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ACRONYMS

AAAA	Aerial Application Association Australia
AC	Advisory Circular
AFAC	Australia and New Zealand Council for fire and emergency services
AGL	above ground level
AHD	Australian Height Datum
AIA	aviation impact assessment
AIP	Aeronautical Information Package
AIS	aviation impact statement
ALARP	as low as reasonably practicable
AMSL	above mean sea level
ARP	Aerodrome Reference Point
AS	Australian Standards
ATSB	Australian Transport Safety Bureau
BoM	Bureau of Meteorology
CAO	Civil Aviation Orders
CAR	Civil Aviation Regulation (1988)
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulation (1998)
CFIT	controlled flight into terrain
CNS	communications, navigation and surveillance
DAH	Designated Airspace Handbook
EIS	environmental impact statement
ERC-H	en-route chart high
ERC-L	en-route chart low
ERSA	En Route Supplement Australia
GA	general aviation
ICAO	International Civil Aviation Organization
IFR	instrument flight rules
IMC	instrument meteorological conditions
LGA	local government area

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LSALT	lowest safe altitude
MOC	minimum obstacle clearance
MOS	Manual of Standards
MSA	minimum sector altitude
NASAG	National Airports Safeguarding Advisory Group
NASF	National Airports Safeguarding Framework
NDB	non-directional (radio) beacon
OLS	obstacle limitation surface
PANS-OPS	Procedures for Air Navigation Services - Aircraft Operations
PSR	primary surveillance radar
RAAF	Royal Australian Air Force
RFDS	Royal Flying Doctor Service
RPT	regular public transport
RSR	en route surveillance radar
SSR	secondary surveillance radar
VFR	visual flight rules
VMC	visual meteorological conditions
WMT	wind monitoring tower
WTG	wind turbine generator



UNITS OF MEASUREMENT

ft	feet	(1 ft = 0.3048 m)
km	kilometres	(1 km = 0.5399 nm)
m	metres	(1 m = 3.281 ft)
nm	nautical miles	(1 nm = 1.852 km)

DEFINITIONS

Definitions of key aviation terms are included in **Annexure 2**

NOTES

Nil



EXECUTIVE SUMMARY

Introduction

Synergy Renewable Energy Developments (SynergyRED), (the Proponent) is proposing to develop the King Rocks Wind Farm (the Project) in the Shire of Kondinin local government area (LGA) in Western Australia, approximately 35 km north-east of Hyden, and 350 km east of Perth.

Aviation Projects Pty Ltd had previously been engaged by Urbis to prepare an Aviation Impact Assessment for the proposed Project and provided an Aviation Impacts Assessment (AIA).

Since Aviation Projects completed the original Aviation Impact Assessment (April 2024), four turbines have been moved slightly (less than 150 meters from the original location). The Kondinin Shire has requested an updated aviation impact assessment prior to approving the condition of the Development Approval. The change to the four turbines has been assessed and there is no affect to the conclusions of the previous aviation impact assessment.

The AIA:

- Is based upon data provided by SynergyRED on 05 September 2025. The WTGs will have 17 WTGs with a maximum height of 206 m above ground level (AGL).
- Has been prepared to assess the final layout as per the conditions of the Development Approval
- Assesses the aviation impacts associated with the wind farm and provides aviation safety advice in respect of relevant requirements of air safety regulations and procedures and informs and documents consultation with relevant aviation agencies.
- Includes an Aviation Impact Statement (AIS) and a qualitative risk assessment to determine the need for obstacle lighting and marking for client review and acceptance before submission to external aviation regulators.
- Confirms that the micro-siting of the four WTGs does not change the conclusions of the previous aviation impact assessment.

Project description

The Project will comprise the following infrastructure:

- Up to seventeen (17) wind turbines with a maximum overall height (tip height) of 206 m AGL.
- The highest proposed wind turbine is WT8 with a ground elevation of 424 m Australian Height Datum (AHD) and overall height of 630 m AHD (2066.9 ft AMSL).
- One (1) proposed (installed) temporary wind monitoring tower (WMT) with a height of 150 m (492 ft) AGL.
- 2 communications towers up to 100 m AGL.
- Associated power storage and transmission infrastructure. (Connecting to existing 132 kV transmission line that runs through the central project area).
- Potential future installation of battery energy storage system.

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Conclusions

Based on a comprehensive analysis and assessment detailed in this report, the following conclusions were made:

Planning considerations

1. The Project as assessed satisfies the provisions of the Shire of Kondinin Planning Scheme regarding the Wave Rock air strip and will not impact on the current and planned aerodrome operation.

Certified airports

2. The Project Area is located approximately 29 nm southwest from Mt Holland aerodrome (YMHL).
3. Forrestania aerodrome (YFTA) is located approximately 31 nm (58 km) to the south-east of the nearest proposed wind turbine of the Project and won't be affected by the Project

Obstacle Limitation Surfaces (OLS)

4. The Project is located outside the horizontal extent of OLS of any certified aerodrome.

Uncertified Aerodromes

5. The closest known ALA to the Project is Wave Rock aerodrome (YWRC) located approximately 16 nm (30 km) south-west of the nearest proposed wind turbine and won't be affected by the Project.

Air Routes and Lowest Safe Altitude (LSALT)

6. The WTGs would not infringe the Grid LSALT of 3100 ft specified in Enroute Chart – Low (8).
7. Based on the latest AIP information, Air Route J21 is no longer infringed. The WTGs would not infringe any LSALT of air route designated in Enroute Chart – Low (8).

Airspace

8. The project area is located within Class G airspace and outside all controlled airspace, Prohibited, Restricted and Danger areas.

Aviation Facilities

9. The WTGs would not penetrate any protection areas associated with aviation facilities.

ATC Surveillance Radar

10. The project site is located outside the area of interest to assess the potential impact of the development on surveillance radar. The Project would not impact the Kalamunda Air Route Surveillance Radar (RSR).

