Environmental Impact Assessment of proposed ILS approach to RWY 09 at Mildura Airport

CIRRIS EA-0001776

Version 1

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Change summary

Version	Date	Change description
0.1	29 October 2021	Initial draft
1.0	25 February 2022	Reviewed and approved for internal release

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A.1 Purpose

The purpose of this document is to conduct an environmental impact assessment (EIA) of a proposal by Airservices to introduce an instrument landing procedure (ILS) approach to RWY 09 at Mildura Airport. This report is divided into three parts:

PART A: CONTEXT provides specific background information on the proposed change and current aircraft operations at Mildura Airport.

PART B: ENVIRONMENTAL IMPACT ASSESSMENT includes analysis and assessment of the significance of any potential environmental impacts of the proposed change, including impacts on communities, ecological and heritage impacts, and effects on aircraft emissions. This fulfils Airservices obligations under sections 28 and 160 of the Commonwealth Environmental Protection and Biodiversity Conservation (EPBC) Act, 1999. As a Commonwealth agency, Airservices is required (by the EPBC Act) to assess the potential environmental significance of any ‘actions’ it takes, including changes to on-ground operations and changes to air traffic management (ATM) practices. This requirement is outlined in Airservices National Operating Standard, *AA-NOS-ENV-2.100, Environmental Management of Aircraft Operations*. This EIA has been prepared by Airservices in compliance with that standard.

PART C: COMMUNITY NOTICEABILITY is provided in this document to support community engagement activities undertaken by Airservices. This includes information on areas and communities that may potentially observe a noticeable change as a result of the proposal.

A.2 Airport description

Mildura Airport (ICAO: YMIA) is located approximately 9km southwest of Mildura, Victoria. The airport has two sealed runways illuminated for night operations. The main Runway 09/27 is 45 metres wide and 1,830 metres long. Runway 18/36, the north south aligned runway, is 30 metres wide and 1,139 metres long.

Runway 09/27 can accommodate larger aircraft (i.e., Boeing 737 or Airbus A320), though with weight restricted departures. There is no control tower located at the airport and pilots must co-ordinate arrivals and departures using a Common Traffic Advisory Frequency, aided by an Aerodrome Frequency Response Unit (AFRU), which notifies pilots that their transmissions have been received on the frequency and activates lighting systems as appropriate.

Prior to the pandemic, three airlines, Qantas Link, Regional Express (Rex), and Virgin Australia Airlines (Virgin), provided Regular Public Transport (RPT) services to Melbourne, Sydney, Adelaide and Broken Hill, utilising turboprop and jet aircraft as follows:

• Qantas Link: operating de Havilland Dash 8 400 (74 seats)

• Virgin Australia: operating Embraer ERJ-190 and Boeing B 737-800 (98 and 170 seats respectively) and

• Regional Express (Rex): operating Saab 340 (34 seats).

In addition to RPT, charter and general aviation movements further increase air traffic at Mildura Regional Airport.

A.2.1 Circuit Training

Circuit training is a key part of aircraft operations at Mildura Airport. The Mildura Airport Noise Management Policy states that the direction of the training circuit depends on the runway in use but in all cases, circuits are flown to the north of the airport to avoid the Mildura Glider airfield which is located 2 miles to the south. Flying circuits to the north of the airport is critical to the safety of pilots from both the airport and the glider airfield. The circuit length, and therefore the area overflown, depends on several factors such as aircraft type, weather conditions, pilot proficiency and other aircraft in the circuit. Mildura Airport prescribes recommended circuit routes, heights and lengths to ensure the safety of all aircraft operations at the airport, but these are subject to prevailing conditions including weather and other aircraft operations.

Training operations from the Flying school have significantly increased traffic at Mildura, attracting noise complaints from the residential areas mostly to Mildura's south. The Fly Friendly and Community Engagement Policy is an attempt to mitigate the impacts of aircraft noise. As part of the strategy to minimise the impacts of noise on communities, circuit training is only allowed as shown below:

Circuit Training

Monday to Saturday: 7am to 10.30pm

Sunday: 8.30am to 3pm

Figure 1 shows a satellite image of Mildura Airport.

Figure 1: Satellite image of Mildura Airport.

A.3 Proposed change

Airservices has been contracted by the Mildura Airport to develop the instrument flight procedures (IFP) for the instrument landing system (ILS) to RWY 09. The ILS is a precision approach and therefore reduces the risk of Controlled Flight Into Terrain (CFIT), the probability of a missed approach and the probability of a diversion, by providing lower minima. An ILS enables aircraft to land if the pilots are unable to establish visual contact with the runway and improves the predictability of landing in low visibility conditions.

The ILS or LOC RWY 09 is a new procedure which was designed to align as closely as possible to the existing holding and base turn nominal paths of the VOR-Z and VOR-Y RWY 09 but at higher altitude of 3,000FT compared to the current MSA of 2,000FT. Additionally, the straight-in portion of the proposed procedure is exactly on the same path as the existing RNAV-Z (GNSS) RWY 09 with the same vertical profile down to the threshold. The proposed installation of an ILS may generate additional training flights using Mildura Airport. The existing and proposed procedures are shown in Figure 2.

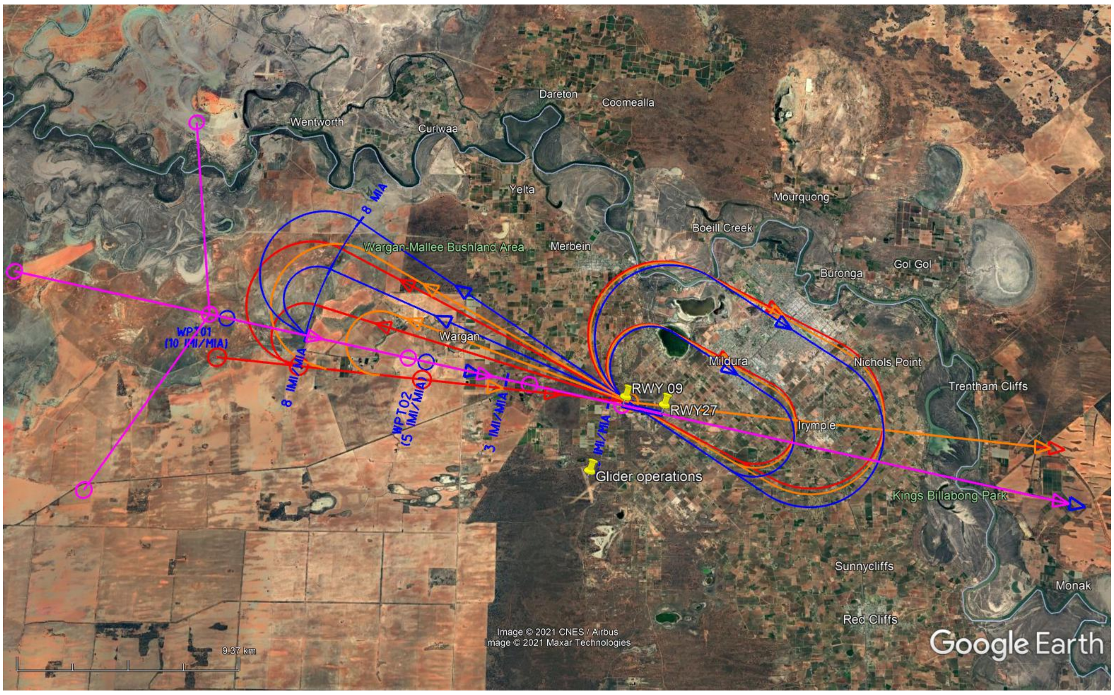


Figure 2: Current RNAV (pink) VOR approaches (red and orange) and proposed ILS (blue).

A.4 Environmental assessment scope analysis

The proposed ILS approach procedures to RWY 09 including the missed approach, and the holding pattern have been determined to require further analysis, due to the proposed lateral changes in the flight path over residential areas (Screening criteria NOS 2.100).

An alternative design was also considered to try to shift the noise away from built-up areas but advice from the Airport authorities was that this proposal would interfere with glider operation and thus discarded for safety reasons. The alternative design is shown in Figure 3.

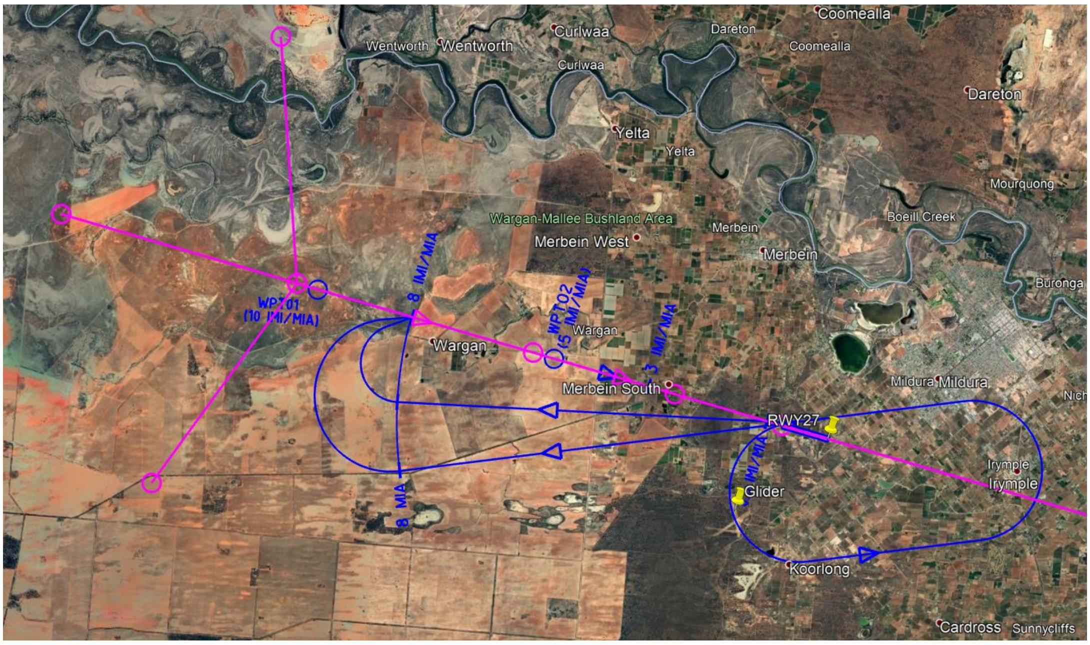


Figure 3: Current RNAV (pink) and proposed alternative ILS design (blue). *Note* this design was not progressed for safety reasons.*

Part B: Environmental impact assessment

Part B is an assessment of significant environmental impact within the meaning of the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* including impacts on Matters of National Environmental Significance (MNES) and on sites of cultural and heritage value.

If an EIA determines that a proposed change may have a 'potentially significant impact' within the meaning of the EPBC Act 1999 (as per Airservices environmental significance criteria in Appendix B of AA-ENV-NOS-2.100), then that proposal must be referred by Airservices to the Commonwealth Environment Minister for advice (unless Airservices decides not to proceed with the proposal).

The methodology used to make this analysis is found in Appendix B, including details of Airservices assessment criteria.

B.1 Assumptions

This EIA has been undertaken based upon existing aircraft arrival information obtained from Mildura Airport as well as Airservices Operational Data Analysis Suite (ODAS), for Mildura Airport. The baseline information and assumptions that inform this EIA are set out below:

- Calculated noise levels are based on the most common IFR aircraft type operating at Mildura Airport and one of the loudest aircraft types operating at the airport.
- Noise analysis is based on the United States Federal Aviation Administration's (US FAA's) Aviation Environmental Design Tool (AEDT), version 3.0b.
- Projections for traffic movements for the next 12 months are not expected to be above 2019 levels prior to the Covid-19 pandemic. When the flight school was in full operations, they did approximately 150 flights per day with the Royal Flying Doctors flying approximately 10 medical flights per day. The Royal Flying Doctors (RFDS) and GA predominantly utilise RWY 36. The proportion of circuits is estimated at 80% on RWY 36 (they perform a right-hand circuit which is safer), 10% on RWY 27 and 10% on RWY 09.
- The proposed installation of an ILS may generate additional training flights from other airports. For the purpose of this EIA, it is assumed an average of one extra movement per day from other airports may require to use the ILS.
- There are currently no B737/ A320 aircraft flying at Mildura Airport as these were lost due to the pandemic, resumption of the service not expected in the next 12 months. However, noise modelling has been carried out for the B738 to show the extent of the noise contour in the event this aircraft returns to Mildura.
- SF34 and DH8 are expected to be the main RPT aircraft in the near future.
- The C172 is the most commonly used aircraft type for circuits.
- For the purpose of this EIA, noise levels will be calculated for the C172, SF34, and B738 as representative aircraft types.
- Flight school not allowed to operate between 10.30pm-7am so no night hours training.

- Holding pattern will be used mostly by training aircraft and on rare occasions by commercial RPT aircraft.
- Weather conditions – a single set of standard weather conditions for the airport from AEDT data will be modelled. In reality weather conditions will vary throughout the year. For the purpose of this EIA, the annual mean minimum temperature has been used as a more conservative scenario.
- Standard aircraft operations – an AEDT modelling assumption has been made that each aircraft type will be operated according to a standard Noise, Power, Distance (NPD) curve. In reality, each airline and pilot may operate the aircraft differently, such as using different engine power settings, or retracting or lowering landing gear at different times.
- Standard arrival and departure profile – an AEDT modelling assumption is made that every aircraft will operate according to a standard approach and departure profile; essentially operating at the same rate of climb or descent. In reality, arrival and departure profiles may vary on an individual basis for a number of reasons, including:
    - Traffic
    - Weather and cloud conditions
    - Pilot requirements
    - Separation and sequencing requirements for Air Traffic Control (ATC).
- For the holding pattern, it is assumed that there is wide variation in the spread of holding tracks depending on aircraft speed/category. the variation in tracks is likely to be bigger than the difference in the lines shown on the map for VOR Y, VOR Z and proposed ILS.
- Estimates provided by the airport assume that 80% of all RPT traffic will arrive to RWY 27 and 20% to RWY 09.
- The remaining 20% would use RWY 09 and as little as 2% would use the ILS on that approach. RWY 18/36 is not suitable for regular RPT use. However, for the purpose of this EIA, all RPT aircraft arriving to RWY 09 will be assumed to use the ILS.
- Missed approaches from RPT aircraft at Mildura Airport are extremely rare.
- Based on an average of 240 students over a 12-month period, an estimation is made that each student undertakes ILS training that consists of 3 approaches (2 normal and 1 missed) approach giving a total of 720 ILS approaches of which 240 will be missed approaches. It is assumed that the majority of ILS training is conducted using a simulator.

