# 5 Aircraft Noise Metrics



## 5.1 Introduction

**Noise is associated with many activities that involve a release of energy, including transport movements arising from the operation of airports. Noise from aircraft is consistently identified as the most significant environmental effect of airport operations.**

The most effective means for reducing the impact of aircraft noise is through the proper planning of land use for areas adjacent to the airport. Other means include alternative runway alignments and/or adopted flight path procedures, restrictions of aircraft movements by aircraft type or the implementation of aircraft operational procedures aimed at achieving desired noise abatement objectives.

In 2015 and 2016, Airservices Australia undertook a detailed noise monitoring program around Parafield Airport. The data obtained from this program provides an in-depth analysis of aircraft movements, including numbers of aircraft operating, seasonal variations in aircraft movements, time of operations, runaway usage and types of aircraft operating at the airport. These data, along with the detailed flight path data from the previous Master Plan, have provided a sound database of information about the spread of approaching and departing aircraft in the Parafield airspace and circuit training around the airport.

The modelling of the noise associated with aircraft movements included in this Master Plan therefore reflect this greater detail, providing the most accurate estimates of noise exposure for community consultation.

The *Airports Act 1996* requires a Master Plan to include forecasts of noise levels resulting from the operation of the airport. There are many ways to forecast and display aircraft-related noise levels and the Australian Government has specified the use of the computer-based Integrated Noise Model which produces Australian Noise Exposure Forecasts (ANEFs) for the prediction of exposure to aircraft noise.

ANEFs are one measure to describe aircraft noise in relation to impacts on surrounding lands and communities, but recent evidence suggests that there is little relationship between noise exposure predicted by ANEF modelling and aviation-related noise complaints.

Therefore, additional tools have been devised to better model and describe noise from aircraft in communities around airports. ANEFs are still required by law and additionally by government planning authorities to plan and regulate land use and proposed developments around airports.

PAL has included in this Master Plan an additional descriptor of airport noise at Parafield Airport. These are maps showing the numbers of noise events above 70 decibels (dB), caused by overflying aircraft (a decibel is a direct measure of the sound pressure emanating from a defined source)—the background to how these maps were prepared is also provided in section 5.12.1.

## 5.2 Definitions of Noise Plots

ANEI, ANEF and ANEC plots are plans of the airport and surrounding localities on which contours of equal (usually 20, 25, 30 and 35) noise exposure units have been superimposed. The level of noise impact increases as the noise level value increases. Each of the three variations of contour plans is closely related but differs in the type of base data and assumptions used in its preparation. The definitions and relationship of each type are as follows:

- ANEI (Australian Noise Exposure Index): An ANEI is a plot of defined noise exposure based on the actual operations of the airport and uses an analysis of actual aircraft movements over a twelve-month period, usually a calendar year. It represents the best estimate of the actual noise exposure for a particular period rather than for some forecast future scenario. An ANEI is primarily used to establish a “base case” from which an ANEF and ANECs can be developed.
- ANEF (Australian Noise Exposure Forecast): An ANEF is a plot of estimated noise exposure based on a forecast of aircraft movements and fleet mix for a defined future horizon. The ANEF provides an indication of the change in noise emissions over time, and is used for developing appropriate land use zoning of areas affected by aircraft noise.
- ANEC (Australian Noise Exposure Concept): An ANEC is an illustration of the aircraft noise exposure at a site using data which may bear no relationship to actual or future situations. Its primary function is to assess the noise effects of various operational or airport development alternatives. Although the land use compatibility table can be used to evaluate the ANEC values, ANEC information is not used for definitive land use planning. However, it serves as a valuable planning guide in assessing the relative impact of future development options. ANEC plots have been produced for the long-term theoretical capacity of the airport as part of this plan.

## 5.3 The Australian Noise Exposure Forecast System

The ANEF system is the aircraft noise exposure index currently adopted in Australia. The aircraft Noise Exposure Forecast technique was first developed in the United States in the late 1960s and is recognised internationally. It was subsequently modified in Australia as the ANEF in 1982.

The ANEF system provides a scientific measure of noise exposure from aircraft operations around airports. It can also provide valuable guidance for land use planning in the vicinity of the airport. Table 5.1 shows the land use compatibility as recommended by Standards Australia in *Australian Standard AS2021-2015 Acoustics—Aircraft Noise Intrusion Building, Siting and Construction*.

