



AMBIDJI
AIR TRANSPORT INNOVATION

**Ararat Wind Farm
Planning Panels Victoria**

Aviation Expert Witness Statement

by

Syd. Herron

18 June 2010

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A.C.N. 053 868 778

Melbourne, Australia

**In the matter of the Ararat Wind Farm
Planning Panels Victoria
Proponent: RES Australia Pty Ltd
Expert Witness Statement of Sydney Bruce Herron
Expert of RES Australia Pty Ltd**

1 Name and address

Sydney Bruce Herron
Senior Associate Aviation and Airports
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2 Area of expertise

- (a) I am a qualified Civil Engineer and an experienced general aviation pilot who has held a multi-engine instrument rating.
 - (b) For the past 7 years I have been involved in wind farm aeronautical studies and qualitative risk assessments for wind farm companies.
 - (c) My qualifications and experience are detailed in Annexure A.
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3 Scope

3.1 Instructions

I have been commissioned by Freehills to undertake the following scope of work:

- 1. Peer review RES' Ararat Wind Farm Aviation Assessment Report dated September 2009 (**RES Aviation Assessment**);
- 2. Review and familiarise myself with the aviation issues raised in the submissions;
- 3. Prepare an Expert Witness Statement for the Panel Hearing that independently assesses the aviation issues for the Ararat Wind Farm; and
- 4. Attend the Panel Hearing.

3.2 Process and Methodology

The process followed in forming my opinions and preparing my expert witness statement was:

1. A site visit to the proposed Wind Farm area, Ararat Aerodrome, Ararat and its environs;
2. A review of the RES Aviation Assessment;
3. Consideration of input from Ambidji's sub-consultant airspace planner on the RES Aviation Assessment;
4. A review by both Ambidji's sub-consultant and myself of submissions 11 and 15;
5. A review of the other submissions for any aviation issues; and
6. The preparation of my Expert Witness Statement in regard to the content and issues raised in:
 - a. RES Aviation Assessment;
 - b. The submissions.

3.3 Reports Reviewed to Prepare my Expert Witness Statement

The reports and documentation that I have reviewed in preparing my Expert Witness Statement are listed in Annexure B but in particular, were:

- RES Aviation Assessment.
- The submissions, with particular focus on:
 - A letter from Mr. Peter J. O'Rorke to the Victorian Minister for Planning dated 11 December 2008 (**Submission Number 11**).
 - A letter from Ararat Rural City Council (ARCC) to the Victorian Minister for Planning dated 28 April 2010 (**Submission Number 15**).

3.4 Persons assisting me with this work

Mr Peter White, an Ambidji airspace sub-consultant, provided input to me in regard to aspects of the RES Aviation Assessment and the technical consideration of any impacts of the existing or expanded Ararat Aerodrome Obstacle Limitation Surface (**OLS**).

3.5 Any additional work undertaken

A diagram was prepared by Peter White depicting the location of the OLS surfaces for Code 1, 2 and 3 runways at Ararat Aerodrome to the closest wind turbine (T63).

3.6 Consultation

I was involved in discussions regarding aviation issues associated with the Ararat Wind Farm with:

- Mr. Geoff Waller, Ararat Airport Manager, of the Ararat Rural City Council, and
- Mr Bryan Fitzgerald of Airport Survey Consultants, who undertakes the Council's annual obstacle limitation survey.

3.7 Assumptions

No material assumptions were made in forming my opinions.

3.8 Limitations and Exclusions

There were no limitations that materially impacted on forming my opinions, albeit, I did not visit One Tree Hill or Mount Langi Ghiran due to there being minimal visibility (due to inclement weather) precluding a visual appreciation of the wind farm area from these locations.

I have not excluded any issues of relevance in forming my opinion on the requested issues.

4 Findings

4.1 RES Aviation Assessment

I have reviewed RES Aviation Assessment and have concluded that RES has followed a rational approach in assessing the impacts on the existing aerodromes at Ararat and Stawell.

It is my view that the RES Aviation Assessment is correct in regard to the location and approximate distance of the nearest point of the wind farm to the Ararat Aerodrome. It is my view that the RES Aviation Assessment is also correct in its assessment that the current OLS at Ararat is not infringed upon by the wind farm.

