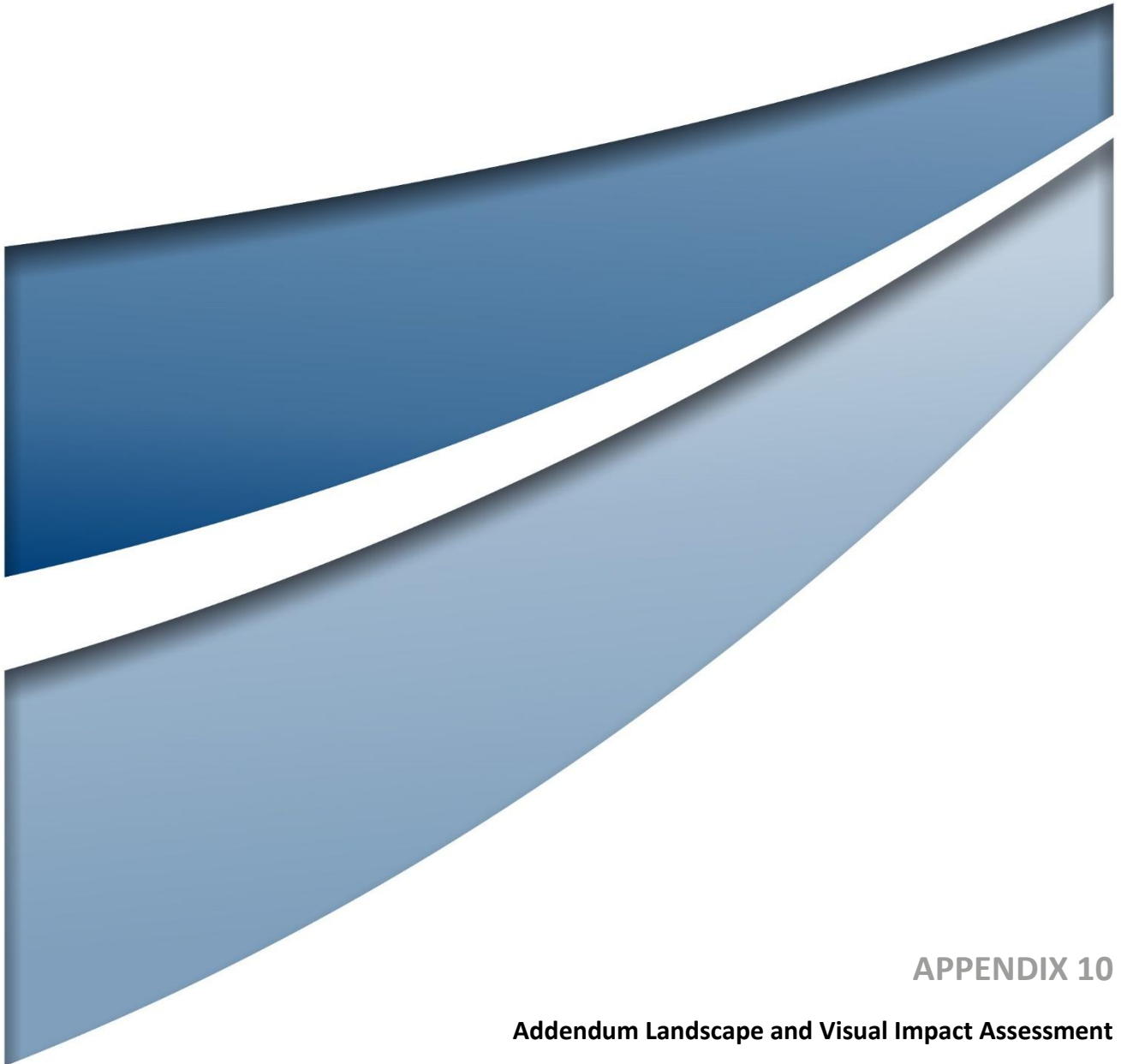




APPENDIX 10

Addendum Landscape and Visual Impact Assessment



14th April 2025

Junction Rivers Wind Farm (SSD-30448824)

Addendum to Landscape Visual Impact Assessment (LVIA)

1.0 Introduction:

Moir Studio (Moir Landscape Architecture Pty Ltd) prepared a Landscape and Visual Impact Assessment (LVIA) for the proposed Junction Rivers Wind Farm Project (SSD-30448824) in May 2024. The LVIA formed part (Appendix 9) of the Environmental Impact Statement (EIS) which was publicly exhibited between Tuesday 16th July 2024 and Monday 12th August 2024.

The purpose of this LVIA addendum is to provide a response to the agency advice received from Civil Aviation Safety Authority (CASA). CASA's advice outlined that it considers the Project to be a hazard to aviation safety, as such would require that the Project has aviation lighting installed. This LVIA addendum provides an overview of the impacts resulting from the lighting and provides recommendations for mitigating anticipated visual impacts.

2.0 Overview of Project Lighting Requirements:

Since the lodgement of the EIS, further details regarding obstacle lighting requirements have been provided.

