



HEGGIES

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Revision 1

Sydney Metropolitan Airport - Bankstown Noise Management Plan Overview and Supporting Information

PREPARED FOR

**Bankstown Airport Limited
Management Centre
Airport Avenue
Bankstown Airport NSW 2220**

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Sydney Metropolitan Airport - Bankstown

Noise Management Plan

Overview and Supporting Information

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1 INTRODUCTION

Sydney Metropolitan Airport - Bankstown (the Airport) is located on land leased from, and controlled by the Commonwealth Government of Australia. The Airport was privatized in December 2003 and is operated by Bankstown Airport Limited (BAL). The Commonwealth Airports Act 1996 (the Act) and the Airports (Environment Protection) Regulations 1997 (the Regulations) provide DoTARS (Department of Transport and Regional Services) with regulatory control over BAL. The Regulations address environmental management at the Airport and requires the development of a Master Plan (MP) and Airport Environment Strategy (AES).

In accordance with the requirements of the Act the first MP for the Airport was completed and approved in March 2005 and the AES in February 2005. Both the MP and the AES were prepared in accordance with, and to fulfil BAL's statutory obligations.

The MP presents BAL's 20 year vision for the airport, its environmental and commercial objectives for future development and outlines the principles of BAL's proposed Development Concept for the Airport. The AES was developed concurrently with the MP and provides the framework for guidance of environmental management at the Airport for the period 2005 to 2010.

One of the commitments BAL made in the AES and MP was the preparation of a Noise Management Plan (NMP) for Sydney Metropolitan Airport - Bankstown.

The purpose of this NMP is to assist community understanding of;

- Noise in general;
- Noise management controls and procedures at airports; and
- Noise management controls and procedures currently employed at Sydney Metropolitan Airport - Bankstown.

In addition the NMP identifies further practical and cost effective opportunities for noise management at Sydney Metropolitan Airport - Bankstown.

It is outside the scope of the NMP to consider changes to flight paths and general airborne operations as these are controlled by Air Services Australia (ASA) and the Civil Aviation Safety Authority (CASA).

This report is structured as follows;

- **Chapter 1** provides an introduction to the regulatory environment in which Sydney Metropolitan Airport - Bankstown operates and identifies the purpose of the NMP.
- **Chapter 2** explains the principles on which this NMP is founded.
- **Chapter 3** explains how noise is generated, measured and depicted generally and specifically in the aviation environment.
- **Chapter 4** provides an overview of facilities, operations and noise generating activities at Sydney Metropolitan Airport - Bankstown.
- **Chapter 5** describes how noise is managed at airports in terms of planning and operations, how noise is currently managed at Sydney Metropolitan Airport - Bankstown and identifies opportunities for noise management at the Airport.
- **Chapter 6** provides a summary of the noise management initiatives currently undertaken by Sydney Metropolitan Airport - Bankstown and identifies new noise management initiatives for adoption by the Airport.



Heggies Pty Ltd (Heggies) was engaged by BAL to assist with the preparation of this NMP. In the preparation of this plan Heggies conducted a review of existing controls and procedures in consultation with a variety of stakeholders including BAL, airport operators and the Bankstown Airport Community Consultative Forum (BACCF).

2 PRINCIPLES OF THE NMP

The principles on which the NMP are founded include:

- Effective management of aircraft noise requires a cooperative approach from BAL, Airservices Australia, aircraft operators, Bankstown City Council (BCC), Fairfield City Council (FCC) and Liverpool City Council (LCC) who all have a role to play in cooperatively and effectively managing aircraft noise issues;
- Land use planning around the Sydney Metropolitan Airport – Bankstown precinct should be compatible with community concerns and government policy about aircraft noise (refer AS 2021:2000, “*Acoustics – Aircraft noise intrusion – Building siting and construction*”), which allow for a balance between encroaching residential development and the optimal long-term development of the Airport;
- Consulting with and informing the community members in the vicinity of the Airport is a fundamental element of aircraft noise management;
- Effective management of aviation related noise within BAL requires the input and cooperation across a range of BAL functional areas including aviation operations, environment, public relations, planning and project management;
- Aircraft noise complaints are to be investigated and analysed in such a way so that trends, patterns and issues of concern can be identified and resolved at an early stage; and
- Noise management initiatives identified within the plan will be practical and cost effective, recognising the Airport is an integral part of the built and economic environment at Bankstown.

3 ACOUSTIC TERMINOLOGY AND AIRCRAFT NOISE

Sound is a normal part of every day life. It provides a vast array of functions in our life and is often not given a second thought – that is, until the sound becomes annoying, unpleasant or unwanted, at which point it becomes an annoyance and is referred to as “noise”.

In urban areas nuisance noise can be attributed to a wide range of sources including construction works, emergency sirens, barking dogs as well as road, rail and air transport.

This section provides an overview of what noise is and how it is generated and measured. It describes how aircraft noise is generated and factors that can make such noise annoying. It also provides a brief description of how aircraft noise is depicted and assessed in the Australian context. In addition it explains the benefits as well as the limitations of real time data, and the industry wide changes that would need to be instigated in order to capture this information. For more specific information in relation to noise assessment at Sydney Metropolitan Airport - Bankstown refer to the Bankstown Airport Master Plan 2004/2005 which is available at the Sydney Metropolitan Airport website at:

<http://www.bankstownairport.com.au/masterplan/PLN020.asp>



3.1 Sound or Noise Measurement

Sound (or noise) is generated by rapid fluctuations (or vibrations) in the air. The ear drum converts these pressure waves into a signal which the brain can recognise. The human ear responds to changes in sound pressure over a relatively very wide frequency and pressure range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this range to a more manageable size by the use of a logarithmic scale.

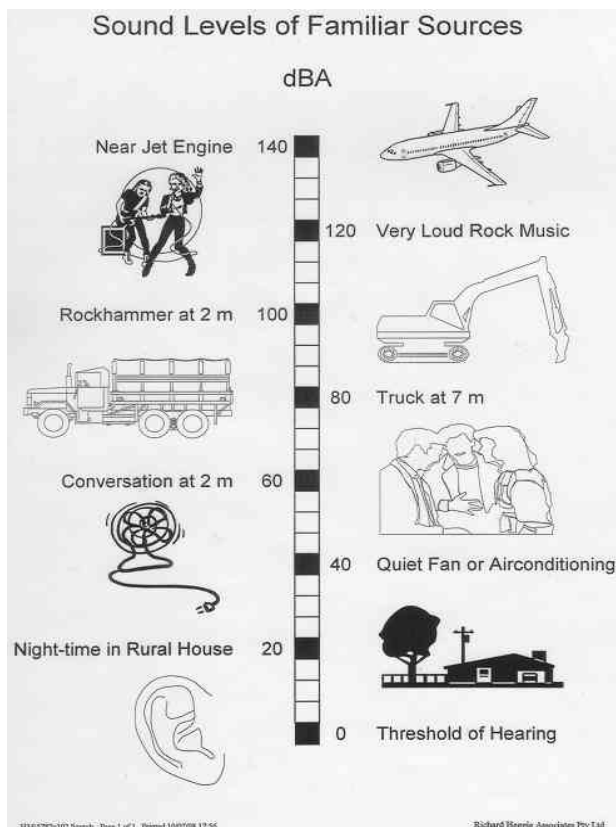
The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an “A-weighting” filter. This is an electronic filter having a frequency response corresponding to a typical human ear.

