

Short Term Monitoring Program VIC, Oak Park Report

April 2013

Version Control

Version Number	Date	Detail
1.0	April 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 – Oak Park, VIC

Following recommendations made in the 'Review of the Melbourne Environmental Monitoring Units' undertaken by Airservices in 2012, Oak Park Primary School was selected as a Short Term Monitoring Location.

All Essendon Airport movements are within close proximity of Oak Park as well as some Melbourne Airport Runway 34 (north/south runway) jet arrivals.

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

11/08/2012 12:00am – 07/09/2012 11:59pm

Environmental Monitoring Unit (EMU) Details

Location	Oak Park Primary School, Oak Park 3046
Latitude	37°42'56.19"S
Longitude	144°54'55.87"E
Capture Zone	2.5km radius with 8,274ft (above ground level) height for noise data capture
EMU Altitude	275ft above mean sea level
Threshold Settings	54.0 dB(A) to 60.0 dB(A) depending on time of day

Location Images

Figures 1 to 3 details the location of monitors surrounding Melbourne and Essendon Airport and the flight paths used for those operations captured by the Oak Park EMU.

Figure 1 Melbourne and Essendon Fixed Environmental Monitoring Unit Locations and the Oak Park Short Term Monitoring Program Deployment Location



Figure 2 Total Movements Captured

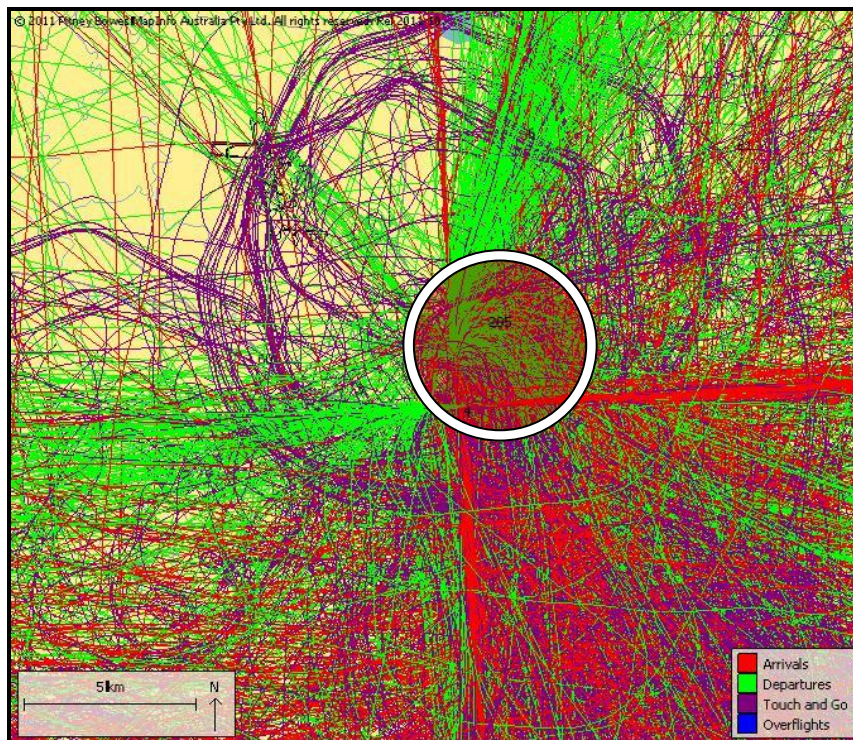


Figure 3 Essendon Airport Movements Captured

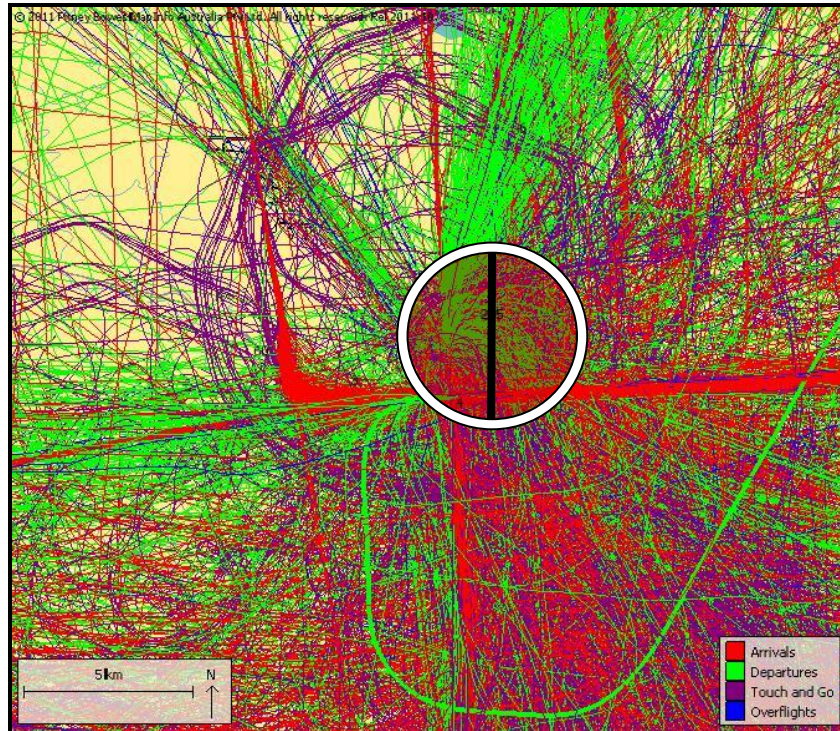
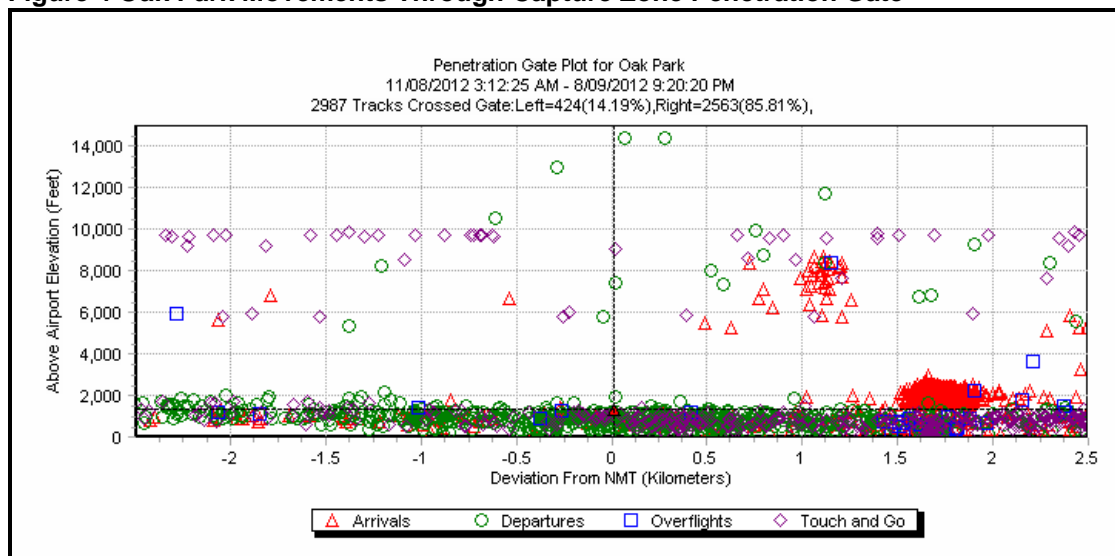


Figure 4 Oak Park Movements Through Capture Zone Penetration Gate



Note: Melbourne Airport altitude is 434ft above mean sea level. EMU altitude is 275ft 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

Table 1 Movement Summary (11/08/2012 12:00am – 07/09/2012 11:59pm)

Type of Operation	Essendon Airport Movements	All Movements
<i>Number of Movements Through Capture Zone*</i>	3,441	5,176
<i>Number of Correlated Noise Events (CNE)</i>	1,887	2,631
<i>Correlation Summary</i>	54.84%	50.83%

