Short Term Monitoring Program
VIC, Aspendale 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.
3.0	January 2014	CNE 60 removed due to threshold settings.

Deployment Purpose – Aspendale, VIC

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

Inbound and Outbound movements to the south of Moorabbin Airport are within close proximity of Aspendale.

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

27/08/2012 12:00am – 23/09/2012 11:59pm

Environmental Monitoring Unit (EMU) Details

Location	Aspendale Primary School, Aspendale 3195
Latitude	38°1'16.15"S
Longitude	145°6'1.57"E
Capture Zone	2.5km radius with 8,036ft (above ground level) height for noise data capture
EMU Altitude	36ft above mean sea level
Threshold Settings	53.0 dB(A) to 64.0 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 Aspendale EMU.

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

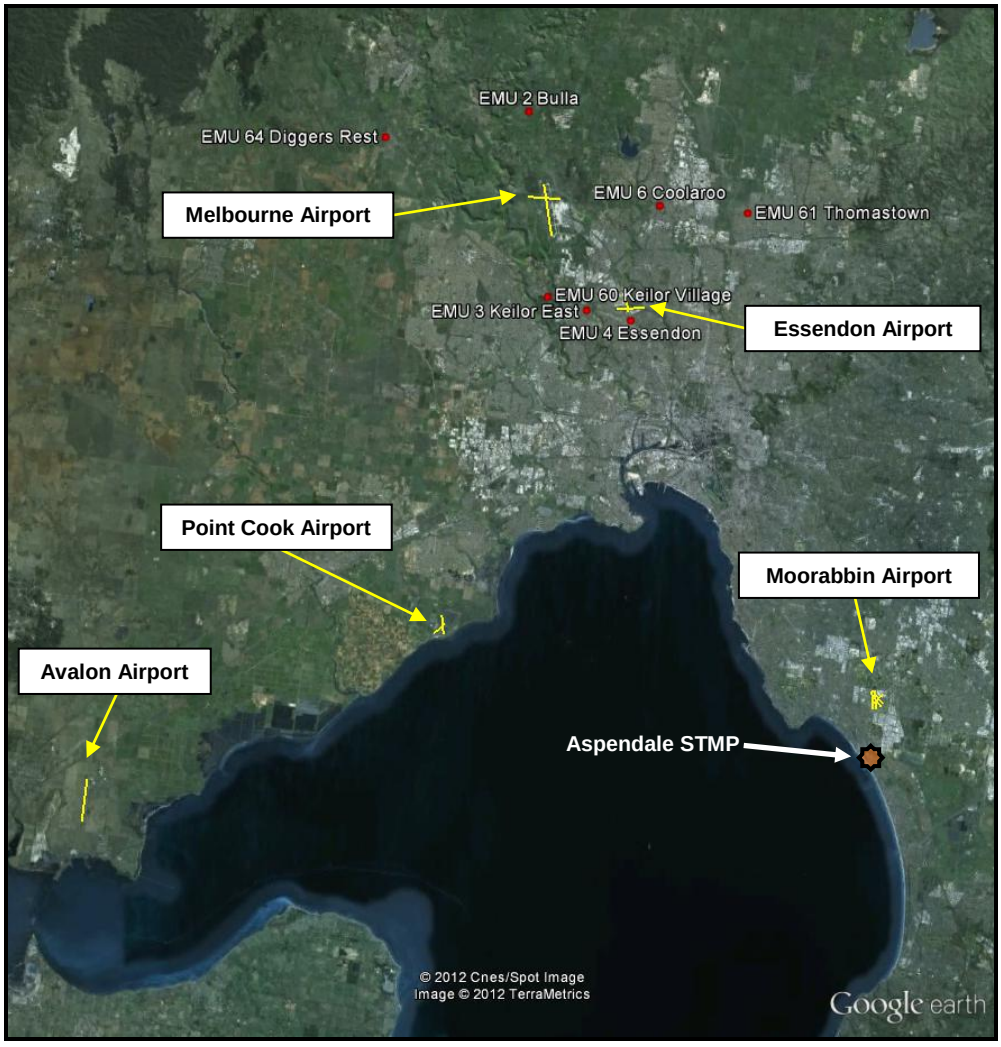


Figure 2 Total Movements Captured

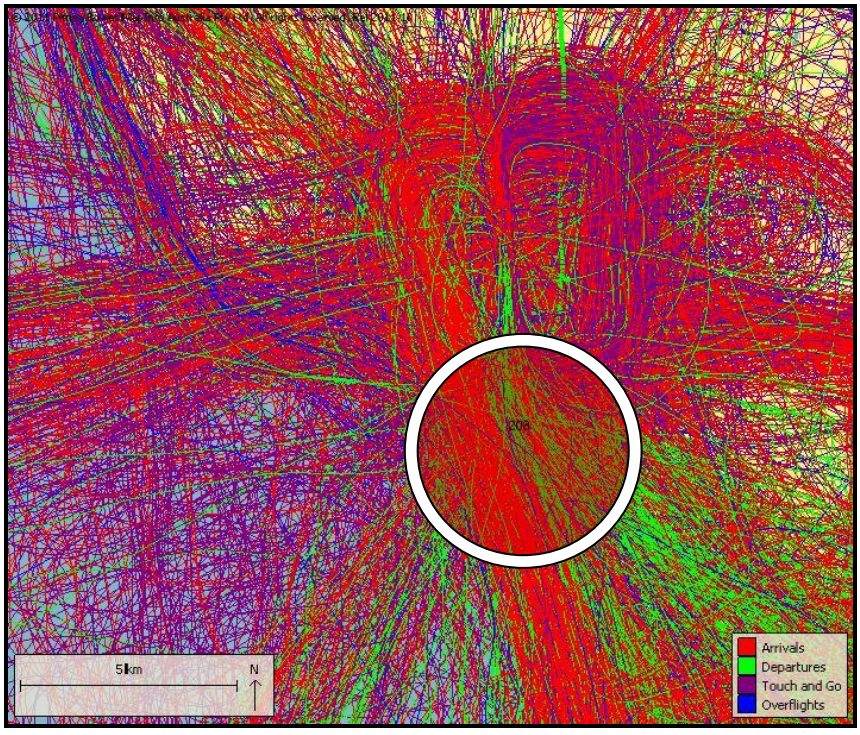


Figure 3 Track Density

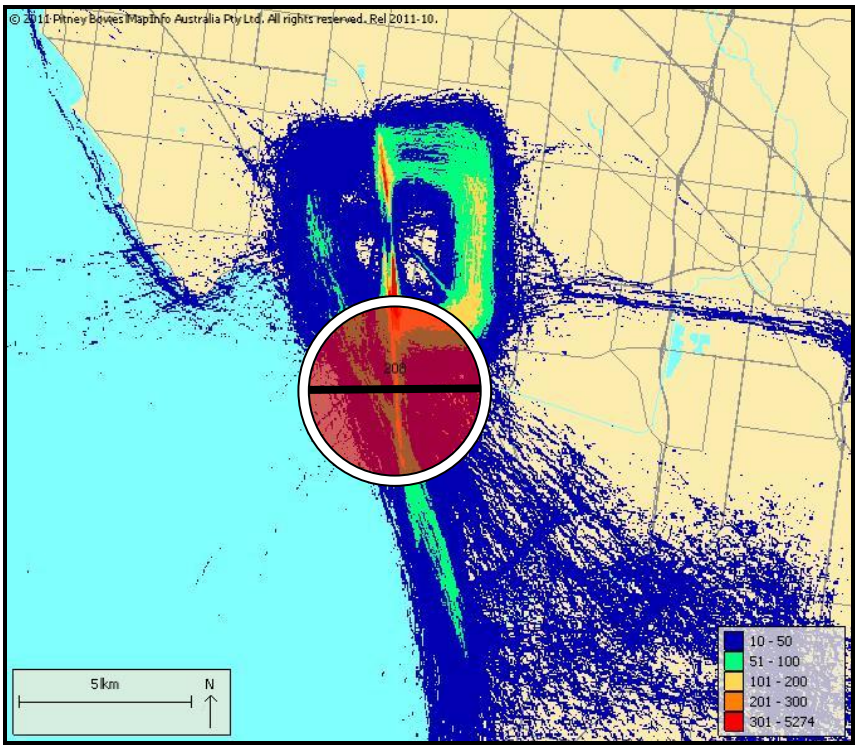
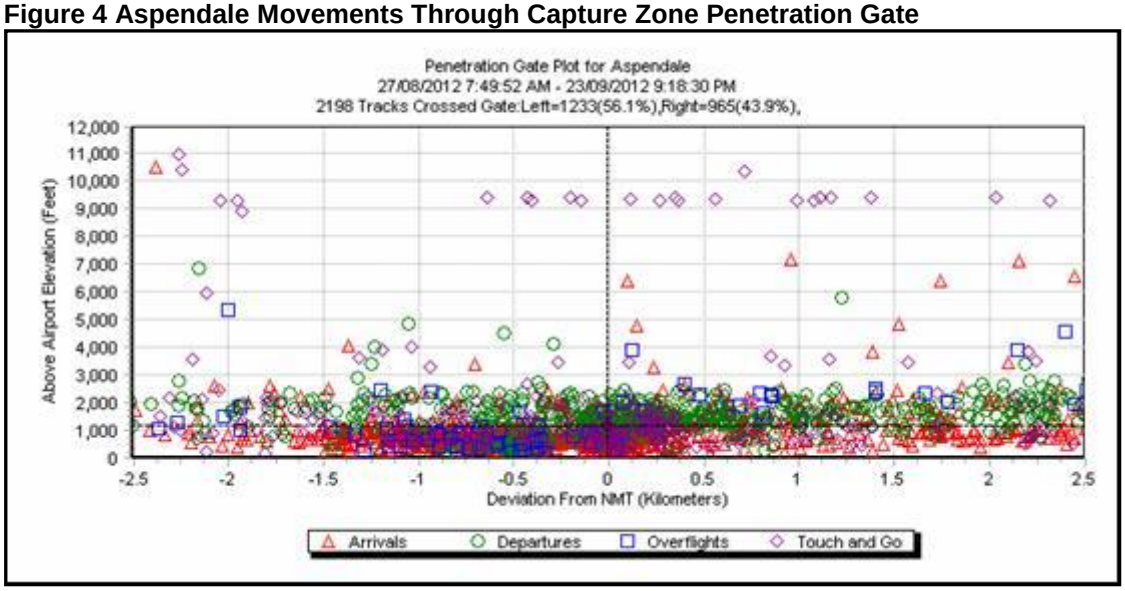