People’s hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dBA is a good measure of the loudness of that sound.

Different sources having the same dBA level generally sound about equally loud. A change of 1 dBA or 2 dBA in the level of a sound is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness.

Figure 1 lists examples of typical noise levels.

Figure 1





3.2 Noise Generation from Aircraft

Aircraft noise is generated in three primary ways:

- From the intakes (on jets) and propellers;
- Engine exhaust and other major engine components; and
- The aerodynamic drag or resistance of airflow around the aircraft body and wings, particularly with large commercial jet airliners.

Noise produced during take-off is predominately created by the aircraft engines operating at full power, while airframe noise is the significant factor during the approach to landings when engines are operating at lower power settings. Technological improvements have therefore focused on improving engine and airframe design with an overarching goal of reducing the noise impacts that *jet aircraft* have on the public.

The overall noise levels from aircraft vary over a large range of levels, depending on the type and operational parameters. Typical aircraft noise levels at 100 m from the source are:

- Jet aircraft full power 105 dBA
- Jet aircraft idling 90 dBA
- Turbo propeller aircraft full power 94 dBA
- Turbo propeller aircraft idling 83 dBA
- Helicopter full power 90 dBA
- Helicopter idling 84 dBA

3.3 Aircraft noise and annoyance

Aircraft noise first became a significant issue for communities in the early 1960's with the introduction of commercial jet aircraft. Since the 1970's there has been an enormous amount of research in regard to what creates aircraft noise annoyance and how to effectively measure, monitor, manage and reduce aircraft noise impact.

Research has found that aircraft noise can result in various forms of annoyance. The level of annoyance experienced by an individual is dependent on the quality of the "sound" and the circumstance in which a person experiences it.

Noise can be annoying due to physical loudness and its effect on lifestyle such as awakening shift workers or a sleeping baby, interrupting conversation or teaching lessons and interfering with listening to television or other home entertainment appliances.

Annoyance can also be due to the tone, frequency and repetition of the noise, or the time of day or night that it is experienced.

The level of annoyance experienced also varies between individuals with the same noise resulting in varying responses in different individuals. Understanding that response to aircraft noise varies between individuals has contributed to the development of a variety of methods for measuring noise impact.



3.4 Aircraft Noise Assessment and Depiction

In an effort to produce a measurement tool representative of a whole of community response to aircraft noise, researchers and governing bodies responsible for the regulation of such noise have adopted methods that describe aircraft noise by taking into account both the quantitative (the physical or scientifically measurable) and the qualitative (how the noise is perceived by people) aspects of such noise.

In Australia, the following assessment tools have been adopted:

- The Australian Noise Exposure Forecast (ANEF) system;
- The Australian Noise Exposure Index (ANEI)
- The Australian Noise Exposure Concept (ANEC); and
- N60 and N70 contours

Australian Noise Exposure Forecast (ANEF) system

The ANEF system evolved out of the American-based NEF system which was designed to assess community response to aircraft noise. The ANEF assesses community response to aircraft noise within an Australian context.

The ANEF is in essence a forecast based on a complex computation that provides a prediction of the cumulative exposure to aircraft noise which communities near an airport are likely to experience in a specified future time (usually 10 or 20 years hence) and over a specified duration (usually one year).

The results of the computation are depicted in the form of contours linking areas that have the same noise exposure. The suitability of particular types of land use within each contour zone has been established and is documented in Australian Standard AS2021-2000 *"Acoustics – Aircraft noise intrusion – Building siting and construction."* This information is used to assist land use planning and development control.

The ANEF system is a "one size fits all" approach to planning, with criteria for "acceptable" land usage being the same whether the land is in the vicinity of a major international jet airport (RPT) or a small regional non-jet aerodrome. The system makes no allowance for local conditions, with an airport on a "greenfield" site treated the same as one already "built out".

The ANEF system does not provide information in relation to "one-off" events, such as a night-time aircraft flyby's, or periods of activity that correspond to a particular meteorological condition, such as early morning take-offs to the west in response to a prevailing westerly wind.

Only one ANEF map can be current at any one time, and a more recently endorsed map supersedes an earlier map.

Australian Noise Exposure Index (ANEI)

The ANEI is a set of contours calculated using ANEF techniques and historical data. It shows average noise exposure for a given period (eg a year). ANEI contours provide information on "actual" past operations, and are therefore useful to compare with ANEF predictions. Like ANEF contours, the ANEI does not provide information about one-off events.



Australian Noise Exposure Concept (ANEC)

The ANEC is a noise contour map produced when considering potential development options for an airport. It is based on a hypothetical set of data such as different runway configurations and use, various aircraft types and mixes, etc. Several ANEC maps may be prepared for the same future year. The ANEC is a planning tool based on hypotheses about possible future development options that may never occur.

Because it has a hypothetical basis an ANEC map has no official status and cannot be used for land-use planning purposes.

N60 and N70 Contours

Over recent years there has been increasing evidence that the number of noise events is a key determinant of the extent to which a person may be annoyed by aircraft noise. These “event based” metrics which report the number of noise events louder than 60 dBA and 70 dBA within a specific area are known as N60 and N70 respectively.

The use of N60 and N70 contours evolved out of community interest in single event contours, which are contours based on a single aircraft movement. In essence, the N60 and N70 contour map summarises single event data for a specified time period over the area surrounding an airport. It has proven to be a good way to produce a “whole of airport” picture of single event aircraft noise patterns. Intuitively it is very easy to conceptualise noise impact using N60 and N70 contours because they represent aircraft noise in the way a person perceives it - as a series of events, some of which are perceptibly intrusive.

The noise contours on an N60 and N70 chart indicate the number of aircraft noise events (for example 50 or 100 events) louder than 60 dBA and 70 dBA respectively which occurred on the average day during the period covered by the chart.

Unlike the ANEI or ANEF computations, “Number Above” metrics have so far had limited use in formal noise assessment documents in Australia and they are therefore not rigorously tested or verified. The figures that may be derived from the N60 or N70 aircraft noise maps are therefore purely indicative, although they can be used for the comparison of operations between differing airports, where appropriate. These metrics are particularly attractive to the layperson, in that they are arithmetic indicators. All other things being equal, if the number of movements over an area doubles, the N60 or N70 also double - a different outcome to logarithmic indicators such as ANEF which are very insensitive to change.

The application and usefulness of N60 and N70 noise maps also varies according to the type of airport noise environment, which can be quite different in the vicinity of a major jet (RPT) airport compared to that around a General Aviation (GA) airport such as Bankstown. At GA airports, the community and particularly residents of areas under training circuits are exposed to noise from much quieter aircraft but the number of overflights is often significantly greater.