Aviation Impact Statement (AIS)

11. Based on the WTG layout and maximum blade tip height of 206 m AGL, the blade tip elevation of the highest wind turbine would not exceed 630 m (2066.9 ft AMSL).
 - a. There is one (1) certified airport located within 30 nm (56 km) from the Project Site – Mt Holland (YHML).
 - i. The WTGs would not infringe any OLS surfaces.



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- ii. The WTGs would infringe the PANS-OPS surface related to the 25 nm MSA for Mount Holland aerodrome, requiring an increase to the minimum altitude to 3100 ft AMSL. This increase should be editorial and would not cause an adverse impact on flight safety or flight path efficiency.
- b. The WTGs would not infringe the Grid LSALT of 3100 ft specified in Enroute Chart – Low (8).
- c. Based on the latest AIP information, Air Route J21 is no longer infringed. The WTGs would not infringe any LSALT of air route designated in Enroute Chart – Low (8).
- d. The project area is located within Class G airspace and outside all controlled airspace, Prohibited Restricted and Danger areas.
- e. The WTGs would not impact the aviation navigation facilities.
- f. The WTGs would not impact the closest ATC surveillance radar installations.
- g. The WTGs must be reported to CASA, and construction details must be provided to Airservices Australia.

Obstacle lighting risk assessment

12. Aviation Projects has undertaken a safety risk assessment of the Project and concludes that the wind turbines and WMTs do not require obstacle lighting to maintain an acceptable level of safety to aircraft. The WTGs and WMTs should be marked in accordance with CASR Part 139 Manual of Standards (MOS) specifications.

Amendments to increase the Mount Holland 25 nm MSA to 3100 ft will ensure that the Project does not infringe any protection surfaces.

Consultation

Refer to **Section 5** for detailed responses from relevant aviation stakeholders received during the Development Application process and more recently, prior to construction of the wind farm.

The risk assessment has been updated, and this report was finalised based on the feedback received during the consultation process.

Summary of key recommendations

Recommended actions resulting from the conduct of this assessment are provided below:

Notification and reporting

1. Details of WTGs 100 m or more AGL must be reported to CASA as soon as practicable after forming the intention to construct or erect the proposed object or structure, in accordance with CASR Part 139.165(1)(2).
2. This updated AIA should be provided to Airservices Australia and IDS Australasia due to the changed nature of the infringements to LSALTs and instrument approach procedures.
3. Final details of WTG coordinates and elevation should be provided to Airservices Australia at least two weeks prior to construction commencing, by submitting the form at this webpage:
<https://www.airservicesaustralia.com/wp-content/uploads/ATS-FORM->

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[0085_Vertical Obstruction Data Form.pdf](#) to the following email address:
vod@airservicesaustralia.com

4. Any obstacles 100 m or more AGL (including temporary construction equipment) should be reported to Airservices Australia NOTAM office until they are incorporated in published operational documents. With respect to crane operations during the construction of the Project, a notification to the NOTAM office may include, for example, the following details:
 - a. The planned operational timeframe and maximum height of the crane; and
 - b. Either the general area within which the crane will operate and/or the planned route with timelines that crane operations will follow.
5. Details of the wind farm should be provided to local and regional aircraft operators prior to construction in order for them to consider the potential impact of the wind farm on their operations.
6. To facilitate the flight planning of aerial application operators, details of the Project, including the 'as constructed' location and height information of WTGs and overhead transmission lines should be provided to landowners so that, when asked for hazard information on their property, the landowner may provide the aerial application pilot with all relevant information.

Operation

7. Whilst not a statutory requirement, the Proponent should consider engaging with local aerial agricultural operators and aerial firefighting operators in developing procedures for such aircraft operations in the vicinity of the Project.

Marking of WTGs

8. The rotor blades, nacelle and the supporting mast of the WTGs should be painted in a low-reflective white, off-white or light grey, as is typical of most WTGs operational in Australia. No additional marking measures are required for WTGs.

Lighting of WTGs

9. Aviation Projects has assessed that the Project will not require obstacle lighting to maintain an acceptable level of safety to aircraft. Once amended, the LSALT and 25 nm MSA altitudes will not be infringed by the Project.

Marking of WMTs

10. It is not mandatory to mark the WMT, however the following markings are recommended to be implemented in consideration of potential day VFR aerial work operations in accordance with NASF Guideline D:
 - a. Obstacle marking for at least the top 1/3 of the mast and be painted in alternating contrasting bands of colour
 - b. Marker balls or high visibility flags or high visibility sleeves placed on the outside guy wires; and
 - c. Guy wire ground attachment

Lighting of WMTs

11. Aviation Project consider that there will be an acceptable level of aviation safety risk associated with the potential for an aircraft collision with the WMTs.

 AVIATION PROJECTS**Micrositing**

12. Providing the micrositing of the planned WTGs it is not likely to result in a change in the maximum overall blade tip height of the Project. No further assessment is likely to be required from micrositing and the conclusions of this AIA would remain the same.

Overhead transmission line

13. It is understood the Project will connect with the existing 132 kV transmission line that travels across the central Project Area. Any additional overhead transmission lines and/or supporting poles that are located where they could adversely affect aerial application operations should be identified in consultation with local aerial agriculture operators and marked in accordance Standards Australia guidelines (ISO 31000:2018 *Risk management – Guidelines*).