The ANEF computation is based on forecasts of traffic movements on an average day. Allocations of the forecast movements to runways and flight paths are on an average basis and take into account the existing and forecast air traffic control procedures at the airport which nominate preferred runways and preferred flight paths for noise abatement purposes. The following factors of aircraft noise are taken into account in calculating the ANEF:

- the intensity, duration, tonal content and spectrum of audible frequencies of the noise of aircraft takeoffs, landings and reverse thrust after landing (the noise generated on the airport from ground running of aircraft engines or taxiing movements is not included for practical reasons);
- the forecast frequency of aircraft types and movements on the various flight paths;
- the average daily distribution of aircraft takeoffs and landing movements in both daytime (7am to 7pm) and night time (7pm to 7am) hours; and
- the topography of the area surrounding the airport.

## 5.4 Calculation of the ANEF

The ANEF system combines noise level and frequency of operations to calculate the average noise level at any point along, and to the side of, the flight path using the following reasonably simple mathematical procedure.

Partial ANEFs are calculated for the frequency of number of night-time and day-time operations of each aircraft type and flight path. These calculations use a value of Effective Perceived Noise level (EPNL) for each aircraft and take into account all known annoying aspects in the temporal, frequency spectrum and spatial domain. The EPNL level is obtained by the algebraic addition of the maximum perceived noise

**Table 5.1 AS2021-2015 Table of Building Site Acceptability Based on ANEF Zones**

| Building type | ANEF Zone of Site | | |
|---|---|---|---|
| | Acceptable | Conditionally Acceptable | Unacceptable |
| House, home unit, flat, caravan park | Less than 20 ANEF (Note 1) | 20 to 25 ANEF (Note 2) | Greater than 25 ANEF |
| Hotel, motel, hostel | Less than 25 ANEF | 25-30 ANEF | Greater than 30 ANEF |
| School, university | Less than 20 ANEF (Note 1) | 20 to 25 ANEF (Note 2) | Greater than 25 ANEF |
| Hospital, nursing home | Less than 20 ANEF (Note 1) | 20-35 ANEF | Greater than 25 ANEF |
| Public building | Less than 20 ANEF (Note 1) | 20-30 ANEF | Greater than 30 ANEF |
| Commercial building | Less than 25 ANEF | 25-35 ANEF | Greater than 35 ANEF |
| Light industrial | Less than 30 ANEF | 30-40 ANEF | Greater than 40 ANEF |
| Other industrial | Acceptable in all ANEF zones | | |

*NOTES: [These refer to tables an Appendices in AS2021-2015, not this Master Plan]*

1. *The actual location of the 20 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.*
2. *Within 20 ANEF 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).*
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 (e.g. an office in an industrial building). In these cases, Table 2.1 should be used to determine site acceptability, but internal design noise levels within the specific spaces should be determined by Table 3.3.*
4. *This Standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2. For residences, schools, etc., the effect of aircraft noise on outdoor areas associated with the buildings should be considered.*
5. *In no case should new development take place in greenfield sites deemed unacceptable because such development may impact airport operations.*

*Source: AS2021-2015 Acoustics—Aircraft Noise Intrusion Building, Siting and Construction.*

level at any instant corrected by noise tonal and duration factors. The EPNL unit is also used for the international certification of new aircraft. These partial ANEF values are computed for each significant type of noise intrusion. The total ANEF at any point on the ground around the airport is composed of all individual noise exposures (summed logarithmically) produced by each aircraft type operating on each path over the period of one day.

These calculated values do not take account of any background noise levels such as road or rail activities.

## 5.5 Noise Threshold Levels

The effects of noise can range from minor to very serious, depending on the noise level, its duration and the subject's sensitivity. Noise, by definition being unwanted sound, elicits a wide range of individual responses in the vicinity of airports and the reasons for the differences between individuals are largely socially-based and too complex to quantify. Research has indicated however, that, unlike an individual's reaction, community response to noise impact issues is more predictable.

In the area outside the 20 ANEF contour noise exposure may be of concern for some individuals. Within the area between the 20 to 25 ANEF contour, levels of noise are generally accepted to emerge as an environmental problem, and above the 25 ANEF contour the noise exposure becomes progressively more severe. Table 5.1 compares land use to acceptable ANEF contour levels.