An aircraft noise event of 70 dBA is one that is likely to approach a level which can disturb conversation inside a house with the façade windows open. Such an event may therefore interfere with activities like watching television or using the telephone. Accordingly, the 70 dBA index has been adopted as an indicator for many major airports where there are likely to be fewer occurrences of noisier aircraft.

In comparison, although a 60 dBA noise event will be perceived as half as loud as a 70 dBA noise event, and hence less likely to disturb conversation inside a house with open windows, it may be a more suitable metric to consider to GA airports, given that a level of 60 dBA is typical of the noise level of aircraft in training circuits around a GA airport.



Further more the N60 contours are considered useful to represent night-time exposure patterns. The external level of 60 dBA equates to the internal sleep disturbance level of 50 dBA specified in Australian Standard AS 2021 - 2000 "*Acoustics - Aircraft noise intrusion - Building siting and construction*".

For more specific information in relation to the modelling parameters, used by Sydney Metropolitan Airport - Bankstown to calculate the N60 contours refer to the Bankstown Airport Master Plan 2004/2005. The masterplan is available at the Sydney Metropolitan Airport website at: <http://www.bankstownairport.com.au/masterplan/PLN020.asp>

Flight Track Analysis

Electronic recording of aircraft movement data including the time of operations, flight paths, aircraft type and other parameters enables downstream analysis and provision of "real time" data outputs such as ANEI contours, N60 and N70 contours, and more specific information such as single event information for a particular aircraft type etc.

These systems can also be used to provide information relating to:

- Where, when and what type of aircraft fly;
- How often the aircraft fly; and
- Seasonal trends, for example during prevailing winds.

Flight track analysis provides useful "real time" aircraft movement data and can therefore be useful for correlating noise complaints with specific aircraft movements. The data is not however generally useful for land use planning or similar applications.

Flight Track Analysis systems rely on a transponder to be fitted to all aircraft (both rotary and fixed wing) that may use the airport. This effectively means that all GA aircraft operating in Australia, as well as international operators of GA aircraft using Australian airports would need to be fitted with a transponder. Implementing this requirement would be difficult and require government support. The requirement would also involve a cost to GA operators, which is why to date the technology is only implemented at international and larger domestic airports where the cost of transponders and processing of data is not significant when compared to aircraft cost and its associated revenue earning capability.

Australian Standard AS 2021 -2000

Australian Standard AS 2021 - 2000 "*Acoustics - Aircraft noise intrusion - Building siting and construction*" used in conjunction with ANEF charts provides guidelines for determining whether aircraft noise intrusion makes building sites "acceptable", unacceptable" or "conditional" for different occupancies such as residential, educational, commercial or industrial. **Table 1** is reproduced from the standard and presents building types and acceptability.



Table 1 Building Site Acceptability Based on ANEF Zones

Building Type	ANEF Zone of Site		
	Acceptable ¹	Conditionally Acceptable ²	Unacceptable ³
House, home unit, flat, caravan park	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF	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: Acceptable. No need for the building to provide specific protection from aircraft noise.

Note 2: Conditional. Buildings within the ANEF zone which has a conditional status are required to comply with internal noise levels appropriate for the intended use of the space.

Note 3: Unacceptable. Building site classified as unacceptable should not normally be considered

4 SYDNEY METROPOLITAN AIRPORT - BANKSTOWN

The Airport is located in western Sydney, 22 km southwest of the central business district, and two kilometres to the north of the M5 motorway. The facility is constructed on a 313 hectare site comprising four runways, and extensive taxiway and apron areas. Aerial photographs of the area and site plan are presented in **Appendix A** and **Appendix B** respectively.

The Airport operates as a General Aviation (GA) airport and is primarily used for private flying, training, aerial work, air charter air freight and for the sale, repair and maintenance of aircraft.

Air Services Australia statistics show that in 2004 there were 233,338 aircraft movements at the Airport and in 2005 this increased to 275,846 movements. The general increase in trend appears to be continuing, based on a mid-year 2005/2006 estimate of 305,700 aircraft movements. Typically 90 percent of these movements were fixed wing aircraft (aeroplanes) and 10 percent rotary wing aircraft (helicopters).

Sydney Metropolitan Airport - Bankstown does not currently operate scheduled flight services, otherwise know as Regular Public Transport (RPT), however the Airport MP does make provision for this type of operation in the future.

This section provides a brief description of the general noise environment at Sydney Metropolitan Airport - Bankstown.

Sydney Metropolitan Airport - Bankstown Noise Environment

Ambient noise surveys previously for BAL at locations surrounding the airport found the measured background noise levels are fairly typical of those of a suburban environment. The background noise level specifically represents the noise component normally present in the noise environment from continuous noise sources such as distant traffic, fan or the 'urban hum'.

In addition the noise aircraft operations surveys identified significant short-term noise contributions associated with individual such as flyovers, take-offs, landings and ground running. Other discernible man-made noise sources generally included one-off vehicle movements from the major arterial roads of Milperra Road and Henry Lawson Drive.



Noise Generating Activities at Sydney Metropolitan Airport - Bankstown

Current operations at the airport that contribute to the generation of noise include:

- Fixed and rotary wing aircraft flights to and from the airport;
- Fixed and rotary wing aircraft training flights – These generally consist of loops or circuits to the north or the south of the airport, consistent with runway orientation; and
- Ground running of fixed and rotary wing aircraft. Ground running is generally undertaken for two purposes,
 - pre-flight engine warm up that typically consists of running the engine(s) at a medium to high power setting for a period of up to 5 minutes; and
 - engine testing and running following maintenance that can take anywhere between 5 minutes and up to 2 hours and may involve running and testing the engines at a variety of settings.
- Non-aviation noise related to construction, vehicle traffic and/or light manufacturing.

At the present time total noise related complaints attributed to operations at Sydney Metropolitan Airport - Bankstown number considerably less than 100 per annum. Of these more than 80% relate to airborne operations, and are associated with concerns such as increased air traffic, flight path deviations and aircraft height. Between 45% and 50% of these complaints are raised in suburbs distant from the airport. Of the complaints arising in suburbs close to the airport, typically 70% relate to airborne operations while the remaining issues are associated with ground operations at the airport, such as engine pre-flight warm up and engine testing associated with aircraft maintenance.

General airborne operations at Sydney Metropolitan Airport - Bankstown are controlled by ASA and CASA and are outside the scope of this NMP. All complaints relating to ground operations are individually investigated and mitigation actions implemented as required.

The following section of this document describes the responsibility for, and general noise management techniques at Australian airports.

5 NOISE MANAGEMENT AT AIRPORTS

Noise management at airports is generally separated into airborne and ground-based activities. Airborne activities are directly related to flight operations and include taxiing to runways, take-offs, flight and landings. Ground based activities are those that *support* airborne activities and include engine testing after maintenance.