Figure 4 Aspendale Movements Through Capture Zone Penetration Gate



Note: Melbourne Airport altitude is 434ft 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 though 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 capture 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 capture zone.

Findings

Table 1 Movement Summary (27/08/2012 12:00am – 23/09/2012 11:59pm)

Type of Operation	Moorabbin Airport Movements	All Movements
*Number of Movements Through Capture Zone**	5,015	5,274
Number of Correlated Noise Events (CNE)	993	1,055
Number of Movements with Correlated Noise Events (CNE)	897	954
Correlation Summary	17.89%	18.09%

* 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 Aspendale deployment are shown in Table 1. A correlation summary for all movements of 18% is a low result. This low result is due to a combination of the background level at Aspendale being quite high during the hours of day 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
*Departures Through Capture Zone***	405	7,249	1,833
*Arrivals Through Capture Zone***	426	10,901	1,283
*All Operations Through Capture Zone***	405	11,392	1,587

** Includes all airports within Melbourne Basin.

Table 3 Captured Movements Breakdown By Airport and Aircraft Category

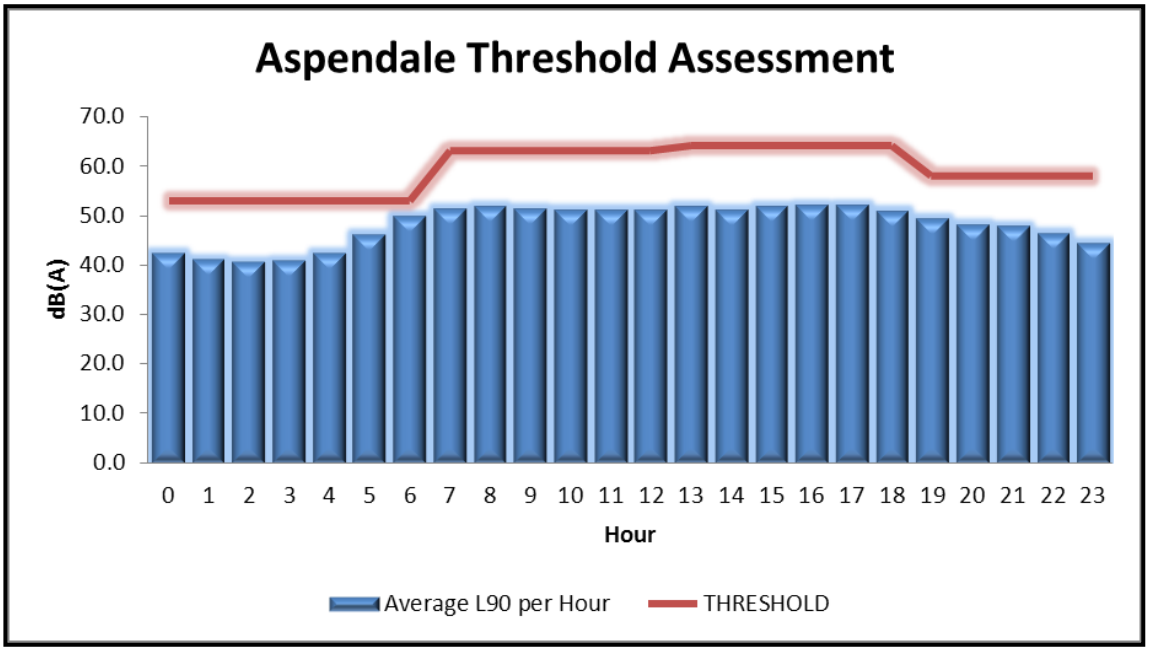
Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
Moorabbin	3	32	464	0	4,516	**5,015**
Essendon	1	5	12	42	58	**118**
Other	5	1	16	2	117	**141**
Grand Total	**9**	**38**	**492**	**44**	**4,691**	**5,274**