Aerial firefighting

14. The developer or operator should consider the guidance contained in the National Council for Fire and Emergency Services, Wind Farms and Bushfire Operations to ensure:
 - a. Liaison with the relevant fire and land management agencies is ongoing and effective
 - b. Access is available to the wind farm site by emergency services for on-ground firefighting operations
 - c. Wind turbines are shut down immediately during emergency operations.
 - d. Where possible, blades should be stopped in the 'Y' or 'rabbit ear' position, as this positioning allows for the maximum airspace for aircraft to manoeuvre underneath the blades and removes one of the blades as a potential obstacle. This may not always be possible due to the risk to equipment and personnel as a fire approaches or exists in or near to the WTGs.
- Aviation Projects considers that it may be impractical to stop and lock the turbine blades in a Y configuration due to the time needed to stop and lock the turbine and the risk to personnel having to climb into the WTG tower as a bush fire approaches. WTG blades can be feathered to effectively stop or reduce the rotation rate of the turbine to a very slow speed.

Triggers for review

15. Triggers for review of this risk assessment are provided for consideration:
 - a. Prior to construction to ensure the regulatory framework has not changed
 - b. Following any significant changes to the context in which the assessment was prepared
 - a. Following any near miss, incident or accident associated with operations considered in this risk assessment..



1. INTRODUCTION

1.1. Situation

Synergy Renewable Energy Developments (SynergyRED), (the Proponent) is proposing to develop King Rocks Wind Farm (the Project) in the Shire of Kondinin local government area (LGA) in Western Australia, approximately 35 km north-east of Hyden, and 350 km east of Perth. Aviation Projects Pty Ltd has been engaged by Synergy to update the Aviation Impact Assessment with the final layout as per the conditions of the Development Approval..

The Project will consist of up to 17 wind turbine generators (WTGs) capable of generating a maximum 150MW of power.

Since Aviation Projects completed the original Aviation Impact Assessment (April 2024), four turbines have been moved slightly (less than 150 meters from the original location). the Kondinin Shire has advised that they cannot approve the aviation impact condition of the Development Approval until an updated report is provided.

This AIA will:

- Assesses the potential aviation impacts, provides aviation safety advice in respect of relevant requirements of air safety regulations and procedures, and informs and documents consultation with relevant aviation agencies.
- Includes an Aviation Impact Statement (AIS) and a qualitative risk assessment to determine the need for obstacle lighting and of applicable aspects for client review and acceptance before submission to external aviation regulators.
- And supporting technical data will provide evidence and analysis supporting the development application to demonstrate that appropriate risk mitigation strategies have been identified.

1.2. Purpose and Scope

The purpose and scope of work is to prepare an AIA for consideration by Airservices Australia, CASA and Department of Defence and support a development application to be submitted to the Shire of Irwin.

The assessment specifically responds to the:

- Airports Act 1996.
- Civil Aviation Safety Authority:
 - Advisory Circular (AC) 139.E-05 v1.0 *Obstacles (including wind farms) outside the vicinity of a CASA certified aerodrome.*
 - Civil Aviation Safety Regulations 1998 (CASR).
- NASF Guideline D: *Managing the Risk to aviation safety of wind turbine installations (wind farms)/Wind Monitoring Towers.*
- Shire of Kondinin Planning Scheme, 2018 Amendment.
- WA Government Department of Planning, Lands and Heritage, Position Statement: Renewable energy facilities, March 2020.
- Other specific requirements for an AIS as advised by Airservices Australia.

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Assistance will be provided in support of stakeholder consultation and engagement in preparing the assessment and negotiating acceptable mitigation to identified impacts.

1.3. Methodology

Aviation Projects conducted the task in accordance with the following methodology:

- Confirmed the scope and deliverables with the Proponent.
- Reviewed client material.
- Reviewed relevant regulatory requirements and information sources.
- Attended the Project site for an empirical assessment on applicable aviation context.
- Prepared a draft AIA and supporting technical data that provides evidence and analysis for the planning application to demonstrate that appropriate risk mitigation strategies have been identified.
- Prepared an AIS and a qualitative risk assessment to determine need for obstacle lighting and marking.
- Identified risk mitigation strategies that provide an acceptable alternative to night lighting. The risk assessment was completed following the guidelines in *ISO 31000:2018 Risk Management – Guidelines*.
- Consulted with relevant Councils, Part 173 procedure designers (Airservices Australia) and aerodrome operators of the nearest aerodrome/s to seek endorsement of the proposal to change instrument procedures (if applicable).
- Consulted/engaged with stakeholders to negotiate acceptable outcomes (if required).
- Finalised the AIA report for client acceptance when responses received from stakeholders for client review and acceptance.

1.4. Aviation Impact Statement (AIS)

The AIS included in this report (see Section 6) includes the following specific requirements as advised by Airservices Australia:

Aerodromes:

- Specify all certified aerodromes that are located within 30 nm (55.6 km) of the Project Site.
- Nominate all instrument approach and landing procedures at these aerodromes.
- Review the potential effect of project operations on the operational airspace of the aerodrome(s).

Air Routes:

- Nominate air routes published in ERC-L & ERC-H which are located near/over the Project Site and review potential impacts of project operations on aircraft using those air routes.

Airspace:

- Nominate the airspace classification – A, C, D, E, G etc where the Project Site is located.

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- Nominate aviation navigation systems in proximity to the Project Site.

1.5. Material reviewed

The material provided by the Proponent for the preparation of this assessment includes:

- GIS Data of King Rocks Wind Farm (received 05 September 2025)
 - 20250714-KRWF- layout.kmz.
- WTG coordinates and ground elevation data (received 05 September 2025)
 - KRWF - Layout Coordinates and ground elevation.xlsx.

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2. BACKGROUND

2.1. Site Overview

The closest townships to the Project Area include Hyden, 35 km south-west, Narembeen 77 km north-west, and Kondinin 91 km south-west.

An overview of the Project Area relative to localities of Hyden, Narembeen and Kondinin is provided in Figure 1 (source: SynergyRED, Google Earth).