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

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. The correlation results for the Oak Park deployment are shown in Table 1. A correlation summary for all movements of 51% is a reasonably low result. This lower result is due to a combination of operations being captured by the edge of the zone and 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 Above The Monitor Summary

Type of Operation	Min	Max	Average
<i>Departures Through Capture Zone**</i>	167	14,557	1,202
<i>Arrivals Through Capture Zone**</i>	160	8,817	1,968
<i>All Operations Through Capture Zone**</i>	160	14,567	1,796

** Includes all airports within Melbourne Basin.

Figure 4 shows Melbourne Airport Runway 34 jet arrivals typically fly within proximity of Oak Park between 2,000ft and 3,000 feet.

Table 3 Captured Movements Breakdown By Airport and Aircraft Category

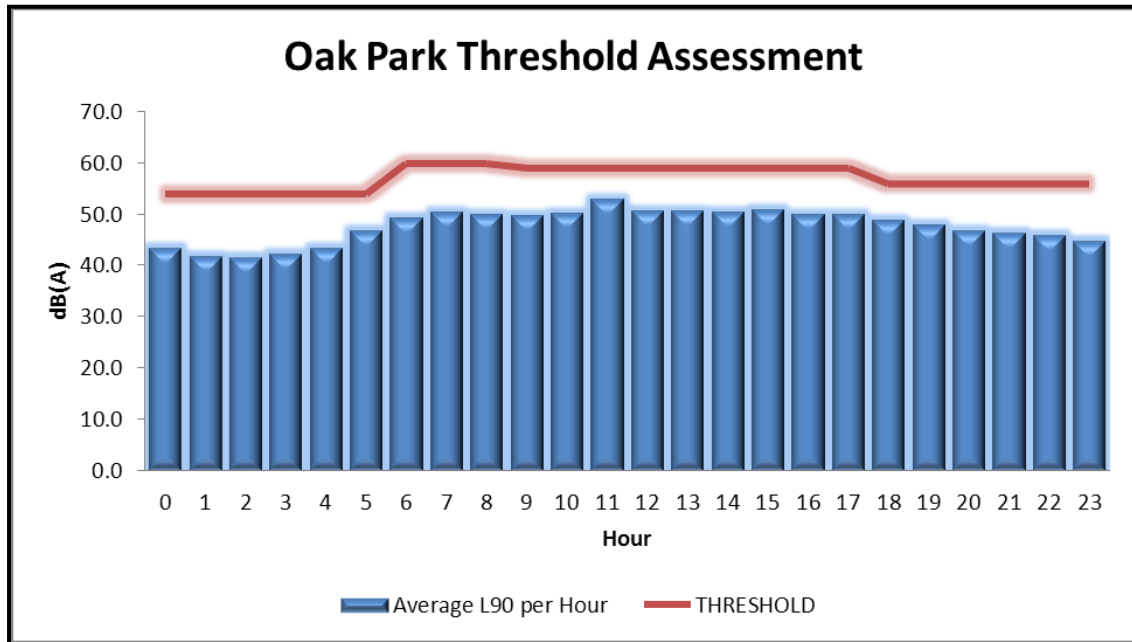
Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
<i>Essendon</i>	261	837	533	1,114	696	3,441
<i>Melbourne</i>	1,375	171	0	0	0	1,546
<i>Moorabbin</i>	2	0	125	1	5	133
<i>Other</i>	2	5	26	13	10	56
Grand Total	1,640	1,013	684	1,128	711	5,176

*These non-flight planned operations are generally recreational aircraft conducting private or training flights.

