

A History of Noise Contours

for Melbourne Airport



MELBOURNE AIRPORT

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Introduction

Melbourne Airport received submissions during Master Plan 2022 and Melbourne Airport's Third Runway Major Development Plan public exhibition referencing previous noise contours. In response, we undertook an exercise to collate information into a single source for community reference.

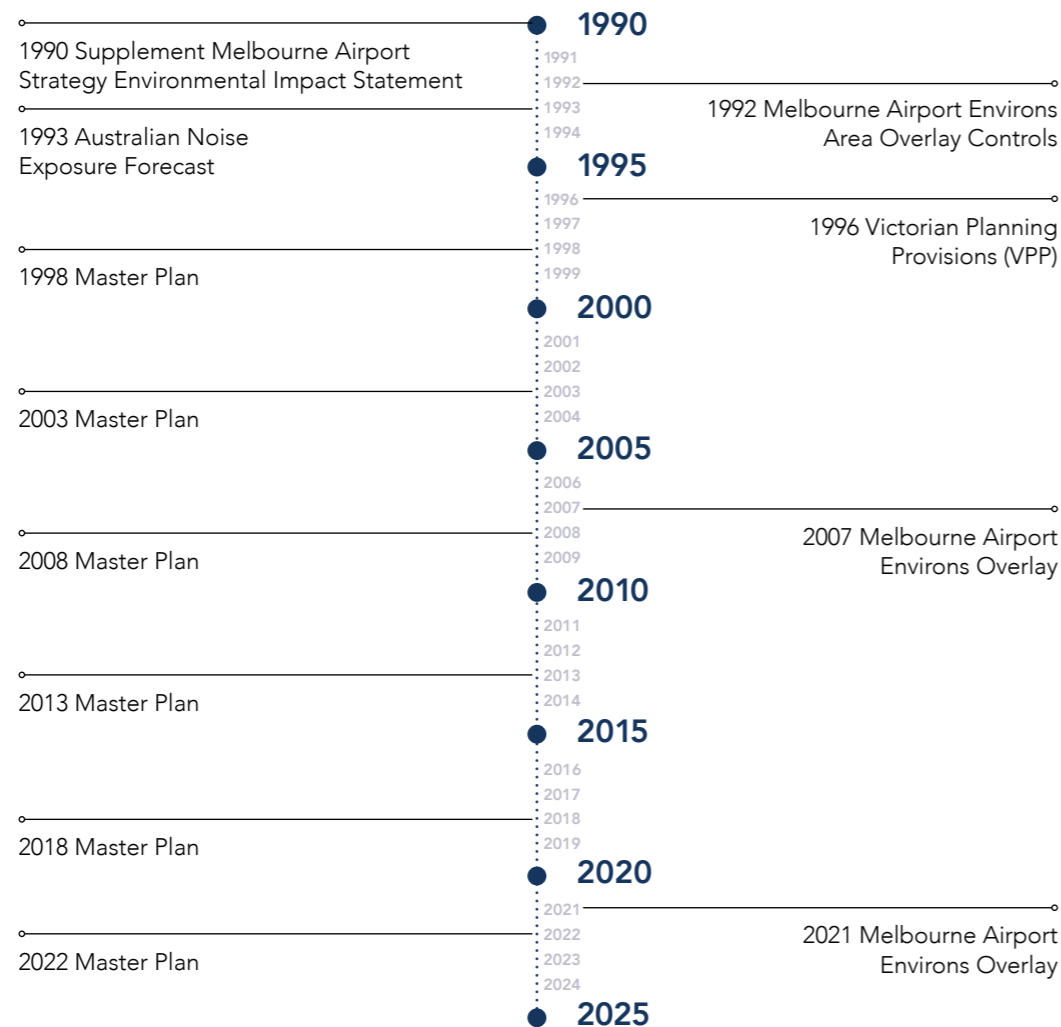
This booklet provides information on the noise contour projections prepared for Melbourne Airport since the 1990s. A timeline opposite highlights the various points in time where noise contours have been published. Victorian Planning Scheme overlays are also referenced.

Over the following pages, information is provided for each noise contour including the runway assumptions, forecast movement assumptions and modelling software.

For each type of noise contour, a scaled map is prepared to help show where changes have occurred in subsequent Master Plans.

It should be noted that each noise contour becomes superseded by the latest endorsed Australian Noise Exposure Forecast (ANEF) associated with the approved Master Plan.

Timeline



Australian Noise Exposure Forecast (ANEF)

For land-use planning in Australia, the accepted measure of aircraft noise exposure is the Australian Noise Exposure Forecast (ANEF).

ANEFs are formally endorsed for technical accuracy by Airservices. An endorsed ANEF is required for each Master Plan.

Australian Standard 2021:2015 provides guidance on the acceptability of various areas for certain types of development, in terms of the ANEF level in the area.

Types of ANEF

There are three different types of ANEF that are endorsed for technical accuracy by Airservices. These types relate to the volume of traffic being modelled and are outlined below:

- Standard (20 year) ANEF.
- Long Range ANEF (greater than 20 year projection).
- Ultimate Practical Capacity ANEF (with the runway system at full capacity).

Whilst 'Ultimate Practical Capacity' ANEFs were prepared for the 1998-2013 Master Plans, a Long Range ANEF (30 years) was prepared for the 2018 and 2022 Master Plans.

We outlined this change within the 2018 Master Plan. We believe that adopting a long range ANEF as opposed to an Ultimate Capacity ANEF balances the safeguarding of future demand. The ultimate capacity will continue to evolve over time in line with advancements in the aviation industry. As such, the long range 30 year ANEF is most appropriate.

Australian Noise Exposure Concept (ANEC)

Contours developed using ANEF methodology, but not formally endorsed, are called 'Concepts' (ANECs).

For Melbourne Airport, ANECs are used to forecast noise for the different runway layouts within the Master Plan.

Australian Noise Exposure Index (ANEI)

Australian Noise Exposure Index (ANEI) contours are prepared for a previous year using historical data.

Changes to ANEFs in Master Plans

Each Master Plan outlines the differences between the previous ANEFs and the endorsed ANEF. The ANEFs have evolved over time to reflect:

- Updated aircraft movement forecasts.
- Updated assumptions regarding aircraft types operating at Melbourne Airport (such as the introduction of Airbus A380s and Boeing 787s).
- Evolution of the modelling software used to generate the noise contours (such as updated versions of software or a new software such as AEDT).
- Refinement of flight paths and runway models.

1990 Supplement to the Melbourne Airport Strategy Environmental Impact Statement

The 1990 Supplement to the Melbourne Airport Strategy Draft Environmental Impact statement (Supplement Report) includes a number of ANECs:

ANEC 3rd RWY Wide Spaced N/S Direction:

- This ANEC includes the following runway infrastructure:
- 1,311m spaced north south runway, 2,500m long
- Extension to the existing east-west runway to a total length of 3,500m
- Extension north to the existing north-south runway to a total length of 4,500m
- 250,000 aircraft movements

ANEC Runway Option SC3:

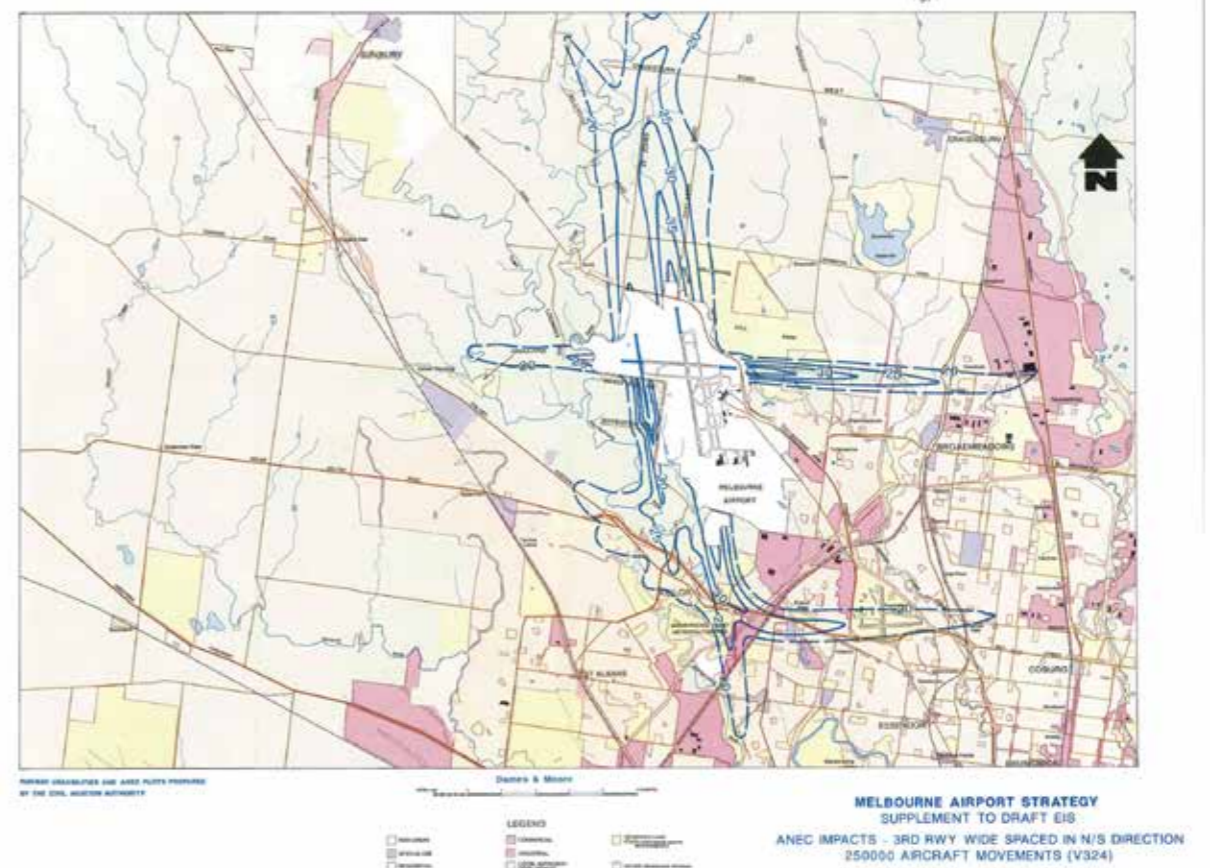
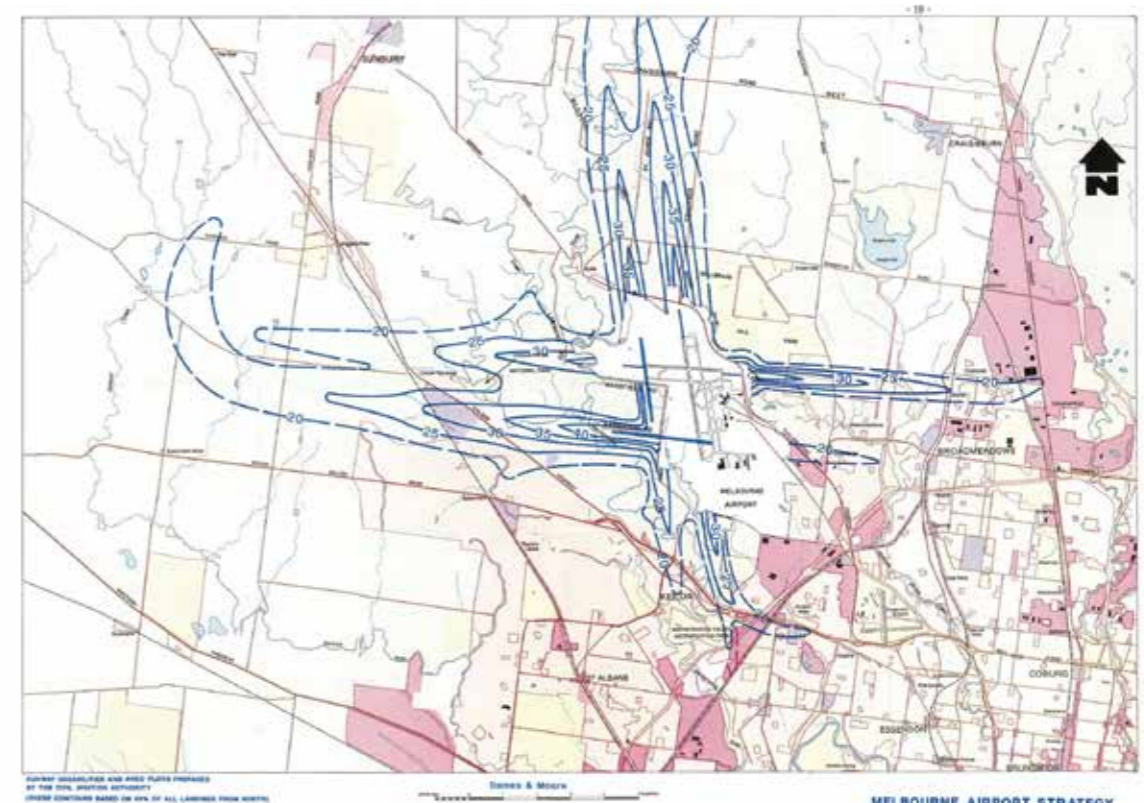
This ANEC includes the following runway infrastructure:

- 1,311m spaced north south runway, 2,500m long
- Extension to the existing east-west runway to a total length of 3,500m
- Extension north to the existing north-south runway to a total length of 4,500m
- A parallel east-west runway, 3,000m long
- 320,000 aircraft movements



Extracts from the Supplement Report are shown opposite to highlight the extent of the noise contours.

These contours were prepared prior to the privatisation of the airport by the Federal Aviation Corporation (FAC). We have not been able to source these noise contours in digital format, however we will continue to explore avenues to obtain these noise contours in digital format.



ANEF - Prior to Master Plans

Prior to the first Master Plan in 1998, an ANEF was prepared for Melbourne Airport by the FAC, referred to as the 1993 ANEF.

