5

AIRCRAFT NOISE

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5.1 Introduction

Under the *Airports Act 1996*, Adelaide Airport is not responsible for the noise generated from aircraft whilst landing, taking-off or taxiing. However, AAL recognises the need for the airport to assist in managing aircraft noise for the surrounding communities by acting as a facilitator between the airlines – the generators of the noise – and Airservices Australia, the airspace manager.

The most effective means for reducing the impact of aircraft noise is through the effective planning of land use for areas adjacent to the airport site. Other means include a combination of land use with alternative runway allocations and/or adopted flight path procedures, restrictions of aircraft movements by aircraft type, and the implementation of aircraft operational procedures aimed at achieving desired noise abatement objectives. The recent trend in renewing airline fleets also has the advantage that the newer aircraft types are generally quieter than existing or older aircraft.

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 (INM) 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 may be little relationship between noise exposure attributed to the results of ANEF modelling and aviation-related noise complaints.

ANEFs continue to be required by law and additionally by State Government planning authorities to plan and regulate land use and proposed developments around airports. However, further tools have been devised to better reflect and identify areas around airports which experience noise from aircraft.

An additional descriptor of airport noise at Adelaide Airport is included in this Master Plan through an N70 map showing the number of noise events above 70 decibels[1] (dB) caused by over-flying aircraft. The background to this mapping is also provided in this section.

5.2 Noise Plots

Noise plots are plans of the airport and surrounding localities on which contours of equal noise exposure units (usually 20, 25, 30 and 35) have been superimposed, the level of noise impact increasing as the noise level value increases. There are three variations of contour plans which are closely related, but differ in the type of base data and assumptions used in their 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 12-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 ANEC 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 that 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. ANECs are used for specific investigations and should not be used for definitive land use zoning. However, it serves as a valuable planning guide in assessing the relative impact of future development options. An ANEC plot has been produced for the long-term theoretical practical capacity of the airport as part of this Master Plan.

An ANEF is a chart that is endorsed by Airservices Australia for technical accuracy. An airport can only have one endorsed ANEF at any one time.

1 A decibel is a direct measure of the sound pressure emanating from a defined source.

5.3 The Australian Noise Exposure Forecast (ANEF) System

The ANEF system is the aircraft noise exposure index currently adopted in Australia. The aircraft Noise Exposure Forecast (NEF) technique was first developed in the United States of America in the late 1960s and is recognised internationally. It was subsequently modified in Australia to 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: Australian Standard AS2021-2000 *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 over a year 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 take-offs, 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 take-offs and landing movements in both daytime (7.00am to 7.00pm) and night time (7.00pm to 7.00am) hours; and
- the topography of the area surrounding the airport.

5.4 Calculation of the Australian Noise Exposure Forecast

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 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 is obtained by the algebraic addition of the maximum perceived noise 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 which, particularly in ground transport corridors, could be much higher than aircraft noise.

5.5 Noise Threshold Levels

The effects of noise can range from minor to very serious depending on the noise level, the duration of the noise, and the sensitivity of the subject. 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 complex to quantify. Research has indicated however, that community response to noise impact issues is more predictable than an individual's response.

In the areas outside the 20 ANEF contour, noise from sources other than aircraft tends to predominate over aircraft noise. Within the area between the 20 to 25 ANEF contours levels of noise are generally accepted to emerge as an environmental problem, and within the 25 ANEF contour the noise exposure becomes progressively more severe. Table 5.1 identifies the acceptability of land use in the various ANEF contour zones.

It should be noted that the actual location of the 20 ANEF contour is difficult to accurately define. This is because variations in actual flight paths, operating techniques of pilots, meteorological conditions and topography all have a largely unpredictable effect on the position of the 20 ANEF contour for any given day.

5.6 The Integrated Noise Model

Studies of aircraft noise impacts were carried out using the United States Federal Aviation Administration (FAA) approved 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 three scenarios:

- the recorded 2013 calendar year movements (ANEI);
- the highest predicted number of aircraft and fleet mix for 2034 (ANEF); and
- the highest predicted number of aircraft and fleet mix at maximum (ultimate practical) capacity (ANEC).

These ANEF and ANEC scenarios are estimated to be 'worst-case' in terms of potential noise impacts, and provide a considerable safety margin for future planning.

By extrapolating out the forecast movement numbers provided in Chapter 4 – Forecasts and shown graphically in Figure 4.6 of this Master Plan, it is estimated that the practical capacity of the airport would be reached in about 2052. This estimate is well outside the 20-year planning horizon of this Master Plan and relies on no changes to current air traffic control procedures or other air traffic management practices that

Table 5.1 AS2021 Table of Building Site Acceptability Based on ANEF Zones

	ANEF Zone of Site		
Building type	**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)	20-25 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:

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 in AS2021 – 2000 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 in AS2021 – 2000).
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 5.1 above should be used to determine site acceptability, but internal design noise levels within the specific spaces should be determined by Table 3.3 in AS2021 – 2000.
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 in AS2021 – 2000. For residences, schools etc., the effect of aircraft noise on outdoor areas associated with the building should be considered.
5. In no case should new development take place in greenfield sites deemed unacceptable because such development may impact airport operations.

could extend this estimate. Hence the estimate of 2052 for when the airport will reach practical capacity is considered a conservative one.

These ANEF and ANEC scenarios are estimated to be 'worst-case' in terms of potential noise impacts, and provide a considerable safety margin for future planning.

Airservices Australia has reviewed the noise modelling for the 2013 ANEI and the 2034 ANEF and has formally endorsed these models for technical accuracy (see Appendix B). Only one ANEF can be endorsed for an airport, and thus the ANEC for practical ultimate capacity is not endorsed but is based solely on the identical modelling procedures for the 2034 ANEF, with increased aircraft movement numbers.

5.7 Flight Movements

The number of flights operating from Adelaide Airport in the future is discussed in detail in Chapter 4 – Forecasts. These forecasts have been used for both the 2034 and ultimate capacity modelling. The estimated aircraft movement numbers are provided in Table 5.2.

Table 5.2 Proposed Fleet Mix for 2034 and Ultimate Capacity Projections

Aircraft Category	Aircraft Type (Fleet Mix)	2034 Total Movements	Ultimate Capacity Total Movements
A380	A380 - 800	520	702
Large Wide Bodied (LWB)	B777 - 300 ER	1,820	2,456
	A350 - 900	1,820	2,456
Medium Wide Bodied (MWB)	A330 - 300	1,872	2,527
	A330 - 200	468	632
	B787 - 900 ER	1,820	2,456
	B787 - 800	9,204	12,422
Small Wide Bodied (SWB)	B777 - 200	260	351
Large Narrow Bodied (LNB)	A320 - neo	26,260	35,441
	B737 - 800 NG	26,260	35,441
Small Narrow Bodied (SNB)	B737 - 800	17,940	24,212
	EMB - 190	17,940	24,212
Regional Jet (RJ)	B717/EMB - 190	3,640	4,913
	Lear 35	1,976	2,667
Large Turbo Prop (LTP)	Q400	5,200	7,018
	ATR 72	5,200	7,018
Medium Turbo Prop (MTP)	Dash 8	3,640	4,913
Small Turbo Prop (STP)	EMB - 120	6,240	8,422
	SAAB - 340 B	6,240	8,422
	PC 12 (RFDS)	5,200	7,018
General Aviation	CAN 441	28,080	37,898
Freighter (FRT) B737	B737 - 400	1,040	1,404
Helicopters	EUROCOPTER EC130B4	1,774	4,373
	Bell 430	1,774	4,373
Total		**176,188**	**241,746**

5.8 Fleet Mix

The predicted fleet mix of aircraft operating from Adelaide Airport 20 years or more into the future cannot be defined accurately. 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 major airlines regarding future purchases and operational arrangements.