This section describes the responsibility for the management of aircraft noise with Australian aviation, the general noise management techniques used at Australian airports, and provides a brief overview of how these techniques currently apply at Sydney Metropolitan Airport - Bankstown. It also identifies opportunities that Sydney Metropolitan Airport - Bankstown may consider adopting in order to maintain and or improve the noise environment at the airport.

5.1 Legislative Responsibility for Aircraft Noise

Aircraft noise related matters are the responsibility of a number of different organizations including;

- International Civil Aviation Organisation (ICAO);
- Commonwealth Department of Transport and Regional Services (DoTARS);
- AirServices Australia;



- Civil Aviation Safety Authority (CASA);
- Aircraft Operators including both Airline Operators and individual aircraft owners;
- The Airport Operator; and
- State and Local Government planning agencies

From a legislative position in Australia, noise generated by an aircraft in flight or undertaking flight-related activities such as taxiing to runways, taking-off or landing, is regulated by AirServices Australia under the *Air Navigation (Aircraft Noise) Regulations*.

Noise related to ground-based activities is regulated under the *Airport (Environment Protection) Regulations* which are administered by DoTARS. Responsibility for managing ground-based noise is the responsibility of the individual operators responsible for generating the noise and the airport operator.

5.2 Current Noise Management at Airports Generally

There are a variety of options available for the management of aircraft activities to reduce the impacts of noise on the community. The type and number of noise management options that an airport may reasonably and feasibly be able to implement will depend on a variety of factors including:

- What type of airport it is (GA, Regional or International);
- The size of the airport (number and type of movements);
- The location of the airport;
- Safety considerations; and
- Land use and buffers around the airport

The management of aircraft noise generally takes two forms, management of noise via planning controls and operational controls.

5.2.1 Planning Controls

ANEF

As outlined in **Section 3.4** the ANEF system is designed to assess community response to aircraft noise within an Australian Context. The ANEF system is designed to assist land managers (generally State and Local Government planning agencies) with planning land use in the vicinity of airports by 'forecasting' noise exposure for a future year (usually a 10 to 20 year projection).

The forecasts are based on how it is predicted the airport and aircraft movements will develop in the intervening years. The considerations made in developing these forecasts include whether the runway configuration at the airport is expected to change, whether aircraft movements are expected to increase or decrease and whether the mix and type of aircraft operating into and out of the airport will change.

Within Australia, airports are required to conduct aircraft noise modelling in order to produce and update their ANEF contours every 5 years. At this time the ANEF contours are used for land use planning and are compared with previous forecasts and ANEI contours (as these they have been produced based on actual flight movement data).



Current use at Sydney Metropolitan Airport - Bankstown

The Bankstown Airport Year 2024–2025 ANEF contours that were produced as part of the Airport Master Plan developed in 2005 are reproduced in **Appendix C**.

N60 and N70 Contours

As outlined in Section in **Section 3.4**, N60 and N70 contours provide information on the number of aircraft noise events exceeding 60 dBA and 70 dBA respectively on a “typical” day.

Within Australia, the N70 Contour has recently been introduced as a tool for providing aircraft noise information around major jet airports. This reports the number of noise events louder than 70 dBA over a specified time period. The 70 dBA is considered to be a useful trigger level since this equates to 60 dBA within a house with open windows. An internal level of 60 dBA is the sound level at which noise events may start to become intrusive to speech and interfere with activities like telephone conversations and watching the TV.

While 70 dBA is commonly used as a reporting level for major jet airports, the number of events per day for a person living around a GA airport is often significantly higher than for a person living around an RPT (major jet) airport, hence lower contours such as the N60 are likely to be more representative of the noise regime. This is because the smaller aircraft involved in performing training circuits normally generate outdoor sound pressure levels at houses which are around 60 dBA.

Current Use at Sydney Metropolitan Airport - Bankstown

The Bankstown Airport Year 2024–2025 N60 Map for 50 and 100 events that were produced as part of the Airport Master Plan developed in 2005 are reproduced in **Appendix D**.

Opportunity for Sydney Metropolitan Airport - Bankstown Noise Management

Prior to commencement of modelling aircraft noise for the Master Plan review, consideration will be given to the inclusion of N70 contours.

Flight Track Analysis

As outlined in **Section 3.4**, Flight Track Analysis (FTA) is based on the electronic recording of aircraft movements which captures such things the time of the operation, the flight path taken, the aircraft type and a range of other parameters. The data gathered in this way can be analysed to provide “real-time” information such as ANEI, N60 and N70 contours, and more specific information such as single events for a specific aircraft type, etc.

In Australia, the use of these systems (due to their cost and complexity) is limited to international airports and selected large domestic airports. It is noted that access to these airports is generally restricted to the larger passenger aircraft where the cost of transponders is relatively insignificant compared to the aircraft cost and its associated revenue earning capability.

Current Use at Sydney Metropolitan Airport - Bankstown

Flight track analysis is not implemented at Sydney Metropolitan Airport - Bankstown, nor any GA Airport nationally, due to the significant expense involved in fitting transponders, in particular to smaller aircraft. For such a system to operate effectively at the Airport, all general aviation aircraft operating in Australia and internationally would have to be fitted with transponders.

The implementation of FTA at Sydney Metropolitan Airport - Bankstown would require a Commonwealth Government initiative to legislate the mandatory use of transponders.



Opportunity for Sydney Metropolitan Airport - Bankstown Noise Management

Implementation of FTA would be supported by BAL, but requires the Commonwealth Government to legislate mandatory use of transponders in all aircraft, including GA aircraft. Bankstown Airport will work with the government to achieve this outcome.

5.2.2 Aircraft Noise Management

Ground Running

Noise associated with ground running operations is not included in the ANEF or ANEI calculations or contours. Procedures for the ground running of fixed wing and rotary wing aircraft are contained in the guideline ... *"Aircraft Engine Ground Running Guidelines for Bankstown Airport"* - February 2001. The guidelines provide advice on the hours of operations, location and other operational parameters for the ground running of aircraft.

Opportunity for Sydney Metropolitan Airport - Bankstown Noise Management

Opportunities exist to refine and optimise the guidelines currently recommended by BAL to include recommendations covering positioning of aircraft during ground run-ups (direction facing), hours when permitted, length of time permitted, etc. Additionally, should it prove warranted, consideration could be given to:

- A purpose built run-up bay incorporating noise mitigation features such as noise walls, earth bunds (to act as noise barriers) and/or acoustic louvres; and
- The use of mobile rigs for carrying out engine maintenance testing - BAL will investigate if and under what conditions other Australian airports allow the operation of such rigs and review the conditions governing their use at Sydney Metropolitan Airport - Bankstown.

Pilot Guides

CASA provides Visual Pilot Guides for airports and regions within Australia. The Visual Pilot Guide for Sydney Basin (fixed-wing only) of September 2003 is an aid for pilots to use when flying into, out of and around Bankstown Aerodrome. Detailed information is also provided in the En Route Supplement Australia (ERSA), which applies to both fixed and rotary wing aircraft.