## 5.6 The Integrated Noise Model

Studies of aircraft noise impacts presented for Parafield Airport were carried out using the United States Federal Aviation Administration-approved Integrated Noise Model (INM) Version 7.0d. This internationally recognised, computer- based noise simulation model calculates contours from an analysis of the contribution the various defined aircraft and their operations have on the overall noise emissions from the airport. The resulting noise ‘footprint’ can then be used to assess the relative impacts different aircraft fleets and/ or operational procedures have on the surrounding environs. The INM model contains a database of civil passenger and military aircraft along with their performance and typical noise characteristics. The impact of aircraft noise was modelled for two scenarios:

- the highest predicted number of aircraft and fleet mix for 2037; and
- the highest predicted number of aircraft and fleet mix at maximum (theoretical ultimate) capacity.

The latter scenario is estimated to be at capacity in terms of potential noise impacts and provides a safety margin for future planning.

The previous Master Plan (PAL 2012) contained ANEFs that were modelled using INM version 7.0b. The version used for noise modelling in this Master Plan contains updated noise measurements for different aircraft types and other changes to the modelling program. The change in model version can cause changes to the resultant noise contouring.

## 5.7 Flight Movements

The numbers of flights operating from Parafield Airport in the future are discussed in detail in the previous section (Chapter 4). The numbers of flights used in the noise modelling were the ‘Base Case’ scenario for the 2037 year (20-year horizon as specified in the Act) and the highest numbers of movements as predicted at this stage under current air traffic and airport standards for the airport in the theoretical ultimate capacity modelling. These are provided in Table 5.2 and 5.3 respectively.

## 5.8 Fleet Mix

The fleet mix of aircraft operating from Parafield Airport twenty years or more into the future cannot be defined exactly. At best, the mix of aircraft using the airport in the future can only be inferred from current fleet mixes and discussions on the intentions of the flight training facilities, airlines and industry sources regarding future purchases and any impending retirements of aircraft in the 20-year period. The expected fleet mixes for domestic, regional and general aviation that were used for the modelling are provided in Tables 5.2 and 5.3, and for the majority of the movements, generally reflect the current fleet mix. PAL has recognised in its assessment and fleet mix, the potential for new generation large aircraft such as the Bombardier Dash 8 (modelled as INM code U6 in Tables 5.2 and 5.3) being used for charter operations.

## 5.9 Runway Utilisation

The Civil Aviation Safety Authority (CASA) recommends in accordance with International Civil Aviation Organisation (ICAO) (1987) Annex 14, that the number and orientation of runways at an aerodrome should be such that the usability factor of the aerodrome is not less than 95% for the airplanes that the aerodrome is intended to serve. In Australia, it is usual practice to aim for a usability factor of 99.8% for capital city regular public transport airports and 99.5% for other aerodromes (CASA 2017). The Manual of Standards Part 139 also requires that where runways are provided essentially for light aeroplane operations, the maximum permissible cross-wind component to be used for determining runway usability is to be 10 knots where ab initio flying is carried out.

As flying training, including ab initio flying training, is the major activity at Parafield Airport, the maximum desirable cross wind component is 10 knots. Based on Bureau of Meteorology data, this wind analysis for

### Table 5.2 Predicted Movements in 2037

| INM Code | Aircraft types | Total Annual Movements |
|---|---|---|
| CNA441 | SHORTS Skyvan | 80 |
| DHC6 | BEECH 1900 Airliner | 61 |
| MU3001 | CESSNA Citation V 560 | 827 |
| FAL20 | DASSAULT Falcon 20 | 16,059 |
| LEAR25 | GATES Learjet 25 | 48 |
| BEC58P | BEECH Baron 58 | 66,156 |
| GASEPF | 1985 1-ENG FP PROP | 243,017 |
| GASEPV | 1985 1-ENG VP PROP | 5,112 |
| B206L | BELL 407 | 3,764 |
| EC130 | EUROCOPTER EC130B4 | 7,643 |
| JPATS | EMBRAER Tucano EMB-312/A/G | 257 |
| T34 | BEECH Mentor | 883 |
| U6 | DE HAVILLAND CANADA DHC-2 Total | 1,530 |
| **TOTAL** | | **345,437** |