This assessment is based on the following:

- *AS2021:2015 Acoustics—Aircraft noise intrusion—Building siting and* construction.
- Airservices Departure and Arrival Plates (DAPs) for current and proposed procedure changes.

B.2 Aircraft operations

B.2.1 ODAS Data

Arrival data for Mildura Airport from Airservices ODAS for the calendar year 2019 shows an estimated 4,665 arrivals, equivalent to thirteen arrivals per day on average. It should be noted that ODAS data only includes aircraft that operated with a valid flight plan, which is generally associated with aircraft operating under Instrument Flight Rules (IFR). Therefore, a proportion of operations at the airport (i.e. VFR aircraft, charter operators) have not been accounted for in Table 1 below. However, as the proposed change only relates to instrument procedures, only those aircraft captured by ODAS would be expected to utilise the proposed approach procedure.

Table1 shows the common aircraft types and number of arrivals for Mildura Airport for the calendar year 2019.

Table 1: Most common aircraft operating at Mildura Airport from Airservices ODAS.

Aircraft	Movements	% Arrivals
SF34	1531	32.8
DH8D	1101	23.6
BE20	732	15.7
B738	346	7.4
AC6L	168	3.6
AC50	117	2.5
SR22	80	1.7
PA44	61	1.3
PA31	56	1.2
DA42	44	0.9
DA40	43	0.9
PC12	35	0.8
B737	28	0.6
AEST	17	0.4
P32R	17	0.4
C210	15	0.3
FA7X	14	0.3
C172	12	0.3
C441	12	0.3
B350	11	0.2
Other	225	4.8
Total	**4665**	**100**

For the calendar year 2019, the month of May had the highest movements with an average of 14 movements per day and a 90th percentile busy day of 17 movements per day. For the purpose of this EIA, a busy day movement of 17 RPT arrivals will be used for further analysis.

Table 2 shows traffic distribution by month as way to determine if there is any strong seasonal influence in the distribution of traffic.

Table 2: Aircraft arrivals per month sorted by number of movements (2019) at Mildura Airport from Airservices ODAS.

Month	Number of Arrivals
May	421
Aug	412
Oct	408
Jul	406
Mar	388
Sep	388
Nov	388
Jun	383
Apr	379
Feb	378
Dec	372
Jan	342
Grand Total	**4665**

B.3 Data from BITRE

Aircraft movement data was also collected from the Bureau of Infrastructure and Transport Research Economics (BITRE) for the period 1985 to 2020 https://www.bitre.gov.au/publications/ongoing/airport_traffic_data, accessed 23/09/2021). BITRE data consists of scheduled movements only and excludes all other traffic. Figure 4 below shows the trend in aircraft movements for the period 1985 to 2018. For the purpose of this EIA, the BITRE data (Figure 4) is intended to show trends only.

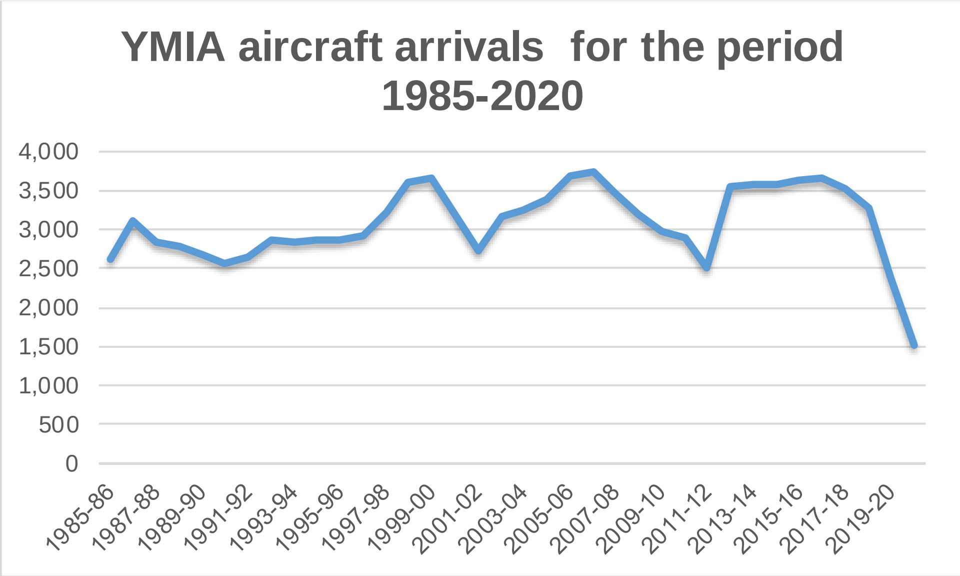


Figure 4: The number of aircraft arrivals at Mildura Airport for the period 1985 to 2020 (source: BITRE, 2021).

B.4 Runway usage

Due to limitations in available track data for Mildura Airport, an estimate of the likely distribution of arrivals for each runway was sourced from the airport. Based on advice from the airport and for the purposes of this environment assessment, runway distribution has been assumed to be an approximate 80:20 ratio between the RWY 27 and RWY 09, respectively for RTP traffic. Based on an 80:20 ratio on a busy day of 17 arrivals per day, there will be 14 arrivals to RWY 27 and 3 arrivals per day to RWY 09.

The Royal Flying Doctors (RFDS) and GA predominantly utilise RWY 36. The proportion of circuits is estimated at 80% on RWY 36 (they perform a right-hand circuit which is safer), 10% on RWY 27 and 10% on RWY 09. Based on a total of 150 training aircraft per day and 10% utilising RWY 09, it is estimated that there are currently 15 training aircraft utilising existing procedures to RWY 09.

B.4.1 ILS Usage

Advice received from the airport indicates that there will be on an average 240 flying students over a 12-month period with an assumption that each student undertakes ILS training that consists of 3 approaches (2 normal and 1 missed) approach giving a total of 720 ILS approaches of which 240 will be missed approaches with the majority of ILS training being conducted via a simulator. However, the proposed installation of an ILS may generate additional training flights from other airports. In addition to the three training aircraft, if all three RPT arrivals to RWY 09 were to use the ILS and an extra movement from other airports, there will be seven movements on the ILS procedure on a busy day. These movement data have been used to determine if the change is potentially significant. For noticeability purposes, Section B5 discusses an alternative scenario that could potentially result in doubling of the movement numbers on the ILS.

B.4.2 Forecast growth in aircraft operations

Forecast numbers are included here for information purposes only. Forecast growth data is only considered as a reliable prediction for the next 12 months, due to a variety of political, social, and economic factors.

Prior to the COVID-19 crisis, the International Aviation Transport Association (IATA) had estimated an annual growth in terminal activity for Australian Regional Airports for the period 2014-2015 to 2020-2021 at 2.0%.

In this assessment, movement numbers based on the data above have been used to evaluate environmental impact. An increase of 2.0% in traffic is not expected to increase the movement numbers in the immediate future to such an extent that the outcomes of this assessment are influenced.

B.4.3 Night movements

Analysis of ODAS data for the calendar year 2019 indicated that night movements at Mildura Airport are minimal and infrequent. Due to the infrequency of night-time movements, the potential impacts of these operations have not been considered separately in this EIA. In addition, there is a night-time curfew on training activities between the hours of 10:30pm – 6.30am.

B.5 Potential ILS Usage

Data provided by Mildura Airport suggests that the ILS will only be used as follows:

- ILS training would be in Phase 5 of a cadet's training syllabus towards the end of the 12–14-month training.
- Each cadet is expected to use the ILS three times, two of those would be practise runs followed by the third which would be the qualifier. It is likely that some cadets would need a fourth if they were struggling with this part of the training.
- The school will have a maximum of 200 cadets at any given time.
- The cadets arrive in batches of approximately 30 and the training will be staggered for each batch i.e. there will not be 200 students all needing to complete ILS training at the same time.
- Based on an average of 240 students (as a worst-case scenario) over a 12-month period, an estimation is made that each student undertakes ILS training that consists of 3 approaches (2 normal and 1 missed) approach giving a total of 720 ILS approaches of which 240 will be missed approaches. It is assumed that the majority of ILS training is conducted using a simulator. The estimated ILS movements per day conducting ILS training is therefore approximately two movements per day
- Additionally, the introduction of an ILS procedure at Mildura Airport could potentially attract an additional one extra movement to the airport per day
- Currently the proportion of circuits is estimated at 80% on RWY 36 (they perform a right-hand circuit which is safer), 10% on RWY 27 and 10% on RWY 09. Based on a total of 150 training aircraft per day and 10% utilising RWY 09, it is estimated that there are currently 15 training aircraft utilising existing procedures to RWY 09. These 15 aircraft could potentially utilise the ILS. Noise calculations have shown that due to the small lateral shift from the current VOR approaches to the ILS are not likely to be noticeable audibly.
- Based on advice from the airport and for the purposes of this environment assessment, runway distribution has been assumed to be an approximate 80:20 ratio between the RWY 27 and RWY 09, respectively for RTP traffic. Based on an 80:20 ratio on a busy day of 17 arrivals per day, there will be 14 arrivals to RWY 27 and 3 arrivals per day to RWY 09. Potentially all three RPT aircraft could utilise the ILS.

Based on the above scenarios, the usage of the ILS per day is expected to be 2 training movements, 1 extra movement from outside the airport, 3 RPT aircraft, and 15 extra aircraft currently utilising other procedures giving a total of 21 movements. However, based on experiences across other airports, it is estimated that on a busy day the ILS could potentially be used twice the estimated figures above, potentially resulting in up to 42 movements on a single busy day. It is therefore possible that on certain but rare occasions, some communities could be overflown by up to 42 aircraft on the ILS in a single day. Most aircraft on the ILS are likely to be circuits. Single event noise contours for aircraft on circuits are shown in Section B6.4

The airport advises that when the flight school was in full operation prior to the Covid-19 pandemic, they did approximately 150 flights per day with the Royal Flying Doctors adding another approximately 10 medical flights per day. Since there are other procedures at the airport that will be used for training it is a challenge to estimate precisely which procedure will be mostly used by training aircraft.

B.6 Aircraft noise analysis

The following section analyses the proposed procedure in detail and shows areas of lateral change from the existing procedure, including where potential significance under the EPBC Act may apply, as per AA-NOS-ENV-2.100.

An assessment of the potential noticeability of the proposed change, both in terms of noise and visual impacts, is provided in Part C: Community noticeability.

B.6.1 Noise modelling

Noise modelling was performed using the US FAA's Aviation Environmental Design Tool (AEDT), version 3B. Noise data were generated showing aircraft noise at different height and thrust settings. Tables 3-5 show aircraft noise levels for selected aircraft types at different heights and thrust settings. The altitude of interest for this change is 3,000FT. Therefore, the noise level for the proposed change will be the noise levels between 2,000FT and 4,000 FT.

Table 3 : Modelled B738 noise levels at different altitudes and thrust settings

Aircraft LAmax noise levels in dB(A) for B738 arrivals different thrust settings		
	7000 pounds thrust setting.	3000 pounds thrust setting
Altitude ft	LAmax (dB(A)	LAmax (dB(A)
1,000	77	75
2,000	69	67
4,000	60	58
6,300	54	52
10,000	47	45

Table 4: Modelled SF34 noise levels at different altitudes and thrust settings

Aircraft LAmax noise levels in dB(A) for SF34 arrivals at different thrust settings		
	75% thrust setting.	30 % thrust setting
Altitude ft	LAmax (dB(A)	LAmax (dB(A)
1000	73	72
2,000	66	65
4,000	59	57

6,300	53	52
10,000	48	46

Table 5: Modelled C172 noise levels at different altitudes and thrust settings

Aircraft LAmax noise levels in dB(A) for C172 arrivals at different thrust settings		
	58.2% thrust setting.	**26.6 % thrust setting**
Altitude ft	**LAmax (dB(A)**	**LAmax (dB(A)**
1000	63	55
2,000	55	48
4,000	47	40
6,300	41	34
10,000	34	29

As shown in Tables 3-5, the noise levels for different aircraft types directly under the flight path at 2,000FT range from 55 dB(A) for a C172 to 69dB(A) for a B738 at higher thrust settings. Noise levels above 60dB(A) in combination with the number of noise events can be potentially significant under the Airservices criteria for potential significance (NOS 2.1). It is expected that the noise levels at 3,000FT will be lower compared to 2,000FT.

B.6.2 Change in Noise levels

Changes in noise levels have been calculated based on the differences in noise for the current procedure closest to residential areas (VOR-Y RWY 09) and the proposed ILS including the ILS base turn, the holding pattern, and the missed approach. Figure 5 shows the lateral distances between the existing and proposed flight path and the resultant change in noise levels.

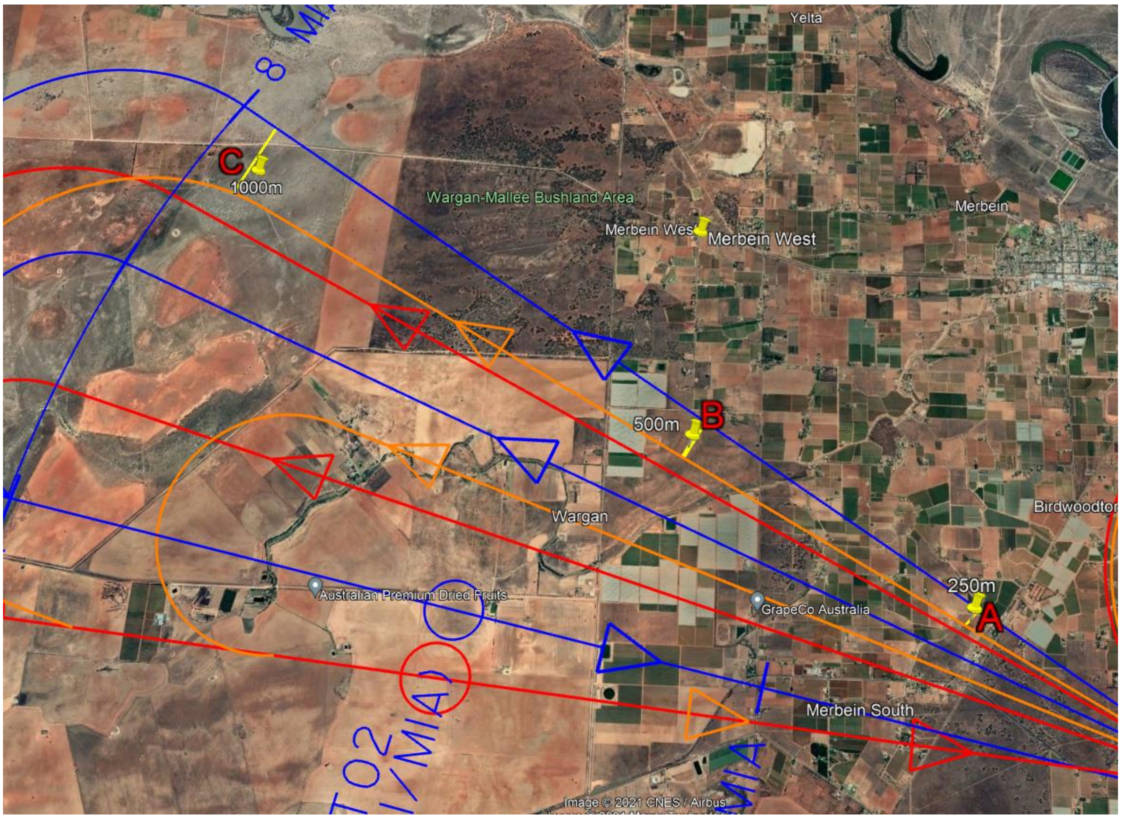


Figure 5: Existing VOR procedures (red and orange) and proposed ILS procedure (blue) with the yellow bars at Points A, B and C showing the distance between the VOR-Y and ILS procedure.