Background Noise Levels and Threshold Settings

At the monitoring site, background noise levels are first assessed to determine the appropriate threshold settings for the noise monitor. 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 Essendon Airport movements, 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	61.2
L _{Aeq} (night), dBA	57.9
Background Day (L ₉₀ dBA)	49.6
Background Night (L ₉₀ dBA)	43.5

Table 5 Correlated Noise Events Summary

	Essendon Airport Movements	All Movements
Total number of Correlated Noise Events (CNE 24hr)	1,887	2,631
Number of Correlated Noise Events at night (CNE night)	92	126
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNE _{xx}) day/night	CNE _{xx}	CNE _{xx}
CNE ₆₀ – day	1,766	2,451
CNE ₆₀ - night	72	102
CNE ₆₅ – day	1,392	1,825
CNE ₆₅ – night	30	46
CNE ₇₀ – day	838	1,029
CNE ₇₀ - night	13	20
CNE ₇₅ – day	395	463
CNE ₇₅ - night	7	10
CNE ₈₀ – day	117	138
CNE ₈₀ - night	3	4
Number of Correlated Noise Events (CNE _{xx}) per 24hr period min – max		
CNE ₆₀	12 to 118	13 to 187
CNE ₆₅	8 to 96	8 to 152
CNE ₇₀	6 to 72	6 to 104
CNE ₇₅	1 to 44	1 to 55
CNE ₈₀	0 to 16	0 to 21
Average Number of Correlated Noise Events (CNE _{xx} Ave.) day/night	CNE _{xx} Ave.	CNE _{xx} Ave.
CNE ₆₀ Ave. – day	63.07	87.54
CNE ₆₀ Ave. – night	2.57	3.64
CNE ₆₅ Ave. – day	49.71	65.18
CNE ₆₅ Ave. – night	1.07	1.64
CNE ₇₀ Ave. – day	29.93	36.75
CNE ₇₀ Ave. – night	0.46	0.71
CNE ₇₅ Ave. – day	14.11	16.54
CNE ₇₅ Ave. – night	0.25	0.36
CNE ₈₀ Ave. – day	4.18	4.93
CNE ₈₀ Ave. – night	0.11	0.14

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

Table 6 LAmix Summary

Min dB(A)	Max dB(A)	Average dB(A)
55.3	94.4	69.1

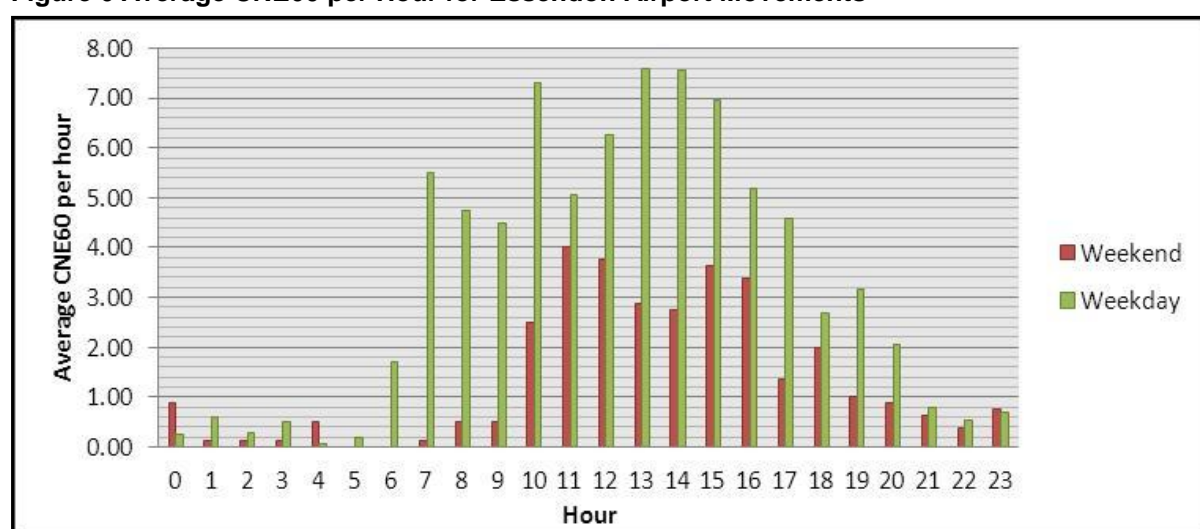
Note: Summary for operations that passed through the capture zone (2.5km radius with 8,274ft height AGL)

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 5 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 Essendon Airport Movements



The highest number of CNE₆₀ in any one hour throughout the reporting period was 24 on the 27th August 2012 between 2pm and 3pm.