### Table 5.3 Predicted Movements at Theoretical Ultimate Capacity

| INM Code | Aircraft types | Total Annual Movements |
|---|---|---|
| CNA441 | SHORTS Skyvan | 104 |
| DHC6 | BEECH 1900 Airliner | 79 |
| MU3001 | CESSNA Citation V 560 | 1,077 |
| FAL20 | DASSAULT Falcon 20 | 14,250 |
| LEAR25 | GATES Learjet 25 | 62 |
| BEC58P | BEECH Baron 58 | 86,152 |
| GASEPF | 1985 1-ENG FP PROP | 316,471 |
| GASEPV | 1985 1-ENG VP PROP | 6,657 |
| B206L | BELL 407 | 7,100 |
| EC130 | EUROCOPTER EC130B4 | 4,917 |
| JPATS | EMBRAER Tucano EMB-312/A/G | 9,983 |
| T34 | BEECH Mentor | 1,150 |
| U6 | DE HAVILLAND CANADA DHC-2 Total | 2000 |
| **TOTAL** | | **450,002** |

a 10 knot crosswind component, runway usability for daylight hours, considering all winds, is as follows:

- Whole airport 92.7%;
- Directions 03-21 79.0%;
- Directions 08-26 77.8%;
- Direction 03 65.1%;
- Direction 21 64.3%;
- Direction 08 41.3%; and
- Direction 26 42.2%.

This analysis shows that the usability of Parafield Airport based on a 10 knot crosswind is below the Australian and ICAO recommended standards. However, based on a 15 knot cross wind, which is within the capability of most modern aircraft, including those operating at Parafield Airport, but not compromised by pilot limitations, a runway usability of 98.8% is available.

In practice, the actual usage of the runway system will depend on a number of factors such as wind, taxiing distance, destinations, runway availability and maintenance. The actual split of runway usage of Parafield Airport for fixed wing aircraft, which was recorded in 2015 and 2016 during the Airservices Australia short-term noise monitoring program, is presented in Table 5.4. This runway data is compared with the 2012 data that was used in the previous Master Plan. The new data, which is based on actual radar identification of the runway use, is deemed to be more accurate and highlights some significant changes to the actual runway use. The data indicate a significant increase in movements on the 21 runway direction and a decrease in the usage on the 26 and 08 cross runways.

## 5.10 Flight Paths

The impacts of aircraft noise will be greatly affected by the flight paths that are used by aircraft approaching the airport or after takeoff. The flight paths that are used are determined by the runway used (discussed previously in Section 5.9) and the destination of the flight.

Generally, the tracks used by aircraft have been chosen to limit the impact of noise on surrounding land uses, but within the bounds of operational guidelines and safety standards imposed by Airservices Australia and CASA.

**Table 5.4 Runway Usage (2015/2016) Compared to 2012 data**

| Runway Direction | Percentage use 2017 Master Plan | Percentage Use 2012 Master Plan | Percentage Change for 2017 |
|---|---|---|---|
| 03 | 32.02 | 31.4 | +0.6 |
| 21 | 62.60 | 46.74 | +15.9 |
| 08 | 0.698 | 7.25 | -6.6 |
| 26 | 4.023 | 14.58 | -10.6 |

### 5.10.1 Arrivals and Departures

Maps showing the general placement of flight paths are provided in Appendix C Figures C1 to C4 (arrivals), Figures C5 to C8 (departures), Figures C9, C10, C12, C15 and C16 (Circuits) and C11, C13 and C14 (helicopters). These flight paths were the flight paths used for the previous noise modelling in 2012 and discussions with Airservices Australia personnel at Parafield Airport confirmed that these flight paths reflect the current operating procedures, as there have been no changes to flight paths since 2012.

Most importantly, the flight paths used are based on measured tracks from radar tracking and have been 'spread' to better represent the lateral extent of the flight paths the aircraft fly in.

### 5.10.2 Circuits

Circuits within Australia are defined by CASA Civil Aviation Regulation 1988 CAR 92 (Civil Aviation Advisory Publications).

#### Fixed Wing Circuits

Circuits are an essential part of pilot training and this the most common use for circuits at Parafield.