The expected fleet mix for international, domestic, regional and general aviation that was used for the modelling is provided in Table 5.2, and generally reflects the current fleet mix. However, the modelling has included newer aircraft types that do not presently fly into Adelaide on a regular basis. These include the Airbus A380 and the Boeing B787 which are now entering service in Australia. The proposed fleet mix also includes aircraft types such as the Airbus A350, which has only recently commenced test flights, and new generation variations of the B737 and A320 type aircraft which are currently under development.

5.9 Runway Utilisation

The runways used by aircraft for arrivals or departures are largely controlled by wind direction and may change during different times of the year, and even time of the day.

The choice of runway can also be influenced by aircraft type, as the larger aircraft can only use the main runway while smaller aircraft have more options available. Operational rules may also be imposed to limit the number of flights on runways that have greater impacts on noise (as a standard noise abatement procedure).

As the INM model predicts average noise levels, runway use can be expressed as an average over a period of time – typically one year. There are differences for different categories of flights and day or night time operations.

Runway usage for the modelling was based on analysis of the available 2013 Adelaide radar data provided by Airservices Australia. Small adjustments were made, with very minor historical runway usage (<1% of total movements) omitted and the difference made up by the other active runways for that aircraft group including jets, large turbo props, and other non-jet aircraft. The allocations were made onto the existing runway layout.

Runway allocations were also made recognising the existing curfew requirements and also the existing noise abatement procedures. The same percentage allocations were used for the ANEF modelling for the year 2034 and the ultimate capacity modelling.

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 take-off. The flight paths used are determined by the runway allocation, as discussed previously, and the destination of the flight.

The flight tracks used for noise modelling were developed through a detailed analysis of flights tracks currently used and available in the Adelaide Airport radar data supplied by Airservices Australia. These flight tracks were confirmed in a number of stages and verified through discussions with Airservices Australia.

Initially, tracks were drawn based on valid path names in the radar data, and the tracks were converted to INM track files. Flight density grids were then plotted over the INM flight tracks. The INM tracks were then assigned to these programmatically for a ‘best fit’, and the resulting images verified through Airservices Australia. Examples of some of more than 150 such flight density grid analyses are shown in Figures 5.1 and 5.2 for arrivals onto Runway 05 and Runway 23 respectively.

Final analysis involved creating flight density grids for all remote airport bearings for each runway and operation type represented in the radar data. In some cases, suitable INM tracks were absent and these were plotted again from the representative INM radar track import files.

Track usage was then derived though a combination of radar track analysis (where possible), analysis of aircraft category remote airport bearings from the AVSTATS data, and discussions with Airservices Australia.

