

Short Term Monitoring Program WA, Riverton Report

May 2013

Version Control

Version Number	Date	Detail
1.0	May 2013	Initial Release.
2.0	January 2014	Figure 5 and L90 figures 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.

Deployment Purpose – Riverton, WA

Following community concerns, Short Term Monitoring was conducted in Riverton.

Runway 21 jet departures from Perth Airport predominately traverse the suburb of Riverton.

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

16/03/2013 12:00am – 13/04/2013 12:00am

Environmental Monitoring Unit (EMU) Details

Location	Riverton Primary School, Riverton 6148
Latitude	32°2'3.96"S
Longitude	115°54'1.80"E
EMU Altitude	49ft 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 58.0 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 Riverton EMU.

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

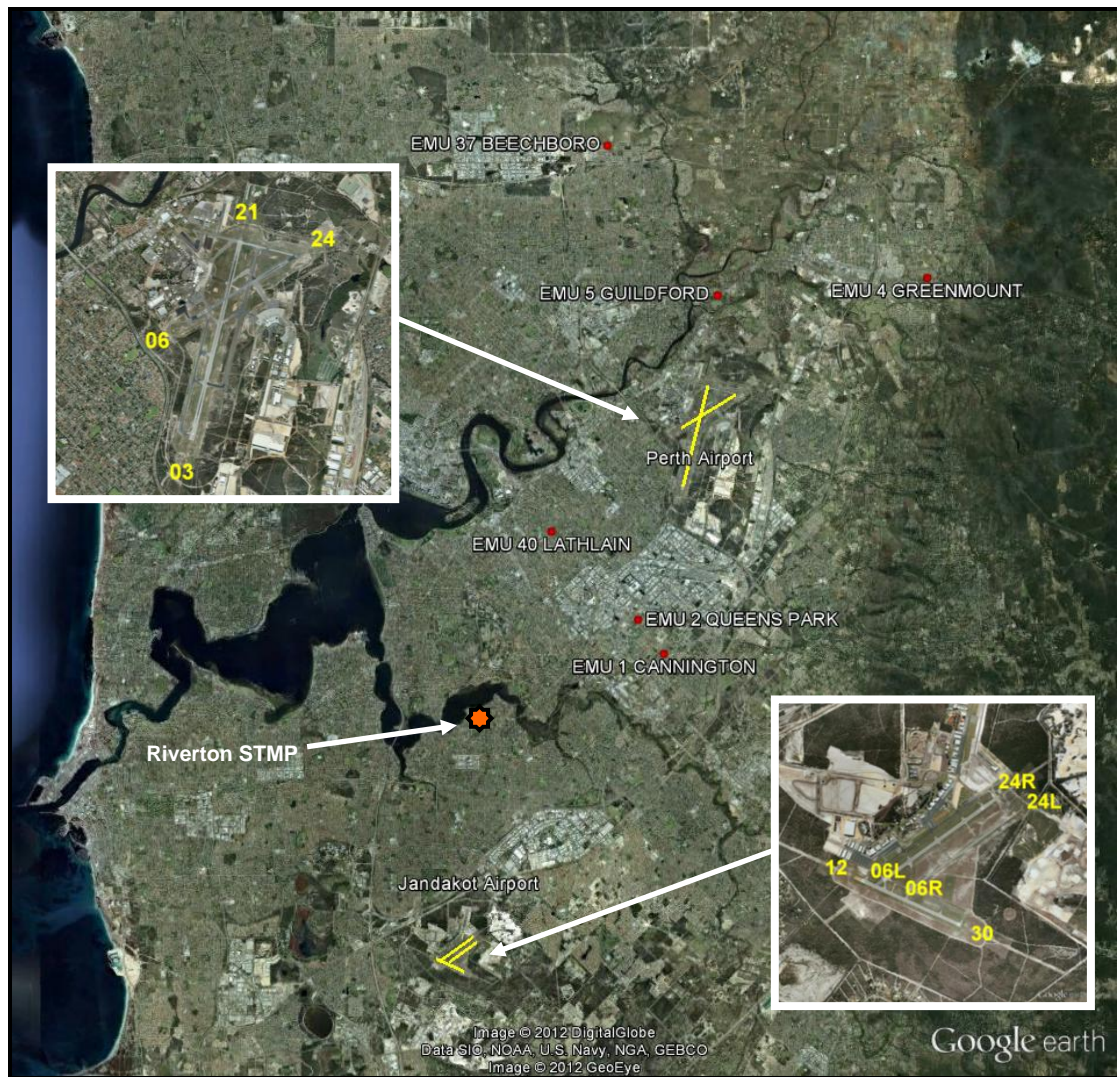


Figure 2 Total Movements Captured

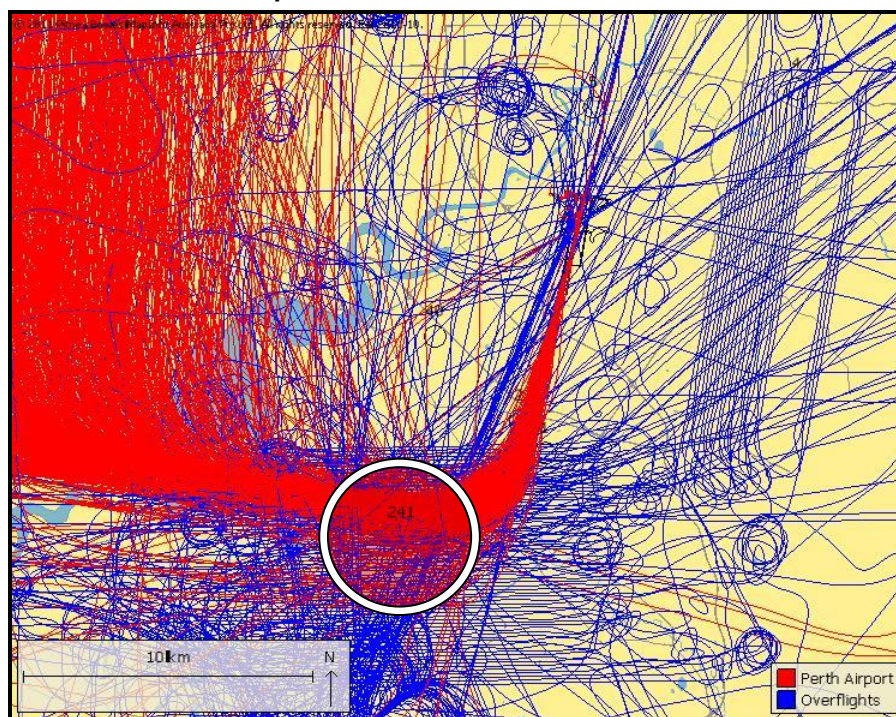


Figure 3 Perth Airport Movements Captured

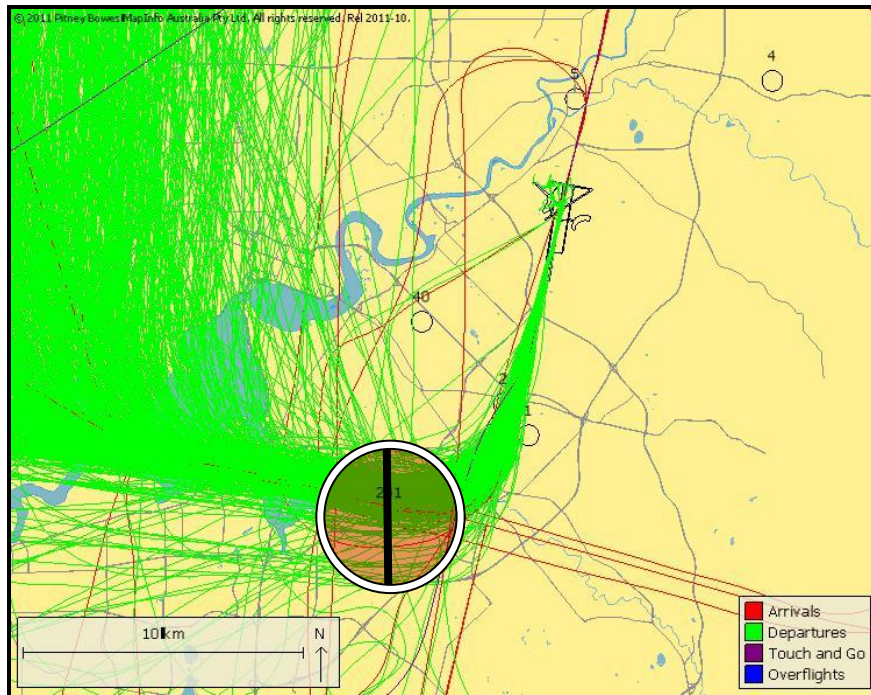
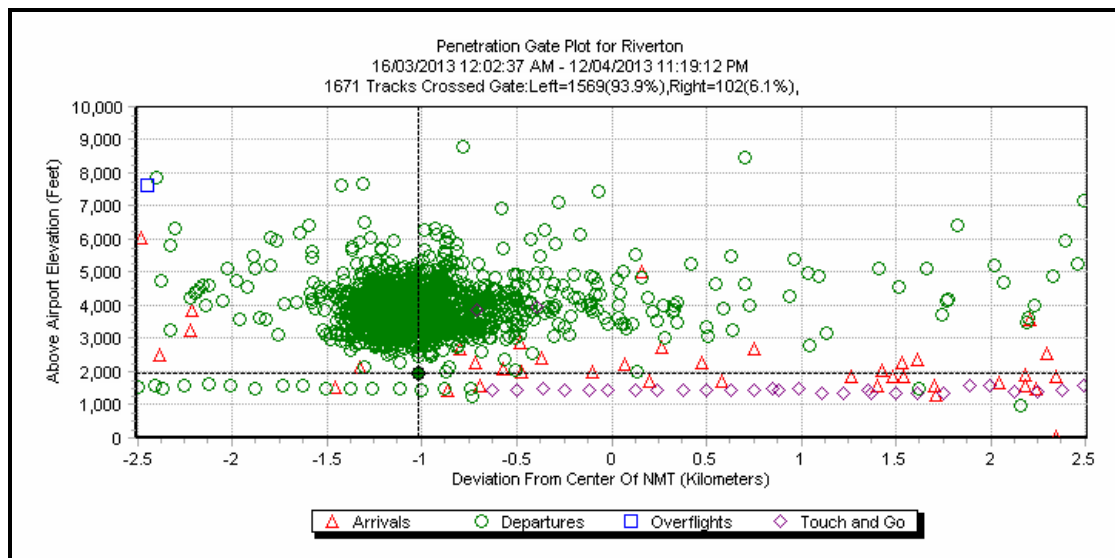