I note, however, that the RES Aviation Assessment advises in its introduction that “This report provides an assessment of the impact of the proposal upon the existing and future aviation operations of the region”. I have not found any assessment of the potential impact of the wind farm in the RES Aviation Assessment on the future aviation operations in the region.

I have, however, addressed this issue and provide my opinion as to whether there is a potential future impact from an expanded aerodrome in Section 4.2 (a).

My specific views and opinions in relation to each section of the RES Aviation Assessment follow.

(a) Introduction

I have considered the main points in the Introduction and I agree that:

- The only aerodromes with OLS within 30m km of the wind farm are Ararat and Stawell;
- The approximate distance of the nearest turbine to the centre of the Ararat Aerodrome is some 6km;
- The approximate distance of the nearest turbine to the centre of the Stawell Aerodrome is some 25km; and
- The current OLS at Ararat Aerodrome is not infringed upon by the wind farm.

- The current OLS at Stawell Aerodrome is not infringed upon by the wind farm.

(b) Consultations

It is my opinion that RES has undertaken sufficient and adequate consultations with the key agencies and airports in the region to make its assessment on whether the wind farm will have any impacts on the existing airports and aviation operations in the region.

Whilst RES advises that it has had extended dialogue with the Ararat Rural City Council, I note that there is no discussion of any impact of the proposed wind farm on potential future upgrades to Ararat Aerodrome. I also note that the RES report provides advice on consultations with Ararat Aerodrome, Stawell Aerodrome, Airservices Australia, Civil Aviation Safety Authority, Department of Defence and the Royal Flying Doctor Service. There is no advice included in regard to the outcomes of any consultations with other aviation industry operators in the region.

(c) Nacelle Lighting

In my view RES has correctly followed the requirements of the previous AC139 – 18(0) and produced a lighting plan that has been endorsed by CASA on 16 July 2008. RES is correct that this AC was subsequently withdrawn, pending a review, and CASA will not be assessing wind farm developments beyond the limits of the OLS.

It is correct that, in the AC's absence, CASA's view is that the proponent may still have a duty of care to local aviators to ensure the turbines are conspicuous in all conditions.

However, CASA has previously stated that they are satisfied as to the conspicuity of turbines in daylight and low light conditions. CASA has determined that by day, large wind turbines are sufficiently conspicuous due to their shape and size, provided the colour of the turbine is of a contrasting colour to the background.

Therefore it is my view that any duty of care considerations by the proponent will be mainly focussed on whether to now proceed to light the wind farm. In this regard and as a function of duty of care, there are now a number of wind farm proponents that are undertaking qualitative risk assessments to consider whether lighting of the wind farm is necessary. Similarly, a number of operators of existing lit wind farms have turned their lights off or are having qualitative risk assessments prepared to consider turning the lights off.

RES refers to a discussion paper released by the Department of Infrastructure, Transport, Regional Development and Local Government in June 2009 entitled "Safeguards for Airports and the Communities around Them". I would emphasise that this is only a discussion paper at this time and that the reference to turbines over 152m being a potential hazard does not necessarily imply that this will be a future trigger height for CASA notifications.

(d) Conclusion

It is my view that the RES conclusions are sound and supported by the information provided in the body of the report in respect of the existing OLS for Ararat and Stawell Aerodromes.

Those conclusions are that:

- The turbines are located outside the existing OLS for Ararat and Stawell Aerodromes and all other aerodromes;
- Consultation has taken place with the relevant airports, key aviation regulatory bodies and some aviation industry operators;
- The key stakeholders have not raised any objections to the proposal, and
- A CASA-endorsed nacelle light plan has been developed, to be implemented if required.

The RES report, however, does not draw any conclusions in regard to the potential for the wind farm to impact the OLS from an upgraded Ararat Aerodrome in the future.

I have, however, addressed this issue and provide my opinion as to whether there is a potential future impact from an expanded aerodrome in Section 4.2 (a).

It is my opinion that the RES Aviation Assessment Report has followed an appropriate process and has correctly assessed that the wind farm does not impact on the existing aerodromes and their physical and operational characteristics in the region.