The following information regarding pre-Master Plan ANEFs is taken from the 1998 Master Plan, Section 9 Airport Protection:

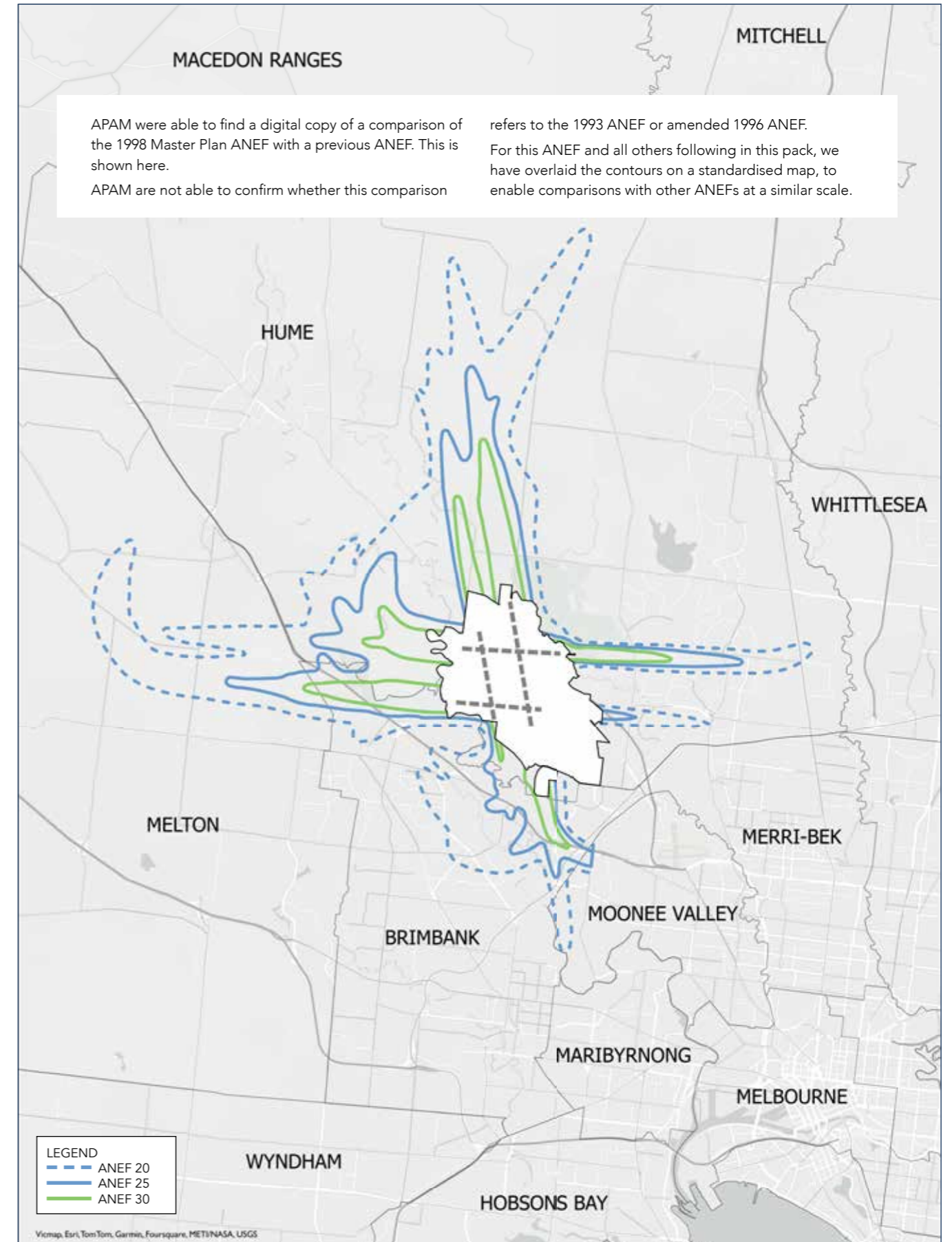
The first Melbourne Airport ANEF was initially issued in 1993 and amended slightly in 1996. It was compiled from the 1990 ANEI and the series of ANEC scenarios that were prepared during the development of the Airport Strategy and was endorsed for technical accuracy by Airservices Australia. The ANEF contours represented the forecast worst case situation for noise impact after taking into account the development stages of a four runway system and a long term operations level of 320,000 movements. A sensitivity check indicated there would only be marginal increases in noise impact for 350,000 movements.

The ANEF prepared in 1993 reflected the standard arrival/departure procedures in place for the existing two runways at the time the 1990 ANEI was prepared and the arrival/departure paths assumed for the future operation of the three and four runway layouts.

In 1995 a revised high level route structure was introduced through Australia to enhance aircraft operating efficiency and safety. This route structure resulted from a consultative group, including the Aviation Industry, Military, Environment and the former Civil Aviation Authority.

In 1996 Melbourne airspace was completely revised to provide a greater level of standardisation of aircraft tracking and to enhance safety assurance. Tracks were also altered to minimise noise impact on townships close to the airport where possible.

An image of the 1993 ANEF has been sourced and is shown below:

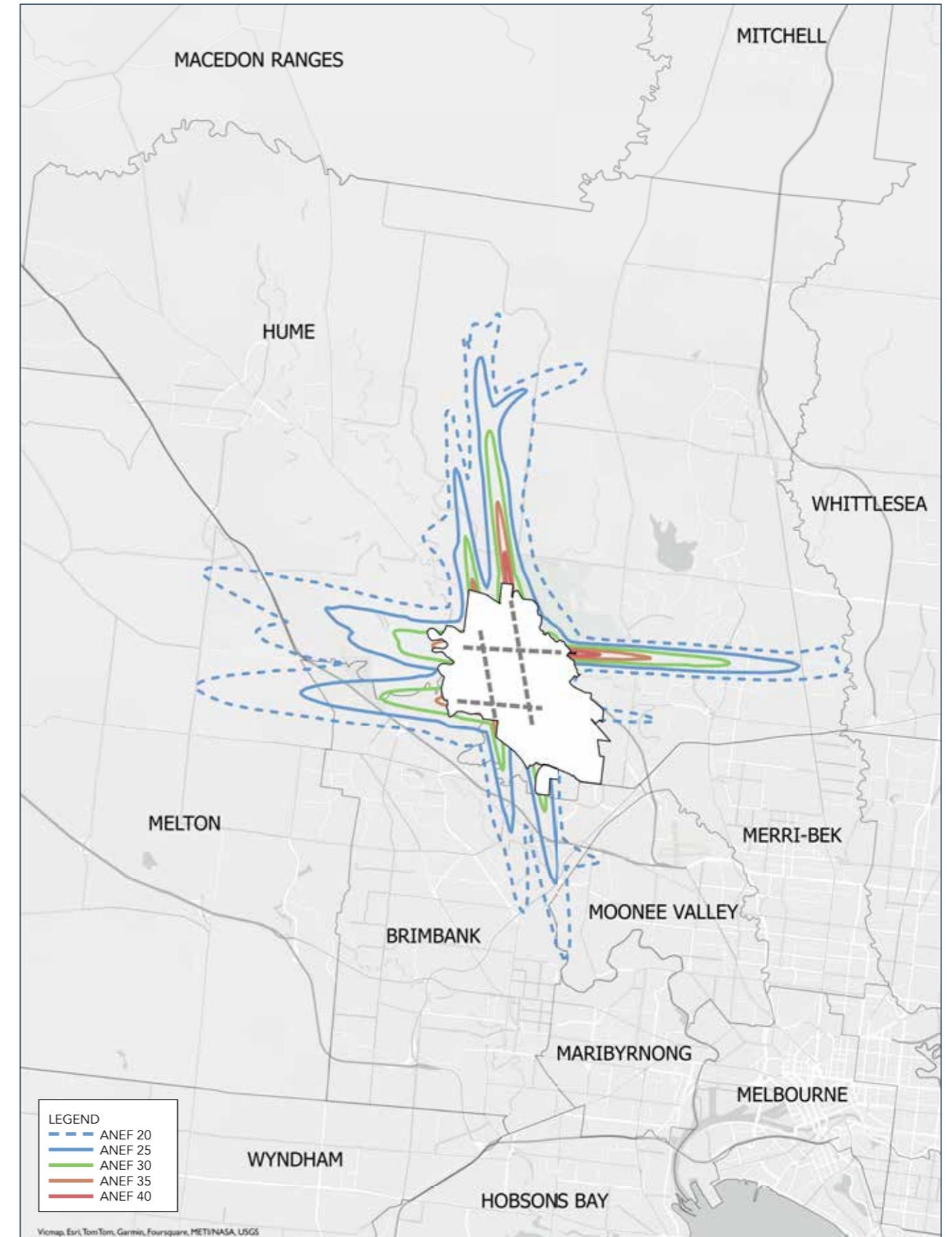
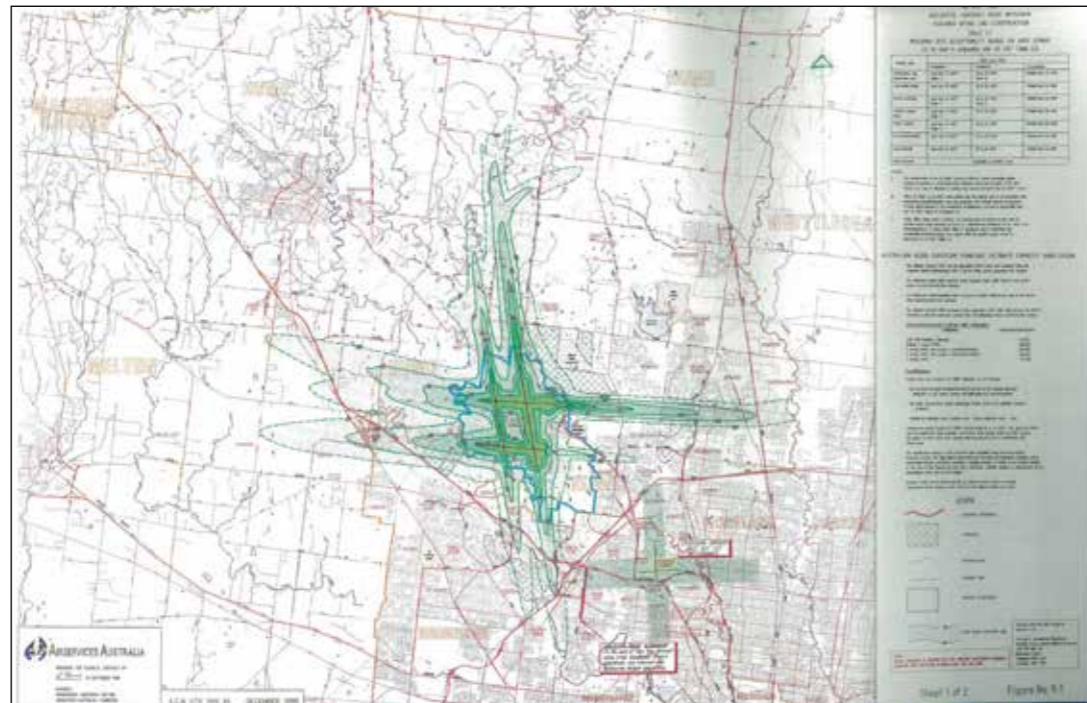


ANEF - 1998 Master Plan

The ANEF included in the 1998 Master Plan is shown below. The 1998 ANEF has been reproduced on the map opposite to allow a comparison with other ANEFs at a similar scale.

The ANEF was a composite of an ANEI and four ANECs:

- A 1996 ANEI covering 153,000 movements
- An ANEC referring to the two-runway system with 248,000 movements
- Two ANECs referring to three-runway systems (one east-west, one north-south) with 325,000 movements
- An ANEC referring to the four-runway system with 371,000 movements



ANEF - 2003 Master Plan

The ANEF included in the 2003 Master Plan is shown below. This ANEF has been reproduced on the map opposite to allow a comparison with other ANEFs at a similar scale.