The noise abatement procedures contained in the Visual Pilot Guide form part of the airport noise management plan. These include:

- Restriction of circuit training operations (touch and go movements) to between 6.00 am and 11.00 pm, Monday to Friday, and to between 6.00 am and "last light" on weekends;
- Where possible, direction of fixed-wing flying training (circuits) to Runway 11R/29L to maximise the extent of circuits done over open space and commercial/industrial areas located to the south of the Airport;
- Referral of aircraft operations to the southern side of the airport for night circuits; and
- Flight paths that direct helicopter training primarily over industrial areas to the south of the Airport.

Fly Neighbourly Procedures

In order to further reduce operational noise, it is recommended **voluntary procedures** that assist pilots to reduce aircraft noise impacts on local communities are identified and adopted by Sydney Metropolitan Airport - Bankstown. These "Fly Neighbourly" procedures should address the following noise abatement and public acceptance objectives:

- Pilot and operator awareness;



- Pilot training;
- Flight operations planning;
- Public acceptance and safety; and
- Sensitivity to the concerns of the community.

The implementation of Fly Neighbourly Procedures would necessarily be **subject to safety considerations**, however their use would help to minimise impacts and thereby improve public perception of airport noise. **It is noted many pilots** of both fixed-wing and rotary aircraft already implement flying procedures as part of their technique to minimise noise impacts on residential areas. Similar procedures have been adopted by other airports in Australia (eg Jandakot in Western Australia which is similar to Bankstown in operations).

Opportunity for Sydney Metropolitan Airport - Bankstown Noise Management

Opportunities exist at Bankstown for the adoption of the following “Fly Neighbourly” procedures by the airport and pilots operating fixed wing and rotary aircraft.

Fixed-Wing Aircraft Procedures

To minimize noise impacts on the surrounding community, it is recommended pilots **endeavour to comply with** the principles of the Fly Neighbourly program which follow:

- Climb as soon as possible within the airport perimeter as instructed;
- Use rates of climb and descent that minimise noise over residential areas;
- Maintain correct tracks after take-off, in line with CASA regulations;
- Reduce engine revs as soon as possible;
- Follow designated flight paths;
- Avoid flying over residential areas, hospitals and schools when possible. Endeavour to be above 1,000 ft when flying over residential areas, hospitals and schools;
- Keep circuits as compact as possible - do not fly wide circuits;
- Conduct circuit training between 6:00am and 10:30pm Monday to Friday and 8:00am to last light Saturday and Sunday. (Note: in the event this is not practicable ASA specified requirements apply); and
- Repetitive formation circuits are not permitted.

Helicopter Procedures

To minimize noise impacts on the surrounding community, it is recommended pilots **endeavour to comply with** the principles of the Fly Neighbourly program which follow:

- Climb as soon as possible within the airport perimeter as instructed;
- Use rates of climb and descent that minimise noise over residential areas;
- Avoid blade slap. Blade slap usually occurs during shallow high speed descents, especially during turns. It can be avoided using slower, steeper descents. With the right door removed, the pilot can easily determine those flight conditions which produce slap, and develop techniques which will reduce or eliminate this source of noise;
- Maintain correct tracks after take-off, in line with CASA regulations;
- Try to avoid flying over residential areas, hospitals and schools when departing from or approaching a landing site (or conducting circuit training). Always fly above 500 ft, and endeavour to be above 1,000 ft when flying over noise sensitive areas;



- Look ahead and select the least noise sensitive route when flying over populated areas; and
- Vary the flight path so the same buildings are not overflown each time when it is necessary to fly over the same area more than once (to access visual landmarks and during circuit training). Noting repetitive noise is far more irritating than a single occurrence.

Fly Neighbourly Procedures Implementation at Sydney Metropolitan Airport - Bankstown

Implementation of **voluntary** Fly Neighbourly Procedures will require effective promotion and communication. BAL will:

- Publish Fly Neighbourly Procedures in the Metropolitan Airport Flyer (issued to all airport users) and the Bankstown Airport Flyer (issued to community adjacent to the Airport);
- Include a message to “Fly Friendly” in the Automatic Terminal Information Service recording (Frequency 120.9 MHz);
- Issue the Fly Neighbourly Procedures to all flight training schools at the Airport and provide sufficient copies that can be issued to all students;
- Develop a video that can be used by training schools to help their students understand the meaning of Flying Friendly; and
- Develop a pilot training program for implementation of the Fly Neighbourly Procedures across all airport users, and consider the use of incentives to engage pilots in the training.

Aircraft Noise Complaints Procedures

Within Australia the responsibility for dealing with complaints relating to aircraft noise rests with:

- The Commonwealth Government for “in flight” related complaints. An aircraft is “in flight” for the full flight operation which includes taxiing, take off, flight and landing; and
- The Airport Operator, for other aircraft noise, eg ground running.

Aircraft in Flight Based Noise

Airservices Australia is the Commonwealth Government body responsible for addressing aircraft “in flight” noise complaints at Australian Airports.

BAL receives a regular statement from Airservices Australia detailing all noise complaints around Sydney Metropolitan Airport - Bankstown. BAL analyses the statistical data to determine any trends that require further investigation, and potential mitigation.

Aircraft Ground Based Noise

BAL handles noise complaints associated with ground based activities, as follows:

- ground running of aircraft and aircraft servicing;
- mechanical plant and servicing equipment;
- non-aviation industrial activities;
- on site road traffic;
- operation of fixed audible alarm or warning systems; and
- on site construction activities.



A Noise Complaint Register is maintained by BAL to enable recording and investigation of noise complaints in relation to ground-based activities at the airport. Follow-up action with tenants is undertaken when required.

Opportunity for Sydney Metropolitan Airport - Bankstown Noise Management

Opportunities exist to develop enhance complaints procedures with respect to the community prior to any potentially noisy activities. It is recommended the following be considered:

- Development of a procedure whereby operators notify BAL of particularly noisy ground based activities prior to commencement and BAL to notify local residents; and
- Provision of better advice to community on the issues to note when making noise complaint (issues that will assist investigation of the complaint). Information may be distributed via BAL website, email registration, newsletters etc.

Community Consultation

BAL is actively involved in consultation with the community and associated bodies on a range of airport related matters including noise. The Bankstown Airport Community Consultative Forum (BACCF) is one such organisation and was established to provide a forum for the community to have direct interaction and input into the development and operation of the Airport through representatives of interested community-based organisations.

BACCF seeks to:

- Identify local issues to be considered during the airport development process;
- Assist in resolving and prioritising issues based on local knowledge;
- Present the views of the broader community;
- Review drafts of development plans and provide comment;
- Brief the community on the development and operation of the airport; and

The Committee is chaired by an independent management consultant and convenes on a regular basis. Committee members include:

- BAL staff;
- Industry representatives, including airport operators;
- Representatives from three councils;
- Representatives from the local schools; and
- Members of Local Community Action Groups.