In addition it is my opinion that RES has correctly identified that, notwithstanding the CASA approval to the obstacle lighting plan, the withdrawal of the AC means there is no obligation on RES to proceed with lighting the wind farm.

4.2 Response to Key Submissions

(a) Submission 11

I have read and reviewed the letters (Submission 11) from Mr Peter O'Rorke which include;

- A covering letter to the Minister for Planning dated 21 April 2010;
- A letter to the Minister for Planning dated 30 December 2009;
- A letter to the Minister for Planning dated 11 December 2008;
- A letter to the Ararat Rural City Council dated 11 March 2008, and
- A follow up letter to the Ararat Rural City Council dated 8 December 2008

My comments, views and opinion on the key points of his objections follow.

Ararat Aerodrome – Code 1 Runway

Mr O’Rorke states that the OLS for Ararat Aerodrome is based on a Code 2 runway. This is incorrect as:

- CASA defines the aerodrome as having Code 1 runways in the AIP-ERSA¹ publication; and
- A telephone conversation with Mr Bryan Fitzgerald, the ARCC aerodrome inspection consultant, confirmed that this remains the case.

Ararat Aerodrome Future Expansion – Wind Farm Impact on OLS

Mr O’Rorke expresses his concern that the aerodrome may need to have its runway extended in the future and that the OLS would then be based on a Code 3 runway. He adds that “nobody knows when the next 20 to 50 years would require the Aerodrome to have the extension done.”

I make the following comments in regard to this element of his objections:

- Runway 12/30 has an existing length appropriate for a Code 3 runway, but its width of only 18m places it into the Code 1 area only. An expansion of the runway width will be required, together with the relocation of the runway lights, to achieve either a Code 2² or Code 3³ runway.
- However this would be a relatively high cost project that would need to be based on significant changes in circumstances and aviation demand;
- Discussions with Mr Geoff Waller, Airport Manager, suggest that existing fixed wing powered aircraft operations are very low, that there is little foreseen change in demand in the future and that questions are now being asked in Ararat Rural City Council as to why the airport should be retained;
- Notwithstanding the level of future demand, the OLS for a Code 1, 2 and 3 runways at Ararat Aerodrome in relation to the closest turbine (T63) have been plotted and shown in Figure 4.1⁴. This figure shows that T63 (and hence all proposed turbines) are outside the limits of a Code 3 OLS.

¹ Aeronautical Information Publications (AIP), Enroute Supplement Australia (ERSA), dated 3 June 2010

² To be a Code 2 runway the width would need to be increased to 23m

³ To be a Code 3 runway the width would need to be increased to 30m

⁴ The diagram shows the outer edge of the Conical Surface for each CN OLS in relation to the location of T63 which was determined from Google Earth