The change in noise levels was calculated based on the lateral distance between the existing VOR-Y and the proposed ILS. At 250 m lateral distance (Point A), the communities directly under the proposed ILS will experience an increase in noise level of 0.7 dB(A), at Point B (500m) there will be an increase of 2.2dB(A) and at Point C (1,000m), there will be an increase of 5.7 dB(A) for all aircraft types.

The lateral changes in the flight path (assuming aircraft flying the ILS instead of the current VOR-Y) will result in an increase of noise levels below 3dB(A) at Points A and B and more than 3 dB(A) ant Point C. Point C is adjacent to non-residential areas.

As described in the Transport Noise Management Code of Practice (Queensland Department of Transport and Main Roads, November 2013), changes in noise levels at or below 3 dB(A) are not likely to be perceptible by the human ear (see Table 6 below).

It is therefore unlikely that any individuals in the communities adjacent to Points A and B in Figure 5 will perceive the change in noise level as a result of the proposed change in flight paths. However, some individuals may notice the visual change in tracking and perceive aircraft to be louder, even though the change in subjective loudness will be minimal. Regardless, the change in the number of noise events will be below the Airservices threshold for potential environmental significance (Appendix A). At Point C, the change in noise levels would be noticeable if overflying communities. However, there are no communities living adjacent to Point C.

Table 6: Significance of environmental noise exposure changes (source: Queensland Department of Transport and Main Roads, November 2013).

Increase over existing noise dB(A)	Change in subjective Loudness	Significance of Change
<3	Nil	Insignificant
3-5	Noticeable	Marginal
10	About Double	Significant
15 or more	At Least Triple	Very Significant

B 6.2.1 ILS Holding pattern

This EIA assumes that the holding pattern will be used mostly by training aircraft and on rare occasions by commercial RPT aircraft. Figure 6 below shows the current and proposed holding pattern with the outer pattern for Cat D aircraft and the inner path for Cat A/B aircraft. The path shown on the diagram is the nominal path for the holding pattern at maximum speed. It is likely most aircraft will be flying within the pattern rather than follow the nominal path. The most likely aircraft to hold are Cat A/B aircraft flying the inner holding pattern.

There is a lateral shift of approximately 500m at the widest point between the existing and proposed flight path. Based on noise calculations, the change in noise level for a 500m lateral shift at 3,000 FT will be less than 3dB(A) and not likely to be perceptible to the human ear. However, the change in tracking from the existing to the proposed nominal path may be visually noticeable.

Given the huge numbers of training aircraft (up to 50 per day based on advice from the airport) and the minimal lateral shift between the holding for existing procedures and the holding for ILS, it is unlikely overflown communities would be able to determine on which procedure aircraft will be flying on. The increase in the number of circuits as a result of the introduction of the ILS is not likely to trigger the threshold for potential significance. However, if the increase is as in the alternative scenario on the ILS usage (Section B5), this would be noticeable to the communities.

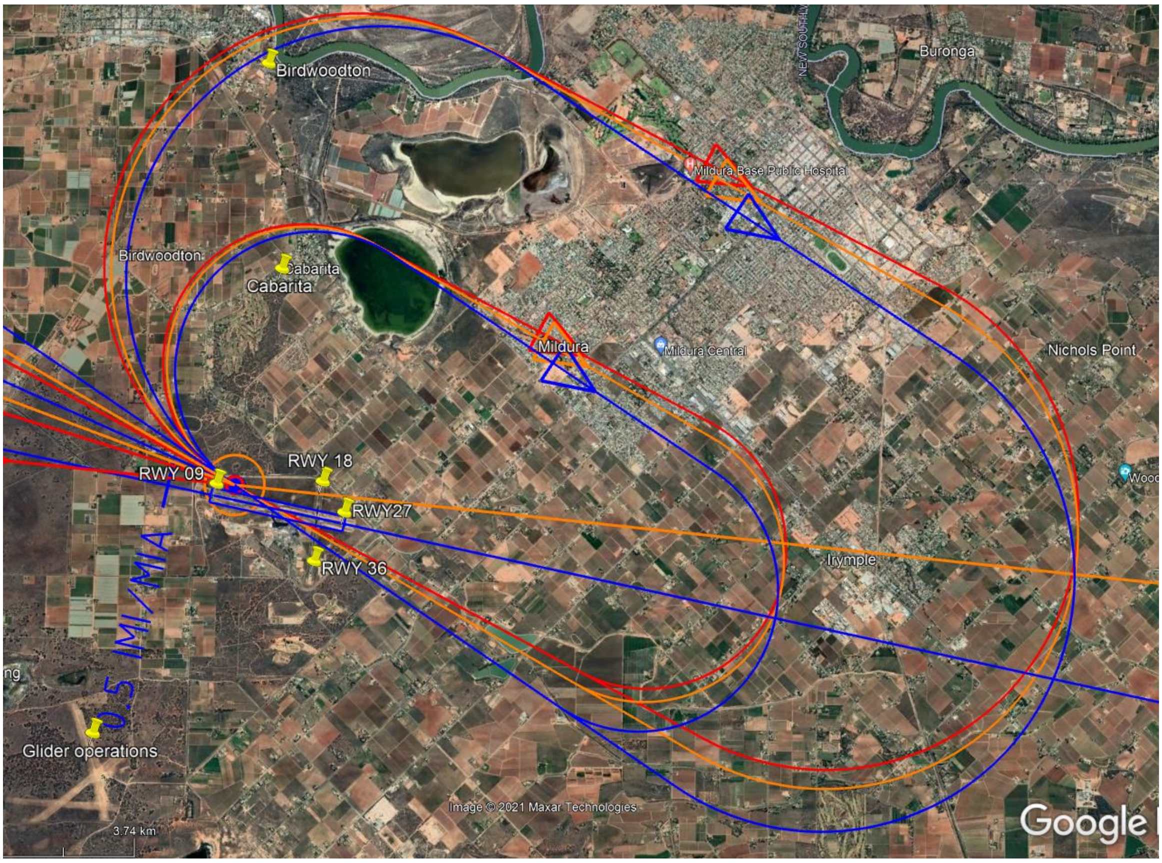


Figure 6: **Current holding path (orange and red) and proposed holding pattern (blue) with the outer paths for Cat D aircraft and the inner paths for Cat A/B aircraft**.

B 6.2.2: Missed Approach

Figure 7 below shows the average flight path for the current missed approach on the VOR (orange) and proposed missed approach (blue). The proposed missed approach is an overlay of the existing RNAV-Z RWY 09. Therefore, no new area is exposed to overflights as a result of the ILS missed approach.

Due to the low numbers of daily movements and an even lower number of aircraft conducting a missed approach (approximately one missed approach manoeuvre per day from ILS training aircraft), the changes to the missed approach are not considered to be a potentially significant noise impact (as per Airservices AA-NOS-ENV-2.100).

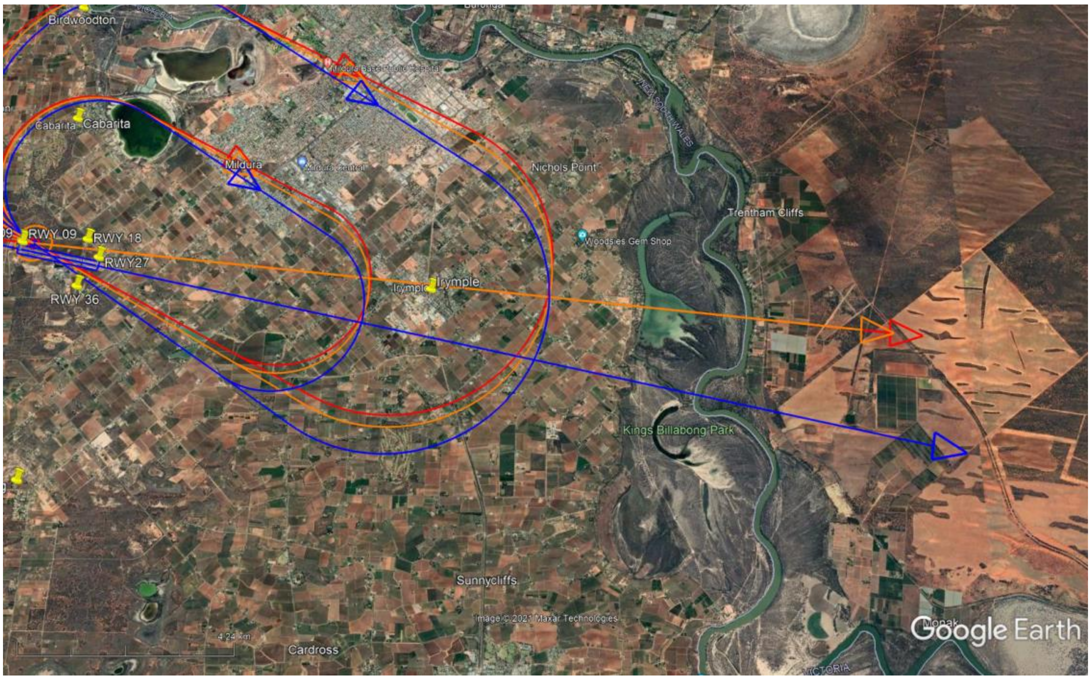


Figure 7: Average flight path for the current missed approach (orange) and proposed missed approach (blue). *Note the proposed missed approach is on the exact flight path as the nominal path for the existing RNAV-Z RWY 09*

Approximate noise levels on missed approaches based on Australian Standard, Acoustics Noise Intrusion- Building siting and construction (AS2021) were provided for different aircraft types (Table 7). Based on this Standard, the following will be the approximate noise levels for different aircraft types on departure.

Table 7: Estimated LAmax noise levels on departures at different locations assuming area is directly under the flight path. Actual noise levels will be lower away from the flight path.

Tracking distance from runway (km)	Estimated LAmax noise level dB(A) C172	Estimated LAmax noise level dB(A) SF34	Estimated LAmax noise level dB(A) B738
5	66	69	87
10	59	61	74
15	54	57	69

There are no new communities that will be newly overflown as a result of the proposed missed approach. However, some of the communities including Sunnycliffs and south of Irymple may be exposed to an extra daily movement doing a missed approach at noise levels above 60 dB(A), the noise level that could potentially trigger the threshold for potential significance. However, due to the low numbers of daily movements conducting a missed approach (on average of one per day) the changes to the missed approach are not considered a potentially significant noise impact (as per Airservices AA-NOS-ENV-2.100).

B.6.3 Measured Noise levels

Below is an example of measured noise levels from the C172, overlaid with the Noise - Power - Distance data from AEDT. These noise levels were mainly captured at Gold Coast Airport and are replicated here for illustration purposes only. As shown in Figure 8 below, noise levels at 3,000FT are below 60dB(A), the threshold for potential significance. It is therefore expected that circling aircraft will result in noise below the threshold for potential significance.

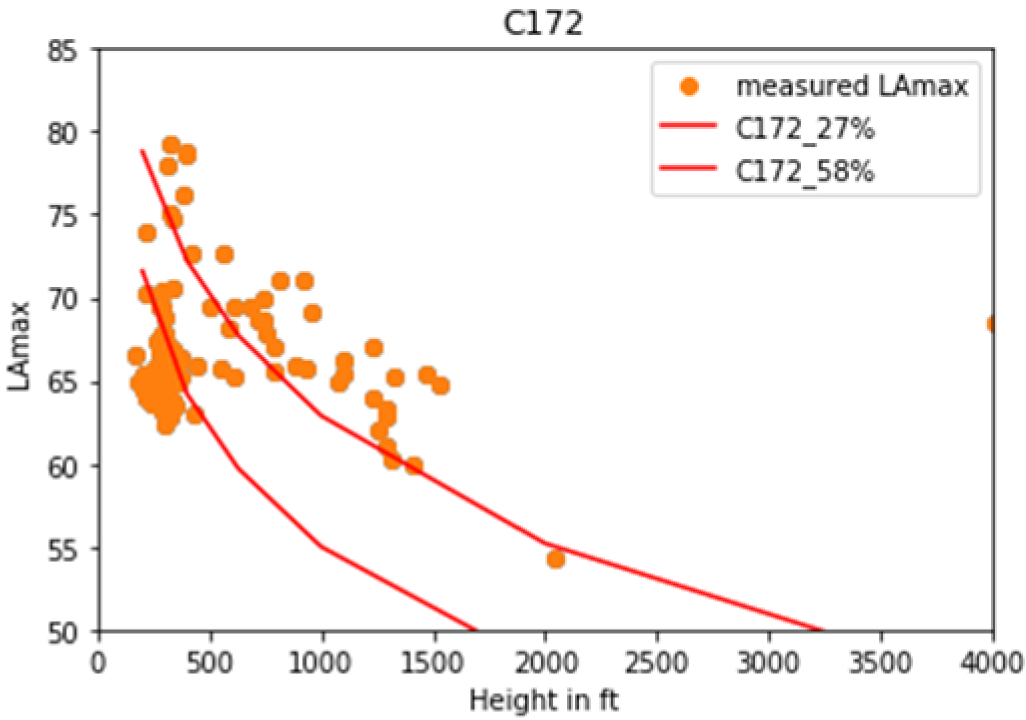


Figure 8: Measured C172 arrivals noise levels at different thrust levels at Gold Coast Airport

B.6.4 Noise Contours

The LAmax 40, 50, 60 and 70 dB(A) noise contours were modelled using AEDT for the C172, SF34 and B738. Figures 9-20 below show different contour types. Some of the contours are shown for either the current procedure or the proposed procedure on its own while some figures show a comparison between the two procedures.