Opportunity for Sydney Metropolitan Airport - Bankstown Noise Management

Opportunities exist to improve the current interface with the community, and in particular to advise on initiatives being undertaken by BAL in relation to fly neighbouring friendly procedures, advice on noisy activities and the complaint mechanism. It is recommended the following be considered:

- Consultation with the local community in relation to the Airport NMP at local shopping centres; and
- Communication of key aspects of the NMP via the BAL website. These can include hours of operation of activities, ground running rules, noise complaints procedure, fly neighbourly friendly procedures etc.



6 NOISE MANAGEMENT PLAN

The noise management initiatives undertaken and proposed by BAL in relation to planning and operation at the airport are summarised in this section.

Planning

The Airport uses ANEF and N60 contours in the preparation of its Airport Master Plan. The ANEF contour maps form a basis for all planning at the Airport subject to the requirements of Australian Standard AS 2021-2000 "Acoustics – Aircraft Noise Intrusion – Building Siting and Construction". In relation to future planning for the development of the Airport, BAL will:

- Review the NMP for the Airport every 5 years;
- Remodel the ANEF contour maps every 5 years for comparison with previous forecasts, consistent with the requirement of the Airport Master Plan;
 - Upon completion of the revised ANEF, advise BCC, LCC and FCC of the land affected by aircraft noise and advise Council of the need to ensure that any new developments in these areas are undertaken in compliance with AS 2021-2000 having regard for the ANEF contour and the type of development;
- Consider modelling N70 and N60 contours for inclusion in the next review of the Airport Master Plan in 2010;
- Ensure that all future developments within the Airport precinct are undertaken in accordance with the requirements of AS 2021-2000 having regard for the ANEF contour and the type of development; and
- Work with Council to have future developments in the vicinity of the Airport designed in accordance with the requirements of AS 2021-2000 having regard for the ANEF contour and the type of development.

Operations

Flight Track Monitoring

Due to operational and economic considerations, no general aviation airport in Australia including Sydney Metropolitan Airport – Bankstown undertakes Flight Track monitoring and analysis. BAL will reconsider application of this technology at the Airport,

- If the development of transponder technology is such that it becomes more economically viable for use with small general aviation operators;
- When regular public transport (RPT) operations commence at the Airport; and
- Lobby the Commonwealth Government to implement legislation to make the use of transponders in all aircraft mandatory.

Ground running

Sydney Metropolitan Airport - Bankstown has promulgated ground running rules to minimise the impact of noise associated with ground based aircraft operations. These rules have been distributed to all operators at the airport and are available on the airport's web site. BAL will:

- Review ground running rules within the next 12 months;
- Consider development of a purpose built run-up bay; and
- Develop guidelines for a minimum standard for ground running equipment.



Aircraft Noise Management

Management of noise in relation to aircraft operating into and out of the Airport is governed by CASA's Visual Pilot Guide for the Sydney Basin which applies to fixed wing aircraft only and ERSA (En Route Supplement Australia) which applies to both fixed and rotary wing aircraft.

To facilitate improved recognition of the relationship between the airport and the local community Sydney Metropolitan Airport - Bankstown will;

- Implement Fly Neighbourly procedures for both fixed and rotary wing aircraft at Bankstown Airport within 12 months;
- Publish the Fly Neighbourly Procedures in a variety of airport media, include a message in the Automatic Terminal Information Service recording, and liaise with Flight Training Schools on the Airport within 12 months; and
- Develop a pilot training program to support implementation of the Fly Neighbourly Procedures within 18 months.

Complaints Procedure

Airservices Australia is the Commonwealth Government body responsible for addressing aircraft "in flight" noise complaints at Australian Airports.

BAL handles noise complaints associated with ground based activities, such as ground running of aircraft and aircraft servicing and other on site noise such as from alarms, road traffic and construction activities. To improve the ground based noise complaint mechanism, BAL will:

- Develop a procedure whereby operators notify BAL of particularly noisy ground based activities prior to commencement and BAL to notify local residents;
- Provide better advice to the community on issues to note when making noise complaint; and
- Monitor BAL and Airservices Australia noise complaints and report routinely to BACCF as a means of identifying problem areas and investigating solutions in consultation with the community.

Community Consultation

BAL is actively involved with consultation with the community and associated bodies on issues relating to noise and the Airport. Included is the Bankstown Airport Community Consultative Forum (BACCF). To improve consultation with the community BAL will:

- Consult with the local community in relation to the Airport NMP;
- Communicate key aspects of the NMP via the BAL website. These will include hours of operation of activities, ground running rules, noise complaints procedure and fly neighbourly friendly procedures; and
- Use the Community Newsletter to advise the community on noise-related issues.

Change Management

The possibility of changes to aircraft operations in the future is foreshadowed in the Master Plan for Sydney Metropolitan Airport - Bankstown. Such changes may include the introduction of new aircraft types, or simply a growth in number of operations, which may, in turn, result in a change to the surrounding noise environment. The Airport's Noise Management Plan specifically recognises the potential for such future changes and, in response, BAL makes the following commitments:



- In the event that airport operations change to the extent that noise emissions from the Airport are likely to be affected, BAL will engage an independent Acoustical Consultant to carry out a risk assessment of the significance of the change.
- Should the noise risk assessment indicate that (a) the change in Airport noise emissions is likely to be noticeable to the surrounding community, and (b) resulting noise emissions are likely to alter current noise indicators used in the management of the Airport (eg a significance change to ANEF contours), BAL will:
 - Engage in further studies to more precisely quantify the potential change in noise emissions from the Airport (this may include the re-calculation of ANEF or N60/N70 contours, ambient noise logging within the surrounding community, etc);
 - Take into account the evolving nature of ICAO Noise Certification limits when considering the introduction of new aircraft types into the airport – for example, BAL will not allow the introduction of Chapter 1 or Chapter 2 aircraft in any future change to aircraft operations;
 - Review all noise-related management tools used by the Airport (eg this Plan) and revise where appropriate; and
 - Consult with the Local Community and Council to ensure they are fully briefed as to the nature of the above changes.