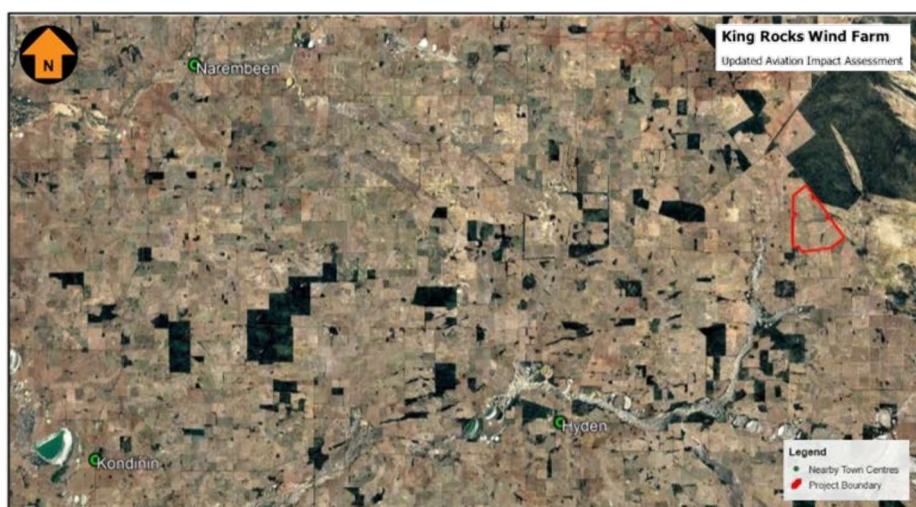


Figure 1 Project Site overview

2.2. Project Description

The King Rocks Wind Farm is proposed to consist of up to 17 wind turbines and 1 (installed) WMT.

An indicative layout of the proposed wind farm is provided in Figure 2 (source: SynergyRED, Google Earth).

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Figure 2 Project layout

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3. EXTERNAL CONTEXT

3.1. National Airports Safeguarding Framework

The National Airports Safeguarding Advisory Group (NASAG) was established by Commonwealth Department of Infrastructure and Transport to develop a national land use planning framework called the National Airports Safeguarding Framework (NASF). The purpose of the NASF is to enhance the current and future safety, viability, and growth of aviation operations at Australian airports through:

- The implementation of best practice in relation to land use assessment and decision making in the vicinity of airports
- Assurance of community safety and amenity near airports
- Better understanding and recognition of aviation safety requirements and aircraft noise impacts in land use and related planning decisions
- The provision of greater certainty and clarity for developers and landowners
- Improvements to regulatory certainty and efficiency
- The publication and dissemination of information on best practice in land use and related planning that supports the safe and efficient operation of airports.

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 WMTs.

The methodology for preparing the risk assessment is contained in the NASF Guideline D.

The risk assessment will have regard to all potential aviation activities within the vicinity of the Project Site including recreation, commercial, civil (including for agricultural purposes) and military operations.

NASF Guideline D strongly encourages consultation with aviation stakeholders in the early stages of wind farm development planning, including with aerodrome owners and operators, regional aircraft operators and CASA and Airservices.

3.2. Western Australia Government, Department of Planning, Lands and Heritage

The Western Australian Planning Commission administers responsibility for approving renewable energy facilities through local councils. The Department of Planning, Lands and Heritage has published *Position Statement: Renewable energy facilities* (March 2020) on behalf the Western Australia Planning Commission. These guidelines provide advice to inform planning decisions about a wind energy facility proposal.

The intent of this position statement is to:

- Outline the Western Australian Planning Commission (WAPC) requirements to support the consistent consideration and provision of renewable energy facilities within Western Australia
- Identify assessment measures to facilitate appropriate development of renewable energy facilities.

The position statement applies to the preparation and assessment of planning instruments including regional and local planning schemes and strategies.

The position statement supersedes Planning Bulletin 67 Guidelines for Wind Farm Development (2004).



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Section 5.3.1 *Community Consultation* and Section 5.3.5 *Public and Aviation safety* are relevant to this assessment and are extracted below:

Section 5.3.1 Community Consultation

Early consultation with the community and stakeholders by the proponents is encouraged to ensure that the proposal is compatible with existing land uses on and near the site. The local government should be consulted with respect to the community consultation program. Relevant stakeholders may include:

- Air Services Australia
- Australian Wind Alliance
- Civil Aviation Safety Authority

5.3.5 Public and aviation safety

Proponents of wind turbine proposals should refer to the National Airports Safeguarding Framework (NASF) Guideline D: Managing the Risk to Aviation Safety of Wind Turbine Installation (Wind Farms) / Wind Monitoring Towers to determine any potential aviation safety risks and possible mitigation measures.

Any potential aviation safety risks identified require consultation with Civil Aviation Safety Authority (CASA), Air Services Australia and/or the Commonwealth Department of Defence.

The position paper defines Renewable energy facility as premises used to generate energy from a renewable energy source and includes any building or other structure used in, or relating to, the generation of energy by a renewable resource. It does not include renewable energy electricity generation where the energy produced principally supplies a domestic and/or business premises and any on selling to the grid is secondary.

An aviation impact assessment would include consultation with relevant aviation stakeholders and address aviation-related matters included in the Position Statement

3.3. Shire of Kondinin

The Shire of Kondinin Local Planning Scheme is published by WA Government Department of Planning, Lands and Heritage. The planning scheme was prepared by the Department of Planning in 2004, with the latest amendment occurring in 2018. The scheme sets out the Shire of Kondinin's planning aims and intentions for the Scheme area, and zones land within the scheme area for the purposes defined in the scheme. The procedures for assessment and determination of development applications are specified in the scheme.

The Project Area is located on land zoned as Rural, as identifiable in Map 01 of the Planning Scheme – Kondinin overall. The planning scheme provides objectives for each zone in Part 3 – Zones and use of land. Rural zone objectives are specified as:

To ensure the continuation of broad-hectare farming as the principal land use in the district and encouraging where appropriate the retention and expansion of agricultural activities.

To consider non-rural uses where they can be shown to be of benefit to the District and not detrimental to the natural resources or the environment.