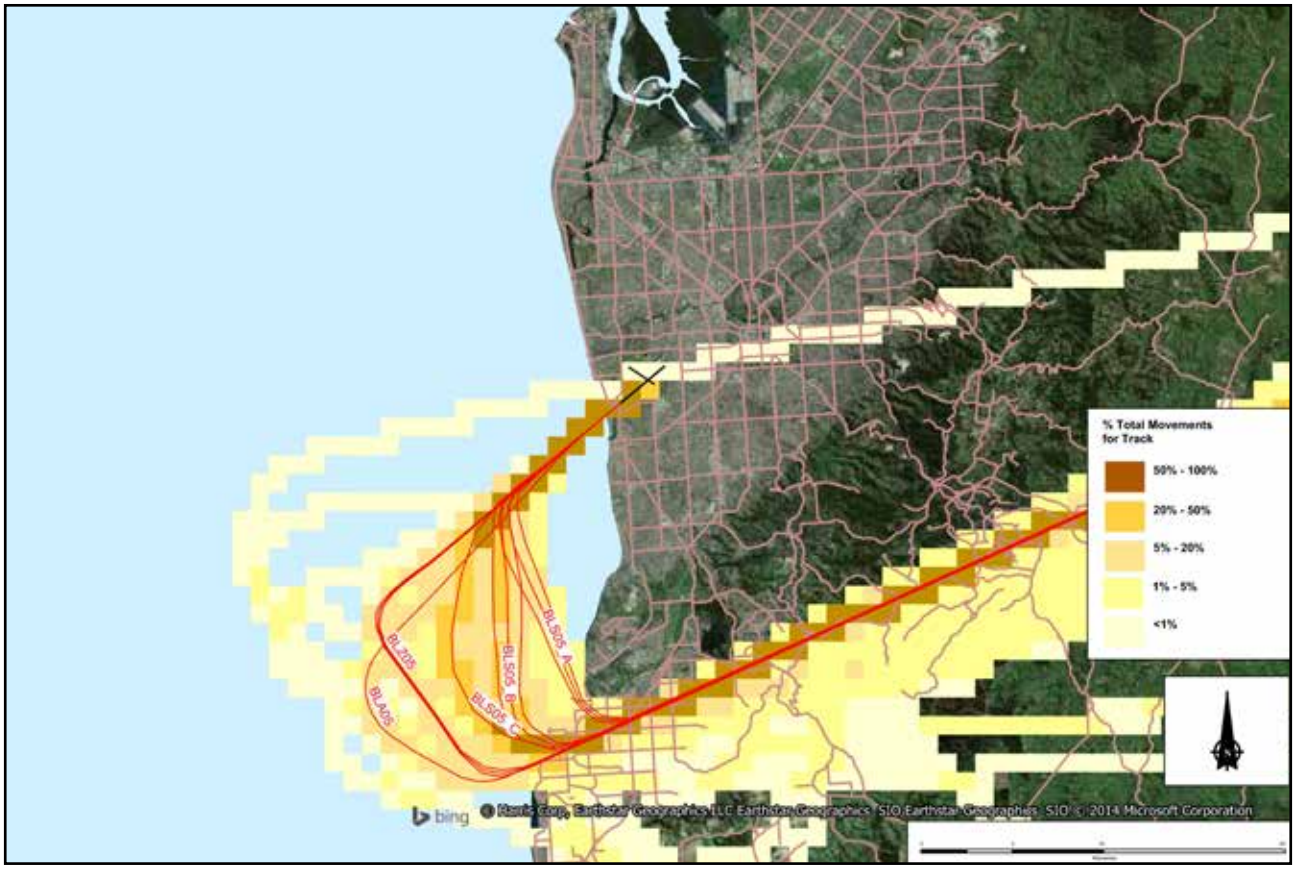

Figure 5.1 Example of Arrivals Flight Density Grid Analysis for Runway 05

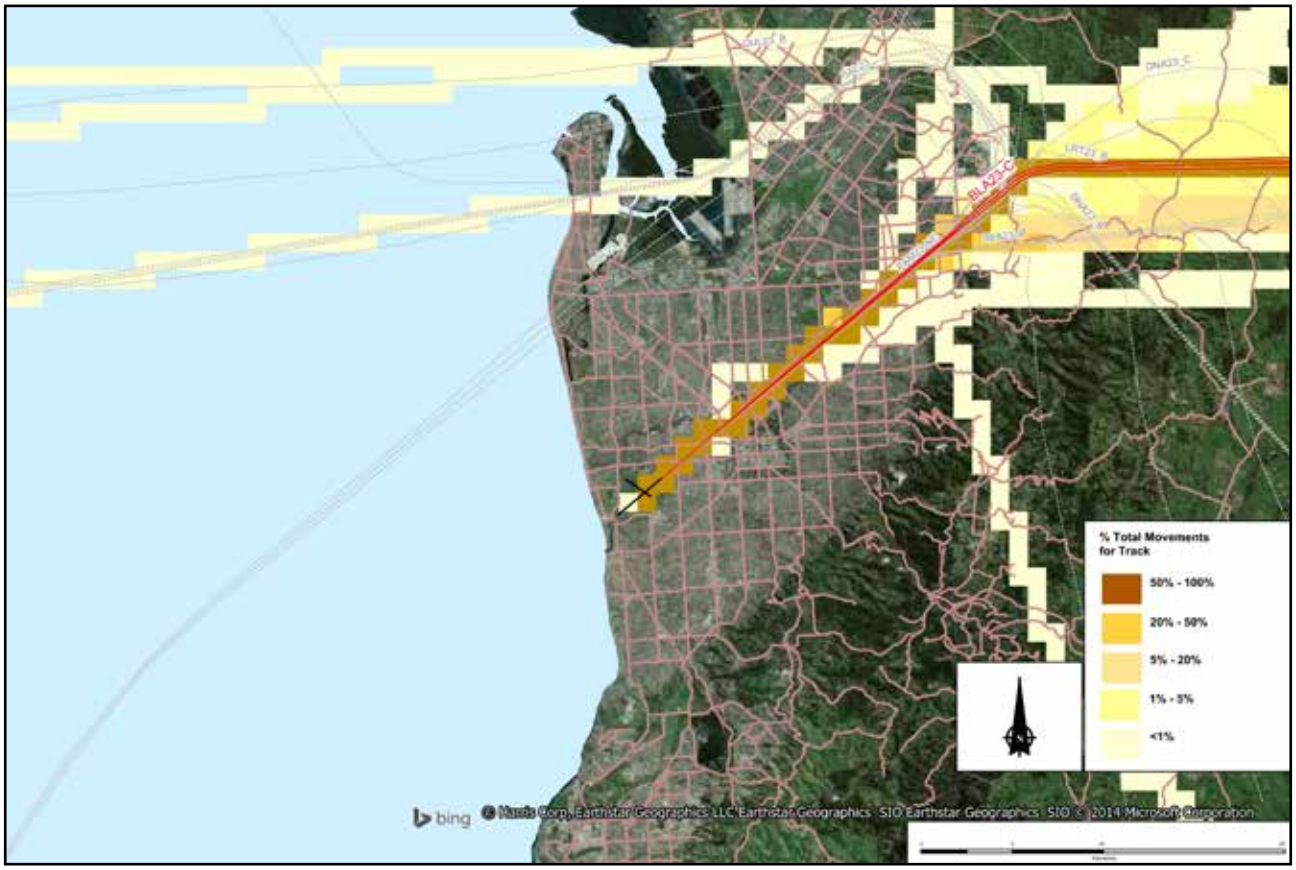

Figure 5.2 Example of Arrivals Flight Density Grid Analysis for Runway 23

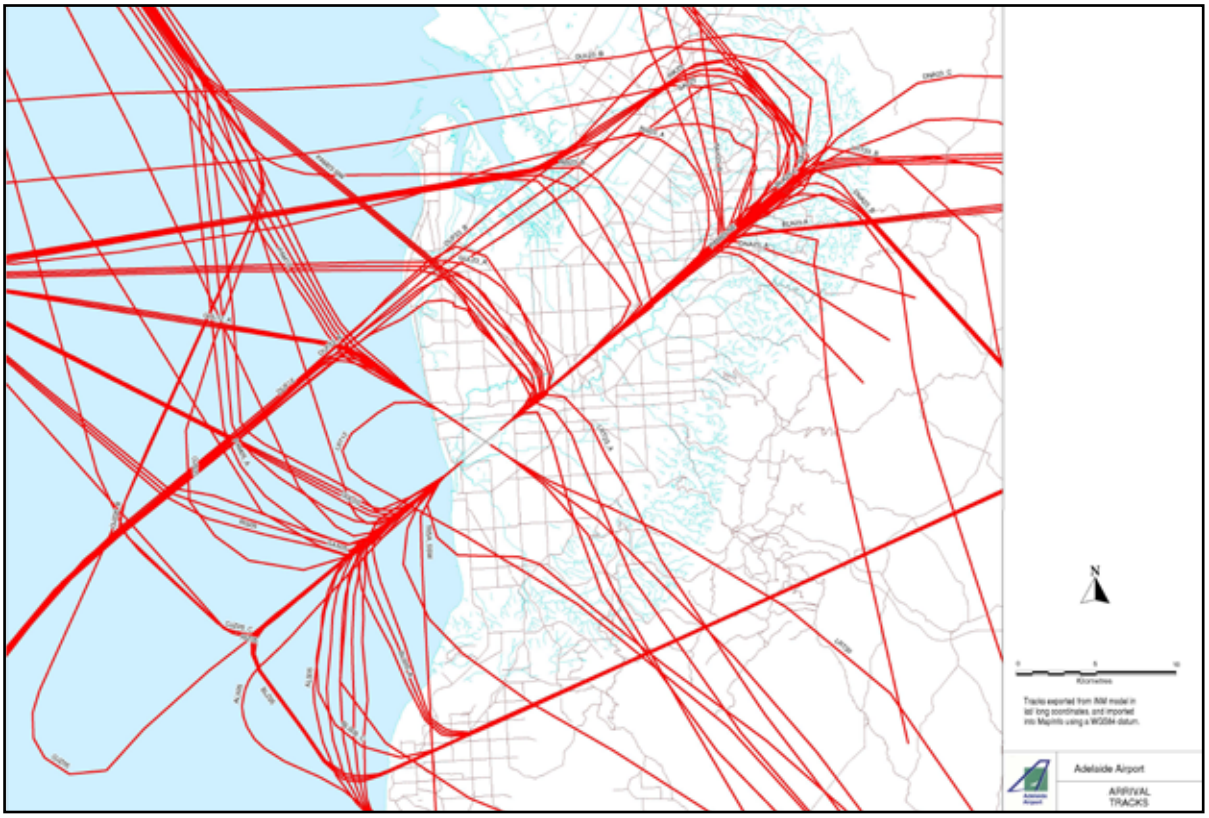

Figure 5.3 Arrivals Flight Paths (tracks)

Maps showing the general placement of flight paths and their importance are shown in Figure 5.3 (Arrivals), Figure 5.4 (Departures) and Figure 5.5 (touch-and-go operations).