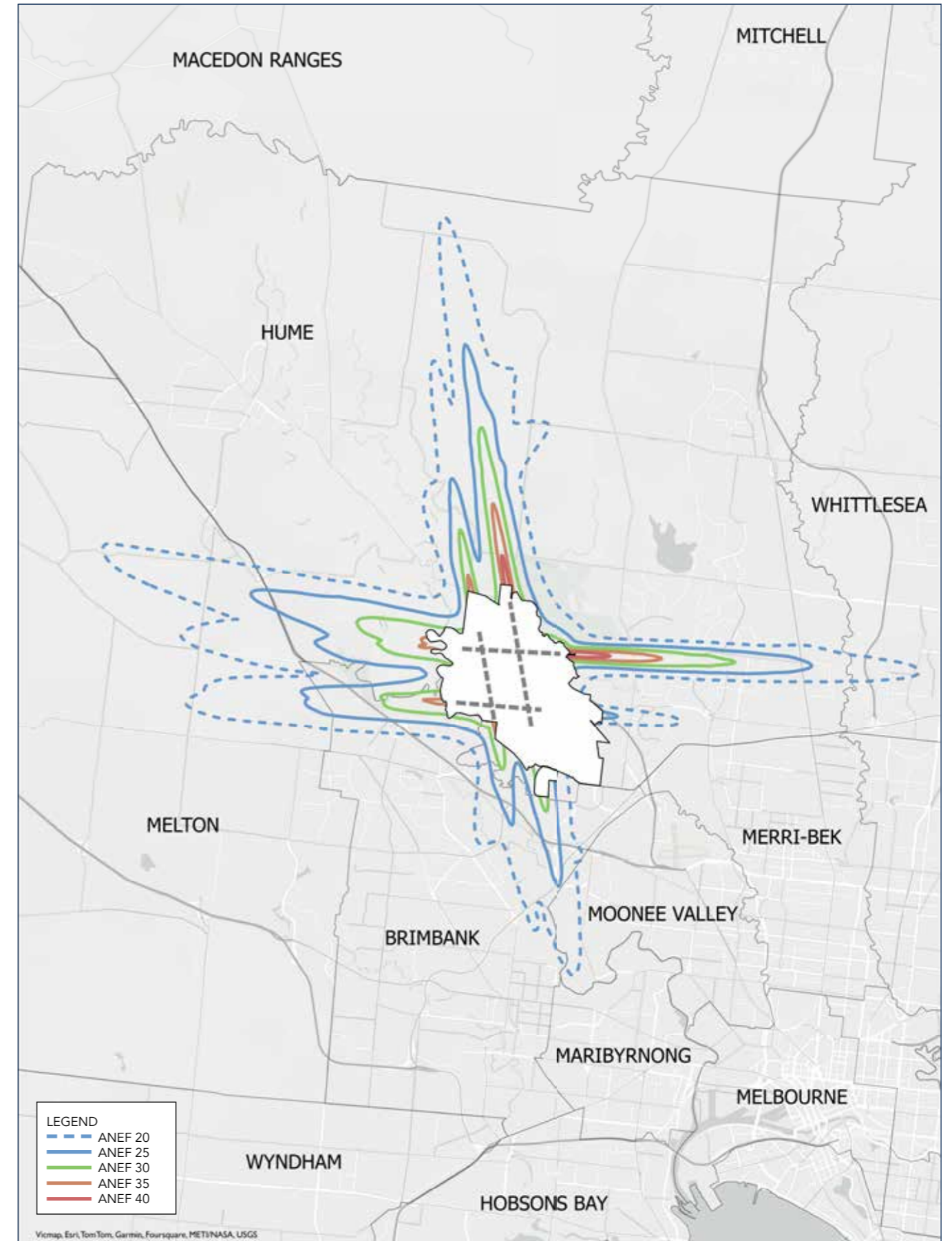
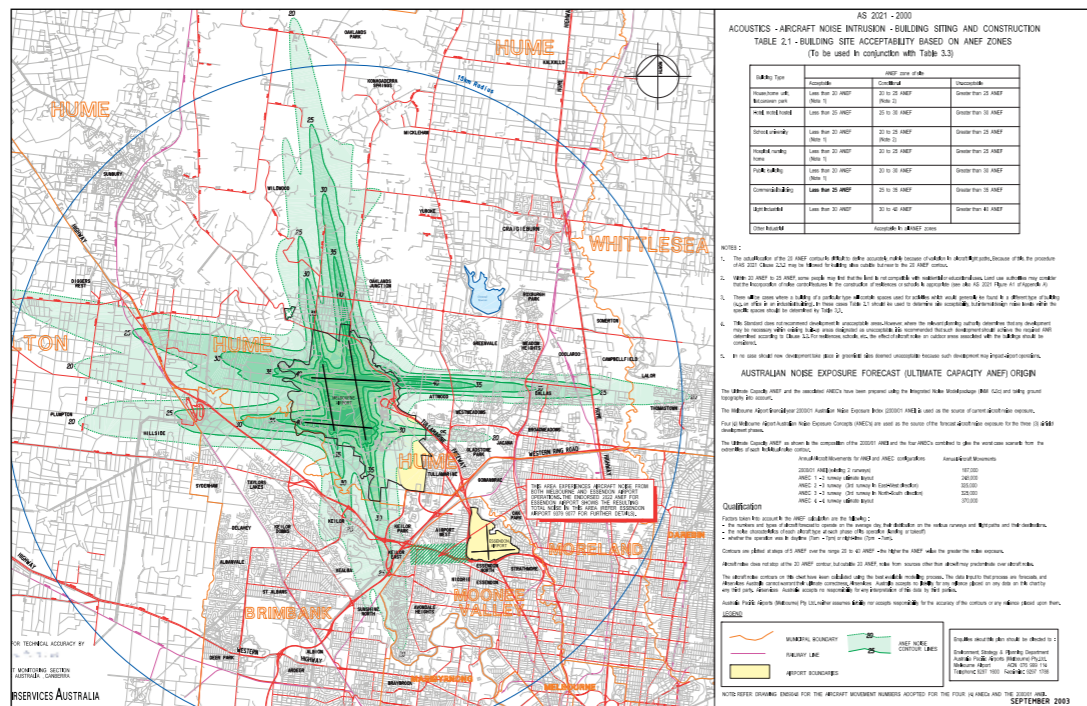
The ANEF was a composite of an ANEI and four ANECs:

- A 2000/01 ANEI covering 187,000 movements
- An ANEC referring to the two-runway system with 248,000 movements (circa 2015/16 forecast horizon)
- Two ANECs referring to three-runway systems (one east-west, one north-south) with 325,000 movements (circa 2038/39 forecast horizon)
- An ANEC referring to the four-runway system with 370,000 movements (circa 2050/51 forecast horizon)



The 2003 ANEF was an ultimate capacity ANEF.

Integrated Noise Model (INM) version 6.0c was used in developing the noise contours.



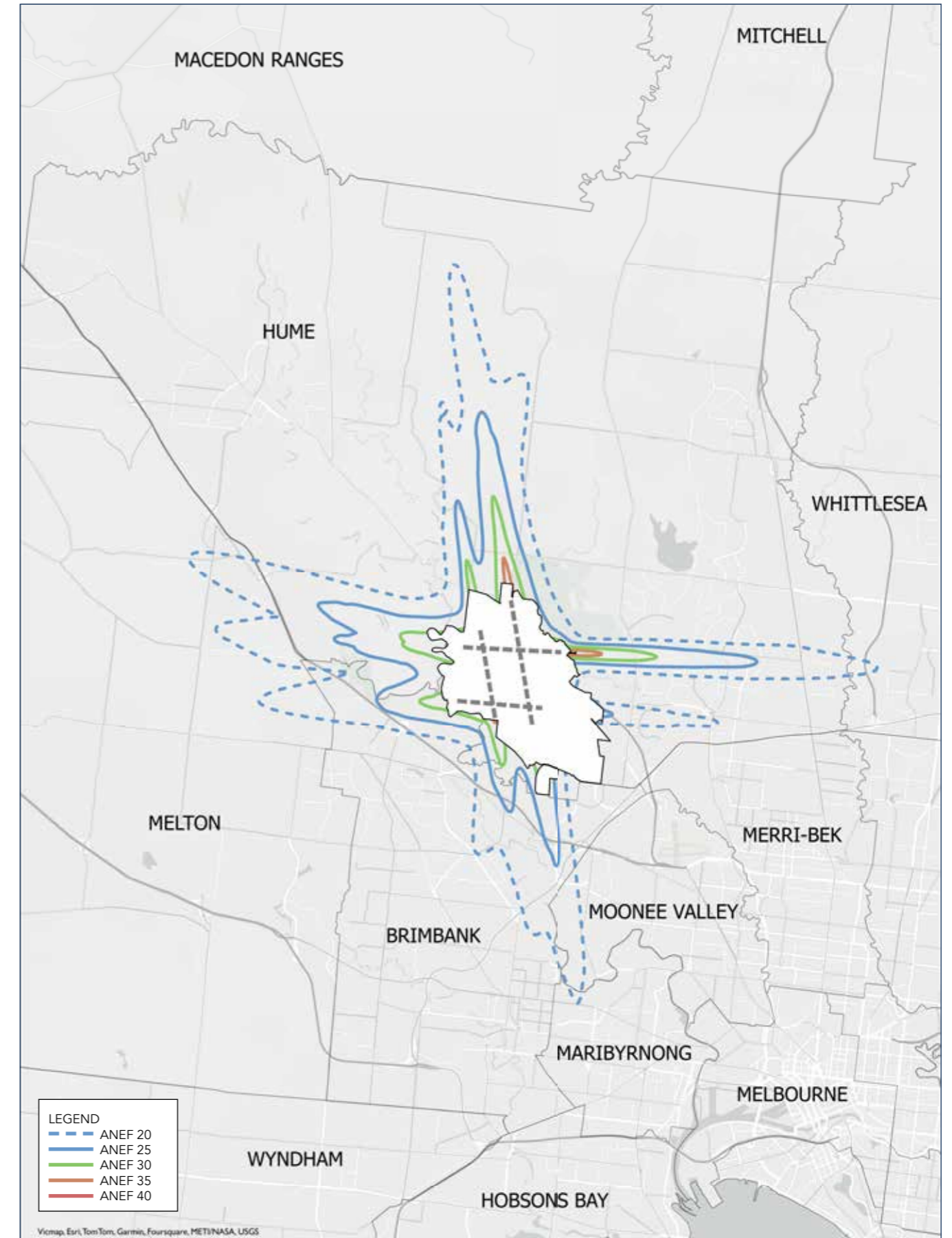
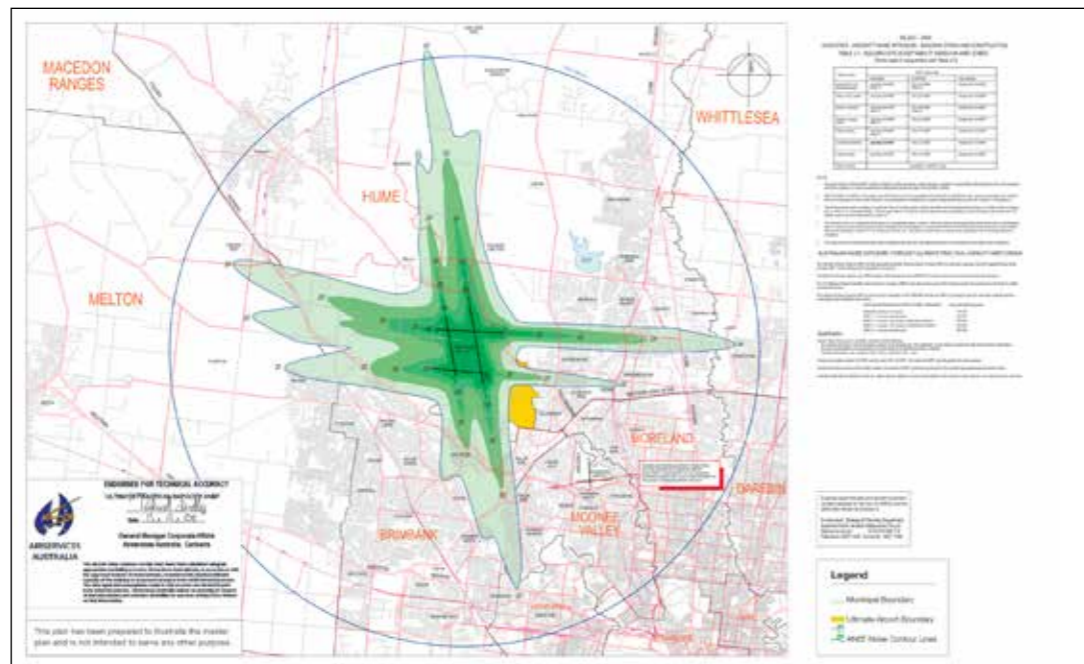
ANEF - 2008 Master Plan

The ANEF included in the 2008 Master Plan is highlighted below. This ANEF has been reproduced on the map opposite to allow a comparison with other ANEFs at a similar scale.

The ANEF was a composite of an ANEI and four ANECs:

- 2006 ANEI covering 176,400 movements
- An ANEC referring to the two-runway system with 254,000 movements
- An ANEC referring to a north-south three-runway systems with 372,000 movements
- An ANEC referring to an east-west three-runway systems with 272,000 movements
- An ANEC referring to the four-runway system with 397,000 movements

The 2008 ANEF was an ultimate capacity ANEF.

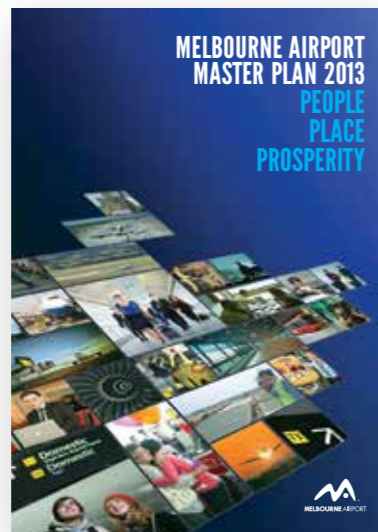


ANEF - 2013 Master Plan

The ANEF included in the 2013 Master Plan is highlighted below. This ANEF has been reproduced on the map opposite to allow a comparison with other ANEFs at a similar scale.