A typical circuit is made up of the following basic components:

- take off into the wind and commence climb;
- turn cross wind at 500 feet or more above ground level and continue climb;
- level at 1,000 feet and turn downwind;
- turn base (cross wind) and commence descent; and
- turn final and land, touch and go or full stop.

To demonstrate where aircraft on a typical circuit fly, a series of diagrams have been created (see Appendix C, Figures C9, C10, C12, C15 and C16).

These circuits have been produced using the training aircraft types used and forecast for use at Parafield Airport on each of the four runways, using both ends. The runways are 03R/21L, 03L/21R, 08L/26R and 08R/26L. Night operations including helicopters are conducted from 03L/21R only. The circuits track the theoretical inner and outer paths flown by the aircraft under set conditions and with no human, mechanical or environmental variation. Flight parameters were set following CASA circuit guidelines. Aircraft climb to 500 ft. above aerodrome level before commencing first turn and continue until levelling flight at 1000 ft. above aerodrome level.

The actual circuits that are flown will vary from the diagrams in the appendix for many reasons including, but not limited to, the following:

- inherent variation of aircraft;
- differing turning circles and cruise speeds of aircraft (like those of motor vehicles);
- wind direction and strength;
- atmospheric pressure;
- air temperature;
- performance of different training aircraft types;
- human variation;
- amount of traffic in the circuit and the need to maintain safe separation;
- training requirement to fly different circuits and landing techniques which involve varying angles of descent; and
- instructions from air traffic control such as to alter path to allow for other circuit traffic or traffic departing or arriving on Parafield Airport.

#### Rotary Wing Circuits

Helicopter circuits at Parafield Airport have been developed in liaison between the helicopter flight training school and Airservices Australia, following CASA guidelines. The circuit paths are designed to reduce overflight of residential areas as much as practicable. Tracks predominantly overfly clear space, industrial areas and major roads to reduce the impact of circuit flying on residential areas surrounding the airport. Helicopters continue to climb after take-off until levelling out at 800 ft. above aerodrome level.

#### Night Circuits

When required, night circuits are flown, but can only operate on runway 03L/21R as this is the only lit runway at Parafield Airport. This means night circuits will only be flown to the West/North West of the runway in the normal circuit pattern. Both fixed wing and rotary winged aircraft fly the same circuit, however training schools liaise with each other when rotary wing night circuits are planned to ensure only fixed wing or rotary winged aircraft fly at one time.

Night flying is an essential component required to achieve a Command Instrument Rating, an important element in advanced flight training.

Parafield Airport is not under curfew; however, circuit training is voluntarily restricted to the following hours: Monday to Friday from 7am until 11pm, Saturday from 7am until 9pm and Sunday from 8am until 9pm and New Year's Day pursuant to an agreed 'Fly Friendly Policy' (see Section 5.13.2).

## 5.11 Modelling Results

A map showing the ANEI for 2016 is shown in Appendix C as Figure C17. The ANEI for 2016 is compared to the ANEI presented in the 2012 Master Plan in Figure C18 in Appendix C.

The comparison of the updated ANEI indicates an increase in the movements, particularly in the 03/21 runways and the reduction on the movements on the 08/26 runways.

Maps showing the ANEF for the numbers of aircraft movements forecast to fly at Parafield Airport in 2037 and the ANEC for the theoretical ultimate capacity of the airport are shown in Figures C19 and C20 in Appendix C.

A chart showing a comparison of the new 2037 ANEF with the previous 2031 ANEF is shown in Appendix C as Figure C21. This comparison also highlights the increased percentage of movements on the 03/21 runways and the reduction of flights on the 08/26 runways.

This change in allocation of flights to different runways is the main contributor to the differences between the two ANEFs. Other factors will also have had minor impacts on the observed changes. These include:

- a change in the INM model from version 7.0b to 7.0d; and
- flight movement data collected during the Airservices Australia short-term noise monitoring program, which provided more accurate information of movement types and aircraft types.

The ANEC for the theoretical ultimate capacity forecast is presented as a comparison to the 2012 forecast ultimate capacity in Appendix C, Figure C22. This comparison shows the slight increase in the extent of the outermost 20 ANEC contour to the north and south, predominantly associated with the higher forecast usage of the 03/21 runways.