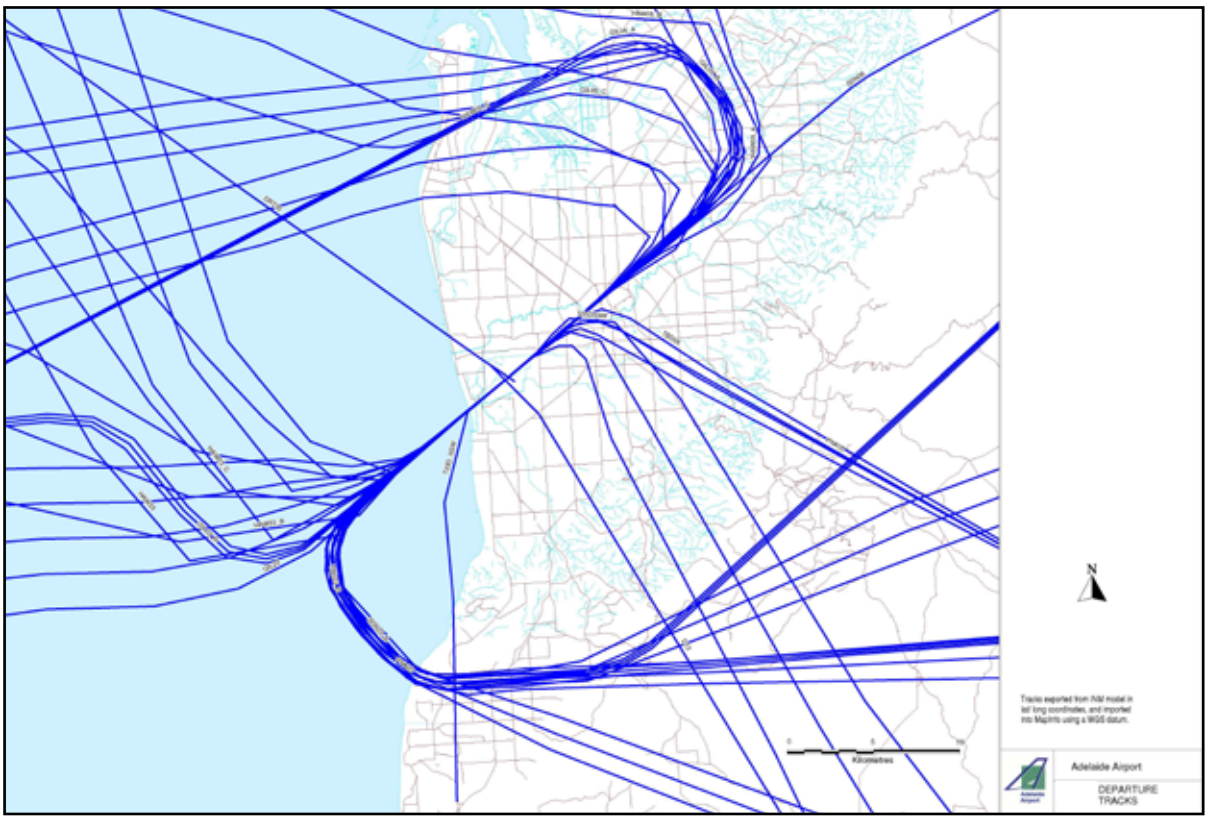

Figure 5.4 Departure Flight Paths (tracks)

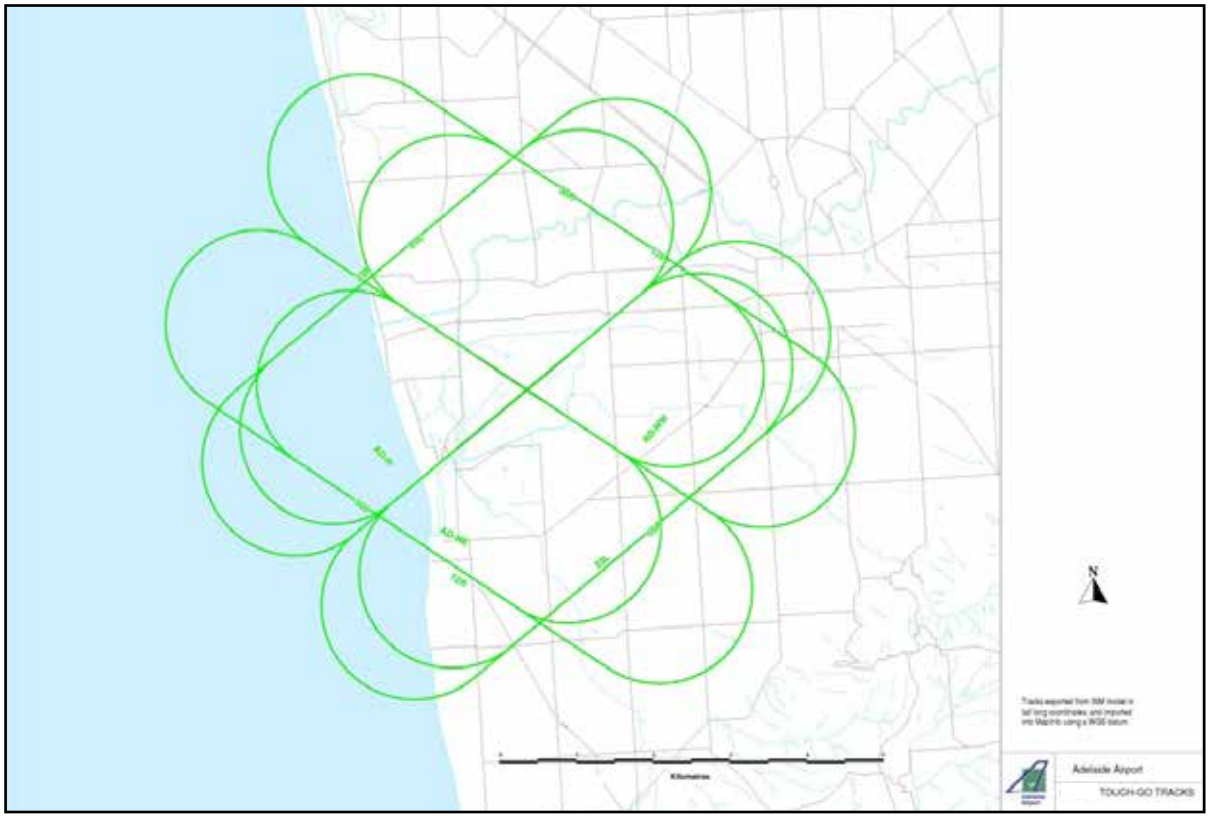

Figure 5.5 Touch and Go Flight Paths (tracks)

Helicopter flight paths are shown in Figure 5.6. These flight paths have been discussed with Airservices Australia and reflect the current operating procedures.