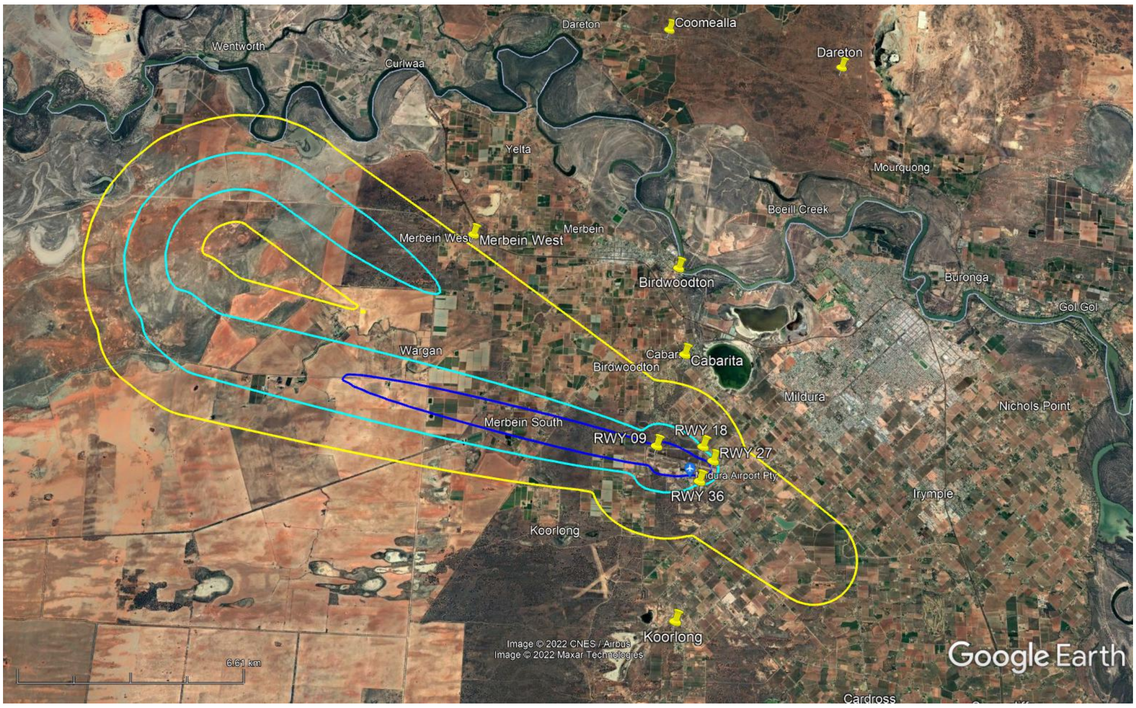


Figure 9: Single event LAmax noise contours for B738 aircraft (yellow 50db(A), light blue 60dB(A) and dark blue 70 dB(A)) on the proposed ILS approach procedure to RWY 09 at Mildura Airport.

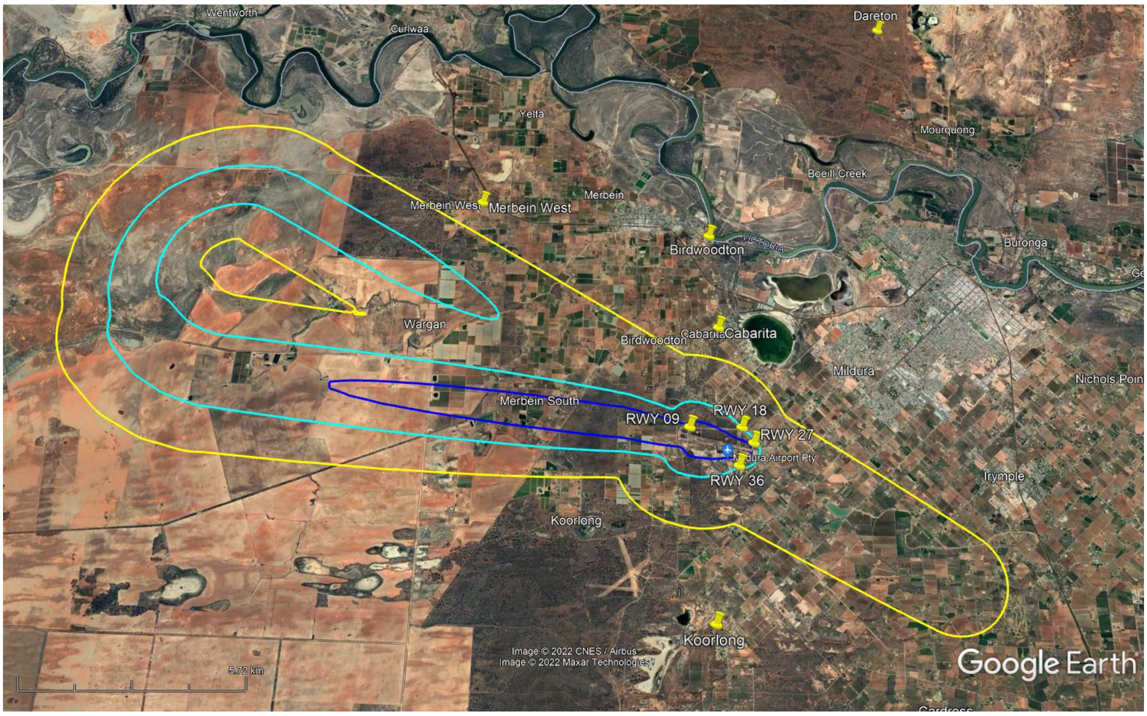


Figure 10: Single event LAmax noise contours for B738 aircraft (yellow 50db(A), light blue 60dB(A) and dark blue 70 dB(A)) on the existing VOR-Y approach procedure to RWY 09 at Mildura Airport.

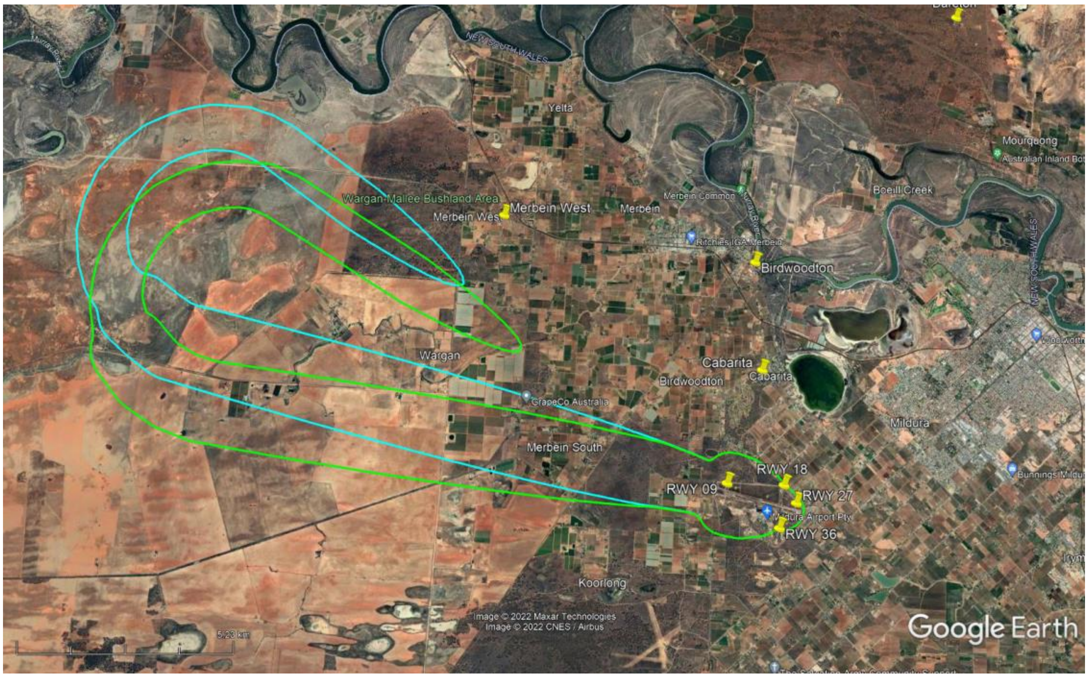


Figure 11: Single event LAmax 60 noise contours for B738 aircraft for the existing VOR-Y (green) and proposed ILS (light blue).

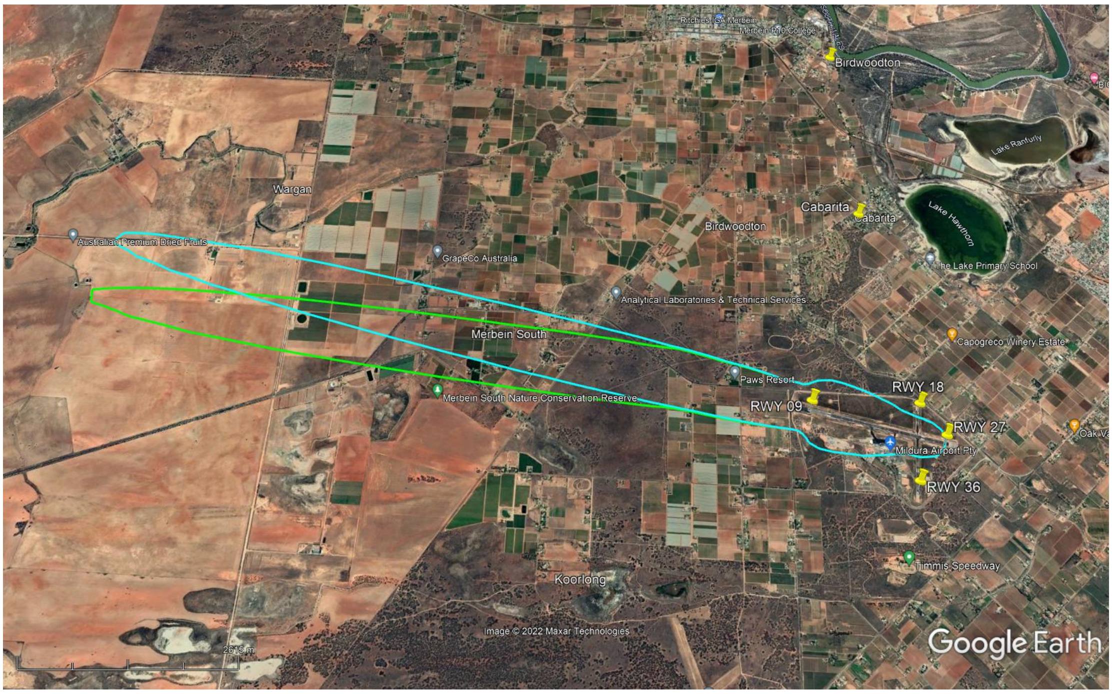


Figure 12: Single event LAmax 70 noise contours for B738 aircraft for the existing VOR-Y (green) and proposed ILS (light blue).

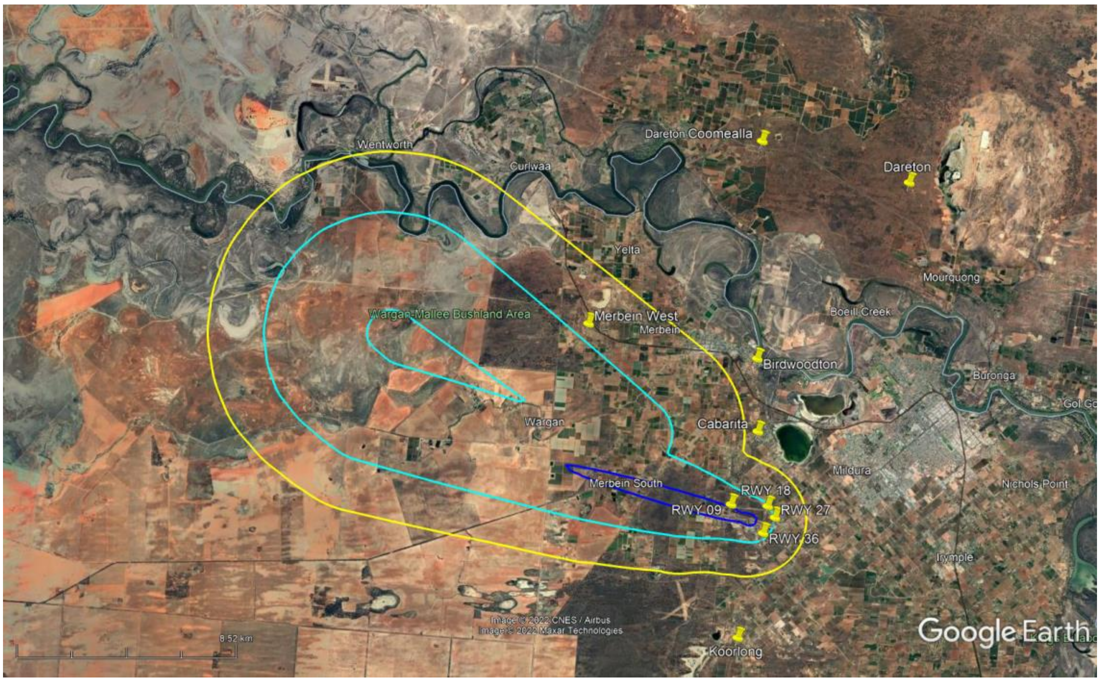


Figure 13:Single event LAmax noise contours for SF34 aircraft (yellow 50db(A), light blue 60dB(A) and dark blue 70 dB(A)) on the proposed ILS approach procedure to RWY 09 at Mildura Airport.