At the time of preparing the LVIA, the Aviation Assessment for the Project determined obstacle lighting of turbines was not a requirement for the Project. During the exhibition phase of the Project, CASA reviewed the Project and provided a recommendation that the obstacle lighting be installed on the nacelle of turbines with a 200 candela intensity. Below is an excerpt from CASA's submission (dated 21/08/2024):

CASA considers the proposed wind farm will be a hazard to aviation safety and recommends that the wind farm is obstacle lit with steady medium-low intensity red obstacle lighting in accordance with the National Airports Safeguarding Framework Guideline D 'Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation' National Airports Safeguarding Framework Principles and Guidelines (infrastructure.gov.au) and section 9.31 of Part 139 Aerodromes Manual of Standards Part 139 (Aerodromes) Manual of Standards 2019 (legislation.gov.au) (lower level lights on the turbine support columns are not essential).

International standards require 2,000 candela lighting intensity on the nacelle housing (also recommended in the NASF guideline) and 200 candelas at the mid-point of the turbine mast. CASA recommends that 200 candela as a minimum intensity lighting on the nacelle would suffice (due mainly to the lack of background lighting in the vicinity of the turbines). The obstacle lighting should be monitored to alert the wind farm operator of any outage and at

least some of the obstacle lights remain on during an outage. CASA is prepared to review a lighting plan that indicates which turbines are proposed to be lit.

In accordance with the recommendation of CASA, Aviation Projects have prepared an Aviation Obstacle Lighting Plan. The plan proposes a total of 36 WTGs (12 WTGs in Stage 1 and 24 WTGS in Stage 2) to be lit with 200 candela (cd) low intensity obstacle lighting (refer to **Figure 1**).

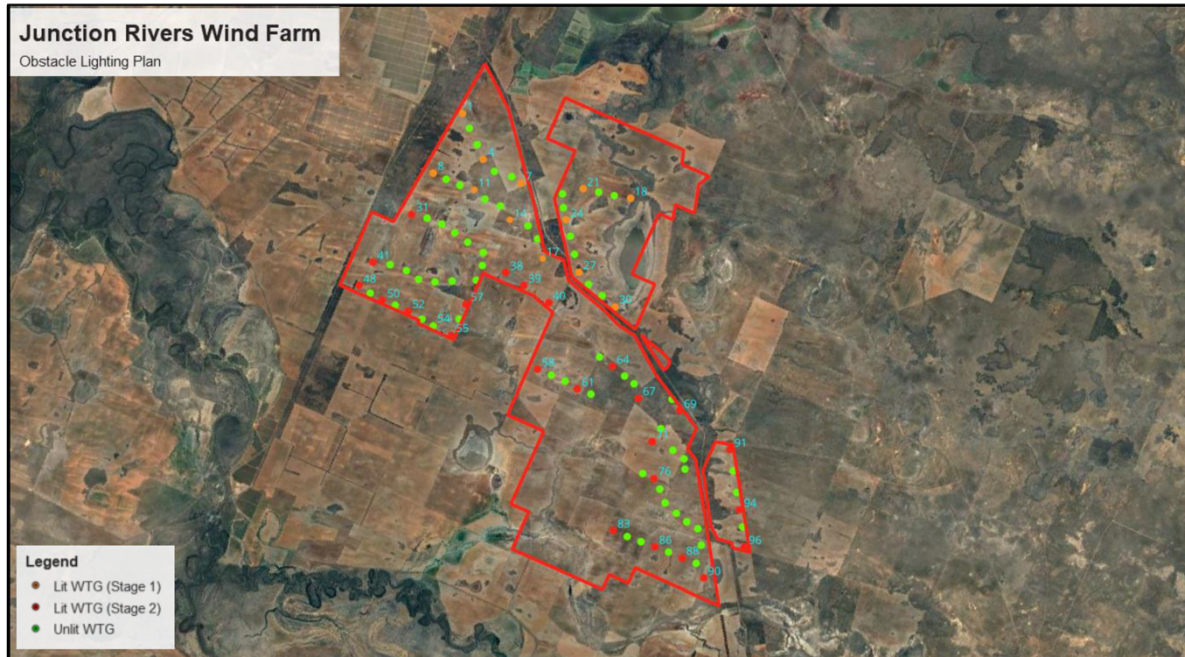


Figure 1. Aviation Obstacle Lighting Plan (Source: Aviation Projects, 2025)

3.0 Revised Assessment of Potential Visual Impacts:

The following provides an overview of the potential visual impacts relating to the revised lighting requirements of the Project. Aviation Projects made a recommendation for obstacle lighting to be located on the nacelle (referred to as the hub height in the LVIA) which is a height of 200 m. The obstacle lighting will operate at night and at times of reduced visibility.

3.1 Impact on Non-associated Dwellings

The LVIA included an assessment from all six (6) non-associated dwellings located within 8,000 m of the Project. Views to the nacelles are sufficiently screened by intervening vegetation from two (2) non-associated dwellings: BALWF50 and BALWF140. The assessment determined that visibility of the proposed turbines at nacelle height is limited to four (4) non-associated dwellings: BALWF58, BALWF67, BALWF70 and BALWF39.