## 5.12 Supplementary Aircraft Noise Metrics

For general aviation airports in Australia with large numbers of flights by training aircraft, the ANEF system is recognised as having limited applicability in defining which areas of surrounding lands may be affected by aircraft noise. In particular, for training aircraft flying circuits, the location of the overflights and frequency of planes flying overhead is often the cause of noise complaints being registered with authorities.

To address this limitation, it is possible to calculate the number of times an area, particularly existing residential, that it is likely to be overflown on an average operating day at the airport by using the refined maps of arrivals and departures flight tracks and the detailed maps of circuits.

### 5.12.1 Noise Event Modelling

The ANEF modelling using the INM model described in Section 5.3 provides noise contours for aircraft operations around airports. Local and State Governments have used these contours for land use planning. As described for most airports in Australia, many (and in some cases the majority) of noise complaints originate outside the 20 ANEF contour.

The Commonwealth Government has recognised the limitations of the ANEF system for predicting and communicating aircraft noise impacts and has recommended that a number of additional metrics can be used for informing communities around airports that they may be affected by aircraft noise.

The ANEF system, in conjunction with Australian Standard AS 2021-2015 *Acoustics—Aircraft noise intrusion—Building siting and construction* is currently proposed to continue to be used for land use planning purposes around airports, particularly in relation to land use suitability and sound insulation.

The Commonwealth Government has suggested that a range of information should be provided including ANEFs, flight paths and other metrics such as measures that convey the level of noise intrusion on a scale that is easily understood by communities around airports. One recommended measure is the N70 metric.

N70 modelling provides maps of areas that are likely to experience a predicted number of noise events from aircraft flying overhead. N70 noise modelling computes the number of noise events, greater than 70 dB on an 'average' day over particular areas. It is calculated as the number of noise events, over a one year period, averaged per day. It is not indicative of a typical day and actual experience on any given day can be considerably different to the 'average' day.

By definition, calculating the N70 maps provides an indication of which areas around the airport will be overflown by aircraft.

The Commonwealth Government selected the 70 dB level as an aircraft noise level of 70 dB is expected to be attenuated by 10 dB for a house with open windows, in accordance with AS2021. Thus, an aircraft noise level of 70 dB would result in a noise level inside a house of 60 dB. A level of 60 dB inside a house may interfere with a normal conversation or with listening to radio or television. Thus, the use of the 70 dB level is used to define noise events from aircraft overflights.

To understand the context of noise levels of 70 dB, a range of noise events is presented for comparative purposes in Figure 5.1.

N70 maps allow all stakeholders to interpret aircraft noise issues based on counts of aircraft with noise profiles greater than 70 dB over the flight paths that aircraft utilise surrounding Parafield Airport. These N70 maps, together with the ANEF maps, allow stakeholders to assess the suitability of areas for property purchase, and enable land use planners to plan for long-term land uses in the vicinity of the airport.

An N70 map for the area around Parafield Airport is depicted in Figure C23 of Appendix C—Aircraft Noise Metrics. This is based on the numbers and types of aircraft used for modelling the 2016 ANEI shown in Figure C17. Additionally, a N70 map for the area around Parafield Airport in 2037 is shown in Figure C24 of Appendix C, which is based on the forecast numbers of aircraft to be operating at the airport in 20 years time, as discussed in Chapter 4.

## 5.13 Aircraft Noise Mitigation

### 5.13.1 Aircraft Noise Analysis

The ANEF for 2037 (Figure C19) and the ANEC for ultimate capacity (Figure C20) in Appendix C show that there may be some increase in the residential areas affected by airport noise with the increased air traffic expected in the future. These impacts will be alleviated to some degree by the gradual replacement of the existing fleet with quieter aircraft.

In terms of significant 2037 ANEF contours, the 35 ANEF contour is contained entirely within the airport boundaries except for a small area to the north of the airport which crosses Kings Road into undeveloped land. In the previous Master Plan this 35 ANEF contour extended towards Kings Road but did not cross the road. The 35 ANEF contour also crosses Kings Road in the ultimate capacity ANEC.

It is therefore important for PAL to work closely with the City of Salisbury to ensure that no inappropriate (noise-sensitive) development occurs in the area across Kings Road that is contained in the 35 ANEF and ANEC contours.