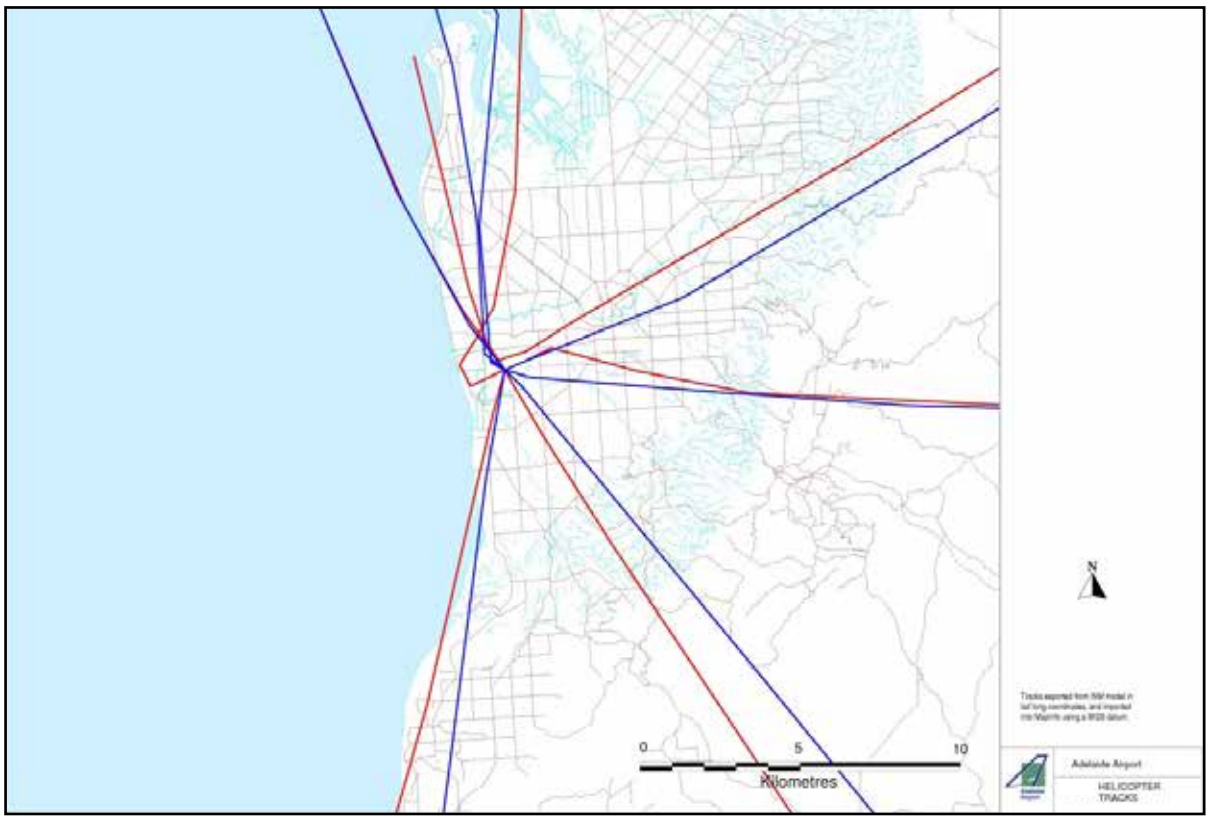

Figure 5.6 Helicopter Flight Paths (tracks)

Flight tracks represent the concentrations of where aircraft fly, and for jet aircraft these tracks are generally representative of actual tracks or corridors where they fly. For example, the jet flight tracks of all jet movements in May 2014 are shown in Figure 5.7. These tracks are based on Airservices Australia radar tracks for jet aircraft for one month (green represents departure tracks and red represents arrival tracks).

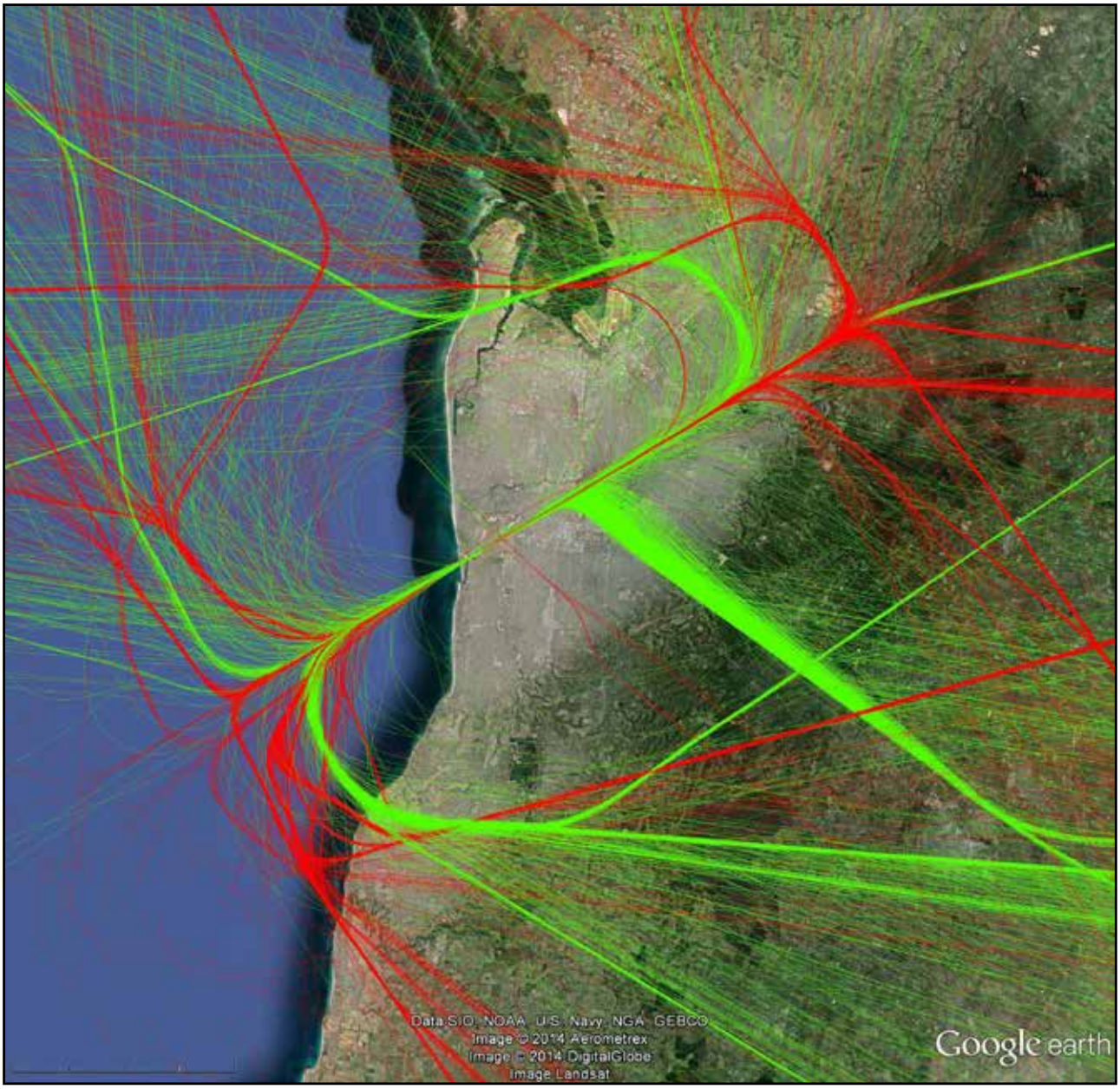

Figure 5.7 Jet Aircraft Tracks for May 2014 (Source: Airservices Australia)

These jet flight tracks generally follow the schematic tracks as shown in Figures 5.3 and 5.4. However, non-jet tracks (turbo-prop, piston engine aircraft and helicopters) arrive and depart Adelaide Airport on much more spread out flight tracks. Examples of these spread out tracks are shown in Figure 5.8 (green represents departure tracks and red represents arrival tracks).

Figure 5.8 clearly shows that there are very few areas around Adelaide that were not overflown by aircraft in May 2014 by non-jets. By comparing Figures 5.7 and 5.8, it can be seen that the nosier jet aircraft generally follow set flight tracks and the quieter aircraft (non-jets) fly over most of Adelaide.

