> Aircraft Noise

Camden Airport

Master Plan
2004/05

> Aircraft Noise

16.1 Why Is Aircraft Noise Modelled?

Modelling of the noise impact of aircraft operations has been undertaken as part of this MP. Such modelling is undertaken for three primary reasons as follows:

- ANEFs are a required part of an Airport Master Plan under the Airports Act, 1996;
- to assist the community to understand the noise impacts associated with the 20 year aircraft movement traffic forecast included in the MP; and
- to assist in land use planning.

ANEFs play a major role in land use planning in communities surrounding airports. The role of noise modelling in land use planning is described in Australian Standard AS2021 which advises on the acceptability of building sites for various uses based on ANEF zones. The key elements of Australian Standard AS2021 are set out in Table 6.

16.2 Statutory Requirements & Beyond

The Airports Act 1996 requires a MP to specify forecasts relating to noise exposure levels (see Section 71 – Contents of Draft or Final Master Plan of the Airports Act 1996).

The Commonwealth Government has accepted the utilisation of the ANEF methodology for the prediction of aircraft noise exposure and hence a draft ANEF is provided as part of this MP.

In addition to the provision of ANEFs, CAL has also conducted an additional noise modelling in order to assist the community and airport stakeholders better understand the impact of aircraft noise. This involved the use of N60 noise contour mapping.

Table 6
Building Type Acceptability in ANEF Zones

This table is an extract of Table 2.1 in Australian Standards AS 2021-1994, Acoustics - Aircraft Noise Intrusion - Building siting and construction, and any references made are to Clauses, Tables and Appendices contained within this Standard.

Building Type	Acceptable	Conditional	Unacceptable
House, home unit, flat, caravan park	Less than 20 ANEF1	20 to 25 ANEF2	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF1	20 to 25 ANEF2	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF1	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF1	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

Note 1: The actual location of the ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside but near to the 20 ANEF contour.

Note 2: Within 20 to 25 ANEF some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A).

Note 3: There will be cases where a building of a particular type will contain spaces used for activities which would generally be found in a different type of building (eg an office in an industrial building). In these cases, Table 2.1 (above) should be used to determine site acceptability but internal design noise levels within the specific spaces should be determined by using Table 3.3.

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Although not a formal requirement under the Airports Act 1996, in a recent discussion paper entitled Going Beyond Noise Contours – *Local Approaches to Land Use Planning Around Smaller Airports*, DoTaRS recommended that GA airports such as Camden Airport also use noise metrics based on the number of aircraft noise events to assist the community to better understand the impacts of aircraft noise.

On the basis of DoTaRS' recommendations for the utilisation of N60 contours, CAL also commissioned N60 modelling of noise impacts as part of this DMP. N60s are counts of the number of noise events greater than 60 decibels over particular flight paths.

16.3 Methodology

The noise modelling methodology adopted in this MP involves the use of the Integrated Noise Model (INM) to prepare both ANEF Contours and N60 maps. The INM model, ANEFs and N60s are described in further detail below.

16.3.1 Integrated Noise Model

The aircraft noise modelling conducted as part of this MP was prepared using the US Federal Aviation Administration (FAA)'s INM computer program version 6.1. The INM has been the FAA's standard tool for aircraft noise prediction in the vicinity of airports since 1978 and has been continuously refined over time to improve the accuracy of noise impact prediction.

The INM calculates noise impacts by applying standard or user defined aircraft flight profiles, performance data and noise curves to specific runway configurations and flight tracks. The time of day at which operations take place is also factored into the noise computation. This allows for varying sensitivity in people's reaction to noise.

For this MP the model was set to produce two forms of output:

- ANEF contours; and
- N60 contours.

These model outputs are described below.

In interpreting the outputs of the model, it should be noted that:

- aircraft movements are allocated as either a day (7:00am to 7:00pm) or a night operation (7:00pm to 7:00am);
- the number of approach and departure operations modelled relate directly to the actual/forecast number of approach and departure movements; and
- the INM requires touch and go training to be modelled as a circuit – the initial take-off coupled with the final landing – in conjunction with a number of touch and go operations – ie each INM "circuit" or touch and go corresponds to two aircraft movements.

16.3.2 Australian Noise Exposure Forecasts

The ANEF is a contour map showing forecast noise levels. It is based on the 2024/25 forecast level of aircraft movements. For the purposes of noise modelling, forecast levels of aircraft movements are categorised into a range of different aircraft types (as different aircraft type categories have different noise profiles). The forecast number of movements by each aircraft type category are then modelled, taking into account the following factors:

- the runway strip end they are forecast to use;
- the flight tracks they are forecast to use; and
- the likely time of day of the operation.

ANEFs are primarily used to educate the community about the likely impacts of aircraft noise (although N60 noise contours also assist – see below) and for land use planning purposes.

16.3.3 N60 Modelling

In addition to ANEF contour based noise modelling, CAL has also undertaken modelling of noise metrics based on the number of aircraft noise events, based on recommendations from DoTaRS. N60 noise modelling measures the number of noise events over a specified period of time over particular flight paths. This allows the community to interpret aircraft noise issues based on actual counts of aircraft with a noise profile greater than 60 decibels over a range of flight paths.