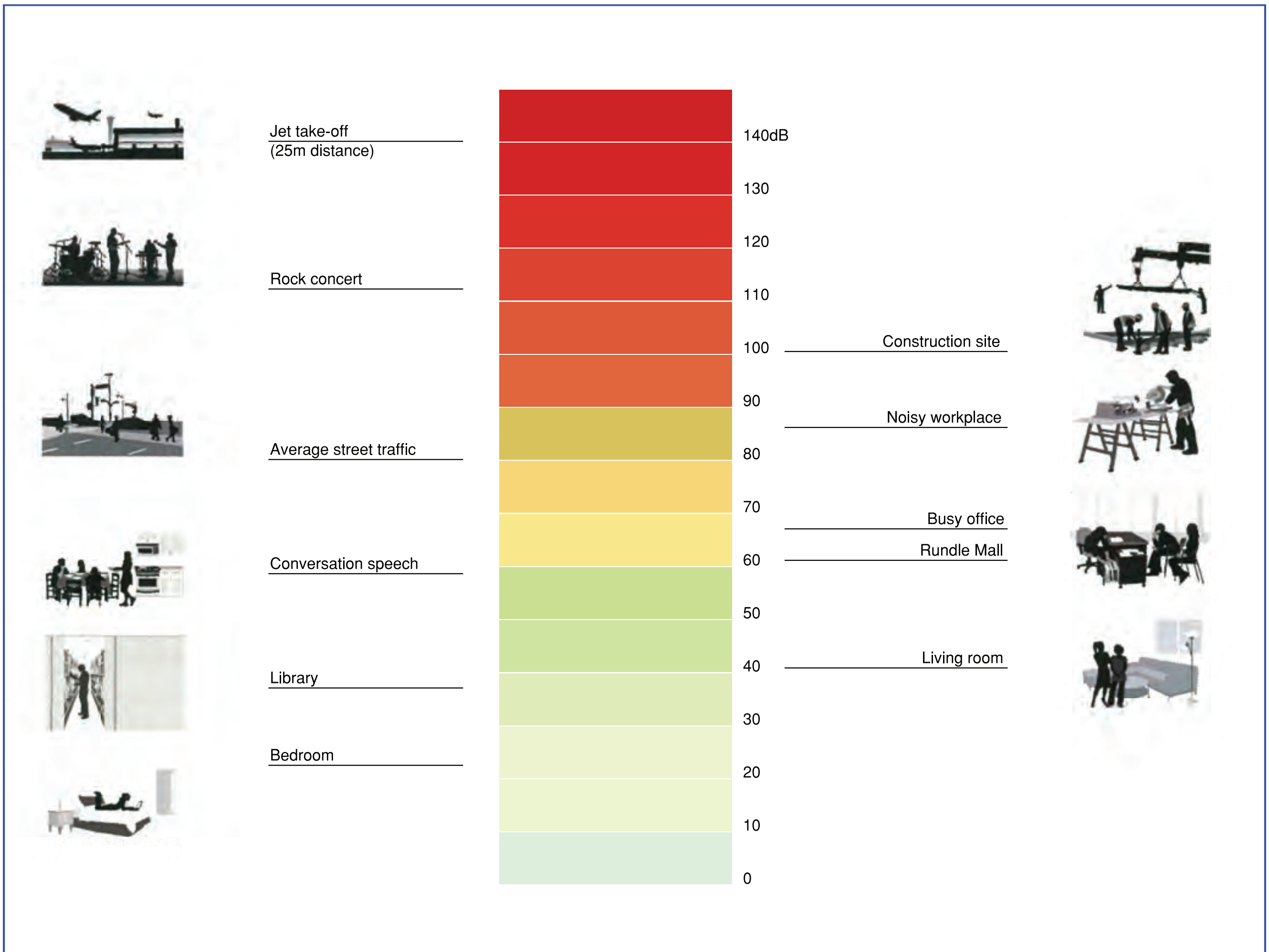
The 30 ANEF contour crosses the airport boundary to the north over Kings Road and predominantly covers an area of land zoned industrial. A small area at the extremity of the 30 ANEF contour enters some residential areas just north of Frost Road. In the previous Master Plan the 30 ANEF contour was contained entirely within the airport boundary.

The 25 ANEF contour extends northward over Salisbury Downs and generally covers areas zoned industrial with an area to the northern tip extending over some residential areas. To the south, the 25 ANEF contour extends across the Commercial Precinct, which mainly includes the University and Defence establishments. To the east, the 25 ANEF contour extends only marginally over Main North Road and slightly into the commercially zoned land along the eastern side of Main North Road.