To allow for facilities for tourists and travellers, and for recreation uses.

Wave Rock airstrip (YWRC) is an uncertified aerodrome located in the Shire of Kondinin. YWRC is located close to the Wave Rock tourist destination, and it is understood its primary use is for aircraft transporting visitors to Wave Rock. Schedule 2 of the planning scheme *Special requirements for Rural Residential Zones* provides



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special requirements for the use of land at Lot 2 Lovering Road Hyden, including permissible land uses. The scheme specifies that:

Council may consider a number of land uses in the 'Rural Residential' Zone in accordance with the Zoning Table. In considering any development application Council will have regard to the following matters:

- (i) *The compatibility of the proposed land use/s with the existing airstrip;*

The Project boundary is located approximately 29 km north-east of Wave Rock airstrip and won't impact aircraft operating to and from the aerodrome. Therefore, the Project does not affect any aviation-related objectives established in the Shire of Kondinin planning scheme.

3.4. Civil Aviation Safety Authority (CASA)

CASA provides the following guidance to inform pilots of their obligations at non-certified aerodromes.

3.4.1. AC 91-02 V1.2, Guidelines for aeroplanes with MTOW not exceeding 5700 kg – suitable places to take off and land, dated November 2022

This AC provides guidance for pilots of:

- Aeroplanes with maximum take-off weight (MTOW) not exceeding 5700 kg that are operated under Part 91 of CASR, including experimental aircraft, and
- Light sport aircraft (LSA) under Part 103 of CASR.

Purpose

This AC provides guidance to assist aeroplane pilots when determining the suitability of a place to safely take off and land. It provides an overview of pilot responsibilities, discusses the relevant circumstances recommended to be considered and includes general information and advice to enhance the safety of taking off and landing at any place.

2 Introduction

2.2 Use of Aerodromes

2.2.1 Regulation 91.410 authorises a place for use as an aerodrome if: (i) it is suitable for the landing and taking-off of aircraft; and (ii) an aircraft can land at or take off from the place safely, having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions).

4.2.4 The examples below are two of many possible considerations:

- the obstacles surrounding the aerodrome have been accurately described and are still current (e.g. have the trees on final grown taller since last reported), and*
- the information provided enables the pilot to judge whether or not a landing approach can be made from both runway directions.*

3.4.2. AC 91-10 v1.6, Operations in the vicinity of non-controlled aerodromes, dated September 2025

This AC provides guidance on procedures that, when followed, will improve situational awareness and safety for all pilots when flying at, or in the vicinity of, non-controlled aerodromes.

7.2 Traffic circuit direction

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7.2.1 The standard aerodrome traffic circuit facilitates the orderly flow. Unless an alternative requirement for an aerodrome is stated in the ERSA or NOTAMs, all turns must be made to the left (regulation 91.385).

7.2.2 When arriving at an aerodrome to land, the pilot will normally join the circuit on upwind, crosswind (midfield), or at or before mid-downwind. Landings and take-offs should be made on the active runway or the runway most closely aligned into wind.

7.3.2 During initial climb-out, the turn onto crosswind should be appropriate to the performance of the aircraft but, in any case, not less than 500 ft above terrain so as to be at circuit height when turning downwind (regulation 91.390). Pilots may vary the size of the circuit depending on:

- the performance of the aircraft
- AFM/Pilot's Operating Handbook requirements
- company standard operating procedures
- other safety reasons.

7.8 Final approach

7.8.1 The turn onto final approach should be:

- completed by a distance and height that is common to all operations at the aerodrome
- commensurate with the speed flown in the circuit for all aircraft of the same type.

Illustrations of the standard aerodrome traffic circuit procedures provided in AC 91-10 v1.6. are shown in Figure 3 and Figure 4.

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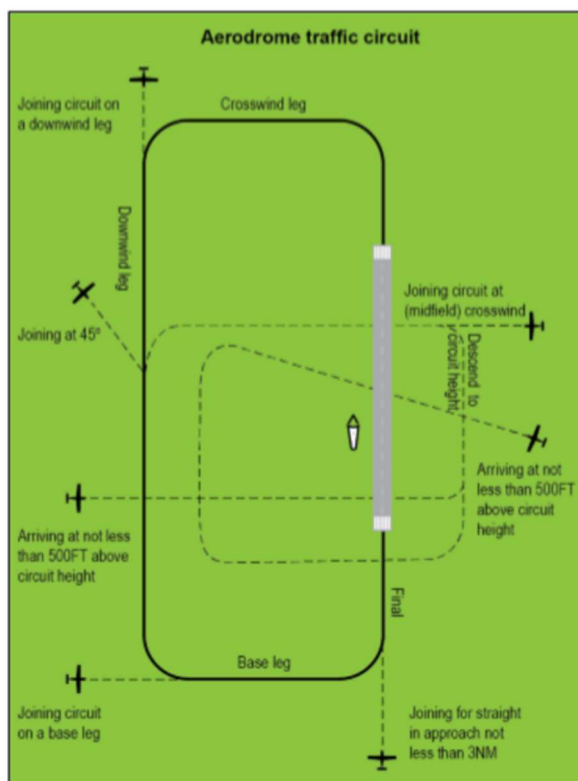


Figure 3 Aerodrome standard traffic circuit, showing arrival and joining procedures.