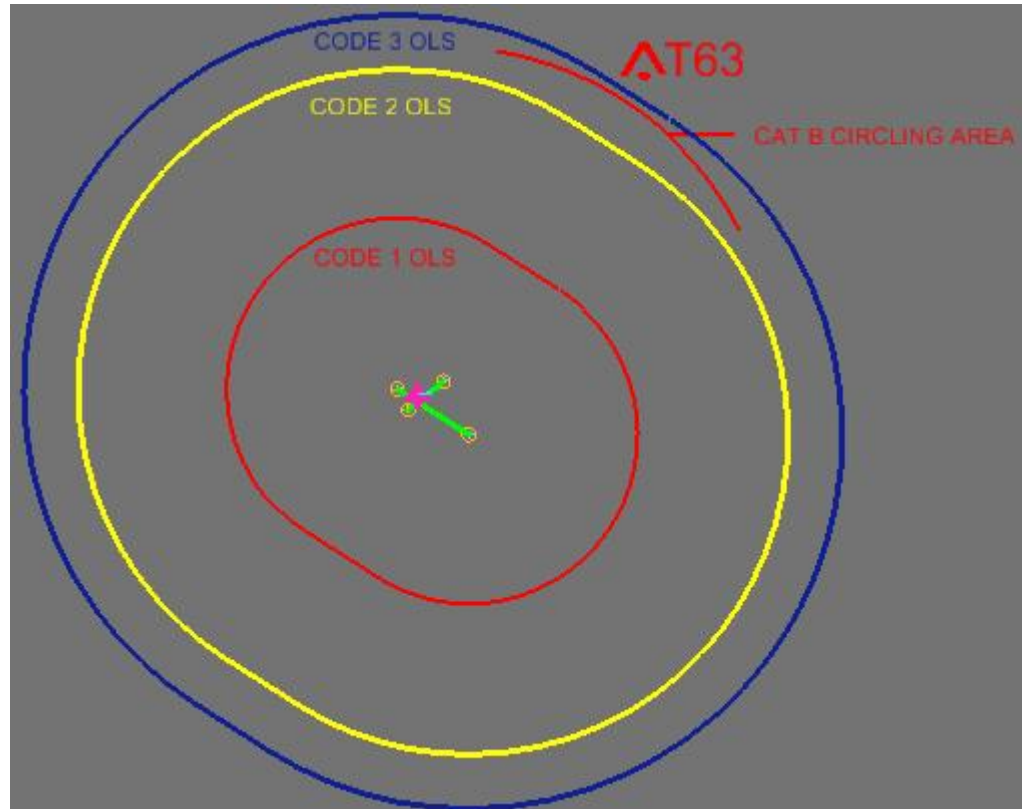


Figure 4.1 Code 1, 2 and 3 Runway OLS versus Turbine T63

Based on Figure 4.1, it is my opinion that the presence of the wind farm will not impact on any OLS for any conceivable expansion of Ararat Aerodrome.

Ararat Aerodrome – Future GPS Approach

Mr O’Rorke states that the Ararat Rural City Council would need “*to consider future expansions of the main runway and also GPS approach to the main runway*”.

If an RNAV (GNSS) (i.e. a GPS approach) non- precision approach was designed, it would only be for the main runway (RWY 12/30). This would take into account the wind farm, if it existed and the terrain of Mt Langi Ghiran and Mt Buangor, the highest terrain likely to determine the approach path and Minimum Descent Altitude. As the wind farm is in the vicinity of both Mt Langi Ghiran and Mt Buangor, and at a lower altitude, the effect of these hills would overshadow any effect from the wind farm.

The closest section of the Category B Circling Area to T63 is also shown in Figure 4.1; if such a circling area was to be promulgated in association with an instrument approach to RWY 12/30 at Ararat Aerodrome.

Ararat Aerodrome – Restriction of Use

Mr O’Rorke suggests that the Air Ambulance (fixed wing) and South Eastern Royal Flying Doctor Service (fixed wing) aircrafts will “*more than likely not use the Ararat aerodrome at night if the wind farm is so close to it.*”

I find that this comment is not supported by the geometry shown in Figure 4.1 as the protective OLS for the existing and conceivable future code runways are not impacted by the wind farm turbines. In addition, it is not supported by the Royal Flying Doctor Service SE Section advice that they are comfortable with the turbine locations since all turbine locations are outside the OLS.

Reporting of Tall Structures - CASA AC 139-08(0) and CASR 139.360/365

Mr. O’Rorke has interpreted the above AC and regulations as meaning that wind farms are not normally (allowed) within 15km of an aerodrome.

The AC states in part:

6.1 CASR 139.360 requires the operator of a certified or registered aerodrome to notify CASA of any development or proposed construction in the vicinity of the aerodrome (normally 15 km) that is likely to be a hazard to air navigation.

In areas remote from an aerodrome, CASR 139.365 requires the owner of a structure (or proponent of a structure) that will be 110m or more above ground level to inform CASA.

There is no CASA regulation or advisory limitation on the distance of a proposed obstacle from an aerodrome. The requirement is for an airport operator and/or a proponent to notify CASA, in accordance with the above.

Mr. O’Rorke’s statement is not correct.

It is my opinion that Mr. O’Rorke’s key objections in his submission, which I have addressed above, are unsupportable.

(b) Submission 15

I have read and reviewed the letter (Submission 15) to the Minister for Planning from the Ararat Rural City Council dated 27 April 2010.

