

Appendix 5

Night lighting plan

Jon Williamson
Managing Principal
Ramboll Australia Pty Ltd

By email: jwilliamson@ramboll.com

Our ref: 104101-01

Dear Jon

Re: Valley of the Winds – Wind Turbine Obstacle Lighting

This correspondence is in response to submissions from the Civil Aviation Safety Authority (CASA) in relation to the Valley of the Winds Wind Farm, specifically regarding obstacle lighting on the wind turbines.

References

- Civil Aviation Safety Authority, *Part 139 (Aerodromes) Manual of Standards 2019*, dated 5 September 2019 (MOS 139)
- National Airports Safeguarding Framework (NASF) Guideline D: *Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation*, version 4.1.3 dated 15 July 2012.

Background

Aviation Projects prepared an aviation impact assessment (AIA) for the Valley of the Winds Wind Farm and concluded that it would not require obstacle lighting to maintain an acceptable level of safety to aircraft.

CASA has reviewed the AIA and recommended obstacle lighting for the wind turbines.

This obstacle lighting design has been prepared in response to this submission.

Aviation. From the ground up.

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Part 139 (Aerodromes) Manual of Standards 2019, dated 5 September 2019

The current version of MOS 139 came into effect in August 2020. Section 9.31 (8) and (9) specifies as follows in relation to obstacle lights for wind farms:

- (8) Subject to subsection (9), for wind turbines in a wind farm, medium-intensity obstacle lights must:
 - (a) mark the highest point reached by the rotating blades; and
 - (b) be provided on a sufficient number of individual wind turbines to indicate the general definition and extent of the wind farm, but such that intervals between lit turbines do not exceed 900 m; and
 - (c) all be synchronised to flash simultaneously; and
 - (d) be seen from every angle in azimuth.

Note This is to prevent obstacle light shielding by the rotating blades of a wind turbine and may require more than 1 obstacle light to be fitted.
- (9) If it is physically impossible to light the rotating blades of a wind turbine:
 - (a) the obstacle lights must be placed on top of the generator housing; and
 - (b) a note must be published in the AIP-ERSA indicating that the obstacle lights are not at the highest position on the wind turbines.

MOS 139 allows for obstacle lights to be provided on a sufficient number of individual wind turbines to indicate the general definition and extent of the wind farm, with intervals between lit turbines not exceeding 900 m.

National Airports Safeguarding Framework (NASF) Guideline D

NASF Guideline D provides guidance to State/Territory and local government decision makers, airport operators and developers of wind farms to jointly address the risk to civil aviation arising from the development, presence and use of wind farms and wind monitoring towers.

Paragraphs 35 and 36 provide guidance in relation to obstacle lighting for wind turbines:

35. When lighting has been recommended by CASA to reduce risk to aviation safety, medium - intensity obstacle lights should be used. Where used, lighting on wind farms should be installed:

- (a) to identify the perimeter of the wind farm;*
- (b) respecting a maximum spacing of 900m between lights along the perimeter, unless an aeronautical study shows that a greater spacing can be used;*
- (c) where flashing lights are used, they flash simultaneously; and*
- (d) within a wind farm, any wind turbines of significantly higher elevation are identified wherever located.*

36. To minimise the visual impact on the environment, obstacle lights may be partially shielded, provided it does not compromise their operational effectiveness. Where obstacle lighting is provided, lights should operate at night, and at times of reduced visibility. All obstacle lights on a wind farm should be turned on simultaneously and off simultaneously.

Current approach to obstacle lighting arrangements

In applying the requirements of MOS 139 or NASF Guideline D in relation to obstacle lighting on wind turbines, and in particular the 900 m interval, it is our experience that approximately half of the wind turbines are nominated to have an obstacle light.

Civil Aviation Safety Advice

Following a request for clarification about the obstacle lighting situation, Matthew Windebank, an Aerodrome Engineer in the Civil Aviation Safety Authority's (CASA) Airspace Protection – Air Navigation, Airspace and Aerodromes Branch, provided the following advice dated 25 May 2022:

The proposed wind farm will comprise approximately 148 wind turbines with a maximum tip height of approximately 250 m (853 ft) AGL. With regard to Visual Flight Rules (VFR) operations, pilots are permitted to fly as low as 500 ft AGL and may need to fly lower due to weather, emergency situations or aircraft performance issues. The turbines will reach to a height of 853 ft AGL, and therefore the turbine blades will infringe navigable airspace by 353 ft and may impact VFR aircraft operating in the vicinity of the proposed turbines.