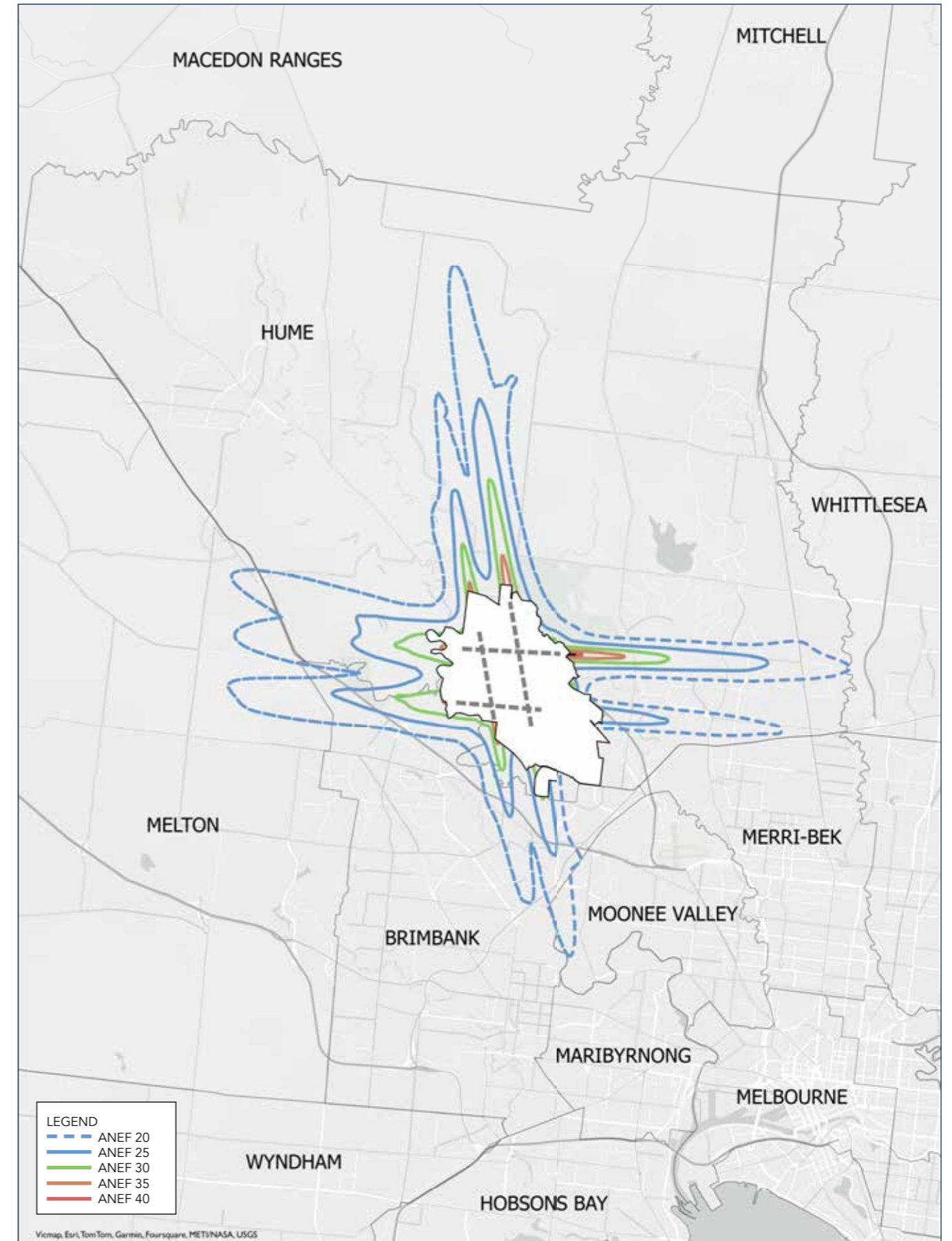
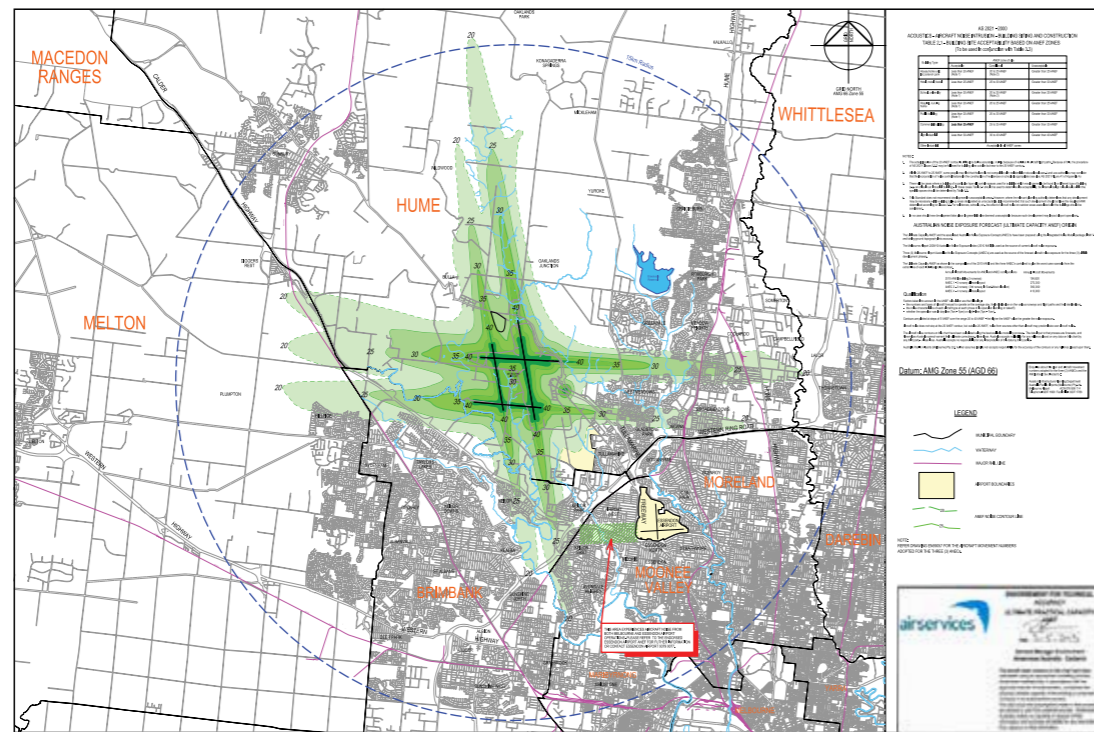
The ANEF was a composite of three ANECs:

- An ANEC referring to the two-runway system with 265,000 movements
- An ANEC referring to an east-west three-runway systems with 380,000 movements
- An ANEC referring to the four-runway system with 400,000 movements



The 2013 ANEF did not include an ANEC for the north-south three-runway system. The 2013 ANEF was an ultimate capacity ANEF.

Integrated Noise Model (INM) version 7.0c was used in developing the noise contours.



ANEF - 2018 Master Plan



The 2018 ANEF did not include an ANEC for the north-south three-runway system.

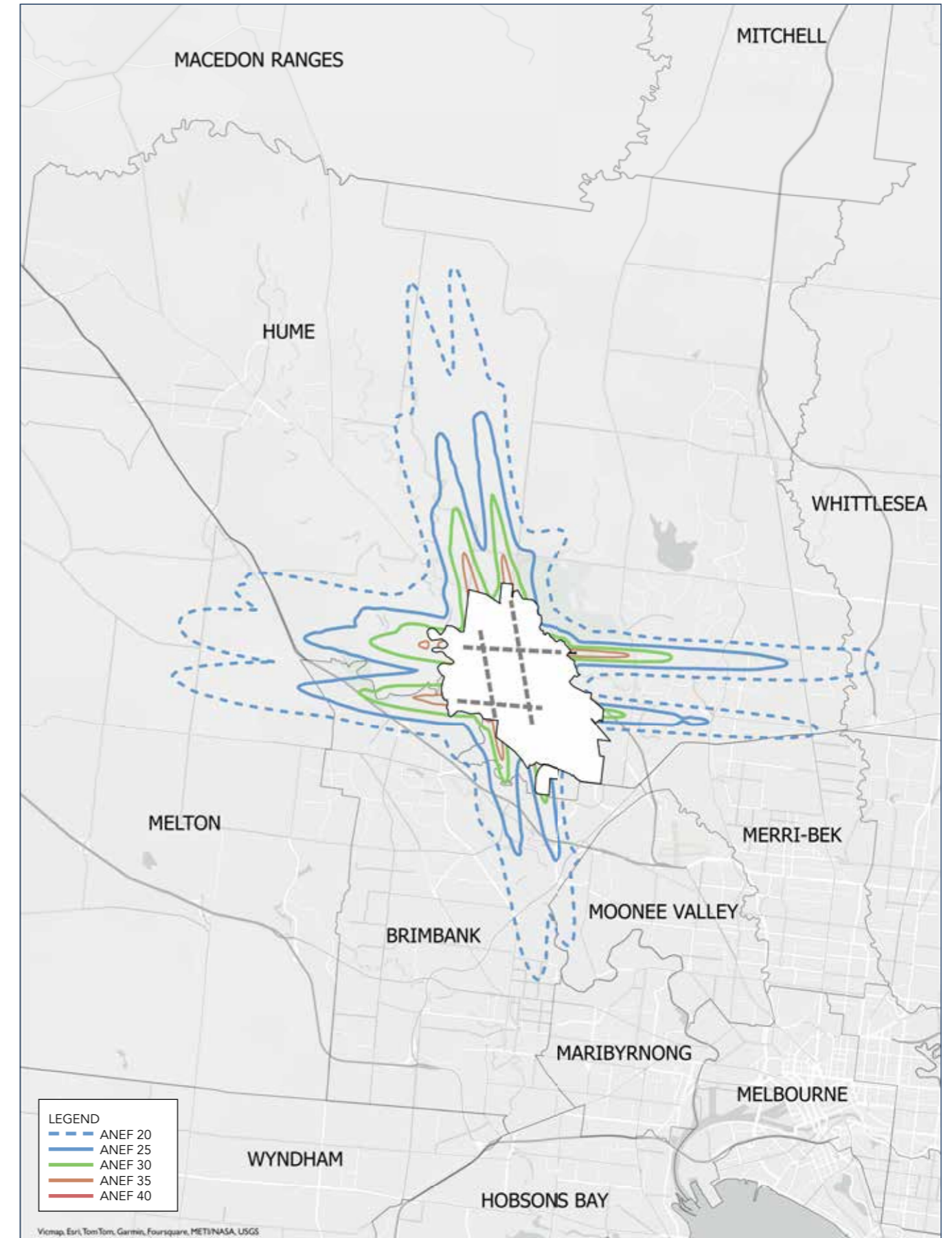
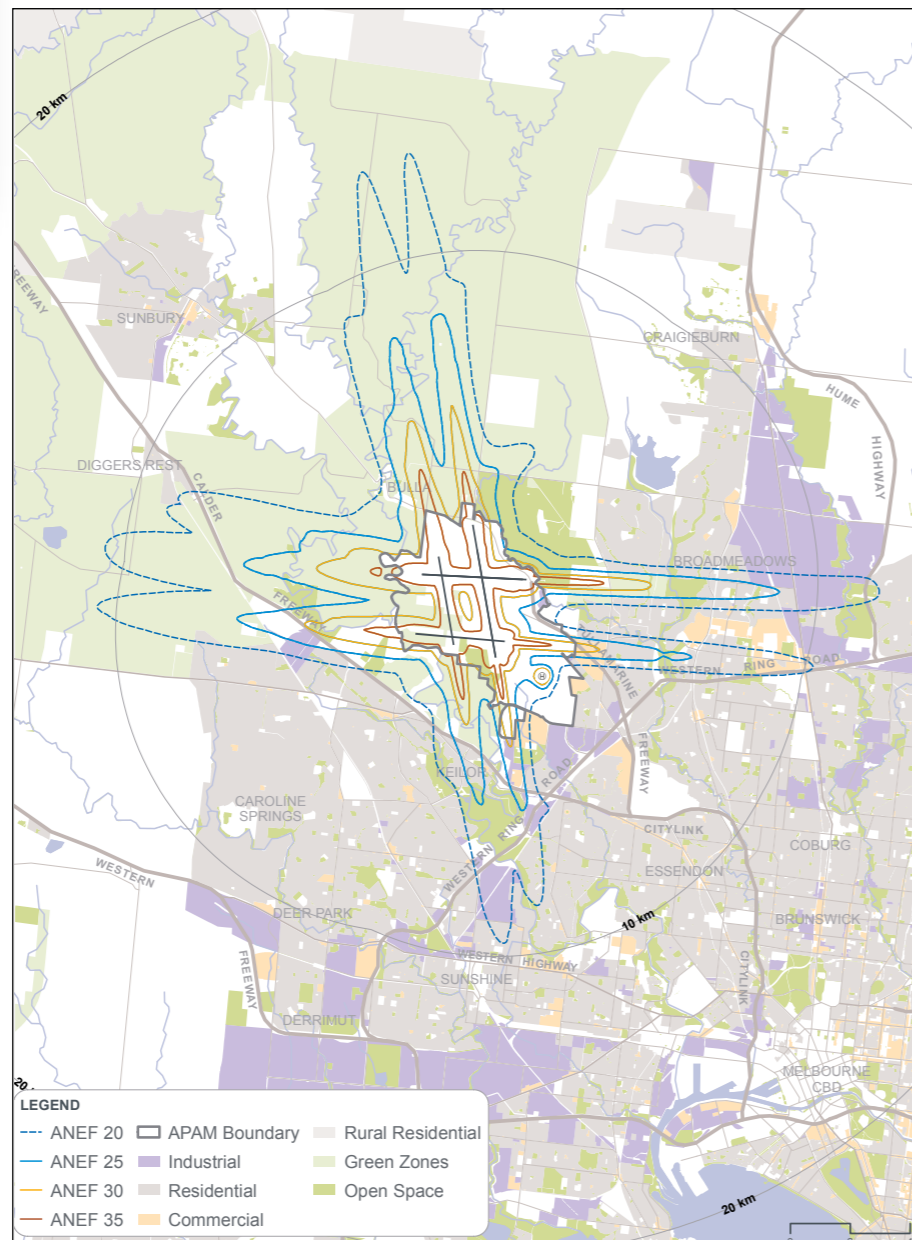
The 2018 ANEF was a long range ANEF.

Integrated Noise Model (INM) version 7.0d was used in developing the noise contours.

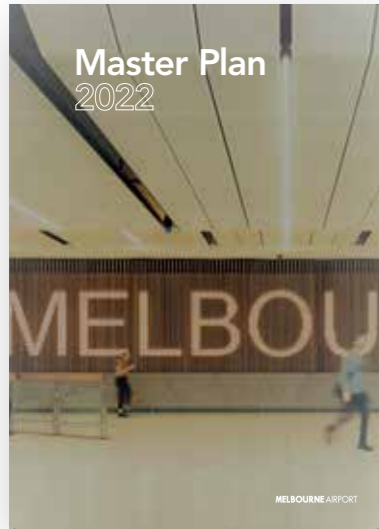
The ANEF included in the 2018 Master Plan is highlighted below. This ANEF has been reproduced on the map opposite to allow a comparison with other ANEFs at a similar scale.

The ANEF was a composite of four ANECs:

- An ANEC referring to the two-runway system with 302,800 movements
- Two ANEC referring to an east-west three-runway systems with 418,300 movements. A 'future ruleset' ANEC for the east-west system was included
- An ANEC referring to the four-runway system with 475,900 movements



ANEF - 2022 Master Plan



The 2022 ANEF did not include an ANEC for the east-west three-runway system.