16.4 Noise Analysis

The 2024/25 ANEF contour and N60 maps are provided in Figure 16 and 17.

The ANEF contours and N60 maps are provided on the aircraft type category, runway strip end use and day-night assumptions set out below. Flight track assumptions have been developed in consultation with Airservices Australia.

16.4.1 Aircraft Type Categories

The distribution of aircraft movements into aircraft type categories has been done on a conservative basis, that is, for the purposes of noise modelling, more aircraft have been allocated to relatively noisier aircraft type categories than actually included in the traffic forecast. This has been done to ensure that the noise modelling outputs presented represent worst case scenarios. The following aircraft types were used:

- a low performance single engine aircraft (GASEPF);
- a high performance single engine piston aircraft (GASEPV);
- a conventional twin engine aircraft (BEC58P); and
- jet ranger type helicopter (modelled as HELICO)

The distribution of forecast aircraft movements by aircraft type categories is presented in Table 7.

Table 7
Distribution of Aircraft Movements into Aircraft Type Categories

Aircraft Type Category	Typical Aircraft in Category	% of Total Movements Year 1
General Aviation	BECP58 GASEPV GASEPF	37.5%
Fixed Wing Training	BEC58P GASEPV GASEPF	54.10%
Gliding	GASEPV GASEPF	5.90%
Helicopter	HELICO	2.50%
Total		100%

16.4.2 Runway End Use

For the purposes of noise modelling, the forecast level of traffic must be allocated according to runway end use. This determines which flight tracks will be used for noise modelling purposes. The allocation of traffic by runway end is based on analysis of current runway end data and analysis of forecast traffic by activity and allocation to an appropriate runway.

The distribution of forecast aircraft movements by runway end is presented in the Table 8.

Table 8
Distribution of Forecast Aircraft Movements by Runway End

Runway	% of Movements 24/25
06	34.20%
10	17.60%
24	27.10%
28	12.90%
06G	2.00%
10G	1.00%
24G	1.60%
24G	1.00%
06H	1.30%
24H	1.30%
Total	100%

16.4.3 Day-Night

There are no official statistics kept on day versus night traffic splits at GA airports such as Camden. Nevertheless, CAL has derived estimates from the following sources:

- CAL's aviation charging system, which uses pilot radio call recordings to determine activity outside of ATCT hours; and
- the tenant and user survey conducted for this MP as part of the consultation program.

The assumptions made are as follows:

- fixed wing aircraft: 95% day, 5% night; and
- rotary aircraft: 100% day.

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16.5 Noise Impact Management Measures

The noise modelling conducted for this MP takes into account a number of Airservices Australia's noise impact management measures already in place at Camden Airport. These measures are supported by CAL and include:

- restriction of circuit training to the hours of 6:15am and 11:00pm Monday through Friday, and 6:15am and 8:00pm Saturday and Sunday;
- the utilisation of the 06 direction for noise abatement;
- aircraft operating in the 24 and 28 direction are required to fly right hand circuits; and
- the tracking of aircraft and helicopters over rural rather than residential land.

16.6 Significant ANEF Contours

The 2024 ANEF prepared as part of this MP include 20, 25, 30 and 35 ANEF contours. In terms of the significant ANEF contours, the 35 ANEF contour is contained wholly within the Airport's boundary, while the 30 ANEF contour only exceeds the Airport's boundary at the western end of the site, although not over significant residential areas. CAL supports the Airservices Australia noise management measures which attempt to reduce the impact over this area. CAL has initiated discussions with Camden Council over this issue, proposing changes to the Camden LEP and other changes for Council consideration to prevent further development in these areas or to ensure that any further development will be constructed to meet Australian Standard 2021-1994.

CAL will ensure that on land within the airport site, the provisions of Australian Standard 2021 will be complied with for any new development on land above the significant contour. In relation to land outside the airport site, CAL has advised Camden Council of the land to be affected and has advised it of the requirements of Australian Standard 2001.

16.7 Current v's Proposed ANEFs

The ANEF modelling undertaken as part of this MP is intended to replace the previous ANEF contours endorsed by Airservices Australia, prepared in 1995.

A comparison between the current, endorsed ANEF and the ANEF prepared for this MP is presented in Figure 18.

The ANEF contours based on the 2024/25 traffic forecast highlight an increase in the area covered by ANEF contours, particularly the 20 ANEF contour, compared to the currently endorsed ANEF, conducted in 1995. This change reflects the following factors:

- higher traffic forecasts for the 2024/25 ANEF than the currently endorsed ANEF, due in part to the closure of Hoxton Park Airport and the resultant traffic increases. The current ANEF was based on a traffic forecast of 110,000 aircraft movements, rather than the 136,000 aircraft movements used for the 2024/25 ANEF;
- more accurate modelling of traffic patterns, particularly with respect to the use of the powered aircraft cross-wind runway (Runway 10/28). The current ANEF assumes only 3 per cent of activity on Runway 10/28. Consultation with Airservices Australia however has confirmed that around 30 per cent of activity is on Runway 10/28 and level of activity has been incorporated into the analysis; and
- inclusion of the glider strips (and associated activity) and helicopter movements in the ANEF analysis for the first time.

