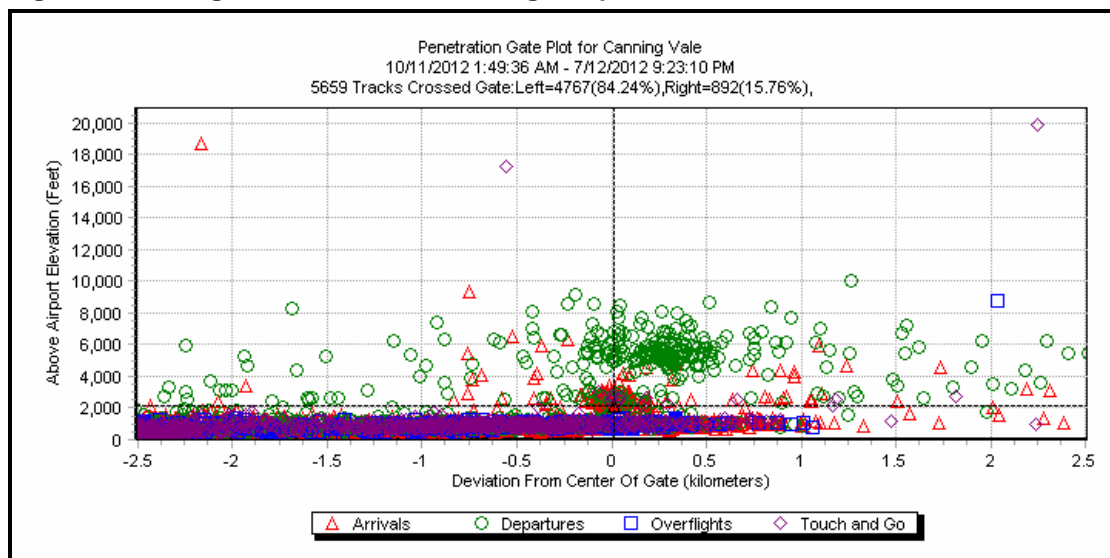


Figure 4 Canning Vale Movements Through Capture Zone Penetration Gate



Note: Perth Airport altitude is 67ft above mean sea level. EMU altitude is 102ft 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 depicts the penetration gate location for the plot shown in Figure 4. Some movements through the capture zone failed to penetrate the gate used for analysis due to their entry and exit point through the capture zone. In addition, a single operation may fly through the penetration gate on multiple occasions. Further, operations that are on climb may pass out of the correlation zone and later penetrate the gate at a higher altitude. The opposite is true for arrivals that will penetrate the gate at a higher altitude and later pass through the correlation zone.

Findings

The following tables present a summary of the operations data.

Table 1 Movement Summary (10/11/2012 12:00am – 08/12/2012 12:00am)

Type of Operation	Jandakot Airport Movements	All Movements
<i>Number of Movements Through Capture Zone*</i>	4,074	4,632
<i>Number of Correlated Noise Events (CNE)</i>	1,325	2,367
<i>Number of Individual Movements with Correlated Noise Events (CNE)</i>	812	1,714
<i>Correlation Summary</i>	19.93%	37.00%

* 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 37% is a reasonably low result. This result is lower than other NFPMS monitors due to the quieter nature of General Aviation aircraft operations. 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>	0	9,963	1,893
<i>Arrivals Through Capture Zone**</i>	26	18,671	1,106
<i>All Operations Through Capture Zone**</i>	0	19,867	1,155