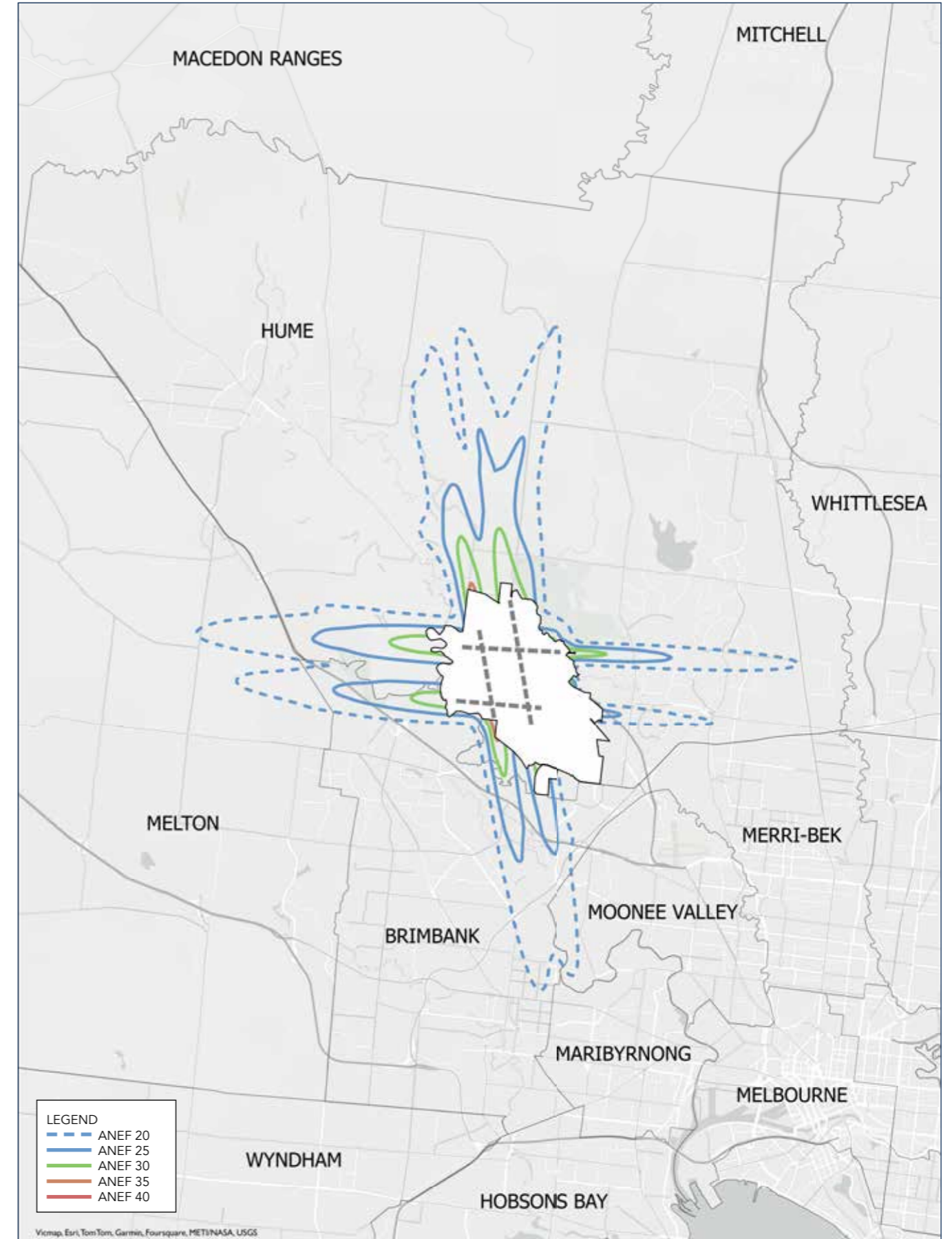
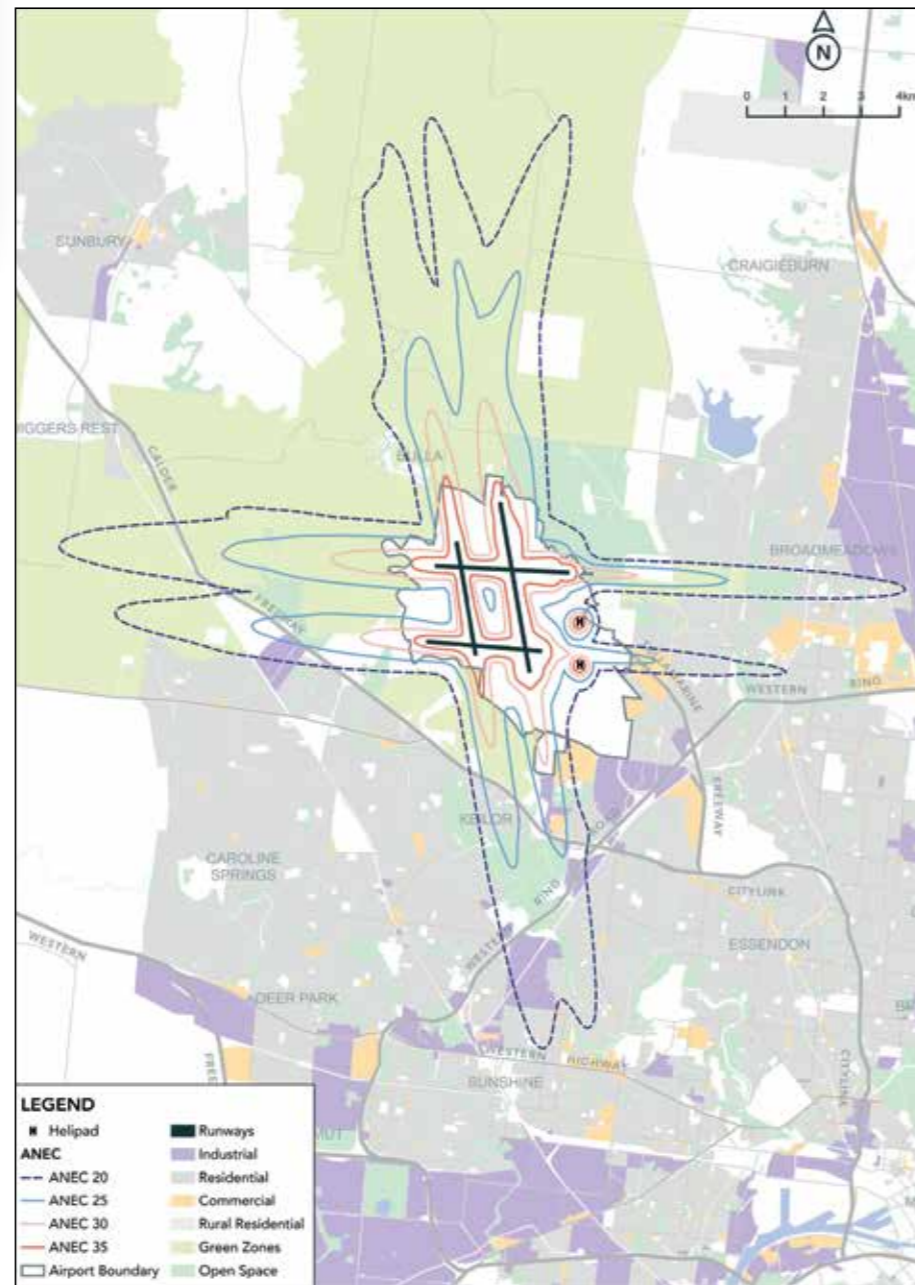
The 2022 ANEF was a long range ANEF.

The 2022 ANEF utilised Aviation Environmental Design Tool (AEDT) software to model noise.

The ANEF included in the 2022 Master Plan is highlighted below. This ANEF has been reproduced on the map opposite to allow a comparison with other ANEFs at a similar scale.

The ANEF was a composite of four ANECs:

- An ANEC referring to the two-runway system with 329,000 movements
- Three ANEC referring to the north-south three-runway systems with 474,000 movements. The three ANECs referred to different operating proposals
- An ANEC referring to the four-runway system with 514,920 movements



N-above Contours

Aircraft noise impacts can be described by the number of noise events exceeding a threshold level.

The most commonly used noise descriptor in this system is N70, the number of aircraft noise events per day exceeding 70 dB(A).

Coloured contours represent the number of events occurring above the N threshold.

For example, a location inside this N70 contour boundary is predicted to experience between 5-10 events exceeding 70dB(A).

N-above contours were introduced within the 2013 Master Plan reflecting the release of the National Airports Safeguarding Framework (NASF) Guideline A: Measures for Managing Impacts of Aircraft Noise.

NASF Guideline A

The Guideline recommends the following N-above contour values to be used:

100 or more daily events of greater than 60 dB(A) – N60 24hr, 100 or more events

50 or more daily events of greater than 65 dB(A) – N65 24hr, 50 or more events

20 or more daily events greater than 70 dB(A) – N70 24hr, 20 or more events

6 or more events between 11pm to 6am greater than 60 dB(A) – N60 night, 6 or more events

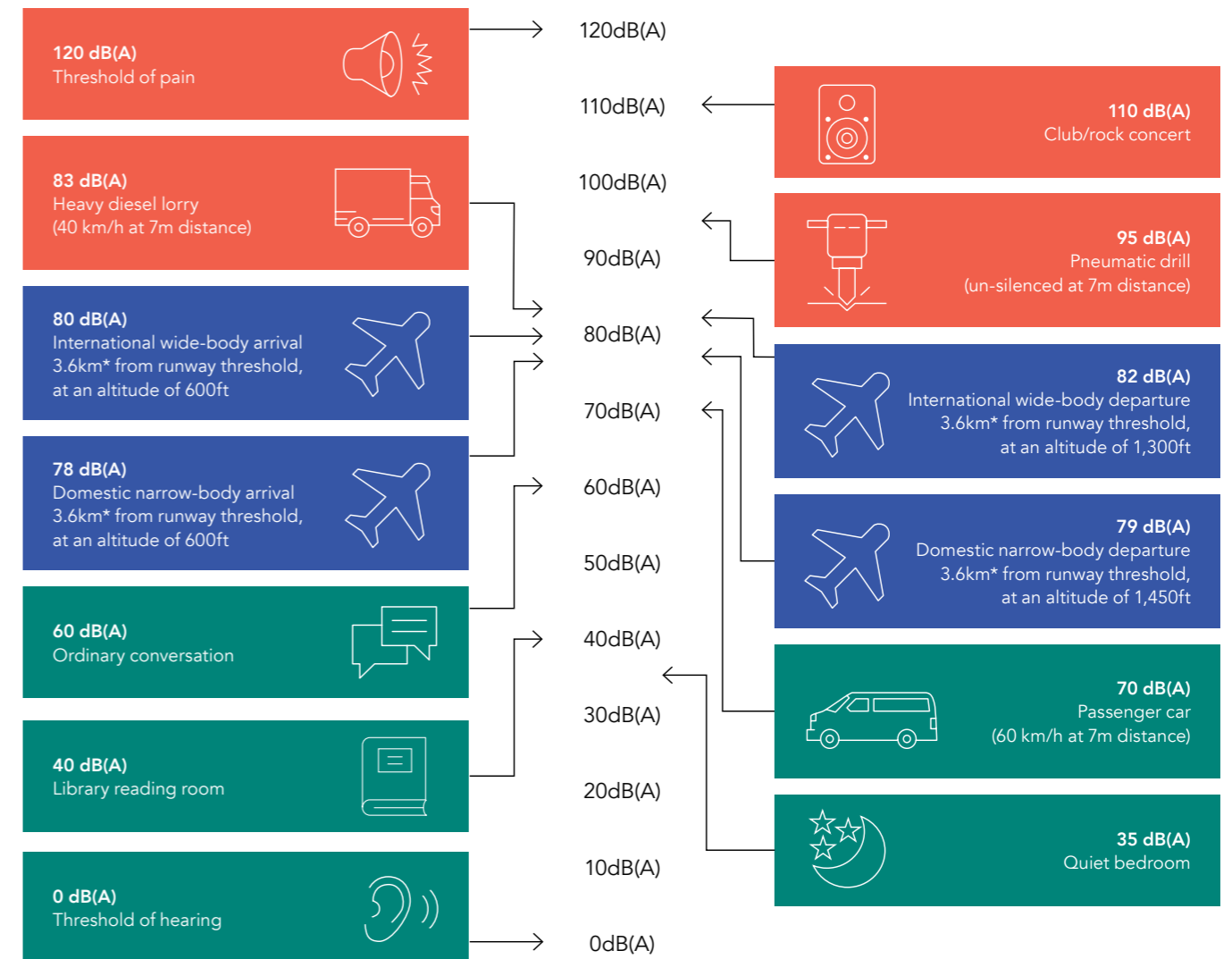
Why N70?

The most commonly used 'N-above' level is N70, which is the number of aircraft noise events a day that exceed 70 dB(A). With a noise level of 70 dB(A) outside a building, the noise inside will be approximately 60 dB(A) with the windows open. This is enough to disturb conversation because someone speaking would generally have to raise their voice to be heard.

Why N60?

For night-time, it is appropriate to consider lower noise levels. N60 values are most often used and would typically result in an indoor maximum noise level of 50 dB(A) with windows open and 40 dB(A) with windows closed. The 50 dB(A) maximum noise level is considered close to the point at which someone sleeping may wake up.