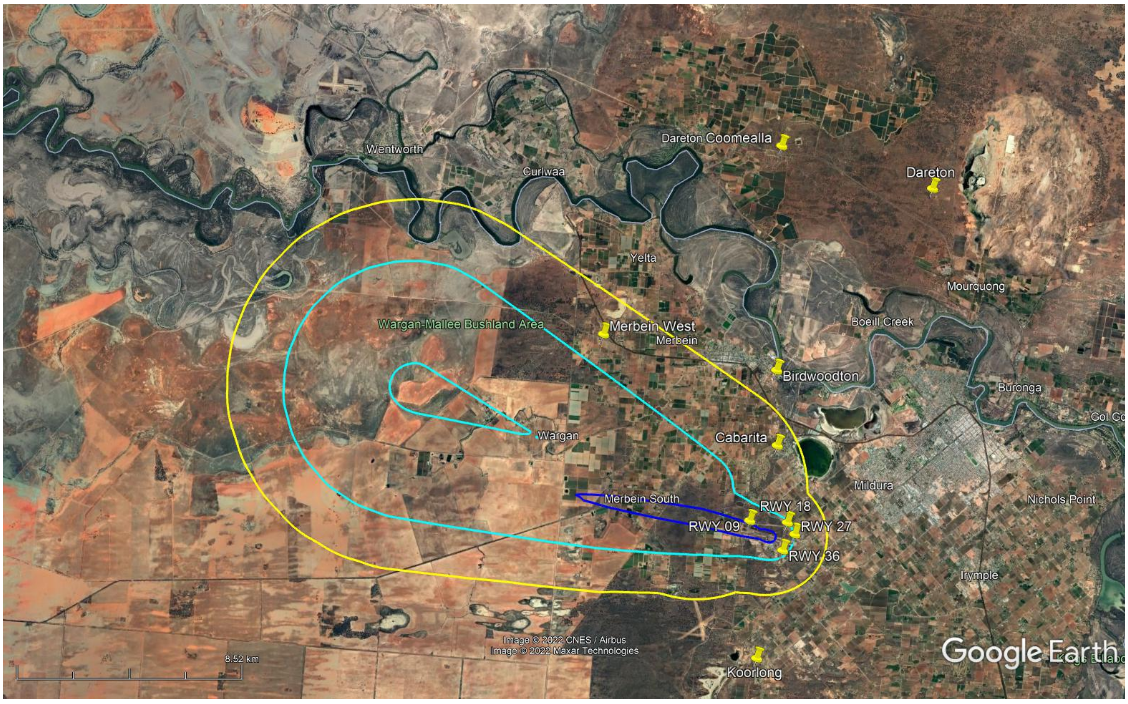


Figure 14:**Single event LAmax noise contours for SF34 aircraft (yellow 50db(A), light blue 60dB(A) and dark blue 70 dB(A)) on the existing VOR approach procedure to RWY 09 at Mildura Airport.**

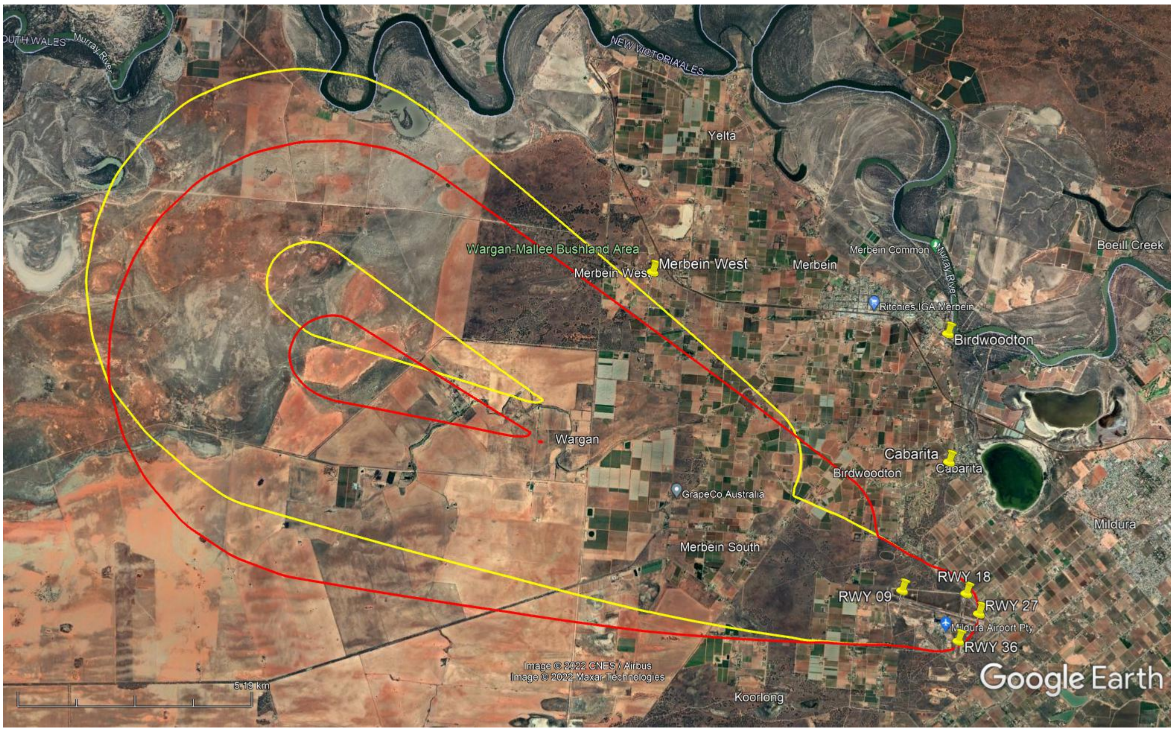


Figure 15: Single event LAmax 50 noise contours for SF34 aircraft for the existing VOR- Y (red) and proposed ILS (yellow).

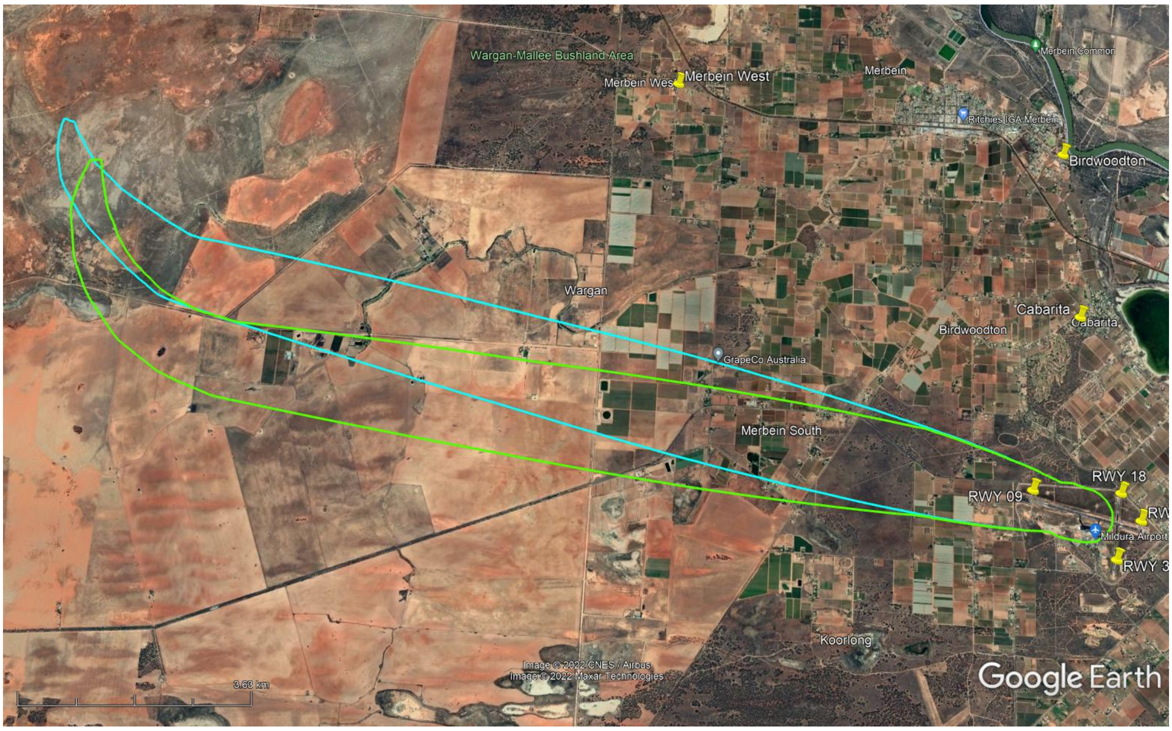


Figure 16: Single event LAmax 60 noise contours for SF34 aircraft for the existing VOR-Y (green) and proposed ILS (light blue)

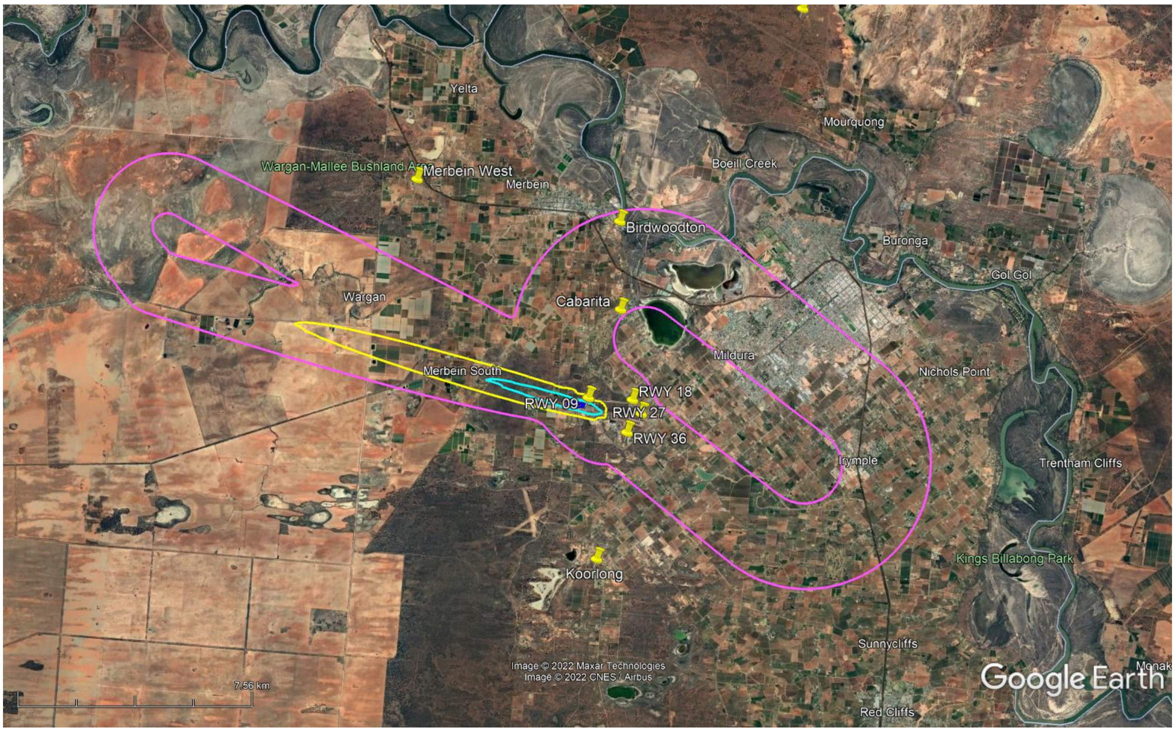


Figure 17: Single event LAmax noise contours for C172 aircraft (pink 40 dB(A), yellow 50db(A), light blue 60dB(A) and dark blue 70 dB(A)) on the proposed ILS approach procedure to RWY 09 at Mildura Airport.

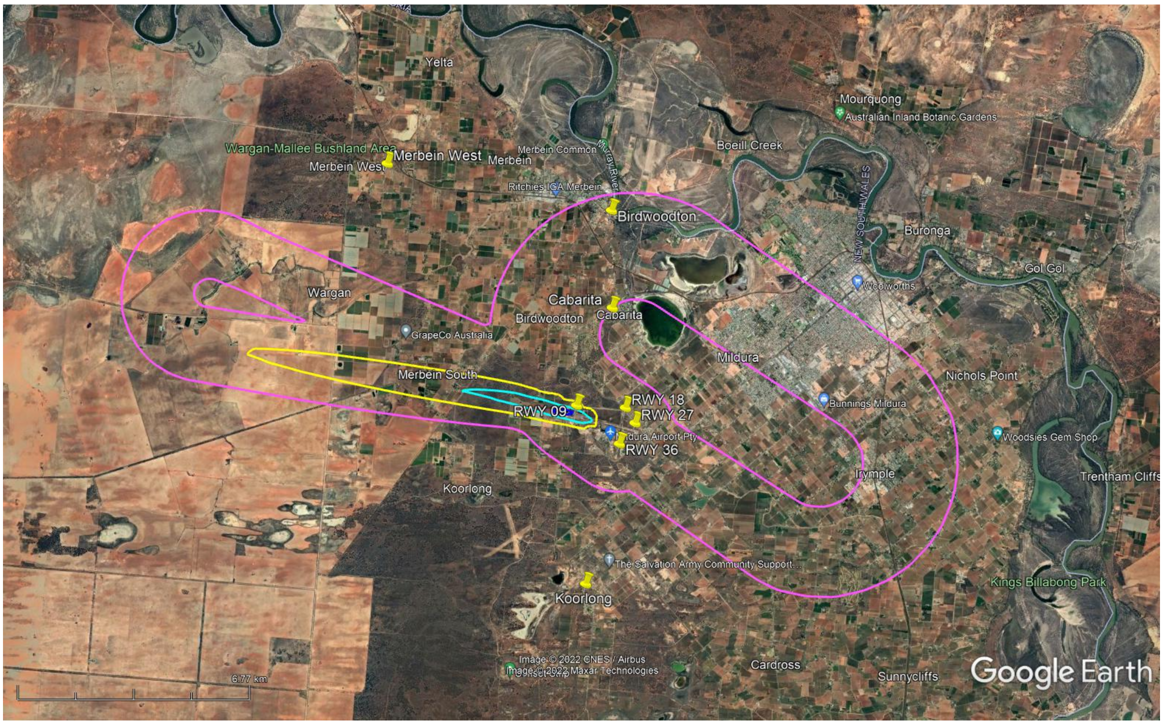


Figure 18: Single event LAmax noise contours for C172 aircraft (pink 40 dB(A), yellow 50db(A), light blue 60dB(A) and dark blue 70 dB(A)) on the existing VOR approach procedure to RWY 09 at Mildura Airport

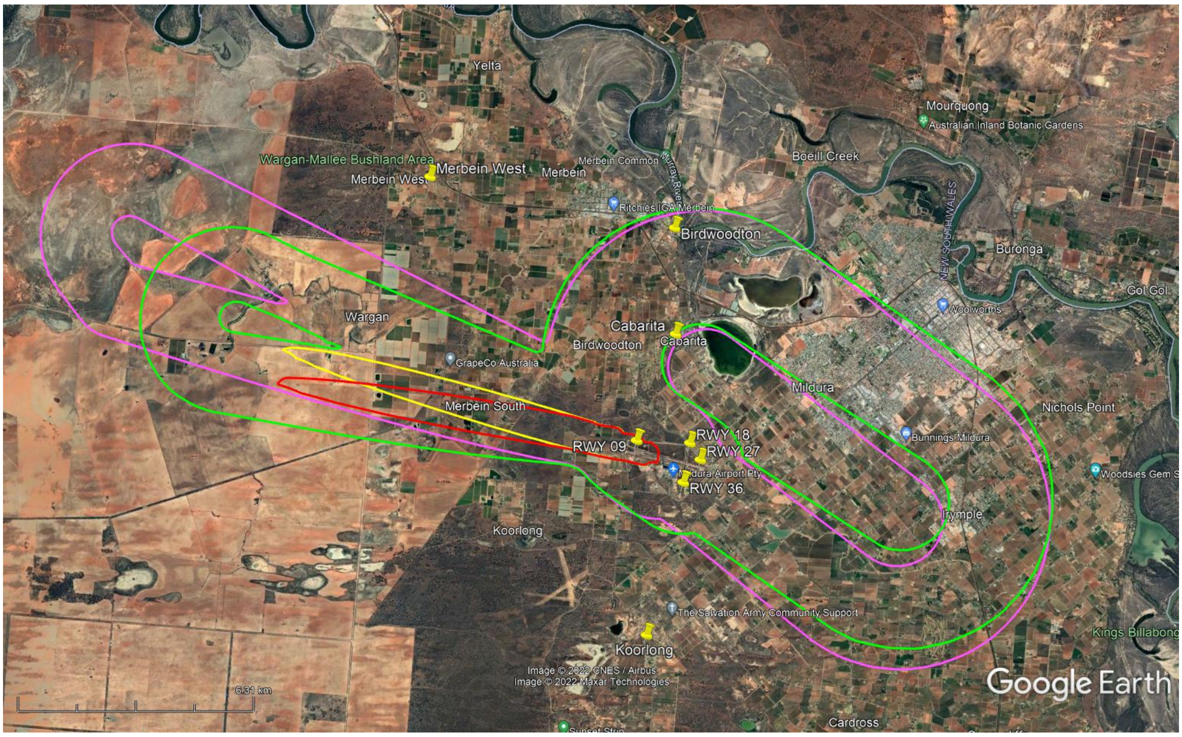


Figure 19:Single event LAmax noise contours for C172 aircraft (green existing 40dB(A), red existing 50db(A), pink proposed 40dB(A), yellow proposed 50 dB(A).