Contacts

Organisation	Address	Phone	Facsimile
Aerodrome operator	Bankstown Airport Limited Management Centre Airport Avenue Bankstown Airport NSW 2220	02 9796 2300	02 9791 0230
Noise Complaints/Enquiry Line	Airservices Australia	1800 802 584	
Airservices Australia	Alan Woods Building 5 Constitution Avenue Canberra ACT 2601	02 6268 4111	02 6268 5683
CASA	CASA Building Cnr Northbourne Ave & Barry Dr Canberra ACT 2600	131 757	02 6217 1209

Section 6 of this report - Noise Management Plan – has been reproduced as a stand-alone document for dissemination purposes:

10-4631-NMP, Bankstown Airport – Noise Management Plan (October 2006)



GLOSSARY AND ABBREVIATIONS

ABC	Airport Building Controller
AEO	Airport Environment Officer
AES	Airport Environmental Strategy -The BAL AES was prepared in February 2005 in accordance with the Airports Act 1996 and the Airports (Environment Protection) Regulations 1997.
AHD	Australian Height Datum
Airservices Australia	Airservices Australia is a government-owned corporation providing air traffic control management and related airside services to the aviation industry.
ANEF	Australian Noise Exposure Forecasts - A scientific measure of aircraft noise exposure around aerodromes for a particular future year that is used to assess average community response to aircraft noise. Computation of the ANEF includes aircraft noise measurements, estimates of type of aircraft and flight paths, and time of operation (day or night)
ANEI	Australian Noise Exposure Index - As per ANEF, however based on actual aircraft movements - nominally for the previous year.
AS 2021-2000	Australian Standard - "Acoustics - Aircraft noise intrusion-Building siting and construction".
Australian Government Aviation Bodies	Airservices Australia, DOTARS and CASA constitute a tripartite structure for providing safe aviation in Australia, each with separate and distinct functions, working together as an integrated system.
BCC	Bankstown City Council
Ambient Noise	The all-encompassing noise associated with a given environment. It is the composite of sounds from many sources, both near and far.
Attenuation	The reduction of noise levels means.
A-weighting	Adjustment carried out to the measured noise spectra via use of an electronic filter, to approximate the response of the human ear.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the LA90 descriptor.
CASA	The Civil Aviation Safety Authority was established on 6 July 1995 as an independent statutory authority. CASA's primary function is to conduct the safety regulation of civil air operations in Australia and the operation of Australian aircraft overseas.
Compliance	Where noise levels meet noise level goals, noise criteria, or noise requirements.
Concept design	Initial functional layout of a concept, such as a road or road system, providing a level of understanding leading to later establishment of detailed design parameters.
Daytime	For aircraft operational purposes, and the calculation of ANEF contours it is the period from 07.00 am to 7.00 pm (Monday to Sunday).



GLOSSARY AND ABBREVIATIONS

DEC	NSW Department of Environment and Conservation, now known as the Department of Environment and Climate Change (DECC).
DECC	NSW Department of Environment and Climate Change.
DOTARS	Department of Transport and Regional Services - advises the Australian Government on the policy and regulatory framework for Australian airports and the aviation industry. The department manages the continuing relationship between the Australian Government CASA, Airservices Australia and Australia's airlines.
dB	Abbreviation for decibel - a unit of sound measurement. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure.
dBA	A-weighted decibel: A single number measurement of the sound pressure based on the decibel but weighted to approximate the response of the human ear with respect to frequencies.
ECRTN	Environmental Criteria for Road Traffic Noise NSW Government's policy in relation to the assessment of road traffic noise impacts.
EIS	Environmental Impact Statement - A study that assesses potential environmental and social impacts associated with the construction and operation of a project.
EPA	Environment Protection Authority, now known as the Department of Environment and Climate Change.
ERSA	En Route Supplement Australia.
Feasible and Reasonable	Terms used in relation to noise mitigation measures: Feasibility relates to engineering considerations and what is practical to build. Reasonableness relates to the application of judgement in arriving at a decision.
FCC	Fairfield City Council
Fixed Wing Aircraft	Conventional Aircraft
GA	General Aviation - usually refers to the type of airport.
Guideline	information intended to advise what the noise level should be. Guidelines are non-mandatory.
INP	Industrial Noise Policy - the NSW Government's INP is administered by the DEC. The policy provides a framework and process for deriving noise limit conditions for consents and licenses that will enable the DEC to regulate premises.
L _{Amax}	Maximum noise level measured at a given location over a specified time interval.
LAN	LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period
LA ₁	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.



GLOSSARY AND ABBREVIATIONS

LA10	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured. During a 15 minute survey, it would represent the loudest 90 seconds.
LA90	The A-weighted sound pressure level that is exceeded for 90% of the time over which a given sound is measured. This is considered to represent the background noise. During a 15 minute survey, it would represent the quietest 90 seconds.
LAeq	Equivalent sound pressure level - the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
LAeq(15minute)	The LAeq noise level for the 15 minute period. In accordance with the NSW INP intrusive criteria, LAeq(15minute) from industry is assessed against the RBL + 5 dBA.
LAeq(period)	The LAeq noise level for the assessment period. For the NSW INP day is 7:00 am to 6.00 pm, evening 6.00 pm to 10:00 pm and night 10.00 pm to 7.00 am. In accordance with the INP amenity criteria, LAeq(period) from industry is assessed against the day/evening/night amenity goal.
Level	The level of noise, usually expressed in dBA, as measured by a standard sound level meter with a pressure microphone. The sound pressure level in dBA gives a close indication of the subjective loudness of the noise.
LCC	Liverpool City Council
Mitigation	Measure to manage and minimise noise impacts.
N60 Contour	Contours showing the number of events above 60 dBA. For example the BAL Masterplan produced N60 contours for 50 daily average events and 100 daily average events. These are also referred to as “noise metrics” and are useful to assist members of the public to better understand aircraft noise.
N70 Contour	Contours showing the number of events above 70 dBA. Also see the N60 contour description above.
Night	For aircraft operational purposes, and the calculation of ANEF contours it is the period from 07.00 pm to 7.00 am (Monday to Sunday).
Noise Level Goal or Noise Level Objective	A noise level that should be adopted for planning purposes as the highest acceptable noise level for the specific area, land use and time of day.
Notams	derived from the old term 'Notices to Airmen'. Notams are issued by Airservices Australia.
RPT	Regular Passenger Transport - usually with reference to the type of airport operation.
RBL	The Rated Background Level is obtained by calculating the median values of day/evening/night assessment background levels (ABLs). For example, for a weeks worth of monitoring, the night RBL is the median of the seven ABLs.
Rotary Wing Aircraft	Helicopters