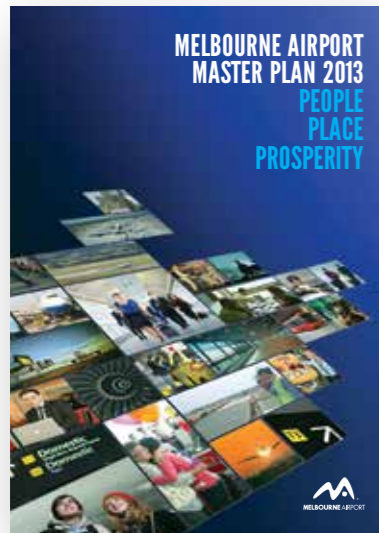
Noise Scale dBA(A) scale



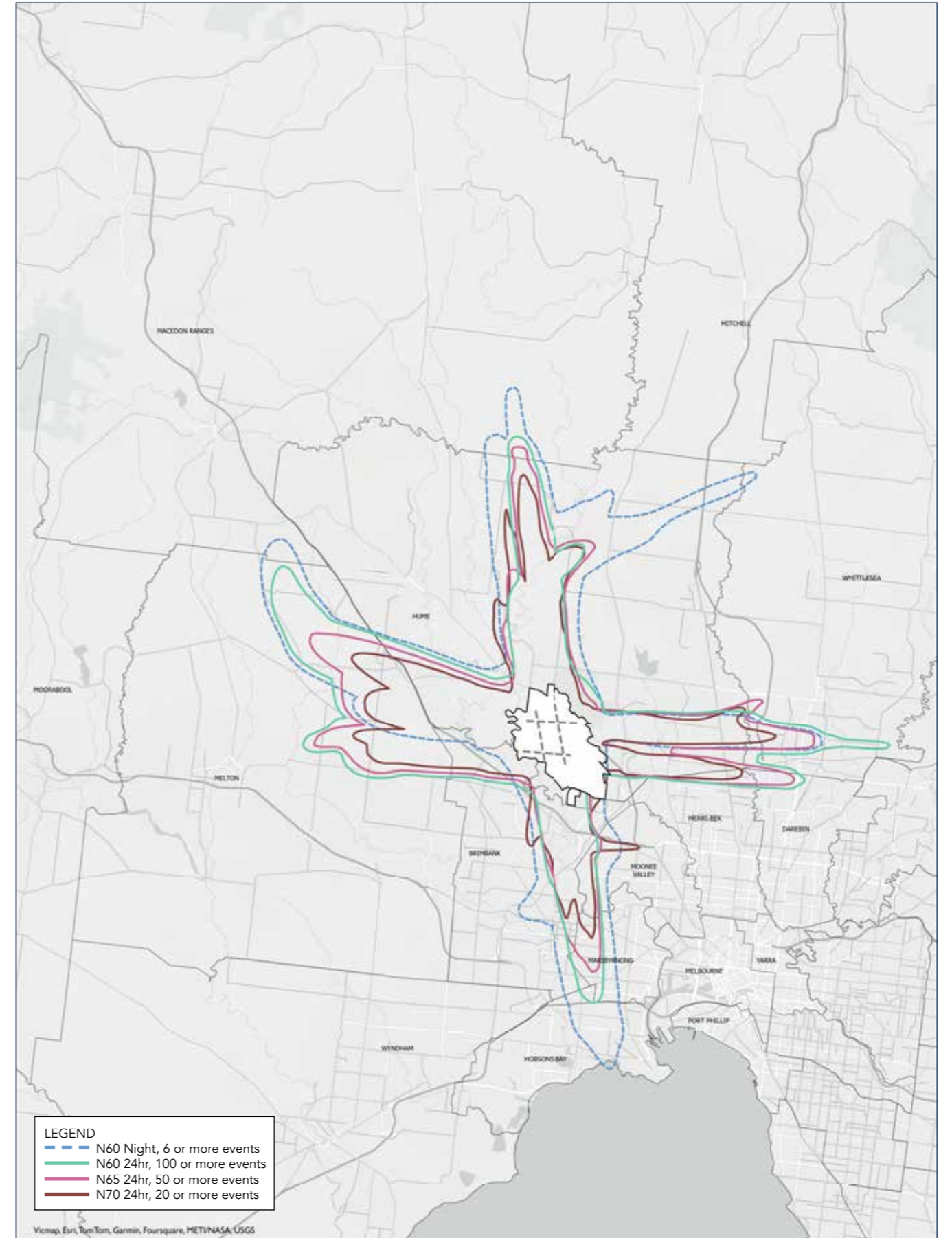
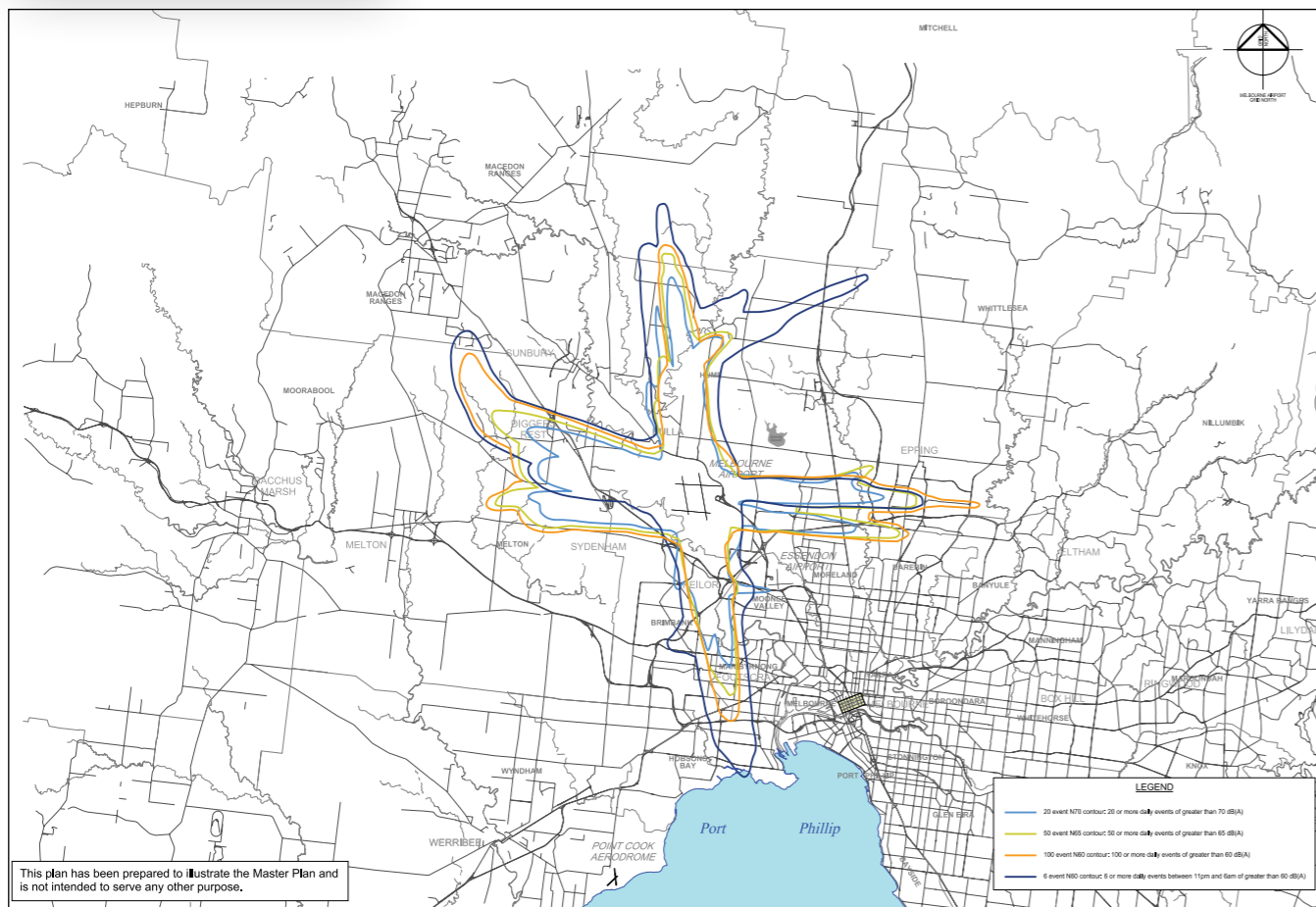
Source: APAM and NASF Guideline A: Attachment 1

*3.6km is approximately the distance from Runway 34R threshold to the Calder Freeway. Aircraft noise values are based on modelling used in Melbourne Airport's Third Runway Major Development Plan.

N-above Contours - 2013 Master Plan



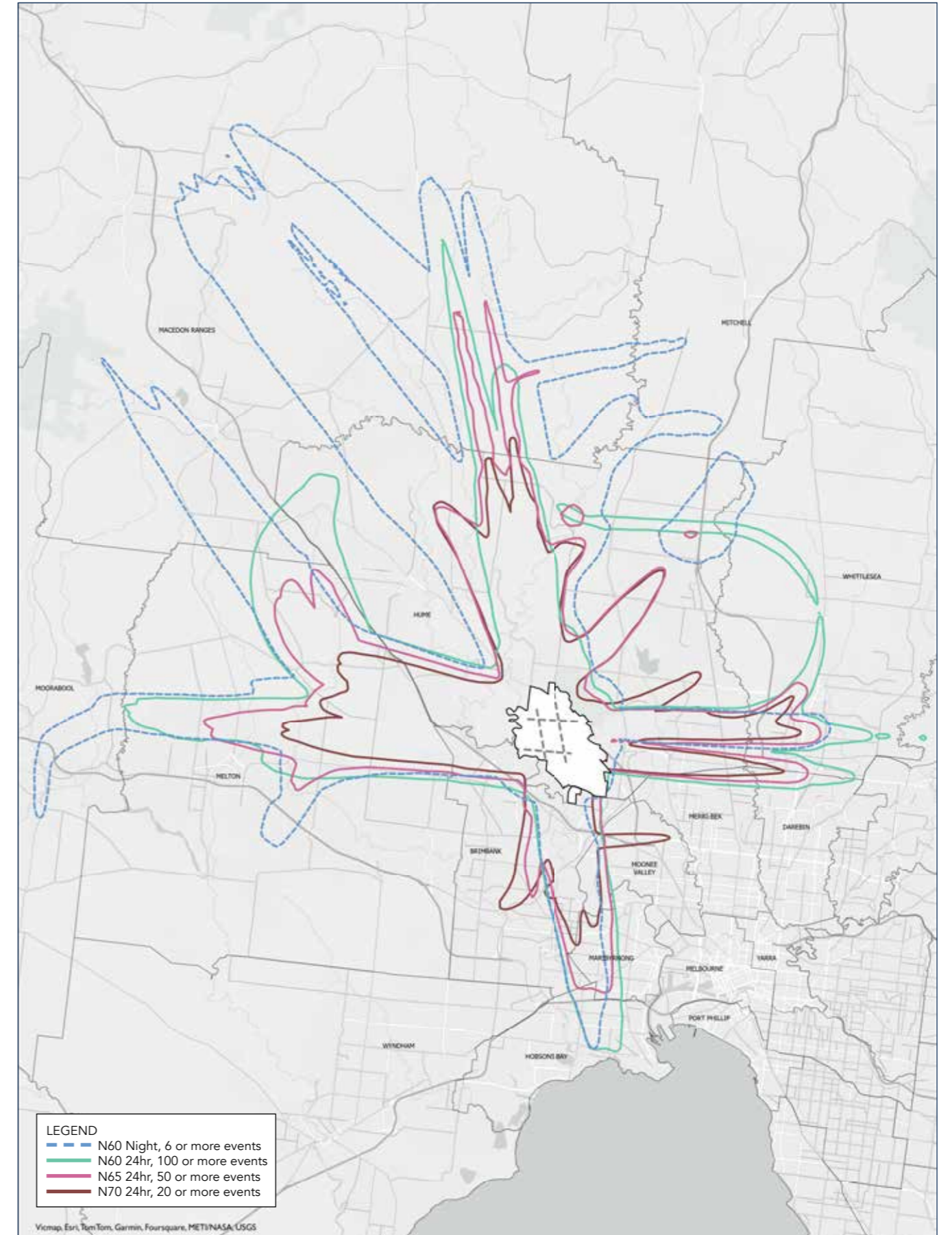
The N-above contour included in the 2013 Master Plan is highlighted below. These N-above contours have been reproduced on the map opposite to allow a comparison with other Master Plans at a similar scale. This N-above contour reflects the noise modelling used to inform the 2013 ANEF.