Figure 4 Riverton Movements Through Capture Zone Penetration Gate



Note: Perth Airport altitude is 67ft above mean sea level. EMU altitude is 49ft 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 (16/03/2013 12:00am – 13/04/2013 12:00am)

Type of Operation	Runway 21 Jet Departures	All Movements
<i>Number of Movements Through Capture Zone*</i>	1,354	1,703
<i>Number of Correlated Noise Events (CNE)</i>	1,222	1,356
<i>Number of Individual Movements with Correlated Noise Events (CNE)</i>	1,219	1,333
<i>Correlation Summary</i>	90.03%	78.27%

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

** May include operations that produced multiple noise events.

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

Type of Operation	Min*	Max*	Average*
<i>Departures Through Capture Zone**</i>	752	7,817	4,258
<i>Arrivals Through Capture Zone**</i>	89	7,683	1,235
<i>All Operations Through Capture Zone**</i>	89	12,854	3,504

* 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.

Figure 4 shows that jet departures typically fly at an altitude of 3,000 to 5,500 feet.

Table 3 Captured Movements Breakdown By Airport and Aircraft Category

Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
<i>Perth</i>	1,356	208	6	0	2	1,572
<i>Jandakot</i>	7	64	44	13	0	128
<i>Other</i>	1	0	1	1	0	3
Grand Total	1,364	272	51	14	2	1,703