...

Due to the height proposed AGL, CASA considers the proposed wind farm likely be a hazard to aviation safety and recommends that the wind farm is obstacle lit. While international standards and the NASF guideline recommend 2,000 candela lighting intensity, CASA would accept 200 candela lighting intensity based on trial installation at another site where 200 CD was found to be sufficient in areas with low backlighting.

To minimise lighting impact on local residents CASA would also recommend the installation of radar activated hazard lights or lighting activated by low visibility measuring equipment. If the lighting fails, it should fail in the 'on' condition until it can be rectified.

Proposed approach to obstacle lighting for Valley of the Winds Wind Farm

Based on CASA's advice and the guidance in NASF Guideline D relating to obstacle lighting on wind turbines, it is suggested that the nominated wind turbines in the Valley of the Winds Wind Farm have 200 cd low intensity steady red obstacle lighting, as illustrated in the following Figures.

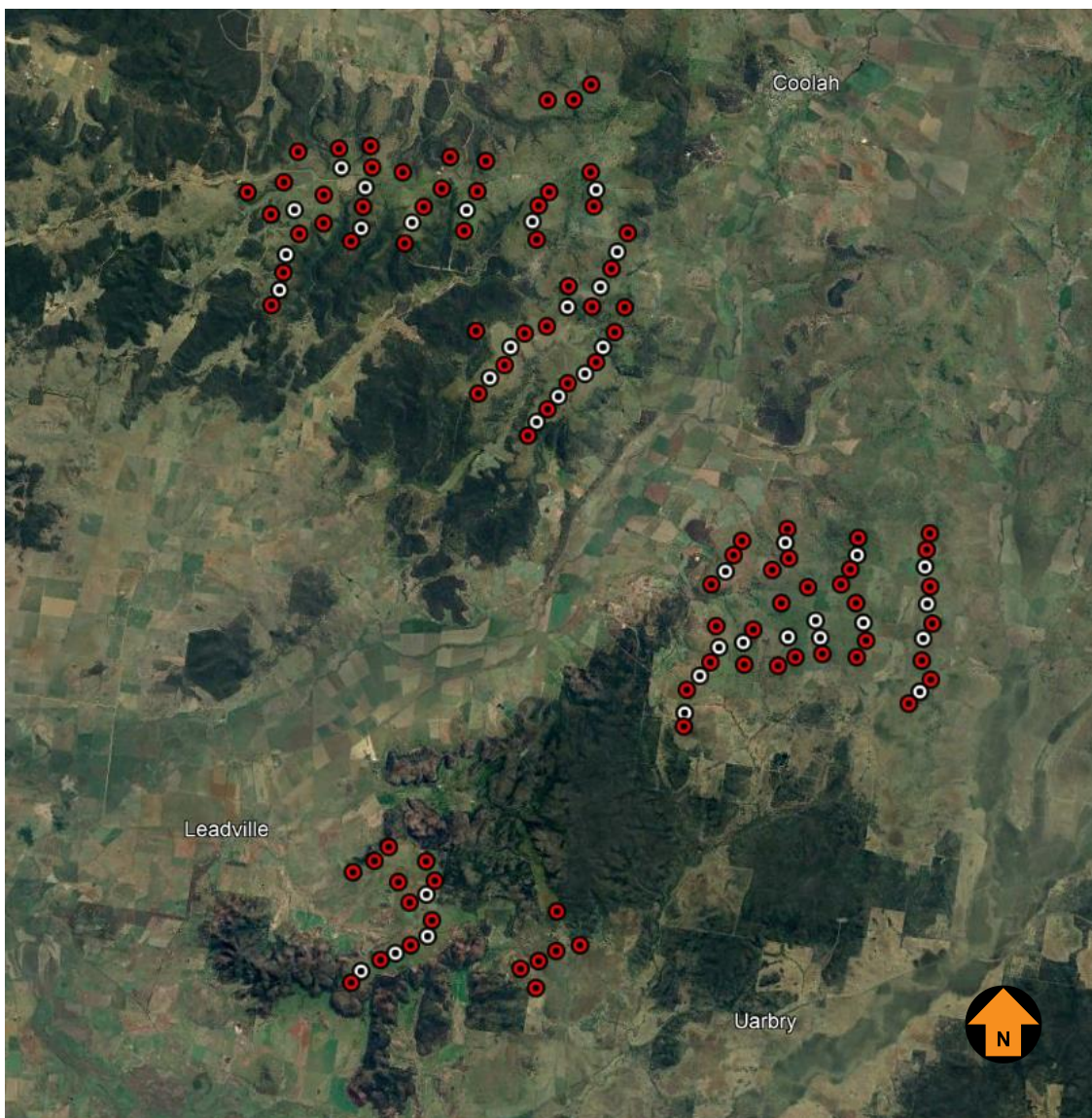


Figure 1 - Overall view of proposed obstacle lighting layout

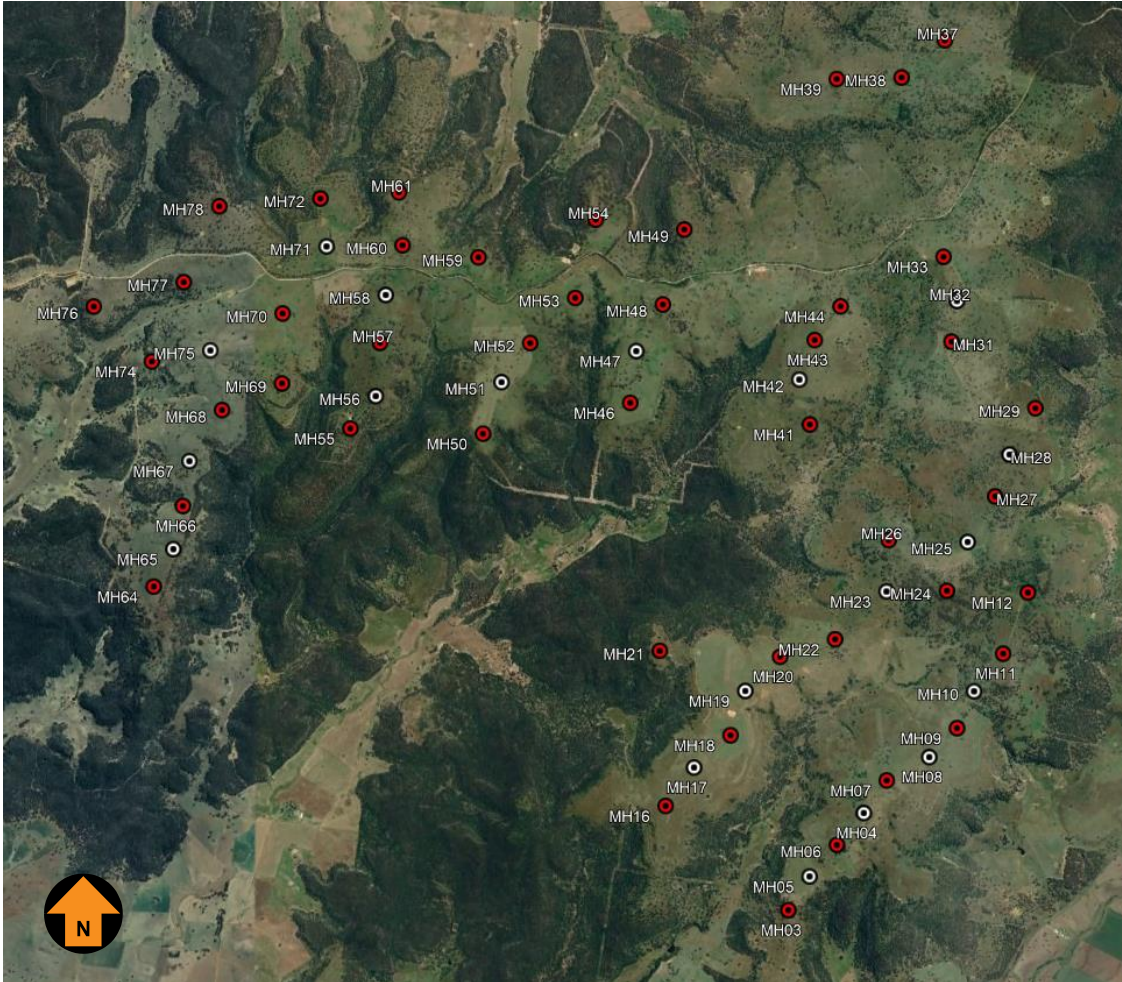


Figure 2 - Northern section - MH03, 06, 07, 09, 11, 12, 16, 18, 20, 21, 22, 24, 26, 27, 29, 31, 33, 37, 38, 39, 41, 43, 44, 46, 48, 49, 50, 52, 53, 54, 55, 57, 59, 60, 61, 64, 66, 68, 69, 70, 72, 74, 76, 77, 78.

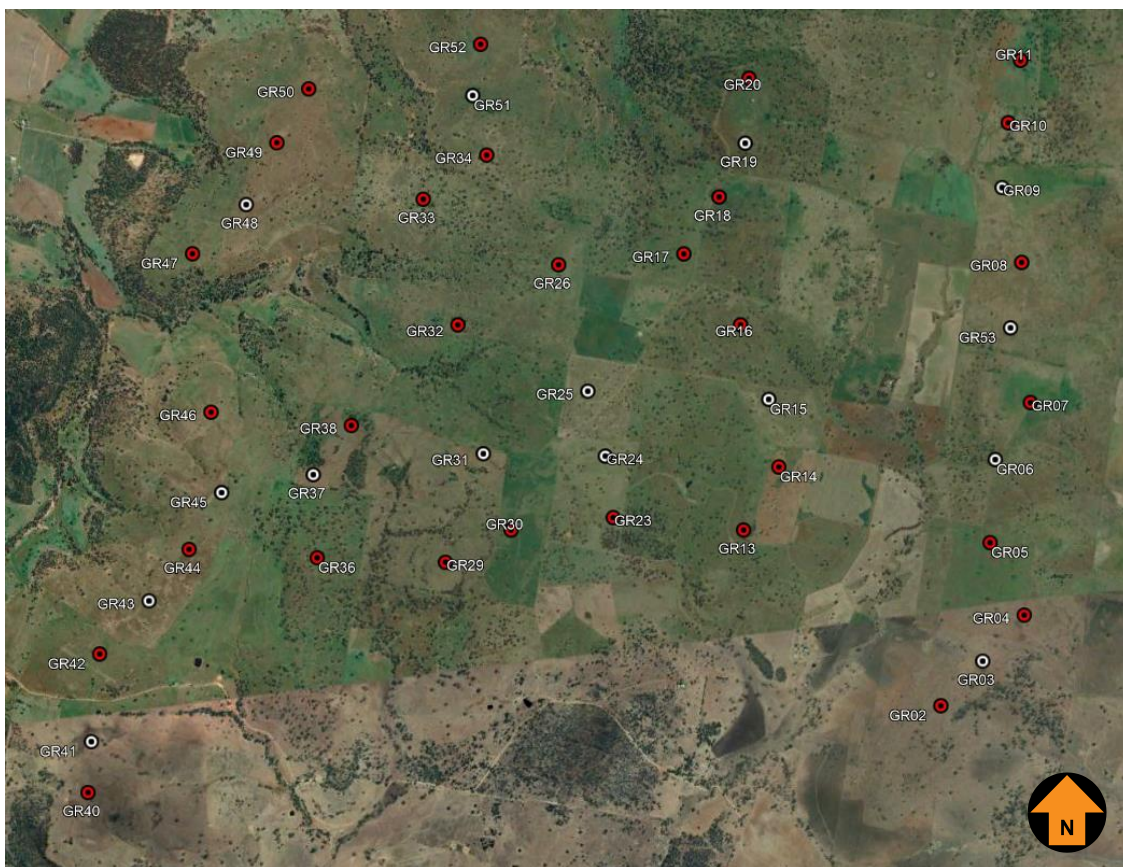


Figure 3 - Eastern section – GR02, 04, 05, 07, 08, 10, 11, 13, 14, 16, 17, 18, 20, 23, 26, 29, 30, 32, 33, 34, 36, 38, 40, 42, 44, 46, 47, 49, 50, 52.