*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 Moorabbin 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	
LAeq 24 hr, dBA	57.2
LAeq (night), dBA	51.8
Background Day (L90 dBA)	50.6
Background Night (L90 dBA)	42.6

Table 5 Correlated Noise Events Summary

	Moorabbin Airport Movements	All Movements
Total number of Correlated Noise Events (CNE 24hr)	993	1,055
Number of Correlated Noise Events at night (CNE night)	10	12
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNExx) day/night	**CNExx**	**CNExx**
CNE_{60} – day	N/A	N/A
CNE_{60} - night	N/A	N/A
CNE_{65} – day	910	964
CNE_{65} – night	5	7
CNE_{70} – day	351	368
CNE_{70} - night	2	3
CNE_{75} – day	67	69
CNE_{75} - night	1	2
CNE_{80} – day	12	13
CNE_{80} - night	1	1
Number of Correlated Noise Events (CNExx) per 24hr period min – max		
CNE_{60}	N/A	N/A
CNE_{65}	9 to 59	12 to 62
CNE_{70}	2 to 31	3 to 33
CNE_{75}	0 to 11	0 to 11
CNE_{80}	0 to 3	0 to 3
Average Number of Correlated Noise Events (CNExx Ave.) day/night	**CNExx Ave.**	**CNExx Ave.**
CNE_{60} Ave. – day	N/A	N/A
CNE_{60} Ave. – night	N/A	N/A
CNE_{65} Ave. – day	32.50	34.43
CNE_{65} Ave. – night	0.18	0.25
CNE_{70} Ave. – day	12.54	13.14
CNE_{70} Ave. – night	0.07	0.11
CNE_{75} Ave. – day	2.39	2.46
CNE_{75} Ave. – night	0.04	0.07
CNE_{80} Ave. – day	0.43	0.46
CNE_{80} Ave. – night	0.04	0.04

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

* The count of CNE60 events are not applicable due to the threshold settings of 53-64dB(A) as depicted in Figure 5.

Table 6 LAmax Summary

Min dB(A)	Max dB(A)	Average dB(A)
59.1	85.2	69.2

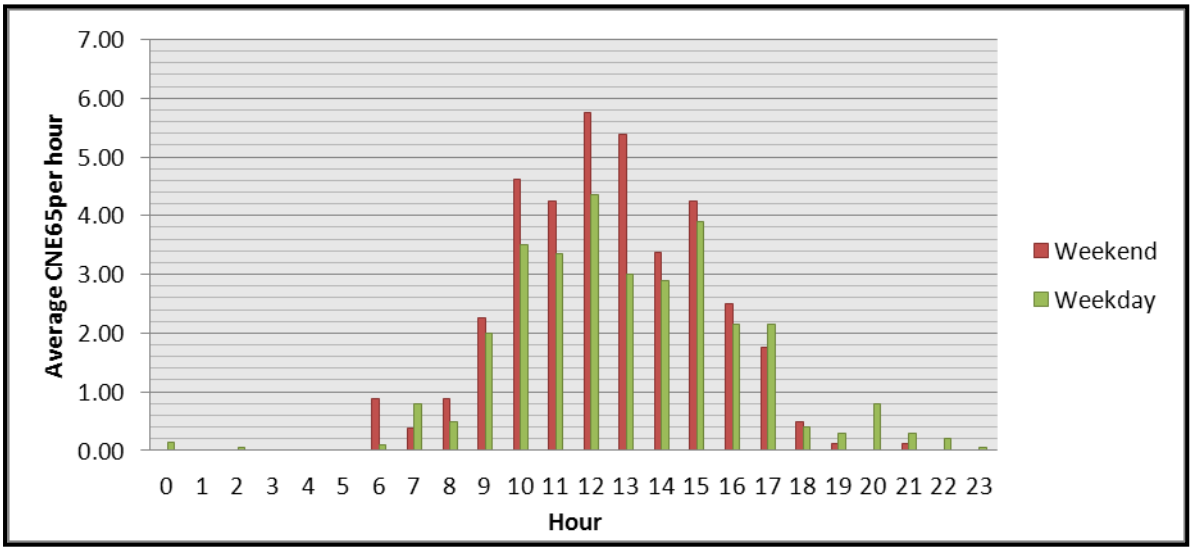
Note: Summary for operations that passed through the capture zone (2.5km radius with 8,036ft height AGL)