The CASA Advisory Circular AC 139.E-05 v1.1 *Obstacles (including Wind Farms) outside the vicinity of a CASA certified aerodrome* (October 2022) provides a clear benchmark for visibility distances of aviation lights. It specifies that a 2,000 candela light, which is ten times the intensity of the CASA recommended 200 candela light for the Project, has a visibility range of approximately 4,900 m. Given that the proposed obstacle lighting is one tenth of this intensity, its visibility range would be significantly shorter. Due to a

combination of distance and intervening vegetation, visibility of the proposed obstacle lighting is anticipated to be minimal from the four (4) non-associated dwellings.

3.2 Impact on Public Viewpoints

The LVIA assessed public viewpoint locations within the 8,000 m Study Area, these public viewpoints were limited to roads with low visual sensitivity. When viewed by motorists travelling along roads at night, obstacle lighting is likely to blend into the night landscape with existing light sources including reflective road signs, lights from vehicles and lights from surrounding homesteads. When in close proximity, the lighting is far above the road level, lighting will not be in the line of view.

It is important to note that since the preparation of the LVIA, the Department of Planning, Housing and Infrastructure adopted the Wind Energy Guidelines (November, 2024) which state: *The visual impact assessment should consider the worst-case view of a project during the day. Whether or not the turbines have lighting is unlikely to change the impact assessment rating. Consequently, a separate night-lighting assessment is not required for individual viewpoints.*

3.3 Impact on National Parks

National Parks and Wildlife Services (NPWS) raised concern about the affects of obstacle lighting to the dark sky in the locality due to light pollution or light spill from the Project. Publicly accessible vantage points within the Yanga National Park are located in excess of 8,000 m from the Project. As discussed in Section 3.1, due to the low intensity of lighting, at a distance in excess of 8,000 m, visibility of the obstacle lighting would be limited.

The visibility of an obstacle light depends on various factors, including distance, environmental conditions (e.g., darkness, fog, or atmospheric clarity), the observer's vision, and the angular position of the light. Aviation obstacle lighting is designed to focus intensity toward the sky and areas visible to aircraft. It is acknowledged that lighting impacts can extend beyond the light source itself at times (i.e. through glow and light spill).

NPWS stated:

“Although the EIS states that the operational, maintenance and security lighting will be designed to reduce disturbance. Potential visual impacts remain, and these are associated with lighting of buildings, temporary accommodation, construction facilities, substations/switching stations.”

As concluded in the LVIA, the proposed ancillary infrastructure has been carefully sited to minimise visibility from existing residences and publicly accessible viewpoints. The proposed substations and BESS areas are located over 14 kilometres from the picnic area, rest area and viewing platforms located in the Yanga Lake National Park.

4.0 Mitigation Recommendations

4.1 Mitigation of Aviation Obstacle Lighting:

The following recommendations were made in the LVIA.

- Lighting is not required on every turbine.
- Treatment of the rear of blades with non-reflective coating to reduce reflection off the rotating blade at night.
- Use of lowest candela intensity allowed by CASA (200 candela).
- Shielding to restrict downward spill of lighting on the ground plane.

In addition to these recommendations, RADAR-activated obstacle lighting is an alternative mitigation measure that could possibly be used to reduce the visibility of obstacle lighting. By using RADAR technology to detect aircraft in the vicinity, this system activates the lighting only when necessary, ensuring that the lights are illuminated only when an aircraft is approaching.

4.2 Mitigation of lighting for Ancillary Structures:

The LVIA prepared for the Project provided principles for lighting of ancillary infrastructure. Principles are consistent with requirements of AS4282:2023 and the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023).

NPWS made the following recommendations for conditioning the post approval process to:

7.1. ensure alteration of scenic values and view lines from the Yanga Lake Viewing Platform at Yanga Homestead are re-assessed post installation of the WTGs as part of Stage 1 (installation of WTG 18 to 30), and at Stage 2 (installation of WTG 1 to 17) within the northern part of the Subject Site above Balranald-Moulamein Road. Measures to further reduce impacts are to be considered and discussed in consultation with NPWS and implemented as needed.

7.2. National Light Pollution Guidelines for Wildlife (DCCEEW, 2023) measures are applied to achieve improved lighting design which considers the natural (biodiversity) values attributed to Yanga SCA and Yanga NP, reducing lighting pollution, or light spill effects.

5.0 Conclusion

Aviation obstacle lighting is intentionally designed to ensure visibility for aircraft rather than ground-level observers. The focus on airspace visibility aligns with regulatory safety requirements and minimises unnecessary light spill or pollution toward the ground. While it is acknowledged that light spill and glow can extend beyond the immediate area of the light source, the intensity of these effects diminishes rapidly with distance. Due to the relatively isolated location of the Project, limited visibility from nearby receptors and distance from key public viewpoints, it is concluded there will be a negligible visual impact resulting from the of obstacle lighting on the Project.