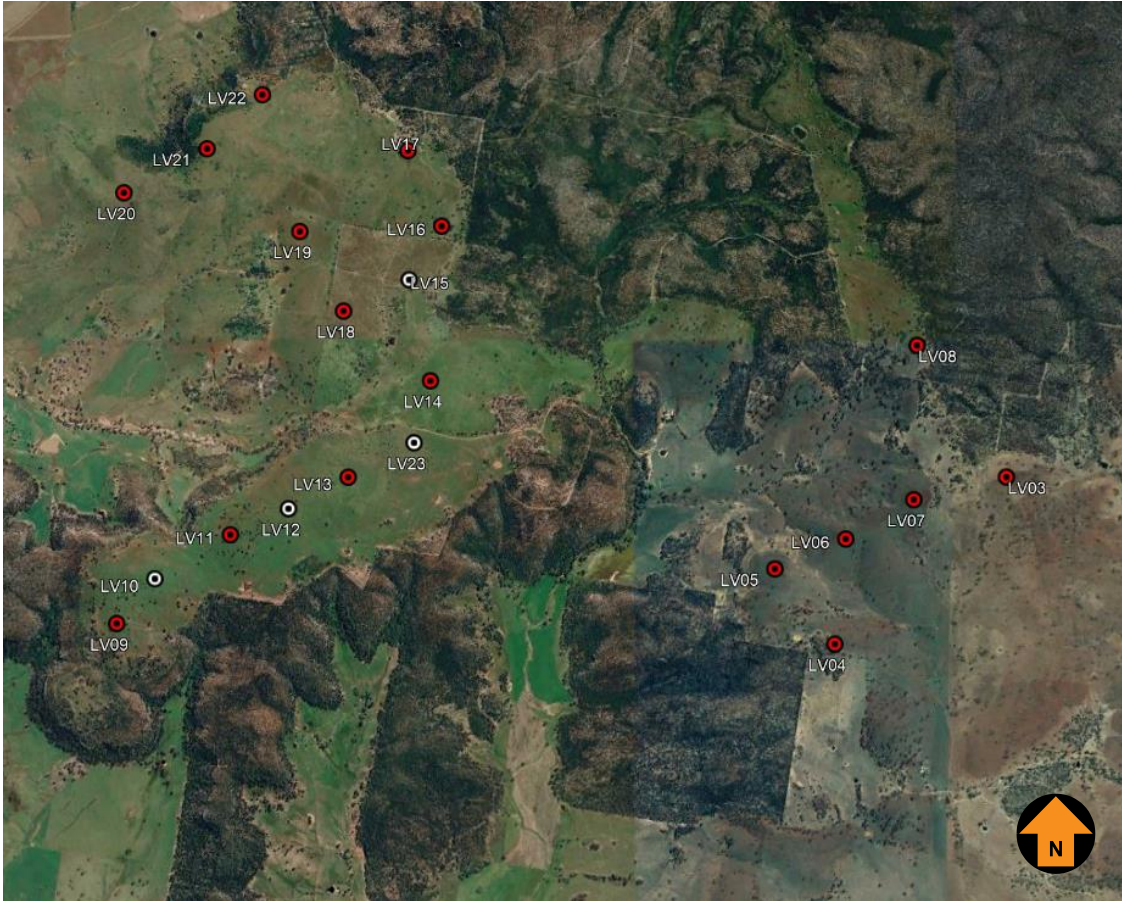


Figure 4 - Southern section – LV03, 04, 05, 06, 07, 08, 09, 11, 13, 14, 16, 17, 18, 19, 20, 21, 22.

If you wish to clarify or discuss the contents of this correspondence, please contact me on 0417 631 681.

Kind regards



Keith Tonkin

Managing Director

02 February 2023