The letter raises concerns in regard to the location and design of obstacle lighting potentially degrading the amenity of the locality; particularly in regard to Gum San, One Tree Hill Lookout and Mount Langi Ghiran.

In my opinion it is likely that the obstacle lights (if installed) will be visible from the three observation points, even if baffled. The social impact of this is outside of my expertise to comment on and there are other consultants who deal specifically with these landscape and visual impact issues.

(c) Other Submissions

I have read and reviewed the balance of the twenty (20) submissions provided to me and identified references to aviation issues only in submissions 1 and 18.

Submission 1

The CFA, in responding with no specific objections, requested that due cognisance be taken of the CFA Emergency Guidelines for Wind Farms (Version 3, April 2007).

Under the section “Aircraft” it was stated:

Fire suppression aircraft operate under “Visual Flight Rules”. As such, fire suppression aircraft only operate in areas where there is no smoke and during daylight hours. The standard distance of 300 metres between wind turbines would allow aircraft to operate around a wind farm given the appropriate weather and terrain conditions.

Wind turbines, similar to high voltage transmission lines, are part of the landscape and would be considered in the incident action plan.

My opinion is that the layout of the proposed wind farm meets the above guidelines in respect of the aircraft section, which is implicit in the CFA response containing no objections.

Submission 18

WJ and LO Stewien note the reference to the potential need for obstacle lighting and referral to CASA in the Notification Report, given the turbines are greater than 110m above ground level.

My comment is that RES has subsequently undertaken a lighting layout and that this has been endorsed by CASA. My opinion is that RES has met the reporting requirements and approval process as required by CASA.

4.3 Summary of Opinions

My opinions are summarised in Table 4.1 below.

Instruction 1	Peer Review of RES Ararat Wind Farm Aviation Assessment Report.
Opinion:	<p>It is my opinion that the RES Aviation Assessment Report has followed an appropriate process and has correctly assessed that the wind farm does not impact on the existing aerodromes in the region.</p> <p>In addition it is my opinion that RES has correctly identified that, notwithstanding the CASA approval to the obstacle lighting plan, the withdrawal of the AC means there is no obligation on RES to proceed with lighting the wind farm.</p>

Instruction 2	Review and familiarise myself with the aviation issues raised in the submissions and in particular submission numbers 11 and 15.
Opinion:	I have provided my opinions on submissions 11 and 15 under Instruction 3.
Instruction 3	Address the aviation issues raised in the submissions.
Opinion:	<p>Submission 11:</p> <p>It is my opinion that Mr. O’Rorke’s objections are unsupportable as:</p> <ul style="list-style-type: none"> • Ararat Aerodrome is a Code 1 runway, not a Code 2 runway; • A conceivable, but unlikely, expansion to a Code 3 runway would have an OLS that does not overly the wind farm; • Any future GPS approaches would be designed taking into account the local terrain and the wind farm; • The wind farm will not impact on night operations, including emergency services fixed wing operations, and • Wind farms can be located within 15km of an aerodrome. <p>Submission 15:</p> <p>In my opinion it is likely that the obstacle lights (if installed and baffled) will be visible from the three observation points, but the social impact of this is outside of my expertise to assess.</p> <p>Submission 1:</p> <p>My opinion is that the layout of the proposed wind farm meets the CFA guidelines in relation to aircraft operations.</p> <p>Submission 18:</p> <p>My opinion is that RES have met the reporting requirements and approval process as required by CASA.</p>

Table 4.1 Summary of Opinions

5 Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Planning Panel.

A handwritten signature in black ink, appearing to read 'S. Herron', with a long, sweeping underline.

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Annexure A - Qualifications

My qualifications and experience, that are both relevant and appropriate in my providing this expert opinion as per the Letter of Instruction, are as follows.

I am a qualified civil engineer as well as a pilot who has held a multi-engine aircraft instrument rating and has extensive experience in flying single and twin aircraft throughout Australia and parts of Papua New Guinea.