While these factors result is a larger and different ANEF, CAL believes that the 2024/25 ANEF prepared for this MP is a significantly more accurate reflection of the potential noise impacts.

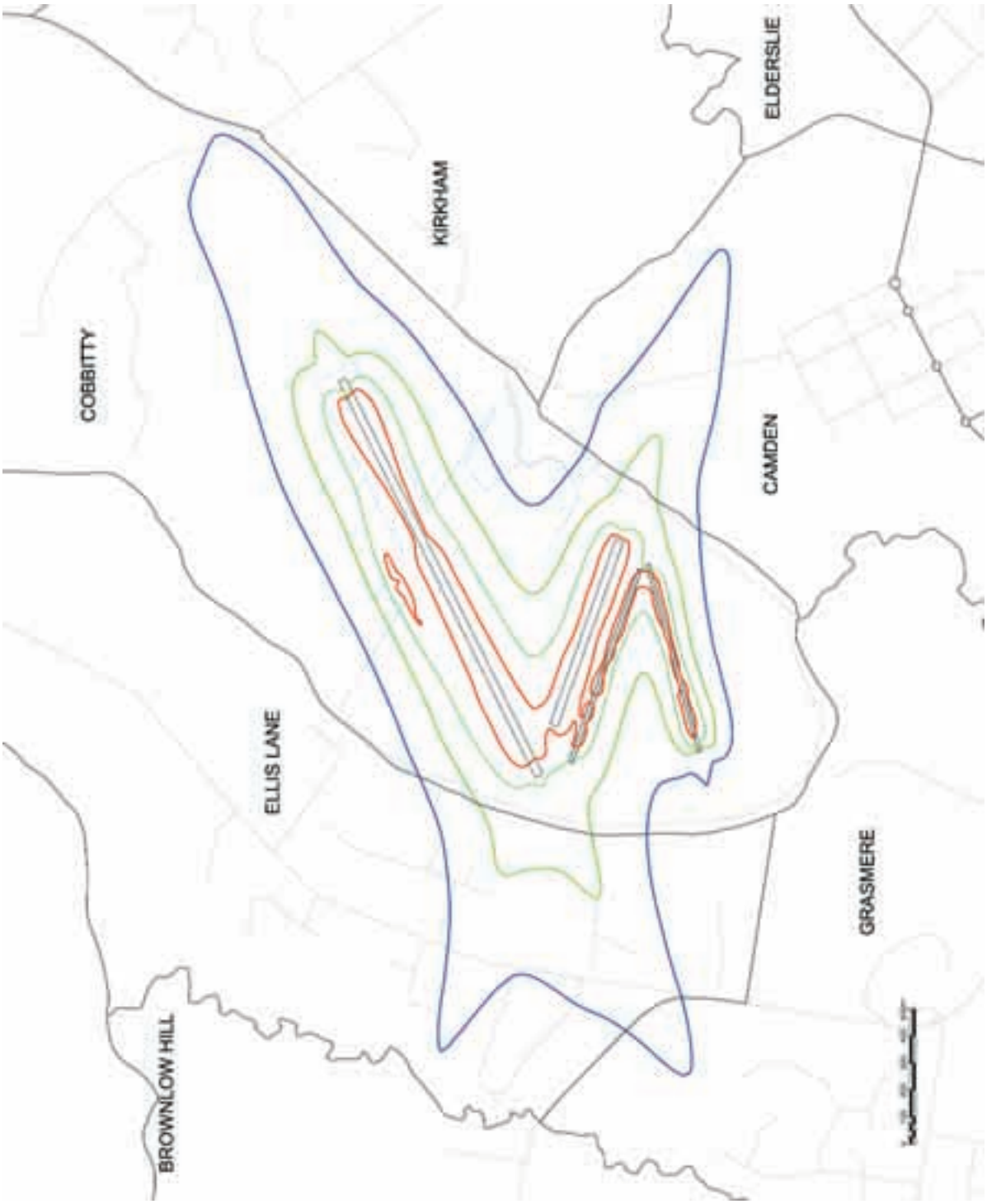
> Figure 16

Camden Airport 2024/25 ANEF

NORTH

LEGEND

- 20 ANEF
- 25 ANEF
- 30 ANEF
- 35 ANEF



> Figure 17

Camden Airport – 2024/25 N6O

NORTH

LEGEND

50 EVENTS

100 EVENTS

DAILY AVERAGE NUMBER OF NOISE EVENTS OVER 60 DECIBLES

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> Figure 18

Camden Airport Current Versus Proposed 2024/25 ANEF

NORTH

LEGEND

CURRENT ANEF

PROPOSED 2024 ANEF