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

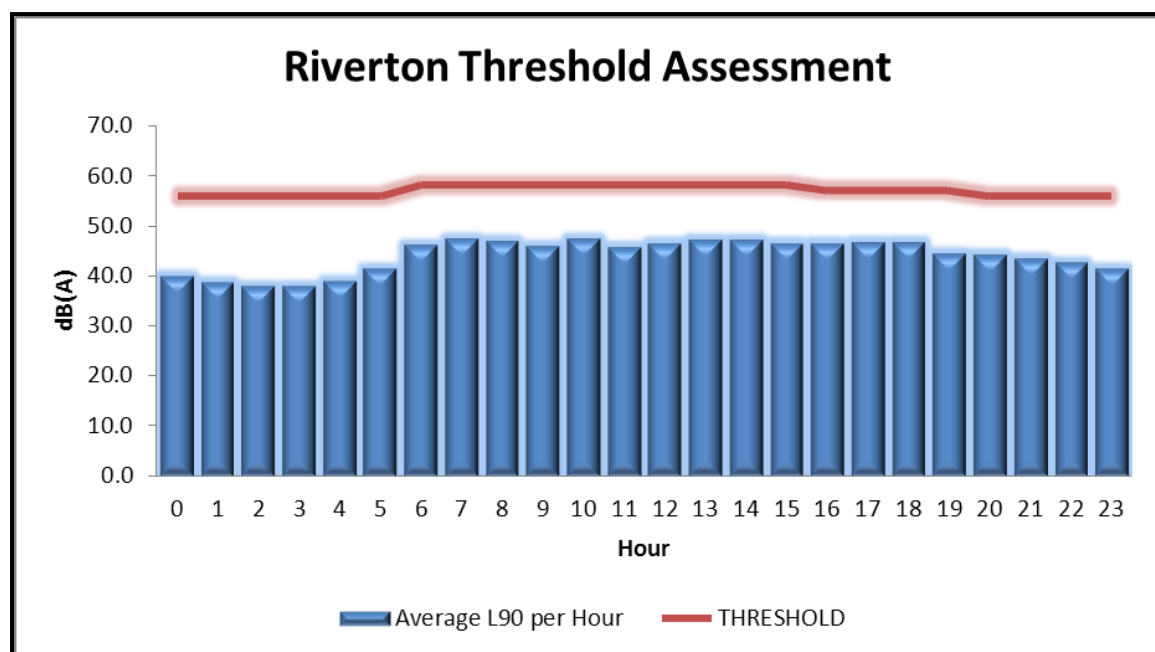
Correlation Summary

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 78% is a good result considering the distance the monitor is located from the airport and the diversity of flight paths over the monitor.

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 Runway 21 jet departure 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	53.5
L _{Aeq} (night), dBA	49.0
Background Day (L ₉₀ dBA)	45.9
Background Night (L ₉₀ dBA)	39.4

Table 5 Correlated Noise Events Summary

	Runway 21 Jet Departures	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	1,222	1,356
Number of Correlated Noise Events at night (CNE night)	203	233
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNE _{xx}) day/night	CNE _{xx}	CNE _{xx}
CNE ₆₀ – day	1,016	1,103
CNE ₆₀ - night	201	217
CNE ₆₅ – day	749	777
CNE ₆₅ – night	153	160
CNE ₇₀ – day	143	146
CNE ₇₀ - night	43	46
CNE ₇₅ – day	6	6
CNE ₇₅ - night	8	9
CNE ₈₀ – day	1	1
CNE ₈₀ - night	0	0
Number of Correlated Noise Events (CNE _{xx}) per 24hr period min – max		
CNE ₆₀	5 to 88	7 to 94
CNE ₆₅	4 to 70	5 to 74
CNE ₇₀	0 to 19	0 to 19
CNE ₇₅	0 to 3	0 to 3
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	36.29	39.39
CNE ₆₀ Ave. – night	7.18	7.75
CNE ₆₅ Ave. – day	26.75	27.75
CNE ₆₅ Ave. – night	5.46	5.71
CNE ₇₀ Ave. – day	5.11	5.21
CNE ₇₀ Ave. – night	1.54	1.64
CNE ₇₅ Ave. – day	0.21	0.21
CNE ₇₅ Ave. – night	0.29	0.32
CNE ₈₀ Ave. – day	0.04	0.04
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)
56.4	83.0	66.5

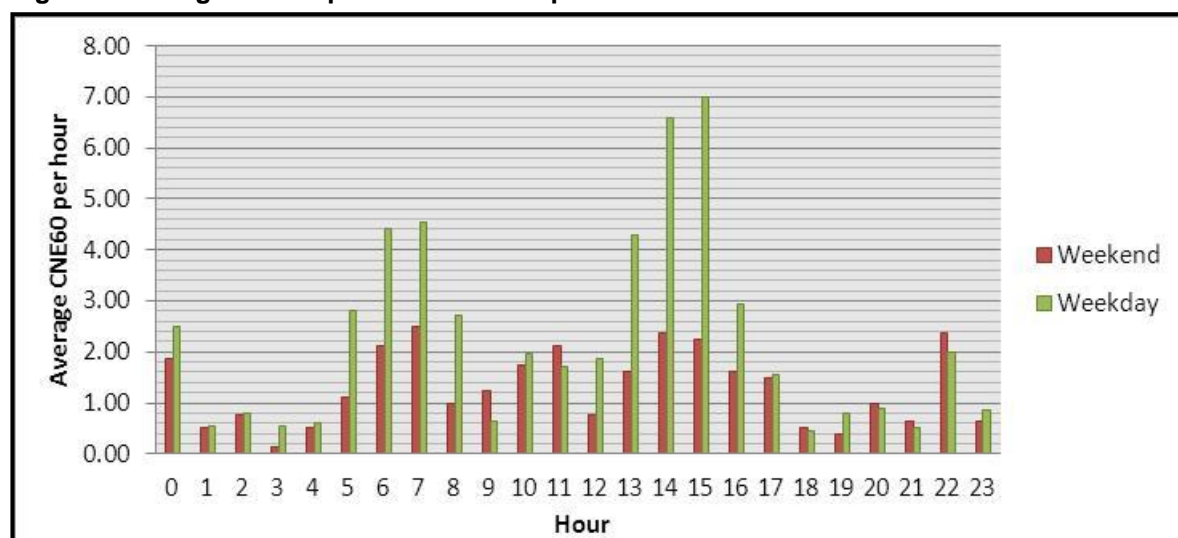
Note: Summary for operations that passed through the correlation zone (2.5km radius with 8,000ft height AGL)