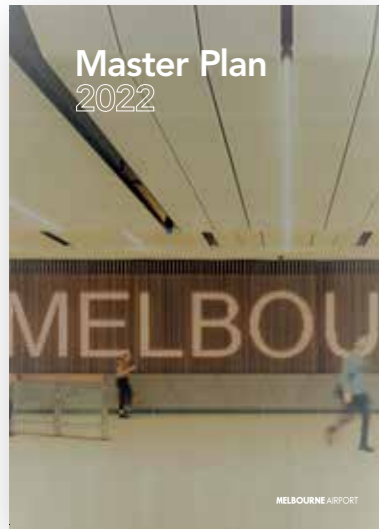
N-above Contours - 2018 Master Plan



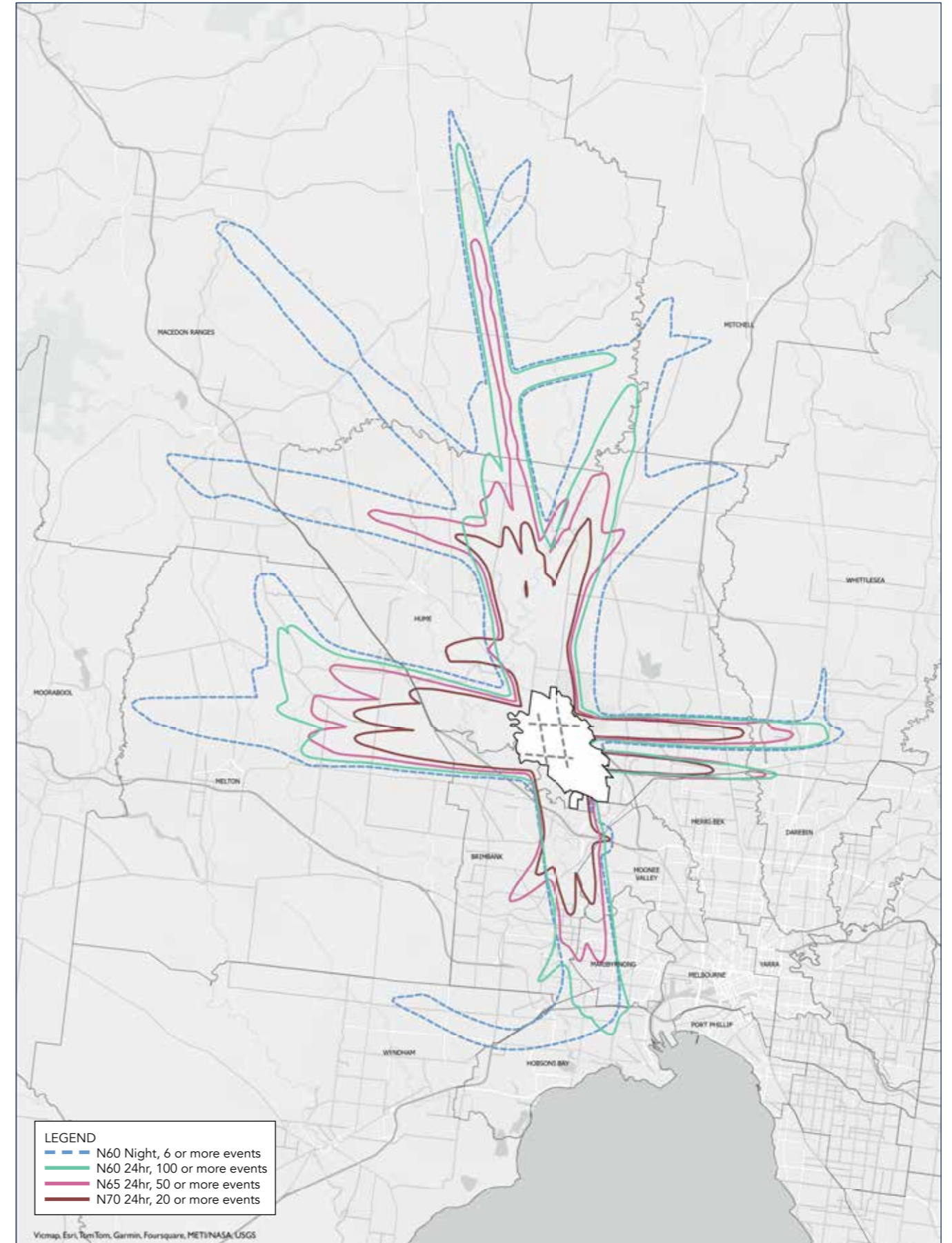
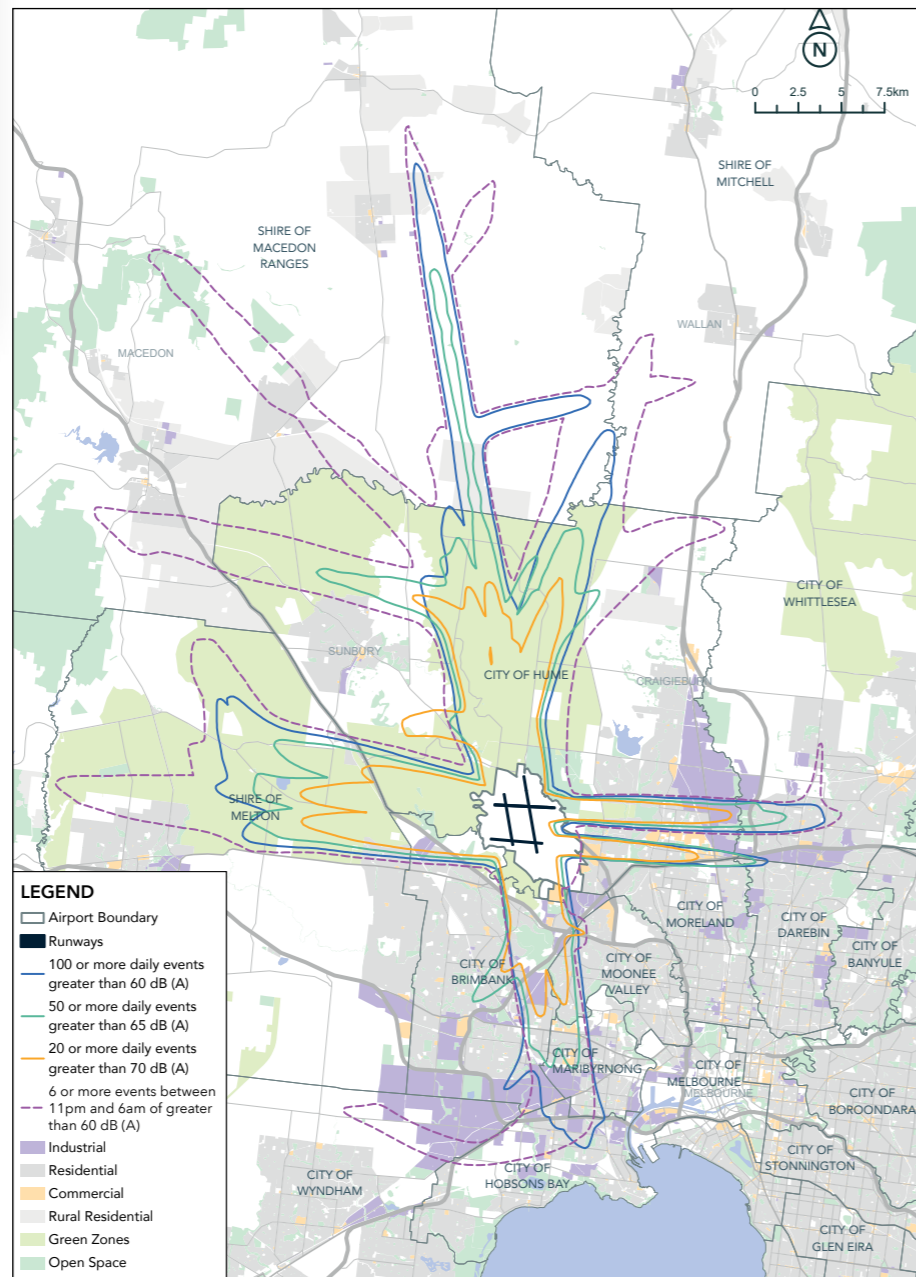
The N-above contour included in the 2018 Master Plan is highlighted below. These N-above contours have been reproduced on the map opposite to allow a comparison with other Master Plans at a similar scale. This N-above contour reflects the noise modelling used to inform the 2018 ANEF.



N-above Contours - 2022 Master Plan



The N-above contour included in the 2022 Master Plan is highlighted below. These N-above contours have been reproduced on the map opposite to allow a comparison with other Master Plans at a similar scale. This N-above contour reflects the noise modelling used to inform the 2022 ANEF.



Victorian Planning Scheme

The state has planned for the protection of the four-runway layout at Melbourne Airport since 1990.

Planning controls were first introduced in 1992 through a Melbourne Airport Environs Area.

In 2007, the Victorian State Government introduced the Melbourne Airport Environs Overlay (MAEO). This was then updated in 2021.

The MAEO could be updated again in the future to reflect Commonwealth endorsed ANEFs in future updated Master Plans. Some properties that are not included within the MAEO may be affected by future ANEF and Master Plan changes.

The following sections provide more information on:

- Melbourne Airport Environs Area
- Melbourne Airport Environs Overlay 2007
- Melbourne Airport Environs Overlay 2021

The following information has been prepared by Melbourne Airport.

Further information on the MAEO can be found on the Department of Transport and Planning (DTP) website:

<https://www.planning.vic.gov.au/guides-and-resources/guides/all-guides/airports/melbourne-airport-environs-overlay>



Melbourne Airport Environs Area

Planning controls to manage the environmental effects of aircraft noise exposure and to protect the continuing operation of Melbourne Airport were introduced in 1992.

The following information regarding pre-Master Plan off-airport planning controls is from the 1998 Master Plan, Section 9 Airport Protection:

After Government endorsement of the Airport Strategy in 1990 a Land Use Study Committee was established by the State Minister for Planning and Housing to make recommendations regarding introduction of planning controls, possible noise attenuation features in building construction and the suitability of some areas of land for Airport related commercial and industrial development.

Included in the report from the Committee entitled "Report of the Melbourne Airport Land Use Study Committee" were recommendations that there should be two principal forms of planning control broadly covering areas above the 25 ANEF contours and those areas between the 20 ANEF to 25 ANEF contours.

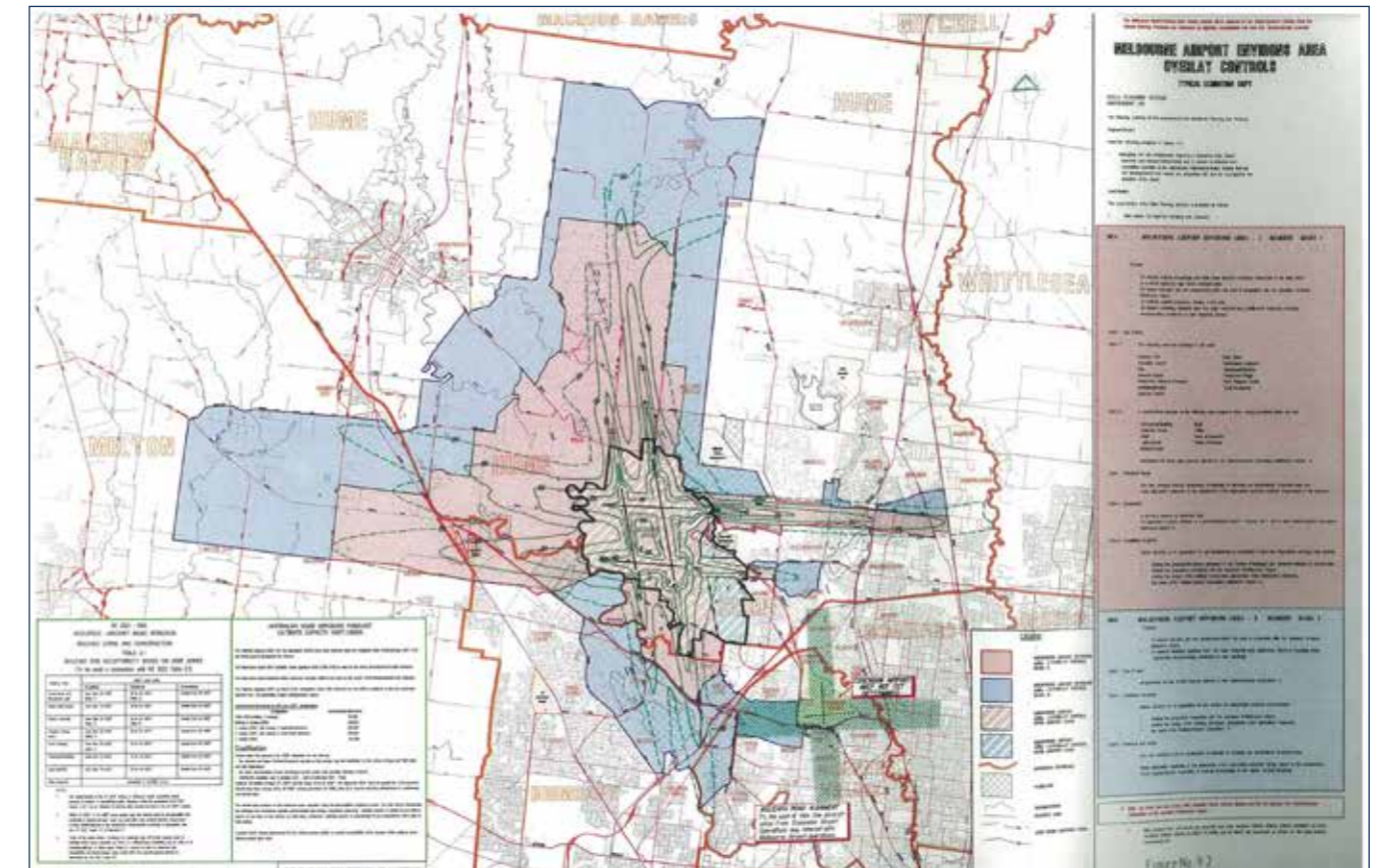
In May 1992 the Minister for Planning and Housing placed on exhibition the necessary amendments to the then Broadmeadows, Bulla, Keilor and Melton Planning Schemes to introduce planning controls for the Melbourne Airport Environs Area 1 (MAEA1) which incorporates long term noise exposure of 25 ANEF and above the Melbourne Airport Environs Area 2 (MAEA2) which incorporates long term noise exposure between 20 and 25 ANEF. The Minister then introduced interim planning controls for the Melbourne Airport Environs Area 1 (MAEA1) but deferred the introduction of controls related to MAEA2. In accordance with the recommendations of the Melbourne Airport Land Use Study Committee the boundaries of MAEA1 and MAEA2 generally provide for a margin of safety above the 25 and 20 ANEF contours respectively. In order to provide a practical means of applying the controls the boundaries follow the most appropriate geographic or cadastral feature, e.g. road, river etc.

A panel to hear submissions arising from the exhibition of the planning scheme amendments was convened in August 1993. A related Advisory Committee to address developments in certain aircraft noise affected areas has reported to the Victorian Minister for Planning and Local Government in June 1996.

The Minister launched the Victoria Planning Provisions (VPPs) in December 1996 which effectively rationalise all municipal planning schemes throughout the State.