Appendix A

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Aerial Photograph of Area

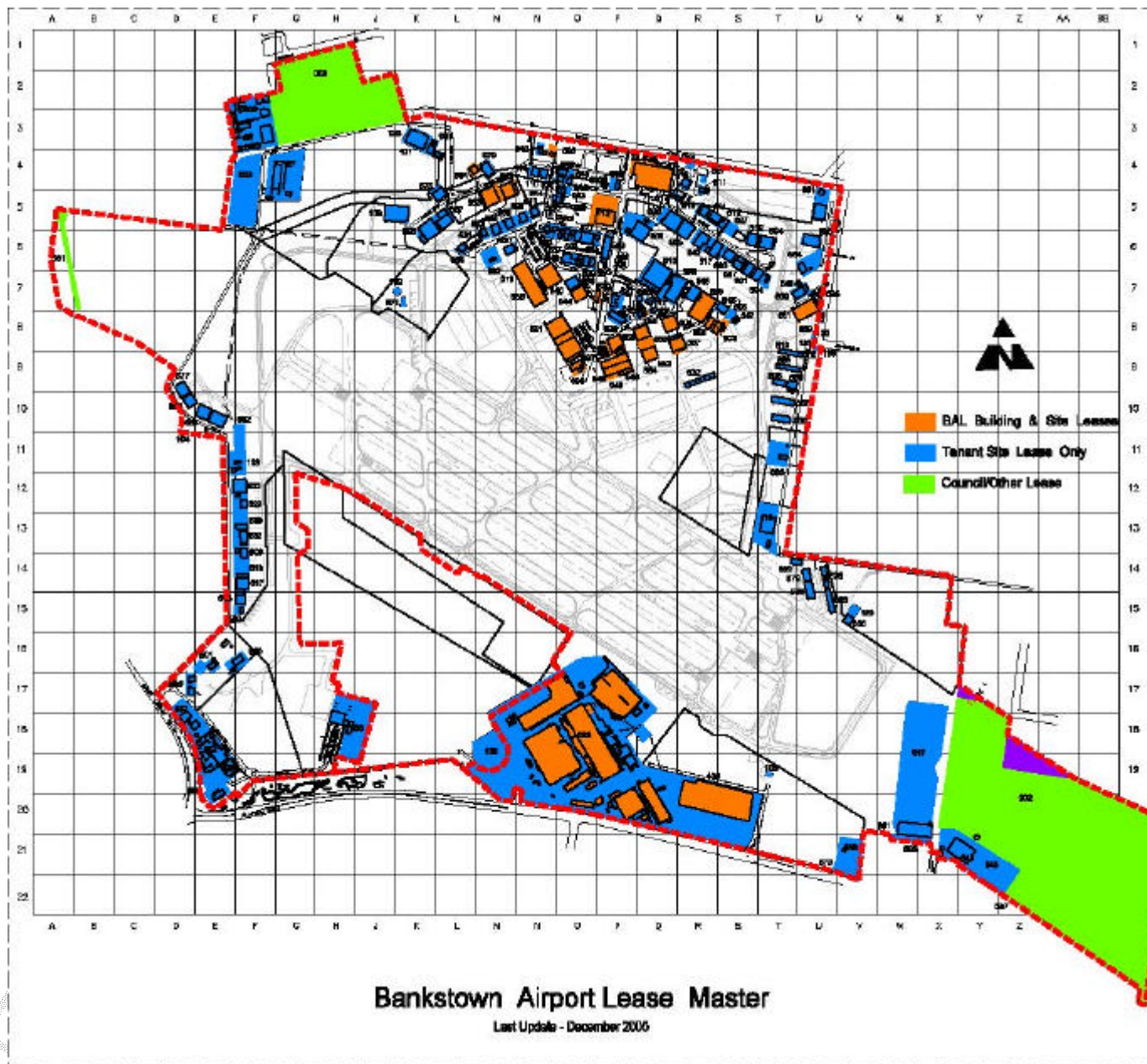


Appendix B

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Site Plan

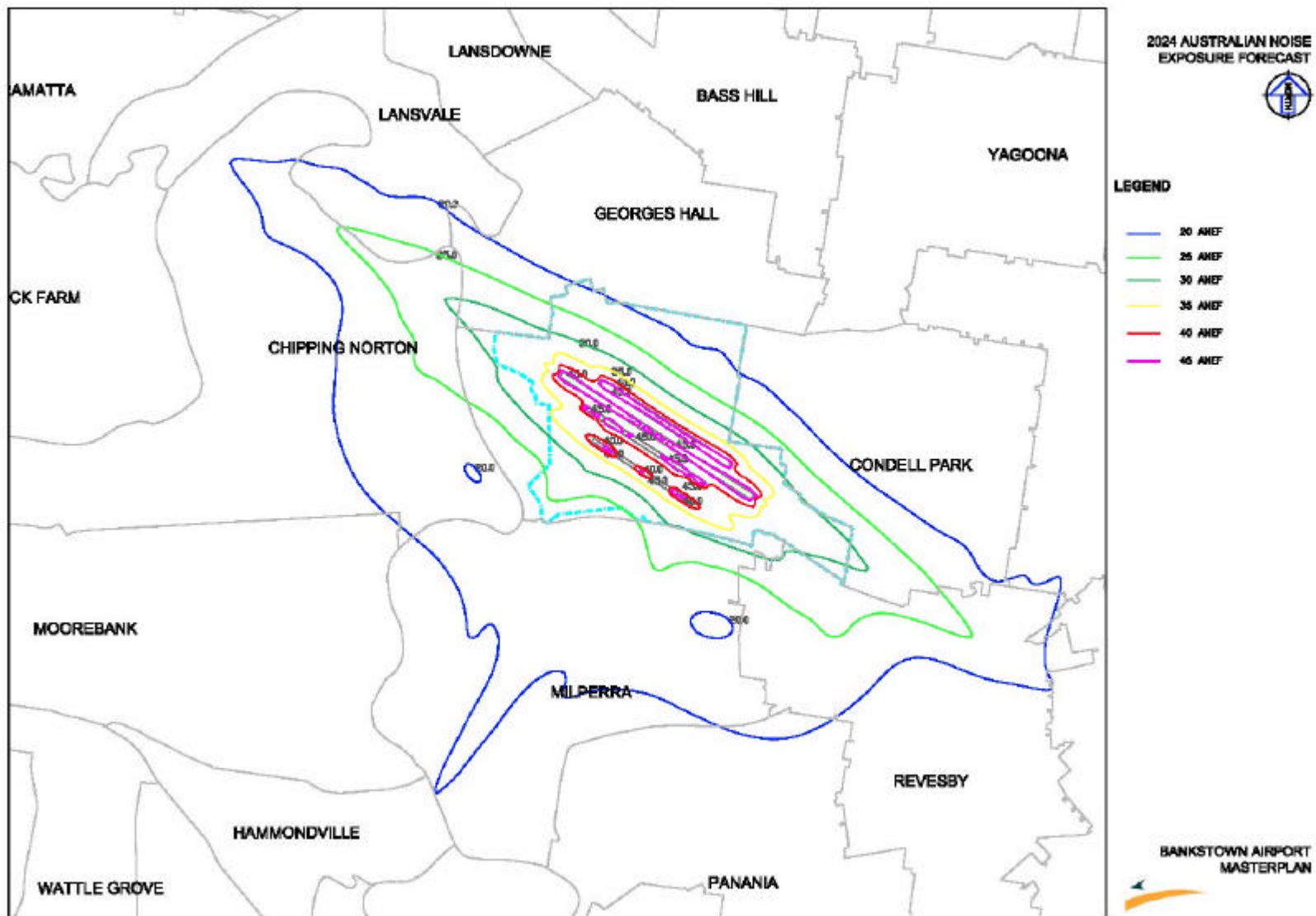


Appendix C

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Airport ANEF Contours 2024/25



Bankstown Airport 2024/25 N60 Map



LEGEND

Orange line: 50 EVENTS

Red line: 100 EVENTS

DAILY AVERAGE NUMBER OF NOISE EVENTS OVER 60 DECIBELS