I am an aviation and airports specialist and I have worked in the industry for some 31 years. My experience includes being:

- A senior Airport Planner for the Commonwealth Government;
- Planning Manager for the Federal Airports Corporation at Melbourne Airport;
- Director for Aviation for the Victorian Government - an aviation development and investment role;
- Seconded to Ansett Airlines – facilities and business planning;
- General Manager of Airbiz, an Australian aviation consulting practice;
- Private consulting to the World Bank and Asian Development Bank on the development of aviation infrastructure in third world countries; and
- Senior Associate of Ambidji, an Australian aviation consulting practice.

Relevant examples of my airport planning and development work at small or medium aerodromes include:

- Warrnambool Airport, Victoria;
- Ravensthorpe, WA;
- All of the Fiji Island airports;
- Samoa's Airports;
- Ofu Island Airport, American Samoa;
- Snowy Mountains Airport, NSW;
- Phillip Island Airport, Victoria; and
- Benalla Airport, Victoria.

Relevant examples of my familiarity and use of CASA regulations, standards and guidelines include:

- Their application to the master planned layouts and airspace protection at airports;
- Their application in aeronautical studies I have prepared for proponents of gas fired peaking power plants;
- Their application in aeronautical studies I have prepared for proponents of wind farms; and
- Their application in aeronautical studies I have prepared for proponents of high rise buildings in the vicinity of major airports.

Specific examples of my wind farm work include:

- Gullen Range Wind Farm - Joint Expert Witness Report;
- Berrybank Wind Farm - Provision of and support to Aerial Application Expert Witness;
- Macarthur Wind Farm - Aeronautical Impact Assessment
- Dollar Wind Farm - Aeronautical Impact Assessment
- Dandaragan Wind Farm - Aeronautical Impact Assessment
- Dandaragan Wind Farm - Aerial Application Assessment
- Lexton Wind Farm - Aeronautical Impact Assessment
- Lexton Wind Farm - Qualitative Risk Assessment
- Waubra Wind Farm - Qualitative Risk Assessment
- Stockyard Hill Wind Farm - Responses to planning submissions
- Meteorological Monitoring Masts - Qualitative Risk Assessments

Sydney Bruce Herron

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Annexure B – Documentation Considered

- Ararat Wind Farm Planning Permit Application - Supporting documentation:
 - Volume I Main Report
 - Volume II Specialist Assessments
 - Landscape & Visual Assessment including:
 - Photomontage Viewpoint 01 (Buangor-Ben Nevis Road, near Warrak Road)
 - Photomontage Viewpoint 08 (One Tree Hill Lookout)
 - Photomontage Viewpoint 14 (Green Hill Lake Road / Camping Area)
 - Photomontage Viewpoint 16 (Northern Melbourne Institute of TAFE Campus)
 - Photomontage Viewpoint 19 (Roadside Rest Stop on Pyrenees Highway)
 - Photomontage Viewpoint 20 (Buangor-Ben Nevis Road, near Pyrenees Highway)
 - RES Aviation Assessment
 - CASA-Endorsed Nacelle Lighting Plan
 - Volume III A3 size Figures and Photomontage

- Submissions, Ararat Wind Farm: 1 - 20

- Submission 1 - CFA

- Submission 11 - Mr O'Rourke
 - A covering letter to the Minister for Planning dated 21 April 2010;
 - A letter to the Minister for Planning dated 30 December 2009;
 - A letter to the Minister for Planning dated 11 December 2008;
 - A letter to the Ararat Rural City Council dated 11 March 2008, and
 - A follow up letter to the Ararat Rural City Council dated 8 December 2008

- Submission 15 - Ararat Rural City Council dated 27 April 2010.

- Airspace Specialist Input and OLS Diagram - Peter White

- CASA Endorsed Nacelle Lighting Plan - Letter of Approval

- Aeronautical Information Publications (AIP), Enroute Supplement Australia (ERSA), dated 3 June 2010

- AC139 – 18(0) Obstacle lighting & Marking of Wind Farms, September 2004 (now withdrawn)

- AC139 – 08(0) Reporting of Tall Structures, April 2005

- Civil Aviation Safety Regulations (1998) CASR 139.360

- Civil Aviation Safety Regulations (1998) CASR 139.365

- Safeguards for airports and the communities around them, Discussion Paper, Department of Transport, Infrastructure, Regional Development and Local Government, July 2009.