CNE65 Count by Hour

A large number of noise events were between 65dB(A) and 70dB(A). Therefore further investigation was undertaken on the number of correlated noise events that exceed 65dB(A) to reveal patterns and determine what time of the day the majority of these events occurred.

Figure 6 presents daily average number of Moorabbin Airport movement noise events 65dB(A) or above (CNE_{65}) broken down on an hourly basis.

Figure 6 Average CNE65 per Hour for Moorabbin Airport Movements



The highest number of CNE_{65} in any one hour throughout the reporting period was 21 on the 12th September 2012 between 12pm and 1pm.

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 (LAmax) at the Aspendale 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 (U)	Moorabbin	D	Unknown	1	82.6	82.6	1
Piper Arrow P28R (P)	Moorabbin	A	35R	1	81.4	81.4	1
Eurocopter Dauphin (H)	Essendon	A	HE	1	77.7	77.7	1
Piper PA31 Navajo (P)	Moorabbin	T	13L	2	76.4	78.5	1
Beech King Air 90 (T)	Moorabbin	T	35L	1	75.4	75.4	1
Piper Chieftain (P)	Moorabbin	T	17L	3	75.2	76.9	2
Cessna Citation (J)	Moorabbin	A	35L	1	74.7	74.7	1
Super King Air 200 (T)	Moorabbin	A	35R	2	74.1	74.6	1
Cirrus SR22 (P)	Moorabbin	D	17R	2	73.9	74.6	1
Partenavia P68 (P)	Moorabbin	T	35R	1	73.5	73.5	1

Table 8 Top 10 Most Correlated Aircraft Types Over the Aspendale 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 (U)	Moorabbin	A	35L	140	69.6	84.2	23
Unknown (U)	Moorabbin	D	Unknown	119	69.1	76.6	13
Unknown (U)	Moorabbin	A	Unknown	90	68.9	81.1	10
Unknown (U)	Moorabbin	A	35R	82	67.8	76.9	18
Unknown (U)	Moorabbin	D	17R	64	68.7	77.4	13
Unknown (H)	Moorabbin	A	H	47	69.2	80.6	11
Unknown (U)	Moorabbin	T	35R	35	68.6	85.2	8
Unknown (U)	Moorabbin	A	17R	32	68.2	76.8	7
Unknown (U)	Unknown	O	Unknown	29	69.2	82.7	5
Unknown (U)	Moorabbin	T	35L	28	69.5	79.6	7

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 locations surrounding Moorabbin Airport during the period of 27th August to 24th September 2012. Aspendale was selected as one of these locations following a review of the recorded Moorabbin Airport flight paths captured in the Noise and Flight Path Monitoring System (NFPMS). Aspendale is within close proximity to the inbound point, Carrum.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 65dB(A) in one day was 62. On September 12th, 21 events exceeding 65dB(A) from Moorabbin Airport movements occurred during 12pm and 1pm, this was the greatest number in one hour during the period. Residents in the area of Aspendale were exposed to noise events exceeding 80dB(A) during the hours of day and night. There were 7 correlated noise events above 65dB(A) that occurred during the hours of night. The average LAmax during the reporting period was 69.2dB(A), with a max level of 85.2dB(A) and minimum level of 59.1dB(A) recorded.

Noise events from Moorabbin Airport movements above 65dB(A) were most common in the weekday hours of 10:00am to 4:00pm and on weekends in the periods of 10:00am to 2:00pm.

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

The correlation summary is low for this monitor. This low result is due to a combination of the background level at Aspendale being quite high during the hours of day and the quieter nature of General Aviation aircraft operations. 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 Moorabbin Airport, 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)
LAmax	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.