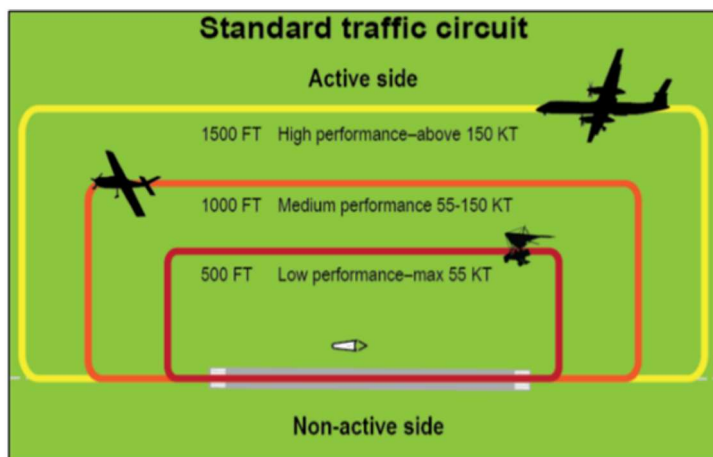


Figure 4 Lateral and vertical separation in the standard aerodrome traffic circuit



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Paragraph 7.11 refers to a distance that is “normally” well outside the circuit area and where no traffic conflict exists, which is at least 3 nm. The paragraph is copied below:

7.11 Departing the circuit area

7.11.1 Aircraft should depart the aerodrome circuit area by extending one of the standard circuit legs or climbing to depart overhead. However, the aircraft should not execute a turn to fly against the circuit direction unless the aircraft is well outside the circuit area and no traffic conflict exists. This should be 500 ft or more above the circuit height and at least 3 NM from the departure end of the runway but may be less for aircraft with high climb performance. In all cases, the distance should be based on the pilot's awareness of traffic and the ability of the aircraft to climb above and clear of the circuit area.

3.5. Rules of flight

3.5.1. Flight under Day Visual Flight Rules (Day VFR)

According to Australia's Aeronautical Information Package (AIP) the meteorological conditions required for visual flight in the applicable (class G) airspace at or below 3,000 ft AMSL or 1,000 ft AGL (whichever is the higher) are: 5,000 m visibility, clear of clouds and in sight of ground or water.

CASR 91.267 (Minimum height rules—other areas) prescribes the minimum height for flight. Generally speaking, and unless otherwise approved, aircraft are restricted to a minimum height of 500 ft AGL above the highest point of the terrain and any object on it within a radius of 300 m in visual flight during the day when not in the vicinity of built-up areas, and 1000 ft AGL over built up areas (within a horizontal radius of 600 m of the point on the ground or water immediately below the aeroplane).

Flight below these height restrictions is also permitted in certain other authorised circumstances.

3.5.2. Flight under Night Visual Flight Rules (Night VFR)

With respect to flight under the VFR at night CASR 91.277 requires that the pilot in command of an aircraft flying VFR at night must not fly below the appropriate lowest safe altitude (unless during take-off and landing operations, within 3 nm of an aerodrome).

3.5.3. Flight under Instrument Flight Rules (Day or Night) (IFR)

According to CASR 91, flight under the instrument flight rules (IFR) requires an aircraft to be operated at a height clear of obstacles that is calculated according to an approved method.

Obstacle lights on structures that are not in the vicinity of an aerodrome are effectively redundant to an aircraft being operated under the IFR.

3.6. Aircraft operator characteristics

Flying training may be conducted under either the IFR or VFR. Other general aviation operations under either IFR or VFR are also likely to be conducted at various aerodromes in the area.

Flight under day VFR is conducted above 500 ft above the highest point of the terrain within a 300 m radius unless the operation is approved to operate below 500 ft above the highest point of the terrain.

It is expected that the proposed WTGs would be sufficiently visually conspicuous to pilots conducting VFR operations within the vicinity of the Project Site to enable appropriate obstacle avoidance manoeuvring.



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IFR and Night VFR (which are required to conform to IFR applicable altitude requirements) aircraft operations are addressed in **Section 6**.

3.7. Passenger transport operations

Scheduled and non-scheduled passenger transport operations are generally operated under the IFR.

3.8. Private operations

Private operations are generally conducted under day or night VFR, with some IFR. Flight under day VFR is conducted above 500 ft AGL in areas outside city and township built-up areas. These operations are usually conducted at altitudes well above 500 ft AGL for passenger comfort and fuel efficiency.

3.9. Military operations

There may be some high-speed low-level military jet aircraft and helicopter operations conducted in the area. Military operations are conducted under separate but compatible regulations and standards, including obstacle separation requirements.

Refer to **Section 5** for a detailed response from the Department of Defence.

3.10. Aerial application operations

Aerial application operations including such activities as fertiliser, pest and crop spraying are generally conducted under day VFR below 500 ft AGL: usually between 6.5 ft and 100 ft AGL.

Due to the nature of the operations conducted, aerial agriculture pilots are subject to rigorous training and assessment requirements to obtain and maintain their licence to operate under these conditions.

3.10.1. Aerial Application Association Australia (AAAA)

The Aerial Application Association Australia (AAAA) has a formal risk management program (which is recommended for use by its members) to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained.

In previous consultation with the AAAA, Aviation Projects has been directed to the AAAA Windfarm Policy (dated March 2011), now superseded by the AAAA Tall Structures Policy dated March 2024, which states in part:

The development of tall structures in agricultural and bush fire prone areas can pose a direct threat to aviation safety, particularly where fixed and rotary aircraft may be requested to operate for agricultural or bush/grass fire control.

The absence of historical aircraft use in an area is considered an insufficient reason to discount the threat to Aviation Operations.

The AAAA will oppose any development application or similar process unless the proponent has:

- *Identified the structure as posing a low-level flying risk that needs to be managed on an ongoing basis*
- *Consulted honestly and in detail with local aerial application operators or the AAAA where a local operator cannot be identified*
- *Consulted with adjoining landowners regarding the impact on adjacent properties*
- *Included appropriate lighting and marking in the development proposal, consistent with providing a warning to low level flying*



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- Identified the process for advising of the location height and presence of the structure to the relevant authorities, and
- Ensure that the proposal is in keeping with CASA requirements for structures near aerodromes, including temporary landing areas.