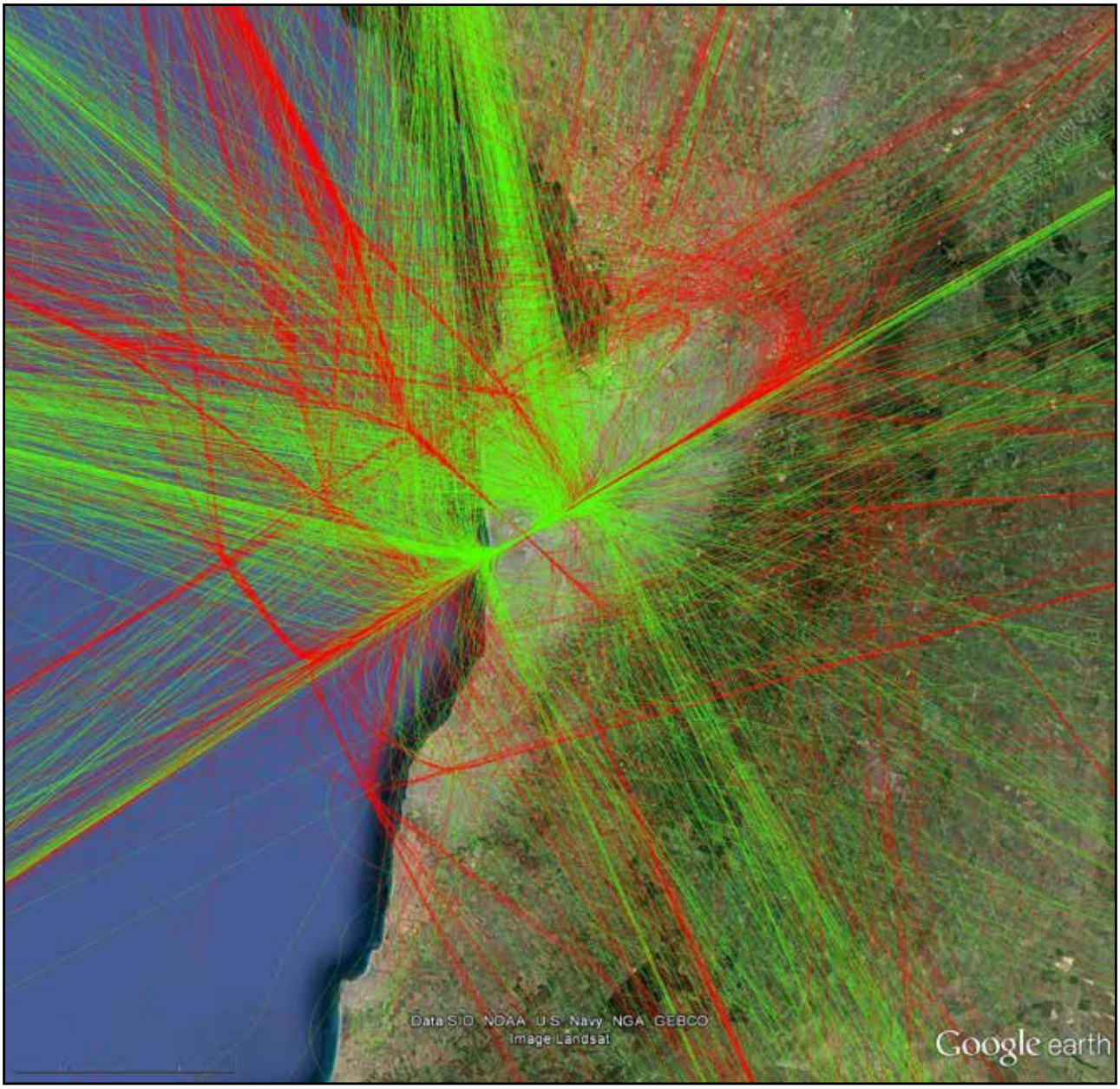

Figure 5.8 Non-Jet Aircraft Tracks for May 2014 (Source: Airservices Australia)

5.11 Modelling Results

A number of noise modelling charts depicting the ANEI contours, ANEF and ANEC for Adelaide Airport are included in Appendix B – Aircraft Noise Metrics, and are briefly outlined below.

A chart depicting the 2013 ANEI contours for the airport is depicted as Figure B1 in Appendix B. Charts depicting the 2034 ANEF for the numbers of aircraft movements expected in 2034 and the ANEC for the ultimate capacity of the airport are included as Figures B2 and B3 respectively.

A chart comparing the 2013 ANEI and the predicted ANEF for 2034 is included as Figure B4 of Appendix B. A comparison of the ANEF for 2034 compared to the current ANEF, which was included in the previous Master Plan for Adelaide Airport for the year 2029, is depicted in Figure B5.

Finally, a comparison of the Ultimate Practical Capacity ANEC in this Master Plan compared to the ANEC in the previous Master Plan is shown in Figure B6 of Appendix B.

5.12 Assessment of Changes

The ANEI chart show in Figure B1 in Appendix B provides an estimate of the current position of the noise contours around the airport. These contours can be used as a guide in assessing future proposed changes to the noise contours in the ANEF and ANEC charts.

The ANEFs and ANECs presented in Figures B2 and B3 indicate an extension in the area of the contours along all runway ends compared to their present position in the ANEI. The reasons for the extensions are mainly due to the increase in the forecast numbers of movements and the types of aircraft using the runways.

Comparison plots of the 2034 ANEF are overlayed over the 2029 ANEF produced in 2009 and depicted in Figures B4, B5 and B6 in Appendix B. These overlays indicate that there is a difference between the 2029 ANEF and 2034 ANEF contours. The reasons for the differences relate to a number of factors:

- an increase in the numbers of fixed-wing flights modelled;
- the spreading of the tracks and the use of sub-tracks in the 2034 modelling;
- a change of the INM Model (version 6 to version 7);
- the use of specific helicopter tracks and the integration of the helicopter modelling into the INM model; and
- a slightly different fleet mix.

All of these factors have influenced the change of the ANEFs from 2029 through to the ANEF for 2034.

In the 2009 Master Plan, the forecast 20-year total annual movements for fixed wing aircraft was 171,732. In this Master Plan, the forecast number of fixed wing movements in 2034 is 172,640. The extension of the contours in this Master Plan is only partially due to the forecast number of total fixed wing movements. However, the forecasts reflect a doubling of international movements of heavy jet international aircraft from a predicted 6,424 movements in 2009 to 12,700 in 2034. In addition, there is predicted to be a significant increase in domestic jet movements compared to forecasts in the previous iteration of the Master Plan.

The predicted change to the fleet mix also adds to the extension of noise contours as there has been a trend for airlines to replace smaller aircraft on more frequent services with less frequent, larger aircraft, flying with higher load factors. The predicted percentage of larger jets in the fleet mix has increased from 4,343 in the 2029 forecasts to 17,500 in the 2034 forecasts.

The extension of the ANEC contours for the ultimate capacity predictions are largely due to an increase in the number of movements and the shift in fleet mix to larger jet aircraft as discussed above. In the previous 2009 Master Plan, the ultimate capacity estimate for Adelaide Airport was approximately 218,000 fixed-wing movements. In this Master Plan, the ultimate capacity has been increased to 233,000 fixed wing movements for the reasons outlined in Chapter 4 – Forecasts.