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 Oak Park EMU

Aircraft Type (Aircraft Category)	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmix dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Beech BE76 (P)	Essendon	D	35	1	83.7	83.7	1
Cessna 337 (P)	Essendon	D	35	1	82.4	82.4	1
Rockwell Grand Commander (P)	Essendon	D	35	3	81.8	92.1	1
Cessna P337 (P)	Essendon	D	35	1	80.7	80.7	1
Beechcraft Super King Air 350 (T)	Essendon	A	35	1	79.4	79.4	1
Cessna Citation CJ3 (J)	Essendon	A	35	1	79.1	79.1	1
Partenavia P68 (P)	Moorabbin	D	35L	1	78.9	78.9	1
Beechcraft Baron (P)	Essendon	D	35	6	78.5	83.4	1
Diamond DA42 (P)	Essendon	D	35	1	77.8	77.8	1
Rockwell Super Commander (P)	Essendon	D	35	11	77.6	89.5	1

Table 8 Top 10 Most Correlated Aircraft Types Over the Oak Park EMU

Aircraft Type (Aircraft Category)	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmax dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Unknown (H)	Essendon	D	HE	245	70.3	89.0	20
Unknown (H)	Essendon	D	35	201	71.7	88.9	26
Boeing 737-800 (J)	Melbourne	A	34	193	66.5	84.7	29
Unknown (H)	Essendon	T	HE	184	69.6	89.8	19
Unknown (H)	Essendon	A	HE	149	69.9	86.8	13
Beechcraft Super King Air 200 (T)	Essendon	D	35	128	67.5	84.8	13
Airbus A320 (J)	Melbourne	A	34	127	66.8	85.4	17
Boeing 767-300 (J)	Melbourne	A	34	125	67.0	86.0	12
Aerospatiale AS-332 Super Puma (H)	Essendon	D	HE	64	73.3	82.4	6
Aero Commander 500 (P)	Essendon	D	35	54	74.2	85.8	5

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

Conclusions

Following recommendations made in 'Review of the Melbourne Environmental Monitoring Units', Short Term Monitoring was conducted at Oak Park Primary School during the period of 11th August to 8th September 2012. It was determined the most common aircraft movements to traverse the Oak Park community are Essendon Airport movements. Melbourne Airport Runway 34 jet arrivals also fly within proximity of the area.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 60dB(A) in one day was 194. On August 27th, 24 events exceeding 60dB(A) occurred during 2pm and 3pm, this was the greatest number in one hour during the period. Residents in the area of Oak Park were exposed to noise events exceeding 80dB(A) during the hours of day. There were 102 correlated noise events above 60dB(A) that occurred during the hours of night. The average LAmax during the reporting period was 69.1dB(A), with a max level of 94.4dB(A) and minimum level of 55.3dB(A) recorded.

Noise events above 60dB(A) were most common in the weekday hours of 10:00am to 4:00pm and on weekends in the periods of 11:00am to 5:00pm.

A review of Tables 7 and 8 indicates the most frequent and generally loudest common aircraft types to pass over Oak Park are General Aviation aircraft operating to and from Essendon Airport. The loudest aircraft were generally one off events with only three of the top ten loudest aircraft creating more than one correlated noise event during the reporting period. Three Regular Public Transport (RPT) aircraft types arriving at Melbourne Airport featured in the top ten most frequent correlated aircraft types.

The correlation summary is reasonably low for this monitor. This is due to a combination of operations being captured by the edge of the zone and the quieter nature of General Aviation aircraft types. Whilst the noise created by these operations maybe noticeable to the human ear, they do not meet the correlation parameters for the monitor.

Due to the distinctive flight patterns and distance from both Melbourne and Essendon Airports, the recorded results are not expected to significantly 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.