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

** Includes all airports within Perth Basin.

Table 3 Captured Movements Breakdown By Airport and Aircraft Category

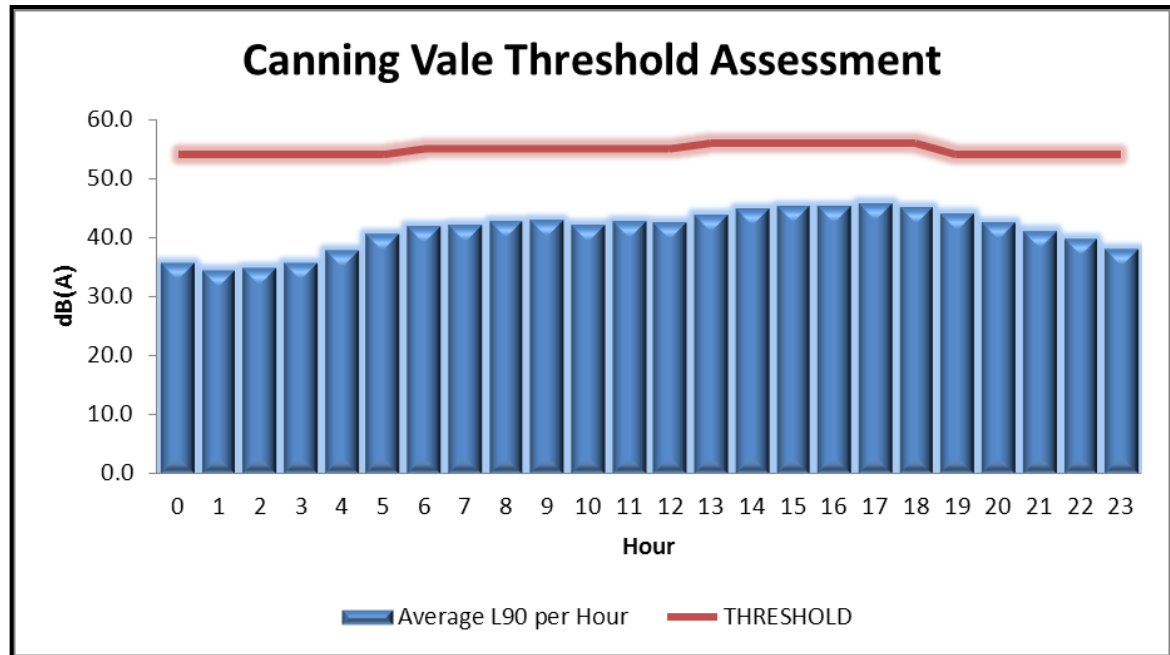
Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
<i>Jandakot</i>	59	465	657	52	1,527	2,760
<i>Perth</i>	617	317	17	4	4	959
<i>Other</i>	1	5	19	6	276	307
Grand Total	677	787	693	62	1,807	4,026

*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 Jandakot 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	54.7
L _{Aeq} (night), dBA	48.7
Background Day (L ₉₀ dBA)	43.2
Background Night (L ₉₀ dBA)	36.7

Table 5 Correlated Noise Events Summary

	Jandakot Airport Movements	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	1,325	2,367
Number of Correlated Noise Events at night (CNE night)	97	198
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNE _{xx}) day/night	CNE _{xx}	CNE _{xx}
CNE ₆₀ – day	918	1,737
CNE ₆₀ - night	74	175
CNE ₆₅ – day	523	1,071
CNE ₆₅ – night	41	128
CNE ₇₀ – day	241	427
CNE ₇₀ - night	27	60
CNE ₇₅ – day	66	125
CNE ₇₅ - night	8	9
CNE ₈₀ – day	19	28
CNE ₈₀ - night	0	0
Number of Correlated Noise Events (CNE _{xx}) per 24hr period min – max		
CNE ₆₀	2 to 67	10 to 249
CNE ₆₅	1 to 46	8 to 155
CNE ₇₀	0 to 25	7 to 66
CNE ₇₅	0 to 8	0 to 24
CNE ₈₀	0 to 5	0 to 5
Average Number of Correlated Noise Events (CNE _{xx} Ave.) day/night	CNE _{xx} Ave.	CNE _{xx} Ave.
CNE ₆₀ Ave. – day	32.79	62.04
CNE ₆₀ Ave. – night	2.64	6.25
CNE ₆₅ Ave. – day	18.68	38.25
CNE ₆₅ Ave. – night	1.46	4.57
CNE ₇₀ Ave. – day	8.61	15.25
CNE ₇₀ Ave. – night	0.96	2.14
CNE ₇₅ Ave. – day	2.36	4.46
CNE ₇₅ Ave. – night	0.29	0.32
CNE ₈₀ Ave. – day	0.68	1.00
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.

Table 6 LAmox Summary

Min dB(A)	Max dB(A)	Average dB(A)
54.4	87.7	65.3

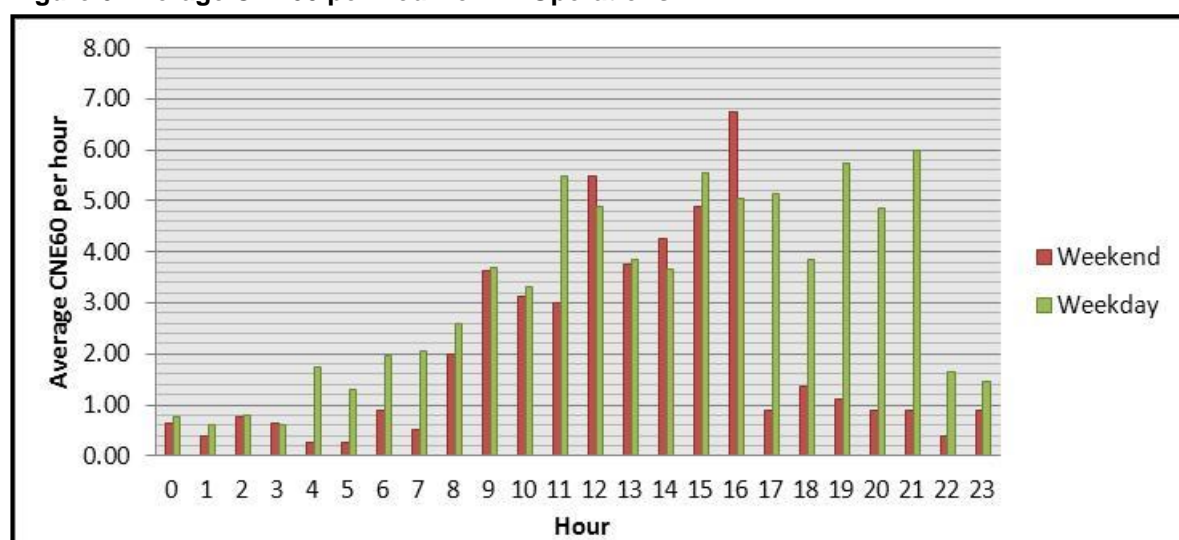
Note: Summary for operations that passed through the correlation zone (2.5km radius with 8,102ft height AGL)
 *Correlated Noise Events of 121.6 dB(A), 115.4 dB(A) and 91.8 dB(A) existed during the reporting period. Further investigation determined these were not aircraft noise events.