B.7 Noise assessment of sensitive sites

The environmental assessment methodology adopted by Airservices, as shown in Appendix B, specifically identifies schools and hospitals as sensitive noise receptors with specific criteria for potential significance. Due to the relatively low number of movements affected by the change (average of seven arrivals on a busy day), and their associated noise levels, the proposed change does not trigger Airservices criteria for potential significance, in relation to sensitive sites (or any other type of receptor). However, this assessment considers that there will be days that the number of movements on the ILS could be more than double the estimated 7 movements resulting in a noticeable increase in the number of movements.

B.7.1 Matters of National Environmental Significance (MNES)

Matters of National Environmental Significance (MNES) were considered as part of this assessment. Due to no new areas being exposed to overflights, the proposed changes do not trigger Airservices criteria for potential significance, in relation to matters of national environmental significance.

B.7.2 Matters of indigenous heritage and cultural significance

This assessment has found that it is highly unlikely that matters of indigenous heritage or cultural significance will be impacted by the proposed changes due to the relatively low number of movements and that these areas are already currently exposed to overflights. As a result, no further analysis for matters of indigenous and cultural heritage was conducted as part of this assessment.

B.7.3 Aircraft emissions

Analysis of the potential environmental impact assessment of fuel burn and emissions was not required as there is no material change in the distance flown between the current and proposed procedures.

B.8 Findings

B.8.1 Noise impacts

This analysis has found that the changes in noise levels are below the threshold for potential significance based on Airservices assessment criteria (Appendix A).

Also, due to the low numbers of movements on the proposed ILS relative to the overall movements including 150 training aircraft at the airport, (21 arrivals on the ILS on a busy day or up to 42 movements on a worst-case scenario), these changes do not trigger the threshold for potential significance. The lateral shift from existing VOR procedures to the proposed ILS does not result in potentially significant noise levels.

B.8.2 Natural environment impacts

There are no likely impacts on the natural environment as a direct result of implementing the proposed change. There are no likely impacts on the natural environment as a direct result of implementing the proposed operation as the area is already overflown and the number of movements is below the threshold for potential significance

B.8.3 Cultural and heritage value impacts

This assessment has found that it is highly unlikely that matters of Indigenous heritage or cultural significance will be impacted by the proposed changes due to the relatively low number of movements and that these areas are already currently exposed to overflights. As a result, no further analysis for matters of indigenous and cultural heritage was conducted as part of this assessment.

B.8.4 Emissions impacts

There is no material difference anticipated in aircraft emissions produced as a result of the proposed change. This is due to minimal change in track miles.

B.9 Risk classification

Based on the analysis and findings in this report, the environmental impacts of the proposed change have been assessed utilising Airservices Risk Management Framework (ARMF), as defined in Airservices *Risk Management Standard (AA-NOS-RISK-0001).*

The proposed change has been determined to be a **medium environmental risk** (as shown in large font in Table 8, below). The risk level has been elevated to medium due to the uncertainty of data especially ILS usage data from the flight school as well as the unknown number of additional aircraft from outside that could potentially conduct training on the ILS.

Table 8: Airservices Risk Classification Table (AA-NOS-RISK-0001 - Table 1, p12).

Source: AA-NOS-RISK-0001

Table 4 – Risk Acceptance, Mitigation Strategies and Review Timeframes				Environmental Team Risk Guide				
Risk Rating	Risk acceptance – minimum authority	Risk mitigation strategy – safety & environment risks	Minimum review timeframes	Consequence (as per Table 3 in AA-NOS-RISK-0001)	Exceeds Noise criteria for "Potential Significance Assessment", as stated in AA-NOS-ENV-2.100,	Exceeds MNES criteria for "Potential Significance Assessment", as stated in AA-NOS-ENV-2.100,	Community noticeability (can be considered)	CIRRIS Assessment Outcome
Extreme (E)	Must be referred to the CEO for attention and action	Unacceptable Immediate risk treatment required to reduce the level of risk to as low as reasonably practicable (ALARP) or cease the activity.	Weekly (continuous risk treatment)	Catastrophic	Likely for cases that include an MDP/EIS, not for EIAs			
High (H)	Responsible Executive Chief	Unacceptable Immediate risk treatment required to reduce the level of risk to ALARP or cease the activity.	Monthly	Major	Y	Y / N	Exceed community noticeability crtieria and well above number of existing operations in the area or will be overflown in new area	Potential Significant Impact (referral to the Environment Minister under the EPBC Act is required or recommended)
Medium (M)	Responsible Head / Principal Advisor / Manager	Undesirable Risk treatment required to reduce the level of risk to ALARP.	Quarterly	Minor / Moderate / Major	Combinations of Y / N		Exceed community noticeability crtieria and above number of existing operations in the area or will be overflown in new area	Potential Significant Impact (referral to the Environment Minister under the EPBC Act is required or recommended) OR Some environmental impact but not significant
Low (L)	Responsible Lead / Senior Advisor	Tolerable Risk is broadly acceptable, however risk treatment should be applied to reduce the level of risk to ALARP.	Biannually	Minor	N	N	Does not exceed community noticeability crtieria or does exceed community noticeability but area currently have existing operations that are greater in numbers or noise levels	Some environmental impact but not significant
Negligible (N)	Responsible Team Leader	Tolerable Risk is acceptable, however the risk must be monitored to assure that it remains within risk tolerance/appetite. ALARP evidence is current.	Annually	Insignificant	Likely for cases that does not pass the initial EA Screening			

Treatment of risk may include among others:

- Letter of Agreement (LoA)
- Noise Abatement Procedures

- Flight Path Design Review
- Raise operation altitude
- Limit operations to daytime
- Limit the number of operations
- Fly Neighbourly Agreements

B.10 Environmental impact assessment conclusion

This EIA finds that the proposed introduction of the ILS procedures to RWY 09 at Mildura Airport, are not likely to result in any significant environmental impacts, within the meaning of the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999.*

There are also no impacts expected on emissions, MNES or on sites of cultural and heritage value, as a direct result of implementing the proposed changes.

Part C: Community noticeability

C.1 Key information

Key information regarding the potential noticeability of the proposed change by nearby communities includes the following points:

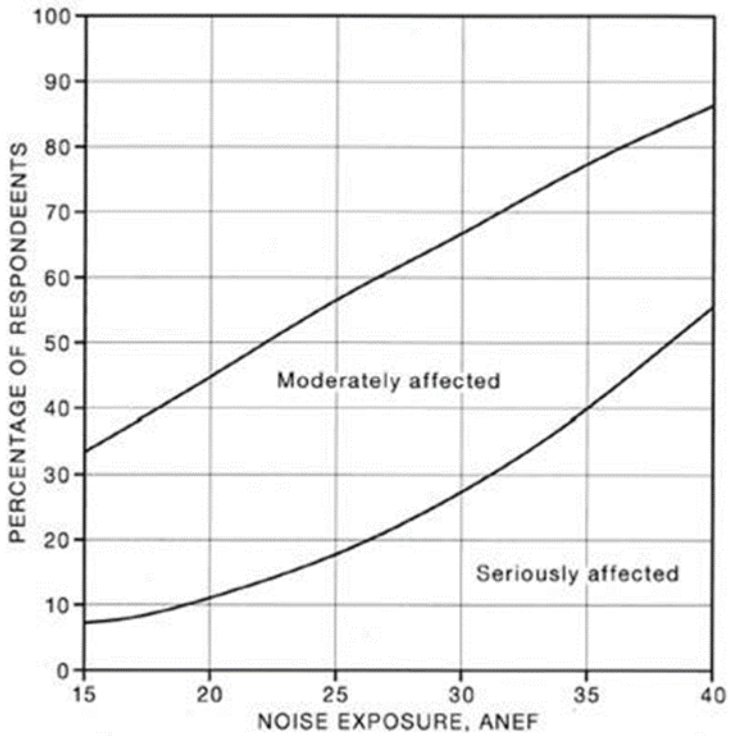
- Changes in noise levels are below the threshold for potential significance.
- The DH8D and SF34 are the two most common RPT aircraft type operating under Instrument Flight Rules (IFR) at Mildura Airport.
- The proposed change will be visually noticeable to communities but below the threshold for potential significance.
- The C172 most common training aircraft type operating at Mildura Airport. On a busy day, communities could potentially be exposed to up to 42movements on the ILS.
- This EIA assumes 20% usage of RWY 09 by RPT and up to three training aircraft on the ILS per day.
- Currently the proportion of circuits is estimated at 80% on RWY 36 (they perform a right-hand circuit which is safer), 10% on RWY 27 and 10% on RWY 09. Based on a total of 150 training aircraft per day and 10% utilising RWY 09, it is estimated that there are currently 15 training aircraft utilising existing procedures to RWY 09. These 15 aircraft could potentially utilise the ILS.
- Based on advice from the airport and for the purposes of this environment assessment, runway distribution has been assumed to be an approximate 80:20 ratio between the RWY 27 and RWY 09, respectively for RTP traffic. Based on an 80:20 ratio on a busy day of 17 arrivals per day, there will be 14 arrivals to RWY 27 and 3 arrivals per day to RWY 09. Potentially all three RPT aircraft could utilise the ILS.
- Introduction of the ILS at the airport could potentially attract additional traffic from neighbouring airports
- The proposed missed approach overlays the existing RNAV approaches so no new communities are exposed to aircraft noise. Additional data is provided in Part B.

C.2 Noise levels and noticeability

As detailed in Part B5, the proposed changes will result in noise level changes below the threshold for potential significance but the change in tracking will be visually noticeable to communities.

C.2.1 Potential community reaction to noise exposure

To help evaluate potential community reaction to aircraft noise exposure, the principles defined in the Australian Standard, Acoustics noise intrusion- Building siting and construction (AS2021) have been considered. AS2021 presents the dose/response relationship between aircraft noise and community reaction based on a socio-acoustic investigation performed in residential communities in Australia (Figure 10). It defined a percentage of respondents that were seriously to moderately affected according to their aircraft noise exposure level. Although this study was undertaken for the Australian Noise Exposure Forecast (ANEF) metric, the principles can be applied to the evaluation of noise from flight path changes. The dose/response curves indicate that there is a percentage of respondents that are seriously affected by aircraft noise at low noise levels where most respondents are not. These principles are widely accepted in the acoustic industry and indicate that regardless of noise level, some small percentage of people may be seriously affected to a level where they are driven to complain. The relationship between noise exposure forecast level and community reaction in residential areas is shown in Figure 20 below.



NOTE: This graph was derived from the National Acoustic Laboratories Report No. 88.

FIGURE A1 RELATIONSHIP BETWEEN NOISE EXPOSURE FORECAST LEVEL AND COMMUNITY REACTION IN RESIDENTIAL AREAS

Figure 20: Relationship between noise exposure forecast level and community reaction in residential areas (Figure A1 in *AS2021:2015 Acoustics – Aircraft noise intrusion – Building siting and construction)*.

C.2.2 Holding Pattern

As shown in Figures 21 below, the proposed changes will result in a shift in the holding pattern nominal path with the proposed ILS holding pattern shifting further south of Mildura Central. However, it is possible aircraft on hold already overfly these areas as only a few fly the actual path shown on the map. If aircraft do fly the nominal path, the change in noise levels will be below 3dB(A) and not likely to be perceptible to the human ear. The modelled noise contours for C172 show that the noise levels for aircraft on hold at 3000FT is less than 50dB(A), the threshold for noticeability for urban areas. However, despite the low noise levels, aircraft on hold will be visually noticeable to overflown communities and this may give a perception on increased noise level to these communities.