In terms of significant 2034 ANEF contours, the 35 ANEF contour extends outside the airport boundaries and just crosses Marion Road. The 30 ANEF contour extends further to the north-east and almost reaches Henley Beach Road. The 25 ANEF contour extends north-east and reaches Wellington Square in North Adelaide. To the south-west, the 25 ANEF contour extends over an area of residential land in North Glenelg and the 30 ANEF contour also passes over some residential properties in this area. The 35 ANEF contour is generally restricted to airport land, public open space and the residential areas at West Richmond; much of which has been subject to a Commonwealth programme of noise insulation measures in the past decade.

5.13 Supplementary Aircraft Noise Metrics

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 2021-2000 Acoustics – Aircraft noise intrusion – Building siting and construction (AS2021)* 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. It should also be recognised that the AS2021 is currently under review. In consideration of this, the current interpretation of AS2021 and additional noise metrics should be taken as interim, as they may change in the future.

Thus 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 in 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 70dB 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.

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

To understand the context of noise levels of 60dB to 70dB, the range of noise events is presented for comparative purposes in Figure 5.9.

N70 maps allow all stakeholders to interpret aircraft noise issues based on counts of aircraft with noise profiles greater than 70dB over the flight paths that aircraft utilise surrounding Adelaide 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 Adelaide Airport is depicted in Figure B7 of Appendix B – Aircraft Noise Metrics. This is based on the numbers and types of aircraft used for modelling the 2012 ANEI shown in Figure B1. Additionally, a N70 map for the area around Adelaide Airport in 2034 is shown in Figure B8 of Appendix B, which is based on the forecast numbers of aircraft to be operating at the airport in 20 years time, as discussed in Chapter 4 – Forecasts.

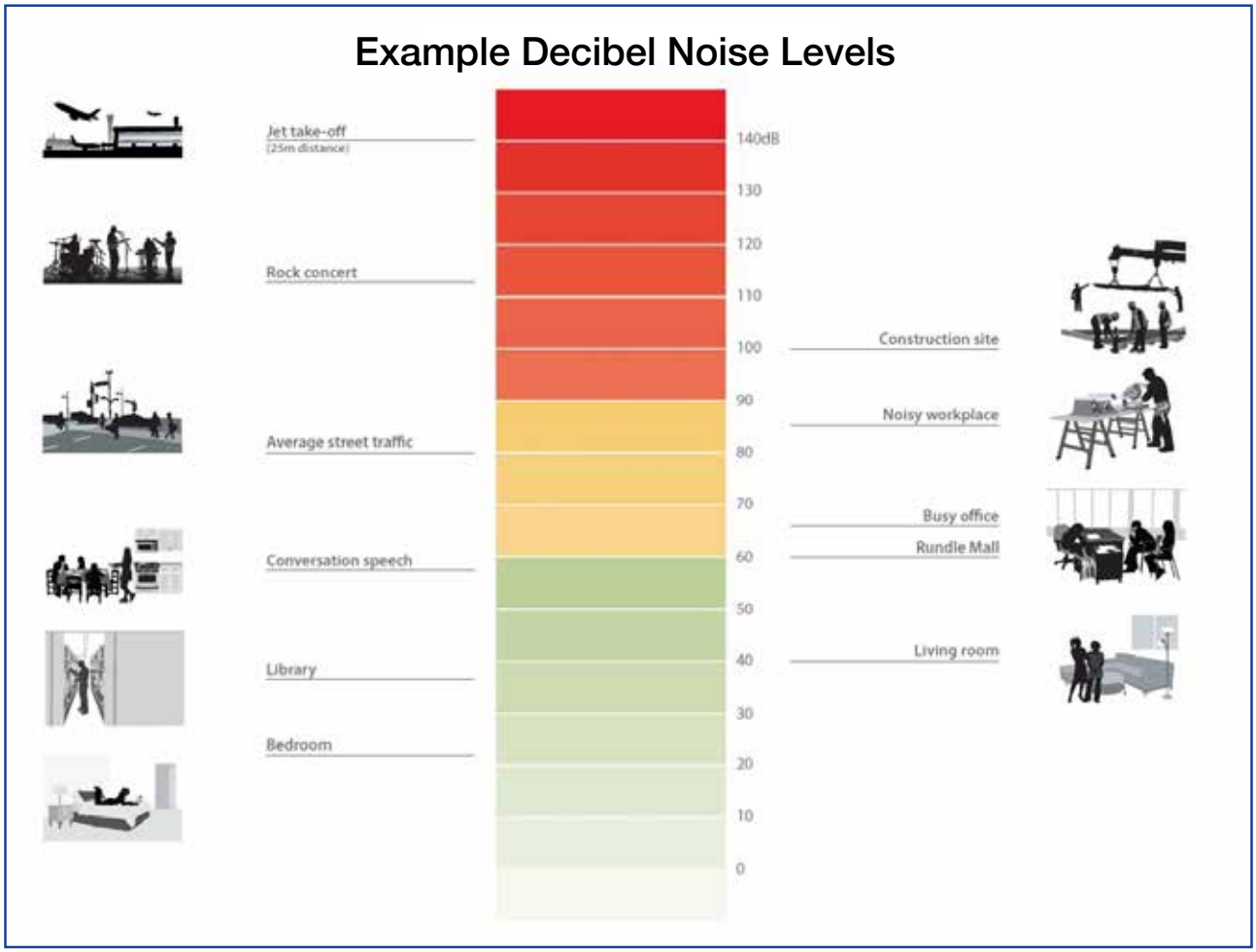

Figure 5.9 Example Noise Levels (In Decibels). (Source: Airservices Australia and Australian Airports Association)

5.14 Aircraft Noise Mitigation

The ANEF for 2034 (Figure B2 in Appendix B) and ANEC for the ultimate capacity (Figure B3 in Appendix B) indicate that there will be some increase in residential areas affected by aircraft noise with the forecast increased air traffic. These impacts will be alleviated to some degree by the design and use of noise reduction features in future models of aircraft.

AAL has a broad range of programs in place to address aircraft noise around the airport. These include:

- working with stakeholders to observe the existing curfew arrangements;
- consulting and engaging with the local community;
- working closely with the Commonwealth, State and Local Governments to ensure a consistent approach, management and implementation of the noise mitigation measures;
- consulting with the airlines that use the airport; and
- investing in airport infrastructure to support new generation quieter aircraft.

5.14.1 Current Curfew Arrangements

Adelaide Airport operates under a legislated curfew (*Adelaide Airport Curfew Act 2000* and *Adelaide Airport Curfew Regulations 2000*) to limit noise impacts from aircraft at night. During curfew hours (the period 11.00pm to 6.00am), take-offs and landings at the airport are restricted to specific types of aircraft and operations. For departing flights to meet the curfew they must be given taxi clearance by Airservices Air Traffic Control after 6.00am and before 11.00pm.

Some aircraft can operate during the curfew if they meet certain low-noise criteria and observe noise abatement procedures. These aircraft movements include:

- a maximum of 15 take-offs and 25 landings each week during the curfew by low-noise heavy freight aircraft that meet the noise level requirements set out in the *Adelaide Airport Curfew Act 2000*; and
- aircraft that are propellor driven or listed as specified types of jet aircraft, of a maximum take-off weight of 34,000 kilograms or less, that meet the noise level requirements set out in the *Adelaide Airport Curfew Act 2000*.