The 20 ANEF contour extends to the north including areas of Salisbury Plain, includes Salisbury Downs and to the west of the airport crosses over Parafield Gardens. To the south, the 20 contour crosses over the Commercial Precinct and Mawson Lakes and to the east extends into the Para Hills area.

PAL will work collaboratively with the City of Salisbury to ensure that any future development will recognise the 2037 ANEF and the ultimate capacity ANEC and that any developments within the significant ANEF contours will be constructed to meet Australian Standard 2021-2015.

The endorsed ANEF in this Master Plan indicates that in 20 years time, based on a number of assumptions, the 30 ANEF contour could extend across the industrial area and into a small residential area.  Such growth may not actually occur and aircraft may become quieter as more modern aircraft are used for training purposes.  This further suggests a much




*(Source: Airservices Australia and Australian Airports Association)*

**Figure 5.1 Example Noise Levels (In Decibels).**

longer time to address this issue. It is estimated that inclusion of residences will not occur for many years, hence there is sufficient time to engage with the City of Salisbury to jointly develop a strategy regarding future land use planning and existing land uses in this area. As Master Plans are updated every five years, there will be incremental reviews of the specific location of the 30 ANEF contour. These reviews will monitor actual movement numbers against forecast growth on a regular basis in conjunction with the Consultative Committee and the Technical Working Group, providing appropriate links to the City of Salisbury.

Whilst Parafield Airport operates 24 hours of the day it has in place voluntary industry working arrangements for circuit training. PAL further proposes to conduct consultative meetings with the airport operators and Airservices Australia to maximise the use of the movement area infrastructure and to minimise the impacts on the community.

PAL has issued an Engine Ground-run Policy for the testing of aircraft engines. This Policy has been ratified by the Airport Environmental Officer and is subject to periodic review. The Policy directs aircraft owners and maintenance operations as to when and where they may test-run engines. PAL staff monitor these events and apply the full remedy of the *Airport (Environmental Protection) Regulations 1997* in the event of any breaches.

The National Airports Safeguarding Advisory Group, comprising of Commonwealth, State and Territory Government planning and transport officials, the Australian Government Department of Defence, CASA, Airservices Australia and the Australian Local Government Association, has developed the National Airports Safeguarding Framework (the Framework).

The South Australian Government is working with other state and territory jurisdictions and the Commonwealth to reach an agreed and coordinated position, in accordance with the Framework, to safeguard significant airports from inappropriate surrounding new development, and on how the agreed framework may be incorporated into their respective planning systems.

### 5.13.2 Parafield Airport Technical Working Group

The Parafield Airport Technical Working Group was formed in 2010. This group works as a sub group of the Parafield Airport Consultative Committee and is comprised of airport management and operations staff, general aviation operatives, the flight training schools, maintenance organisations, Airservices Australia (air traffic control), CASA, Department of Infrastructure and Regional Development and other aviation-related businesses operating from Parafield Airport.

In 2016, the Parafield Airport Technical Working Group reviewed its terms of reference to:

- consider flight paths, airspace and runway usage to minimise aircraft noise impacts on surround communities consistent with the Parafield Airport 'Fly Friendly Program';
- provide a forum to discuss efficiencies and legislative changes relating to:
  - flight paths;
  - training circuits;
  - airspace;
  - runway usage; and
  - operational hours;
- review and improve Parafield Fly Friendly Program policies referred for consideration by the Parafield Airport Consultative Committee;
- review and interpret noise complaint information;
- review current proposed changes to airport aviation facilities and infrastructure;
- review 'ground running' operations;
- participate in airport master planning; and
- report to quarterly meetings of the Parafield Airport Consultative Committee.

The Technical Working Group was formed to enable technical aviation issues to be discussed openly, and in detail, with the relevant outcome reported to the community and elected members represented on the Parafield Airport Consultative Committee.

The Parafield Airport Technical Working Group monitors and discusses any reported noise complaints and operations contradictory to the Parafield Airport Fly Friendly Program. The group also considers improvements to the program such as the recent agreement to avoid operations over the Salisbury RSL during Remembrance Day observances.