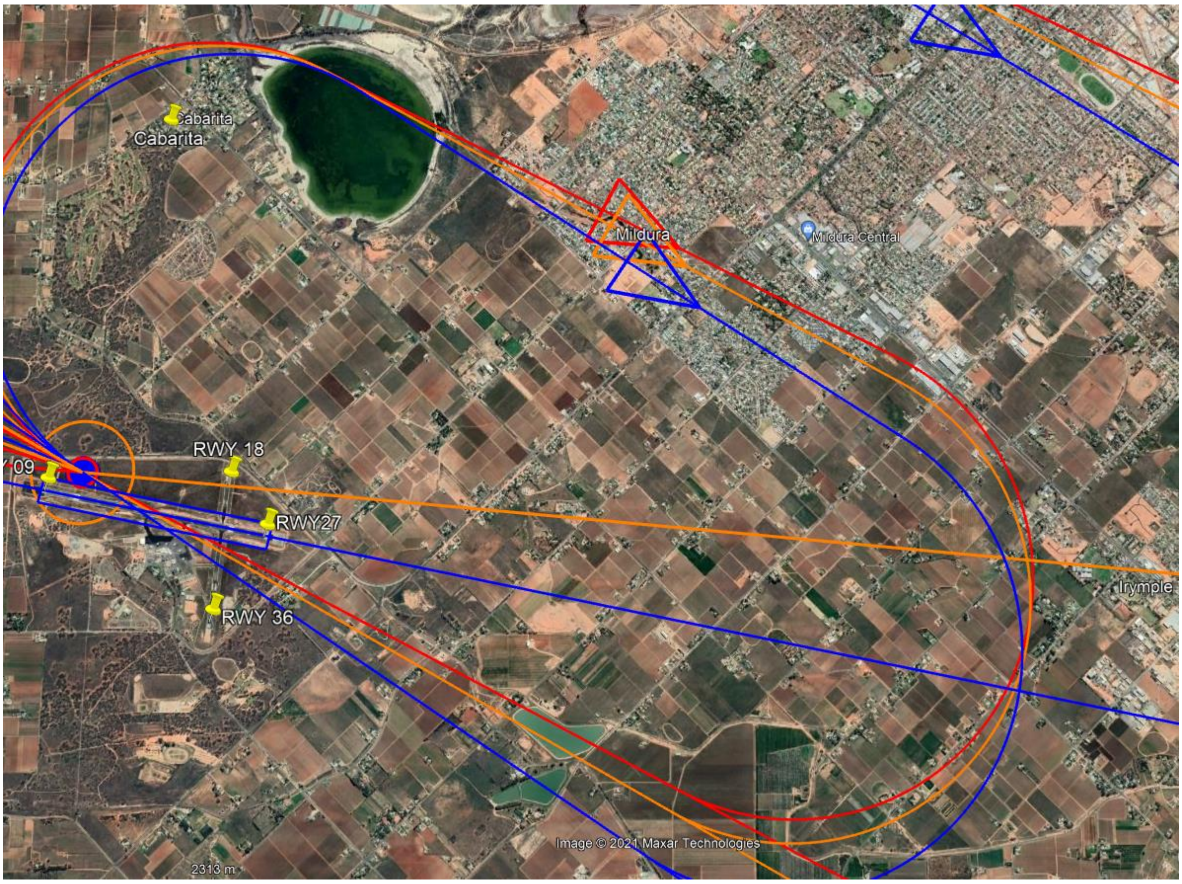


Figure 21: CAT A/B holding pattern for the current procedures (red and orange) and the proposed ILS procedure (blue).

C.2.3 Missed Approach

Information provided by the airport suggests that missed approach is a rare occurrence with no RPT aircraft conducting a missed approach for many years. Training aircraft conducting a missed approach will be on the same path as the RNAV-Z approach thereby will not expose any new communities to aircraft noise (Figure 22).

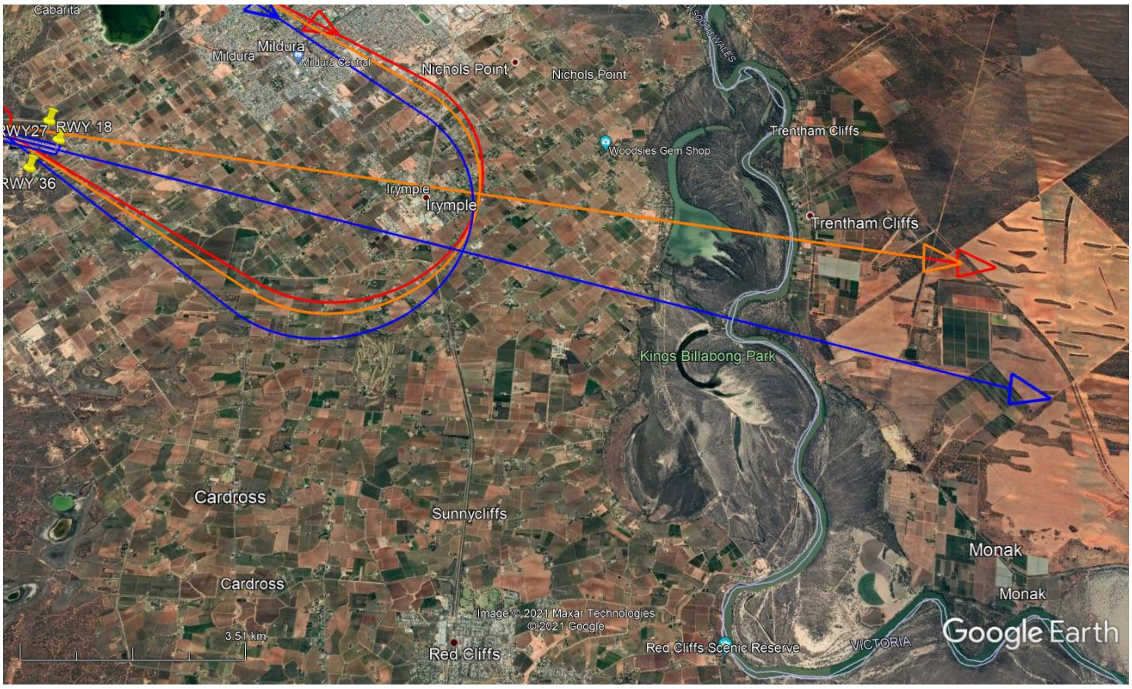


Figure 22: Communities under the proposed ILS missed approach

C.2.4 ILS base turn

The lateral changes in the flight path will result in an increase of noise levels that are unlikely to be audibly noticeable to communities even though the change in tracking will be visually noticeable. The change in tracking could be perceived as an increase in noise levels by some members of the community.

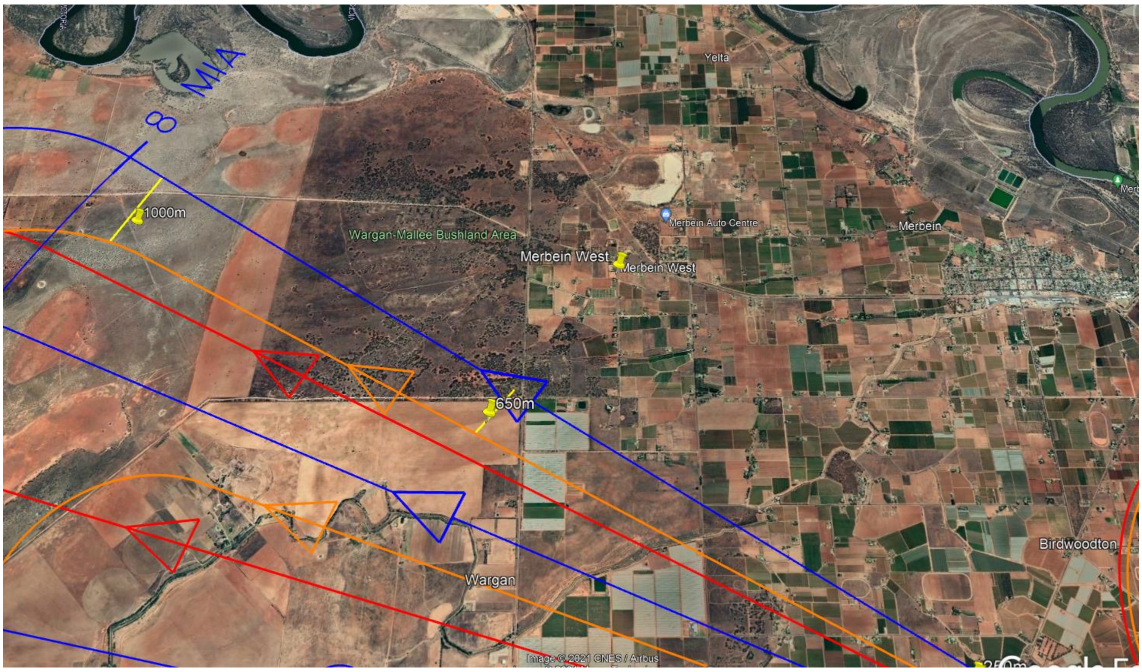


Figure 23: Close-up image of the ILS base turn and residential areas in proximity to the change

Figure 24 below shows some examples of different noise levels for context.

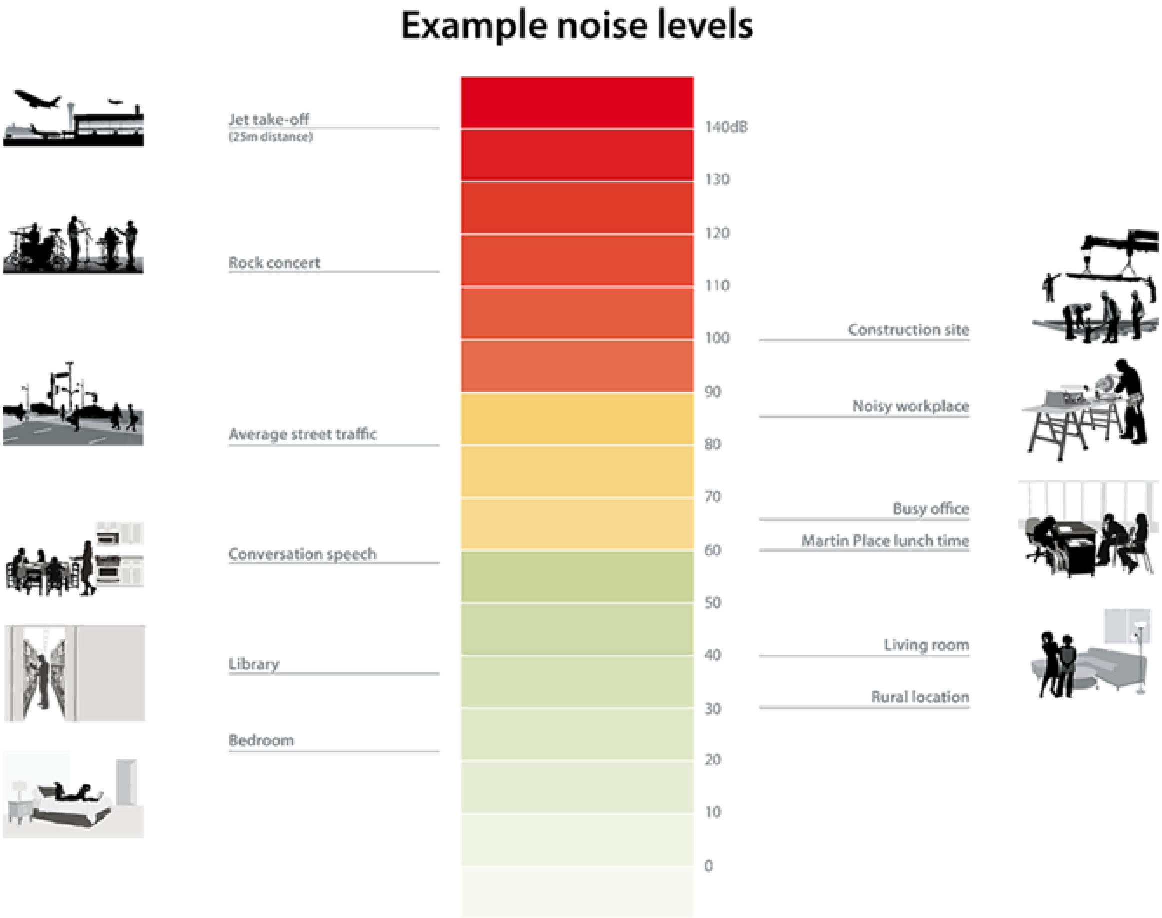


Figure 24: Indicative noise levels

Source: http://aircraftnoise.com.au/causes-of-aircraft-noise/measuring-aircraft-noise/ , accessed 18/07/2019

C.3 Findings

C.3.1 Noticeability

There may be a noticeable (visual and audible) change in tracking of aircraft as a result of the proposed change, particularly in the communities west of Merbein West and Birdwoodton for the ILS base turn approach as well as areas south of Irymple for the missed approaches.

C.4 Community noticeability conclusion

The proposed changes will result in a change to the pattern of how aircraft arrive to the airport, which may be noticeable to some individuals in communities within close proximity of the proposed flight path for areas of Mildura, south of Irymple, Merbein, Merbein West and Birdwoodton. In the event of a huge increase in the number of movements as a result of the introduction of the ILS, communities under the holding pattern may notice the increase in the number of overflights triggering an increase in the number of noise complaints.

Appendix A Airservices aircraft noise significance criteria

Appendix B Criteria for seeking advice under the EPBC Act

Context

The following criteria have been developed by Airservices to provide a quantitative mechanism for determining proposed changes to aircraft operations with the potential to result in 'significant impact' to the environment (as defined under the EPBC Act). All proposed changes that meet the criteria shall be avoided wherever practicable through flight path redesign. Where it is not reasonably practicable for a change to be redesigned to avoid the potential environmental impact (for example, due to a clear safety imperative) Airservices shall seek advice from the Commonwealth Environment Minister prior to implementing the change (in accordance with Sections 28 and 160 of the EPBC Act).

Where the criteria is not met for a given change, Airservices may still decide to seek advice from the Environment Minister for potential significant impact (for example, if social impact analysis indicates a heightened risk of community or socio-political sensitivities to a change).

Application of the criteria

The criteria and application methodology are organised in four parts, as follows:

1. Aircraft noise
2. Fuel burn and emissions
3. Biodiversity
4. Other EPBC Act matters

1. Aircraft Noise Assessment

1.1 Potential significance assessment

Tables 1 - 2 below provide criteria to determine whether advice must be sought (under the EPBC Act) regarding potentially significant aircraft noise impacts arising from proposed changes to our air traffic management practices. The methodology for applying the criteria is described following Table 2.

Table 1: Noise thresholds for seeking advice under the EPBC Act – total number of aircraft noise events.

Noise Metric	Total number[21] of aircraft noise events
N70 (24 hr)	≥ 5
N60 (24 hr)	≥ 10
N60 (11pm – 6am[22])	≥ 2

[21] The number and time pattern of operations is to be based on a 'busy day' for both the existing conditions and conditions associated with the proposed change (the 90^{th} percentile of movements is used to define a 'busy day').

[22] The usage of the hourly ranges for 'day' (6:00am to 11:00pm) and 'night' (11:00pm to 6:00am) is as per the definition of night (11:00pm to 6:00am) used at Australian curfew airports (see Commonwealth Sydney Airport Curfew Act 1995). This definition is applied consistently for all Airservices environmental assessments, whether or not a curfew is in place at the specific airport

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Table 2: Noise thresholds for seeking advice under the EPBC Act – increase in flight numbers.