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 13 on both 21st March and 9th April 2013 between 7am and 8am.

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 Riverton EMU

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmox dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Airbus A340-300 (J)	Perth	D	21	21	73.1	76.1	2
Airbus A330-200 (J)	Perth	D	21	20	70.5	73.0	2
Cessna 172 (P)	Jandakot	T	12	1	70.2	70.2	1
Boeing 777-300ER (J)	Perth	D	21	54	70.0	73.4	4
Fairchild Metroliner (T)	Jandakot	A	24R	4	69.9	76.1	1
Airbus A340-200 (J)	Perth	D	21	2	69.8	71.7	1
Airbus A330-300 (J)	Perth	D	21	141	69.7	77.1	10
Boeing 737-300 (J)	Perth	D	21	2	69.4	69.8	1
Cessna 172 (P)	Jandakot	D	Unknown	1	69.2	69.2	1
Airbus A330-200 (J)	Perth	A	06	1	69.0	69.0	1

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

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAm _{ax} dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Boeing 737-800 (J)	Perth	D	21	292	66.2	83.0	22
Fokker 100 (J)	Perth	D	21	170	66.3	71.9	18
Airbus A320 (J)	Perth	D	21	161	65.8	70.0	11
Airbus A330-300 (J)	Perth	D	21	141	69.7	77.1	10
Boeing 717-200 (J)	Perth	D	21	107	64.0	79.4	9
Avro RJ-100 (J)	Perth	D	21	68	66.2	73.0	6
Boeing 777-200 (J)	Perth	D	21	55	68.9	77.3	3
Boeing 777-300ER (J)	Perth	D	21	54	70.0	73.4	4
Embraer E190 (J)	Perth	D	21	39	67.3	71.4	4
Boeing 777-200LR (J)	Perth	D	21	36	68.6	73.6	3

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

Conclusions

Following community concerns, Short Term Monitoring was conducted at Riverton during the period of 16th March to 13th April 2013. It was determined the most common aircraft movements to traverse the Riverton community are jet departures operating from Perth Airport. During the reporting period 128 Jandakot movements passed through the capture zone, these were predominately turbine and light propeller aircraft.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 60dB(A) in one day was 94. On both the 21st March and 9th April 2013 during the period of 7am and 8am, 13 events exceeding 60dB(A) occurred, this was the greatest number in one hour during the period. Residents in the area of Riverton were exposed to a correlated noise events exceeding 75dB(A) during the hours of day and night. There were 217 correlated noise events above 60dB(A) that occurred during the hours of night. The average LAm_{ax} during the reporting period was 66.5dB(A), with a max level of 83.0dB(A) and minimum level of 56.4dB(A) recorded.

Noise events above 60dB(A) were most common in the weekday hours of 2:00pm to 4:00pm and on weekends in the periods of 6:00am to 8:00am, 2:00pm to 4:00pm and 10:00pm to 11:00pm.

A review of Tables 7 and 8 indicates the Regular Public Transport (RPT) jet aircraft on departure from Perth Airport feature in both the loudest average and most correlated aircraft types. The Airbus A330-300 and Boeing 777-300ER are the only distinct aircraft types to feature in both tables. Three less common Jandakot operations feature in the top 10 average loudest aircraft types.

The correlation summary of 76% is a good result considering the distance the monitor is located from the airport and the diversity of flight paths over the monitor.

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