CNE60 Count by Hour

A large number of noise events were between 60dB(A) and 70dB(A). Therefore further investigation was undertaken on the number of correlated noise events that exceed 60dB(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 60dB(A) or above (CNE₆₀) broken down on an hourly basis.

Figure 6 Average CNE60 per Hour for All Operations



The highest number of CNE₆₀ in any one hour throughout the reporting period was 23 on 27th November 2012 between 7pm and 8pm.

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 (LAmox) at the Canning Vale EMU

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmox dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Bell 412 (H)	Unknown	O	Unknown	1	78.4	78.4	1
Fairchild Metroliner (T)	Jandakot	D	12	1	78.4	78.4	1
Beechcraft BE55 (P)	Jandakot	D	06L	2	77.0	81.0	1
Cessna C404 (P)	Jandakot	D	Unknown	1	75.2	75.2	1
Antonov An-124 (J)	Perth	A	03	1	75.2	75.2	1
Beechcraft BE55 (P)	Jandakot	D	12	1	75.0	75.0	1
Partenavia P68 (P)	Jandakot	D	06R	1	73.1	73.1	1
Grob G115 (P)	Jandakot	A	24R	3	72.9	74.9	2
Boeing 747-400 (J)	Perth	A	03	3	72.8	75.1	1
Embraer E190 (J)	Perth	D	21	1	72.7	72.7	1

Table 8 Top 10 Most Correlated Aircraft Types Over the Canning Vale EMU

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAm _{ax} dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Unknown (U)	Jandakot	A	24L	228	64.9	87.7	34
Pilatus PC12 (T)	Jandakot	A	24R	120	66.4	78.6	8
Boeing 737-800 (J)	Perth	A	03	119	68.3	81.8	39
Unknown (U)	Unknown	O	Unknown	114	65.6	84.3	12
Unknown (U)	Jandakot	T	24R	109	64.2	87.2	22
Unknown (U)	Jandakot	A	24R	101	65.1	78.3	23
Fokker 100 (J)	Perth	A	03	82	65.3	82.7	28
Unknown (U)	Jandakot	T	24L	72	66.2	78.9	10
Airbus A320 (J)	Perth	A	03	69	68.5	81.6	17
Unknown (U)	Jandakot	A	Unknown	63	64.7	83.7	16

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

Conclusions

Following recommendations made in 'Review of the Perth Environmental Monitoring Units', Short Term Monitoring was conducted at Canning Vale during the period of 10th November to 8th December 2012. Canning Vale is located to the north east of Jandakot Airport.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 60dB(A) in one day was 249. On November 27th during the period of 7pm and 8pm, 23 events exceeding 60dB(A) occurred, this was the greatest number in one hour during the period. Residents in the area of Canning Vale were exposed to a correlated noise events exceeding 75dB(A) during the hours of day and night. There were 175 correlated noise events above 60dB(A) that occurred during the hours of night. The average LAm_{ax} during the reporting period was 65.3dB(A), with a max level of 87.7dB(A) and minimum level of 54.4dB(A) recorded.

Noise events above 60dB(A) were most common in the weekday hours of 11:00am to 10:00pm and on weekends in the period of 9:00am to 5:00pm.

A review of Tables 7 and 8 indicates the most frequent and loudest aircraft types to pass over Canning Vale are General Aviation aircraft operating to and from Jandakot Airport. There are a high number of non-flight planned operations that depart or arrive at Jandakot, for this reason the most frequent correlated aircraft types were dominated by Unknown movements.

The correlation summary is reasonably low for this monitor. This result is lower than other NFPMS monitors due to the quieter nature of General Aviation aircraft operations. Whilst the noise created by these operations may be noticeable to the human ear, they do not meet the correlation parameters for the monitor.

Due to the distinctive flight paths and distance from Jandakot Airport, it is not expected the ratio of arrival and departure flights over Canning Vale 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.