Noise Metric	% change from existing situation
N60, N70 (24 hr)	> 20%
N60, N70 (11pm – 6am)	> 2 flights or > 20% (whichever is larger)

Steps in applying noise criteria:

- **Step A** Determine aircraft noise levels[23] associated with the proposed change. This may include the following metrics (as required):
  - L_{Amax} for selected representative aircraft types,
  - Number above metrics (Nxx).
- **Step B** Identify a sample of applicable Noise Sensitive Receivers (NSRs)[24] using online mapping tools.
- **Step C** Categorise areas impacted by the change as either 'rural' or 'urban' based on state, territory or local government land use zoning definitions
- **Step D** Compare expected number of aircraft noise events arising from the change with the thresholds described in Table 1 and Table 2, over.

► Outcome:

- If applicable thresholds from BOTH Tables 1 and 2 are exceeded for any populations in the area of the proposed change, then advice must be sought from the Commonwealth Environment Minister regarding the potential for the change to cause 'significant impact' [note: (2) Fuel Burn and Emissions, and (3) Biodiversity assessments are also required to support the request for advice]
- If applicable thresholds are not exceeded, then proceed to (2) Fuel Burn and Emissions, then (3) Biodiversity assessment sections.

1.2 Consideration of aircraft 'noise noticeability' and 'newly overflown' NSRs

Determining whether a given NSR (or community) will experience 'noticeable' aircraft noise, or will be 'newly overflown', allows us to carry out qualitative consideration of the potential effects of flight path changes, and determine how best to manage them (including community engagement or flight path redesign).

[23] Noise levels may be calculated using a noise model such as INM or AEDT, or using look-up tables in AS 2021:2015 or other applicable calculations

[24] Noise Sensitive Receivers include residences; hotels, motels and other places of temporary residence; schools and other places of education; pre-schools and child care centres; hospitals, aged care facilities and other health-related facilities; places of worship

1.2.1 Noise noticeability

Aircraft noise noticeability shall be determined in one of the following two ways, depending on whether noise modelling is conducted as part of an EIA:

a) EIA with noise modelling:	• 50 dB(A) single event noise contours (LAmax) are modelled for urban areas; and 42dB(A) contours are modelled for rural areas, • Any overflights of NSRs within the above contours are considered to be 'noticeable'.
b) EIA without noise modelling:	• An area is identified 10km either side of the nominal flight path for urban areas (representative of 50dB(A) noise levels), and 20 km[25] either side of the nominal flight path for rural areas (representative of 42dB(A) noise levels), up to a maximum distance of 35 nautical miles (nm) from the relevant runway threshold, • Any overflights of NSRs within the above areas are considered to be 'noticeable'.

Note – where part of an existing procedure remains unchanged under the proposed change, that part of the design is excluded from noticeability modelling or the other noticeability identification process described above.

1.2.2 Determining newly overflown NSRs

A NSR is considered to be "newly overflown" if:

- The proposed change has been identified as 'noticeable', AND
- The NSR currently experiences negligible existing aircraft noise – i.e. less than one overflight per day, during the daytime (i.e. 6:00 am – 11:00pm).

1.2.3 Outcomes of noise noticeability and newly overflown assessment

All proposed changes that are identified by the AEA team as being 'noticeable' or 'newly overflown', must be communicated to the G&CE team to assist with effective, targeted community engagement efforts.

This determination does not affect the outcomes of the 'potential environmental significance' assessment (described in Section 1.1 above), which shall be undertaken in all cases (where the environmental change screening has determined an EIA is required).

[25] Based on a B737 on departure, as per modelled noise levels in AS2021:2015, it has been identified that generally at 2,500m from the centre line of the track (sideline), noise levels will be approximately 60dB(A). This is the maximum sideline distance at which 60dB(A) noise levels would be experienced. Based on geometric spreading of noise, it was calculated that noise levels would be 50dB(A) at around 7,900m sideline and would be 42dB(A) at around 20,000m sideline. The units of 42dB(A) for rural areas and 50dB(A) for urban areas have been selected as representative of noticeability of noise, with consideration of state and territory EPA guidelines. See GHD literature review for additional information. Furthermore, departure noise levels were utilised as overall these are higher than for aircraft on arrival. As such, distances of 10km for urban and 20km for rural have been used as a conservative measure for noticeability and to account for any potential variations in aircraft levels

2. Fuel Burn and Emissions Assessment

Table 4 provides criteria to determine whether to seek advice under the EPBC Act regarding potentially significant environmental impacts associated with increases in aircraft fuel burn and emissions, as a result of proposed changes to our air traffic management practices.

Table 4: Fuel burn and emissions criteria for seeking advice under the EPBC Act

Assessment element	Criteria
1. Airport and flight characteristics	
Airport size and category	A large airport that has both a staffed Air Traffic Control tower and runways equal to or wider than Category 4C[25]
Airport movements	≥ 100 Regular Public Transport (RPT[27]) movements per day ≥ 200 movements per day at a training airport
Change in distance flown	≥ 20% increase in flight path (within a 20NM radius from the Aerodrome Reference Point or ARP) [16]
2. Fuel burn and emissions characteristics	
Increase in fuel burn, CO_2 and other CO_2-e emissions below 10,000 ft (compared to the existing situation)*	≥ 20%
Increase in fuel burn, NOx, SOx and Particulate Matter (PM) below 3,000 ft (compared to the existing situation)*	≥ 20%

* Using AEDT modelling

Steps in applying fuel burn and emissions criteria:

- **Step A** — **Determine the airport and flight characteristics and compare with associated criteria in Table 4.**
  [If all '(1) Airport and flight characteristics' criteria have been met, then proceed to steps B and C to assess '(2) Fuel burn and emissions characteristics'. If these criteria are not ALL met, then no further fuel burn or emissions analysis is required (proceed to Biodiversity assessment)]
- **Step B** — **Using AEDT modelling, calculate any increase in fuel burn, CO_2 and other CO_2-e emissions below 10,000 ft altitude. Compare with Table 4 criteria.**
- **Step C** — **Using AEDT modelling, calculate any increase in NOx, SOx and particulate matter (PM) emissions below 3,000 ft altitude. Compare with Table 4 criteria.**

[25] Runway Code number 4 with Code letter of C, D, E or F. Table 6.2-1 minimum runway width. CASA Manual of Standards Part 139—Aerodromes. https://www.legislation.gov.au/Details/F2012C00095

[27] Civil Aviation Safety Regulations 1998 (CASR). Part 121 - Commercial air transport operations (aeroplanes). "Fitted with more than 9 passenger seats in its approved configuration." https://www.casa.gov.au/standard-page/casr-part-121-commercial-air-transport-operations-aeroplanes

[16] The change in distance flown should consider all changes being undertaken by the proposal (so, if multiple procedures, 20% of all distances, but if a single procedure, 20% of that procedure).

► Outcome:
- **If the criteria in Steps B or C are met , then advice must be sought from the Commonwealth Environment Minister regarding the potential for the change to cause 'significant impact'.**
- **If criteria are not triggered for steps B or C, then no further fuel burn and emissions analysis is required (proceed to Biodiversity assessment).**

3. Biodiversity Assessment

Where the proposed number of aircraft movements associated with ≥ 60 dB(A) noise events is less than 10 per day, no further analysis is required. Where Biodiversity Sensitive Receivers[28] (BSRs) have been identified in the area of the proposed change, then this information should still be presented in the EIA report for information purposes.

Where the proposed number of movements associated with ≥ 60 dB(A) noise events is 10 or more per day, Table 5 provides criteria for determining whether advice shall be sought under the EPBC Act for potentially significant impacts on BSRs, as a result of a proposed change to aircraft overflights.

Table 5: Assessment of Potentially Significant Impacts on Biodiversity Sensitive Receivers (BSRs), as a result of proposed change to aircraft overflights.

Trigger Criteria
Increase of >20% in number of aircraft movements above 60 dB(A).
Increase of >20% in number of aircraft movements above 70 dB(A).
Substantial increase in area of BSR in local area* exposed to noise ≥ 60 dB(A).

* The 'local area' is considered to be a 10km zone either side of the nominal track of the proposed flight path/s.

Steps in assessing biodiversity criteria:

- **Step A** **Identify and classify BSRs including:**
  - Type and status of BSRs in the area where the change has been determined as noticeable, utilising the Commonwealth Matters of National Environmental Significance (MNES) search tool (and other information sources as appropriate); and
  - Noise exposure (in dB(A)) of BSRs overflown by the proposed change.
- **Step B** **Determine extent of potential impacts of proposed change to aircraft overflights, including:**
  - Potential noise level exposure in dB(A) for areas potentially overflown by the proposed change; and

[28] BSRs include: 1) Matters of National Environmental Significance (MNES) listed under the EPBC Act (including World Heritage Properties, Wetlands of International Importance, Commonwealth Marine Environment, the Great Barrier Reef Marine Park, National Heritage Places), and 2) Other sensitive areas which are likely to contain important habitat for EPBC Act listed threatened biota and migratory species or state-listed threatened biota (including nationally important wetlands, State forests, National Parks, other Conservation Reserves listed under State legislation).

- Approximate proportion of BSR habitat overflown by proposed flight path change (with reference to the local extent of the type of BSR potentially affected), where available.

► Outcome:

- **If applicable criteria for any BSR are exceeded (as per the criteria in Table 5), then advice must be sought from the Commonwealth Environment Minister regarding the potential for the change to cause 'significant impact'.**

4. Other EPBC Act Matters

No specific criteria are provided in relation to other categories of potential impacts identified in the EPBC Act definition of the 'environment' (which includes, for example, consideration of potential impacts on heritage values, amenity, people, disadvantaged groups, and the economic or cultural aspects of a place or person).

This does not reflect their relative importance as an assessment issue. However, it is reasonable to assume that the other noise criteria described in the previous sections will serve as a proxy for identifying potentially significant impacts on these matters (e.g. noise impact is considered a reasonable proxy for potential impacts on sensitive communities, including cultural values, amenity and heritage places).

Further details on the methodology for undertaking the assessment of these social and other impacts is provided in the EIA template (Environment Risk Assessment Template C-TEMP0290).

Appendix B Methodology

This EA examines the potential environmental impact of Airservices proposed changes through examination of air traffic movements on the existing and proposed procedures. It includes an assessment of potential environmental impacts such as increased aircraft noise on communities, visual changes in aircraft movements, increased aircraft emissions, heritage sites and potential impacts on Commonwealth Matters of National Environmental Significance (MNES) and heritage sites.

This EA also includes a summary of social data from the area of the proposed change to provide Airservices N&CE Team with information to prepare a social impact assessment as part of their SEP.

Information sources

This assessment is based on the following sources of information:

- Airservices Departure and Arrival Plates (DAPs) for current and proposed procedure changes
- Satellite images (and associated information) from Google Earth Pro, MapInfo and NearMaps
- Data from Airservices Operational Data Analysis Suite (ODAS)
- Commonwealth Matters of National Environmental Significance (MNES) search tool

Aircraft noise modelling

The AEDT was used to model noise impacts of the proposed change. Noise modelling requires input of assumptions to reflect the variability in conditions. These assumptions include:

- Weather conditions – a single set of standard weather conditions based on Australian Bureau of Meteorology (BoM) average data have been modelled. In reality, weather conditions will vary throughout the year.
- Standard aircraft operations – an assumption has been made that each aircraft type will be operated according to a standard Noise, Power, Distance (NPD) curve. In reality, each airline and pilot may operate the aircraft differently, such as using different engine power settings, or retracting landing gear at different times.
- Standard arrival and departure profile – an assumption is made that every aircraft will operate according to a standard approach and departure profile; essentially operating at the same rate of climb or descent. In reality, arrival and departure profiles may vary on an individual basis for a number of reasons, including:
    - Traffic
    - Weather and cloud conditions
    - Pilot requirements
    - Separation and sequencing requirements for Air Traffic Control (ATC).

Environmental assessment criteria

A number of criteria were considered as part of this environmental assessment, including:

- potential aircraft noise and visual impacts on communities, including any newly overflown communities
- potential impact on MNES
- potential impact on heritage and cultural matters, including indigenous heritage
- potential impacts on aircraft emissions.

The assessment criteria adopted by Airservices to determine potential environmental impacts of proposed flight path changes with respect to aircraft noise can be found in Appendix A. These aircraft noise assessment criteria were developed giving consideration to *AS2021:2015 Acoustics—Aircraft noise intrusion—Building siting and construction*, World Health Organisation (WHO) guidance, and the *National Safeguarding Airports Guidelines (NASAG),* 2016.

The section below describes the metrics that have been applied in this environmental assessment, focusing on those metrics that provide analytical insight to best represent the potential impacts of the proposed flight path changes.

Note: Although this assessment does include a summary of social analysis data collected for the areas potentially affected by the proposed ATM changes (see Section Part C:), it does not include a social impact assessment. The social impact assessment is prepared by Airservices N&CE Team as part of their SEP, as described above.

Noise metrics

The following noise metrics were used in this assessment.

LAmax – indicative noise levels

LAmax is a noise metric that shows the maximum noise level of a single noise event associated with a particular flight path. The LAmax noise metric is useful for determining the potential noise change associated with geographical movement of a flight path.

‘Number Above’ metrics (N70and N60)

‘Number Above’ metrics (also known as ‘N Contours’) are an aircraft noise characterisation mechanism used to map noise ‘zones’ around an airport. Number above metrics show the number of noise events above a given noise level. For example, N70 contours would show the number of aircraft noise events greater than 70dB(A).

The former Commonwealth Department of Transport (DOTARS) identified 70dB (A) and 60dB(A) as suitable levels for describing noise impacts given that:

- 70dB (A) is considered to be the external sound level below which no difficulty with reliable communication from radio, television or conversational speech is expected in a typical room with windows open.
- 60dB(A) equates to the indoor design guide level of 50 dB(A) specified in *AS2021:2015 Acoustics – Aircraft noise intrusion – Building siting and construction*, when building attenuation is taken into consideration.

Night and day criteria

The usage of the terms ‘day’ (6:00am to 11:00pm) and ‘night’ (11:00pm to 6:00am) is as per the definition of ‘night’ (11:00pm to 6:00am) used by Australian curfew airports, as defined in the relevant Commonwealth curfew legislation (*Commonwealth Sydney*

Airport Curfew Act 1995). This definition is applied consistently for all Airservices environmental assessments, whether or not a curfew is in place at the specific airport and applies to the Airservices aircraft noise significance criteria provided in Appendix A.

Matters of National Environmental Significance (MNES)

The Commonwealth Department of Environment and Energy (DoEE) Protected Matters Search Tool was used to determine the presence of MNES in the areas below the proposed change. Where MNES were identified using the search tool, the potential impact of aircraft overflights was assessed on an individual basis (for each MNES).