3.10.2. Aerial application operators

Local aerial application operators consulted in previous studies undertaken by Aviation Projects have stated that a wind farm would, in all likelihood, prevent aerial agricultural operations in that particular area, but that properties adjacent to the wind farm would have to be assessed on an individual basis.

Aerial application operators generally align their positions with the AAAA policies, and the utilise the AAAA formal risk management programme.

Based on previous studies for other wind farm projects undertaken by Aviation Projects, and the results of consultation with AAAA and local aerial application operators, it is reasonable to conclude that safe aerial application operations would be possible on properties within the Project site and on neighbouring properties, subject to final WTG locations and by implementing recommendations provided in this report at Section 12.

To facilitate the flight planning of aerial application operators, details of the Project, including location and height information of WTGs, WMTs and overhead powerlines should be provided to landowners so that, when asked for hazard information on their property, the landowner may provide the aerial application pilot with all relevant information.

The use of helicopters or drones enables aerial application operations to be conducted in closer proximity to obstacles than would be possible with fixed wing aircraft due to their greater manoeuvrability.

3.11. Emergency services

3.11.1. Royal Flying Doctor Service

Royal Flying Doctor Service (RFDS) and other emergency services operations are generally conducted under the IFR, except when arriving/departing a destination that is not serviced by instrument approach aids or procedures, in which case they would be operating day or night VFR.

Most emergency aviation services organisations have formal risk management programs to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained.

For example, pilots and crew require specific training and approvals, additional equipment is installed in the aircraft, and special procedures are developed.

3.11.2. Aerial firefighting

Aerial firefighting operations (firebombing in particular) are conducted under Day VFR, sometimes below 500 ft AGL. Under certain conditions visibility may be reduced/limited by smoke/haze.

Most aerial firefighting organisations have formal risk management programs to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained. For example, pilots require specific training and approvals, additional equipment is installed in the aircraft, and special procedures are developed.

The Australasian Fire and Emergency Services Council (AFAC) has developed a national position on wind farms, their development and operations in relation to bushfire prevention, preparedness, response and recovery, set out in the document titled *Wind Farms and Bushfire Operations*, version 3.0, dated 25 October 2018.

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Of specific interest in this document is the section extracted from under the 'Response' heading, copied below:

Wind farm operators should be responsible for ensuring that the relevant emergency protocols and plans are properly executed in an emergency event. During an emergency, operators need to react quickly to ensure they can assist and intervene in accordance with their planned procedures.

The developer or operator should ensure that:

- *liaison with the relevant fire and land management agencies is ongoing and effective*
- *access is available to the wind farm site by emergency services response for on-ground firefighting operations*
- *wind turbines are shut down immediately during emergency operations – where possible, blades should be stopped in the 'Y' or 'rabbit ear' position, as this positioning allows for the maximum airspace for aircraft to manoeuvre underneath the blades and removes one of the blades as a potential obstacle.*

Aerial personnel should assess risks posed by aerial obstacles, wake turbulence and moving blades in accordance with routine procedures.

Aviation Projects considers that it may be impractical to stop and lock the turbine blades in a Y configuration due to the time needed to stop and lock the turbine and the risk to personnel having to climb into the WTG tower as a bush fire approaches. WTG blades can be feathered to effectively stop or reduce the rotation rate of the turbine to a very slow speed.

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4. INTERNAL CONTEXT

4.1. Wind farm location

The wind farm is situated on rural land developed for broad-hectare farming purposes. The Project Area is located on farming properties owned by 2 separate landowners. The western boundary is located along King Rocks Road North.

4.2. Wind turbine description

For the purposes of this aviation impact assessment, a worst-case WTG configuration has been applied which will allow for potential use of a turbine with hub height 125 m, a 162 m rotor blade diameter and maximum tip height of 206 m AGL. Figure 5 provides the WTG layout identifying the highest wind turbine WT8 (source: Synergy RED, Google Earth).

The highest ground elevation of any of the proposed wind turbines (WT8) is 424 m AHD and a maximum overall height of 630 m AHD (2066.9 ft AMSL).

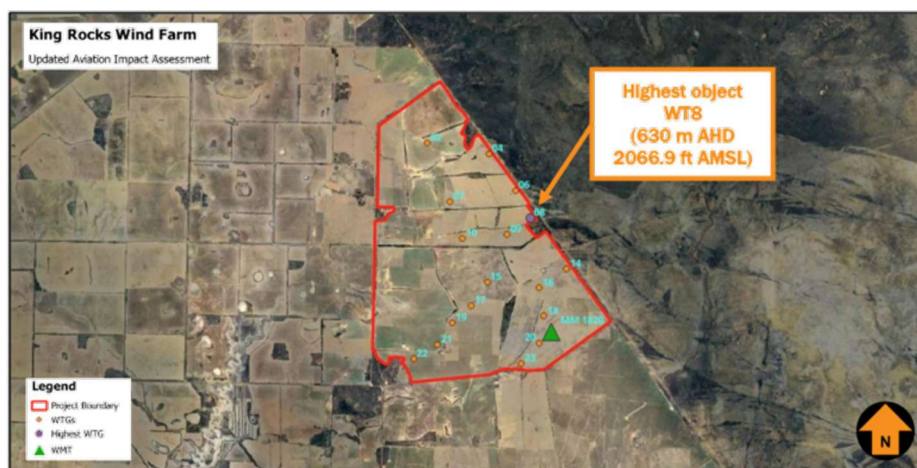


Figure 5 Project layout and highest wind turbine

The coordinates and ground elevations of the Project wind turbines analysed are listed in **Annexure 5**.

Figure 6 and Figure 7 show the general nature of the Project Area along the central west and north-west boundaries.