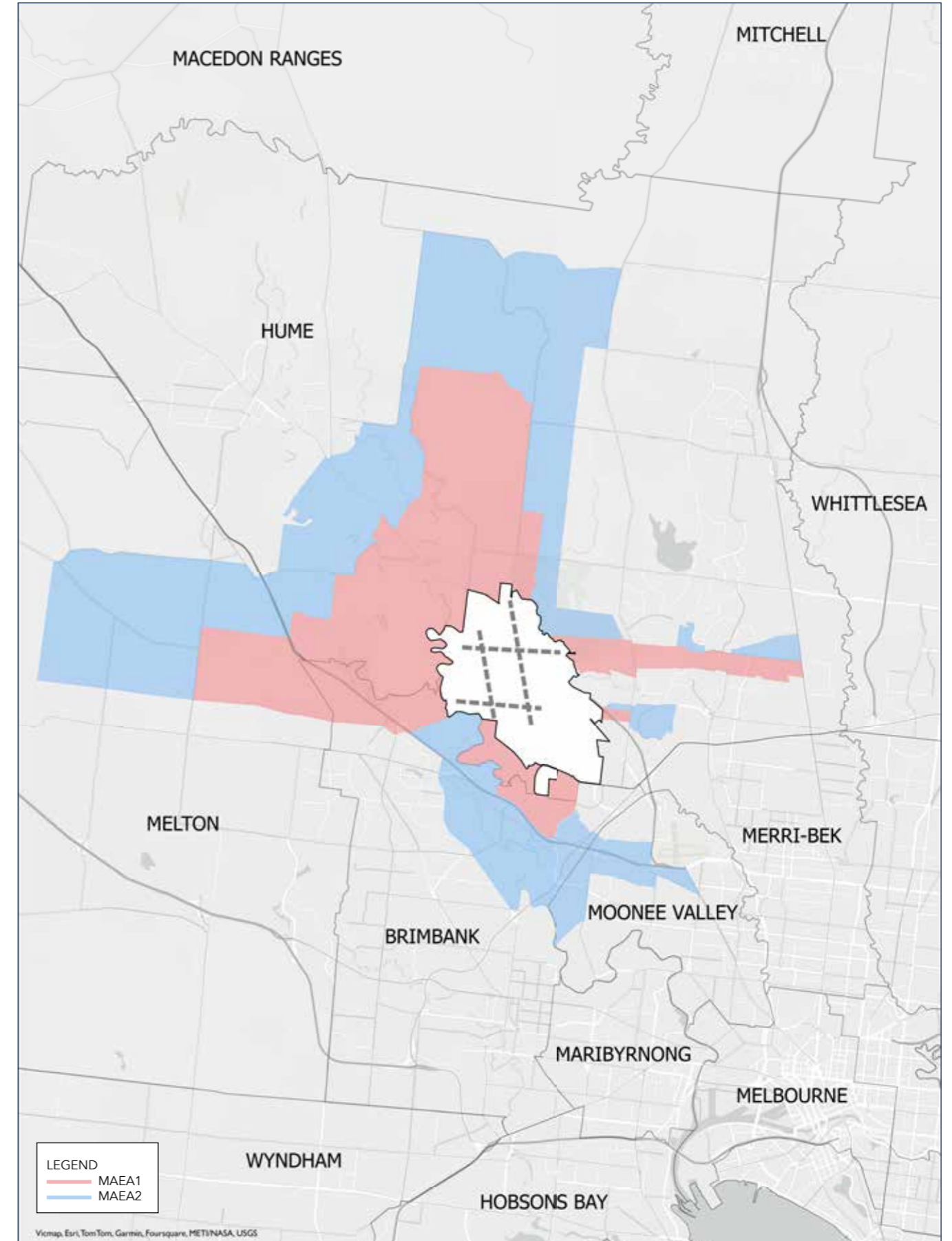
As part of this process the MAEA1 and MAEA2 overlay controls will be replaced with one new common overlay that controls development and subdivisions but has two attached schedules which control land use generally as required for the existing MAEA1 and MAEA2. The intent of the VPPs will be to afford the same level of protection to the operations of the Airport as that envisaged under the initial MAEA1 and MAEA2 overlay controls.

The 1998 Master Plan included a comparison of the 1998 ANEF with the Melbourne Airport Environs Area. The figure is highlighted below.



Melbourne Airport Environs Area

The Melbourne Airport Environs Area included in the 1998 Master Plan has been reproduced on the map opposite to allow a comparison with previous overlays and ANEFs at a similar scale.



Melbourne Airport Environs Overlay (2007)

The Melbourne Airport Environs Overlay (MAEO) is a planning control introduced by the Victorian Government in 2007, with requirements to limit noise-sensitive uses and to assist in shielding people from the impacts of aircraft noise in areas close to Melbourne Airport.

The 2007 MAEO was prepared specifically for Melbourne Airport and reflects the State Government response to the recommendations of the Melbourne Airport Environs Strategy Plan 2003, prepared in accordance with section 46T of the Planning and Environment Act 1987 and approved by both Houses of Parliament in 2003.

The 2007 MAEO used the latest ANEF available for Melbourne Airport, based on the 2003 Master Plan.

The MAEO limits the number of households, schools, child-care centres and other sensitive uses in areas exposed to moderate and high levels of aircraft noise, to ensure land use and development remains compatible with the 24-hour, 7 day a week operation of Melbourne Airport.

The MAEO identifies areas that will be subject to moderate to high levels of forecast aircraft noise, based on the Commonwealth-approved Australian Noise Exposure Forecast (ANEF).

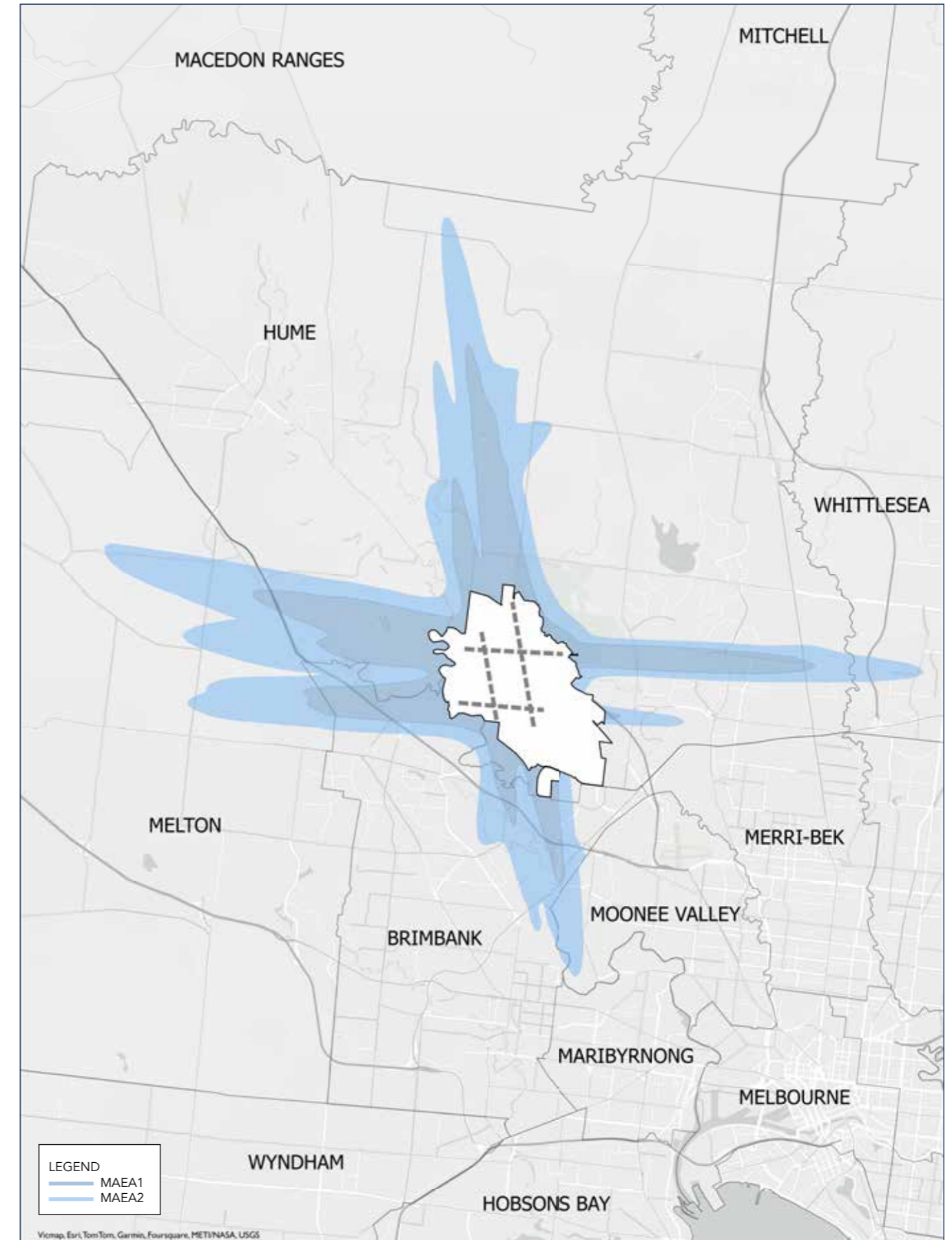
The MAEO has both general and specific requirements under two schedules:

- MAEO Schedule 1 (MAEO 1) - areas subject to high levels of aircraft noise.
- MAEO Schedule 2 (MAEO 2) - areas subject to moderate levels of aircraft noise.

MAEO 1 is more restrictive due to the forecast high levels of aircraft noise. It prohibits a range of new land uses and limits the number of houses on a plot to one.

In both MAEO schedules, where new buildings require a planning permit, they must meet the noise reduction measures required by the Australian Standard. In 2007, when the MAEO was introduced, this standard was *AS2021-2000 Acoustics – Aircraft noise intrusion – Building siting and construction*.

The 2007 MAEO has been reproduced on the map opposite to allow a comparison with previous overlays and ANEFs at a similar scale.



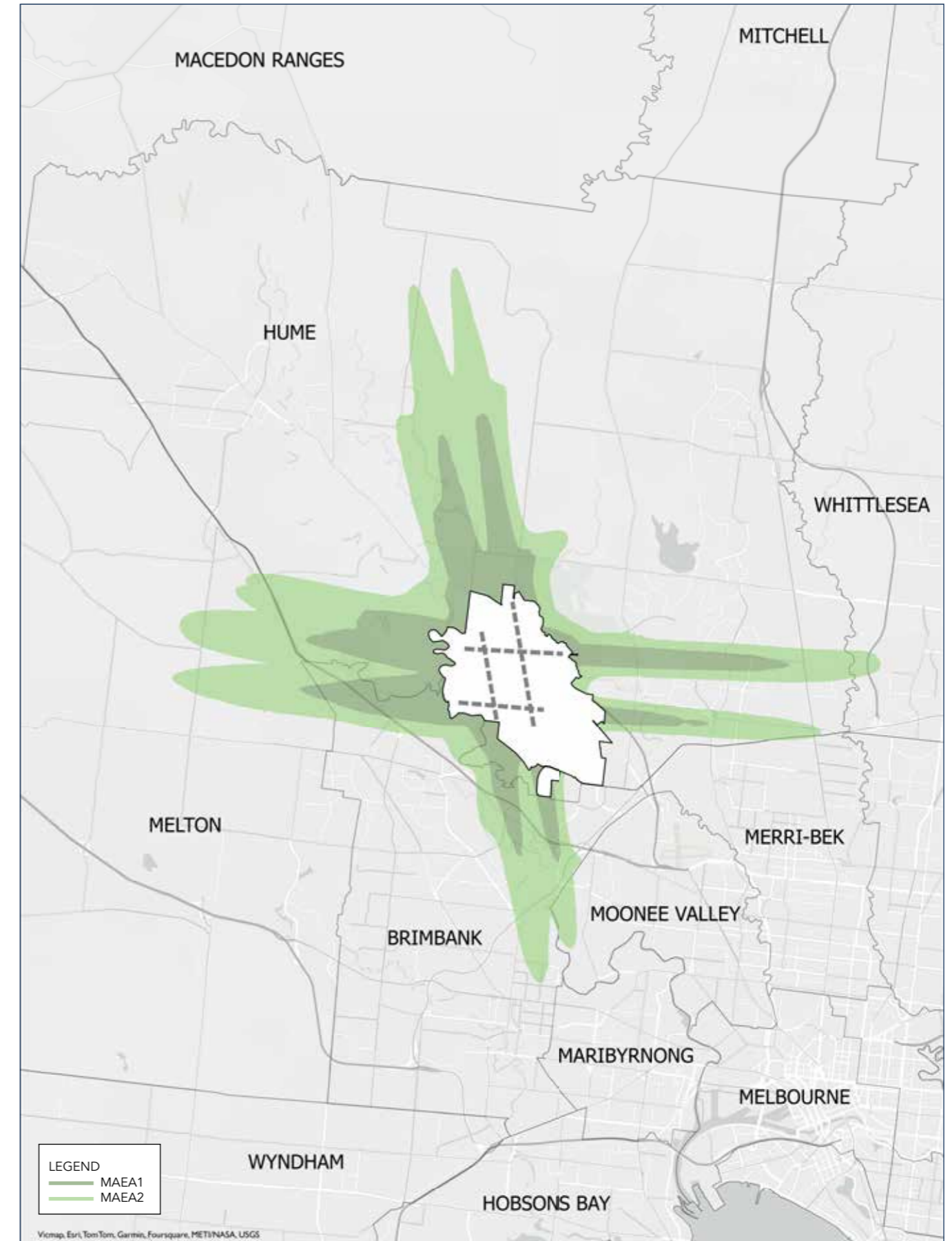
Melbourne Airport Environs Overlay (2021)

The MAEO was updated in 2021 to reflect the approved ANEF for Melbourne Airport at the time, endorsed for technical accuracy by Airservices Australia and included in the Melbourne Airport Master Plan 2018.

Further information on the MAEO can be found on the Department of Transport and Planning (DTP) website:

<https://www.planning.vic.gov.au/guides-and-resources/guides/all-guides/airports/melbourne-airport-environs-overlay>

The 2021 MAEO has been reproduced on the map opposite to allow a comparison with previous overlays and ANEFs at a similar scale.



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