The Commonwealth Minister for Infrastructure and Regional Development has the power to grant a dispensation that allows an aircraft to operate during a curfew period. In practice, a dispensation is granted by the Minister where there are exceptional circumstances to justify the flight. Dispensations must be granted before a flight operates into, or out of, Adelaide Airport. Curfew restrictions do not apply in cases of emergency such as:

- search and rescue or medical emergencies, such as Royal Flying Doctor flights by turbo prop aircraft and Medivac helicoptors;
- a declared in flight emergency landing or resumption of that flight;
- a low fuel emergency; and
- for safety or security emergencies.

During the curfew period, aircraft must land on Runway 05, and must take-off on Runway 23. Under Section 15 of the *Adelaide Airport Curfew Act 2000*, Runway 23 can be used for arrivals only when Runway 05 is declared by Airservices Australia to be not operationally acceptable for arrivals.

The *Adelaide Airport Curfew Act and Regulations 2000* provide for international passenger movements between 11.00pm and midnight and between 5.00am and 6.00am (the curfew shoulder periods) subject to:

- jet aircraft meeting the strictest ICAO noise standards; and
- a maximum of eight landings but no take-offs per week.

AAL will continue to work with Commonwealth, State and Local Governments, airlines, operators and relevant stakeholders to observe the current curfew arrangements and review compliance with regulations through regular reporting to the Adelaide Airport Consultative Committee (AACC).

5.14.2 Commonwealth Noise Insulation Scheme

The Commonwealth Government introduced and operated a noise insulation program for buildings affected by aircraft noise in 2000. The program was established in areas of high aircraft noise exposure around Adelaide Airport. Residential properties in the 30 ANEI (Australian Noise Exposure Index) contour and public buildings (schools, churches, day care centres and hospitals) in the 25 ANEI contour were eligible for assistance under the program.

The noise insulation scheme was funded by a Commonwealth levy on passengers and collection of the levy was terminated in 2010. Insulation works on some public buildings continued until 2012.

During the course of the operation of the scheme, the Commonwealth Government reported on progress to the Adelaide Airport Consultative Committee on a regular basis. This mechanism provided feedback to the airport and all stakeholders on the implementation of the scheme. The Commonwealth Government announced the final project under the noise insulation scheme in May 2013.

5.14.3 Consultation with Local Communities

AAL continues to engage with local communities surrounding the airport through a range of committees and forums. Principally, the Adelaide Airport Consultative Committee (AACC), which includes local community representatives, is a forum where any issue relating to the operations of the airport and potential effects on the local community can be raised. This includes issues such as aircraft noise, car parking, flood mitigation, landscaping, bike path access and commercial developments.

Issues such as the management of the curfew and reporting of dispensations and levels of allowable night time flights are regularly reviewed. Master planning, including the formulation of ANEFs and aircraft flight path improvements, is regularly discussed, including presentations from airlines and Airservices Australia.

AAL maintains a website (www.adelaideairport.com.au) with links to aircraft noise information. This includes a link to the Airservices Australia website 'WebTrak', which provides information about individual flights and allows users to investigate issues and lodge noise complaints if needed.

AAL is also preparing a new section of the AAL website that specifically addresses the issues of off-airport land use and planning with respect to aircraft noise and limitations to developments such as the obstacle limitation surfaces. In addition, the section will address issues such as:

- responsibilities and roles for aircraft noise management (Commonwealth, State and Local Government, Airservices Australia, CASA, and other agencies);
- limitations on the heights of proposed developments to preserve aircraft safety;
- noise metrics (ANEI, ANEF, ANEC, N70);
- links to the WebTrak website;
- links to noise complaint reporting;
- links to the aircraft noise ombudsman;
- updates regarding the various reporting of aircraft movements;
- updates on the National Airports Safeguarding Framework (NASF); and
- details of and updates on the review of AS2021.

AAL also proposes to consult with key real estate stakeholders such as the Real Estate Institute of South Australia and the Property Council of South Australia to inform them of the need for safeguarding the future of Adelaide Airport through considered land use planning. AAL will encourage these parties to influence their membership to accurately represent the degree of aircraft noise impacts on properties to potential buyers and also inform developers of the need to maintain building heights below the published Obstacle Limitation Surfaces (OLS).

AAL regularly publishes in hard copy and on the AAL website, a news magazine 'Plane Talking' which addresses many aspects of the operation of the airport and allows for direct consultation with stakeholders. AAL intends to use this publication to provide details of the master planning process, opportunities for stakeholders to engage with the airport during the public consultation phase and also to provide updated information about airport operations.

5.14.4 Consultation with Commonwealth, State and Local Governments

Representatives of the Commonwealth, State and Local Governments also sit on the Adelaide Airport Consultative Committee (AACC). In addition, all three tiers of government attend the Adelaide Airport Planning Co-ordination forum. This forum regularly deals with off-airport land use planning issues including land use suitability issues such as aircraft noise, OLS and Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) surfaces.

A process to formalise the long-term land use planning of the airport and surrounding areas, particularly those associated with the ANEF and ANEC contours produced at Figures B2 and B3 of Appendix B, has commenced with the South Australian Government as a flow-on from the National Airports Safeguarding Framework (NASF).

AAL is consulting with the State Government regarding a process to implement planning protections in council development plans to ensure that proper account is taken of aircraft noise.

5.14.5 Consulting Airlines and Airservices Australia

AAL conducts regular 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. Regular Public Transport (RPT) and General Aviation (GA) airline representatives are invited members of the Adelaide Airport Consultative Committee.

Airlines are also invited as speakers on issues affecting aircraft noise and operations at the airport. Recent presentations have included Cathay Pacific (concerning early morning arrivals and discussion of State economic benefits and compliance with the noise abatement procedures) and Qantas regarding the potential use of Required Navigation Procedures (RNPs) at Adelaide Airport.

Operators of freight aircraft have presented to the AACC in the past when any changes are proposed to aircraft types or flight times. The views of the AACC are used by such operators when formally applying to the Commonwealth Minster for permission to operate low-noise freighter aircraft in the curfew period.

Airservices Australia (AsA) attends all consultative meetings and is regularly in contact regarding any issues that arise concerning movements that are the subject of any queries. AsA reports on recent aircraft noise complaints, trends in complaint histories and any investigations associated with the complaints. AAL works with AsA on aircraft noise complaint investigations to provide any airport specific information available. AAL has been proactive in dealing with emerging aircraft noise issues by consulting with groups of operators to achieve an industry-based solution to noise issues.

When a noise complainant is not satisfied with the handling or outcome of a noise complaint made to Airservices Australia, the complainant has the option to address their concerns to the Aircraft Noise Ombudsman (ANO). The ANO is a Commonwealth office which investigates the issues raised by complainants. AAL co-operates with the ANO when requested, to provide any information about particular airport operations in question. If any investigations concerning Adelaide Airport referred to the ANO are investigated or are finalised, the ANO will notify the AACC that an investigation is proceeding and when finalised, that the matter has concluded. No details of the complainant or any personal details are provided to the AACC.

5.14.6 Investing in Airport Infrastructure to Reduce Ground-Based Noise

Terminal 1 includes ground power and pre-conditioned and compressed air facilities for the use of aircraft parked at this terminal. AAL regularly consults with the major carriers to encourage their use of these facilities, thereby minimising the impact of auxiliary power units and early engine start-ups on the surrounding environment. Further detail and objectives relating to the management of ground-based noise is provided in Chapter 10 – Environment Strategy.

AAL is planning for the investment for infrastructure to support new generation quieter aircraft such as the B787 and A380 aircraft types.