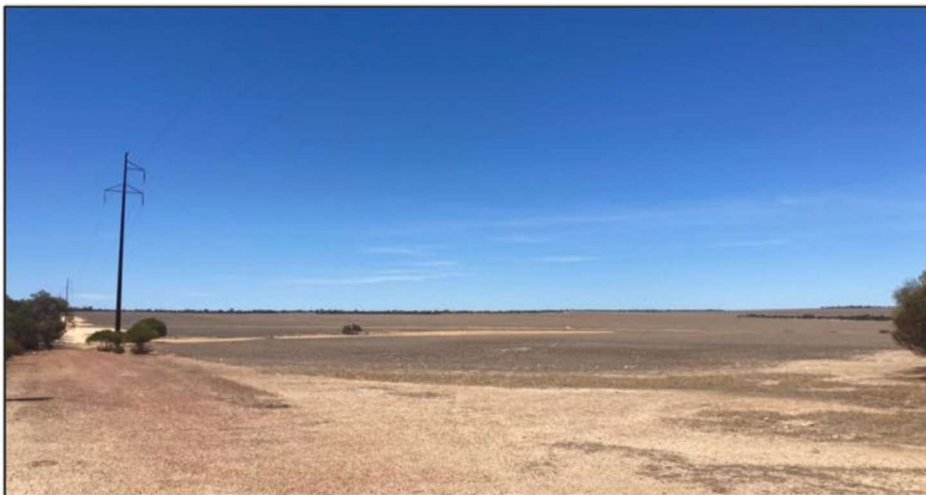
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Figure 6 Central Project Area from central western boundary (North King Rocks Rd)



Figure 7 Project Area from north-western boundary (North King Rocks Rd)

4.3. Wind monitoring tower description

It is proposed to install one (1) WMT with a maximum height of 150 m (492 ft) AGL. One (1) WMT has already been installed in the central part of the Project Area with a height of 85 m (279 ft) AGL.

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The proposed WMT is installed. It has the recommended marking and information regarding its location and height provided to Airservices Australia. This WMT will be in place for about 5 years. It is located near where WTGs are planned to be erected in 6-8 months.

The WMT locations used in this assessment are provided in Figure 8 (Source: SynergyRED, Google Earth).

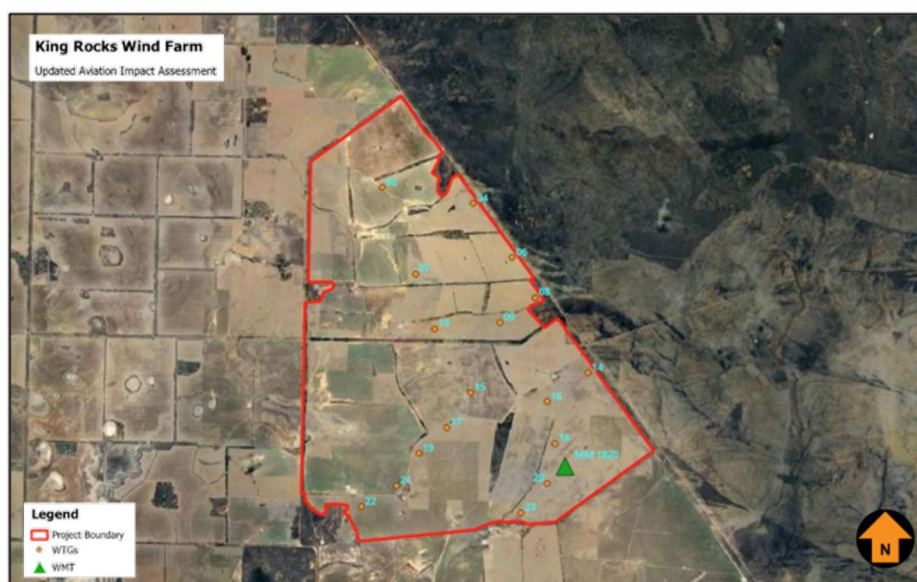


Figure 8 WMT locations within Project Area

Table 1 provides the details of the WMTs as specified by the Proponent. A maximum height of 150 m AGL has been applied for the proposed (installed) WMT representative of the maximum WTG hub height applied in this assessment.

Table 1 WMT details

Parameter	Details
WMT ID	WMT MM1820
Nominal Location	708311.03 m E 6428252.95 m S
Ground elevation at site (approximate)	381 m AHD
Height of tower AGL	Up to 150 m (492 ft)
WMT tip height	531 m AHD (1742.1 ft AMSL)
Design	Steel lattice



5. CONSULTATION

The following list of stakeholders was identified as requiring consultation:

1. Airservices Australia
2. Aircraft operators
3. Aerodrome operator
4. Department of Defence
5. WA Department of Fire and Emergency Services
6. WA Department of Biodiversity, Conservation and Attractions
7. Royal Flying Doctor Service

Details and results of the consultation activities will be provided in Table 2.

A meeting was held with WA DFES on 17 February 2025 to discuss aerial firefighting activities in the event of a bushfire in or near to a wind farm. Details are provided within Table 2

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Table 2 Stakeholder consultation details

Agency/Contact	Activity/Date	Response/ Date	Issues Raised During Consultation	Action Proposed
Airservices Australia	Initial notification 21 April 2022 Follow-up email sent 2 nd June 2022	29 June 2022, by Richard Tomlinson, Airport Development & Engagement Advisor	Airspace Procedures With respect to procedures designed by Airservices in accordance with ICAO PANS-OPS and Document 9905, at the various heights provided the wind farm will not affect any sector or circling altitude, nor any instrument approach or departure procedure at any aerodrome. The wind farm will not affect any air route lowest safe altitudes however, the wind farm will affect the published Grid LSALT overhead the wind farm. Note: procedures not designed by Airservices at any aerodrome were not considered in this assessment. Communications/Navigation/Surveillance (CNS) Facilities We have assessed the proposal to various heights provided for any impacts to Airservices Precision/Non-Precision Navigation Aids, Anemometers, HF/VHF/UHF Communications, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite/Links and have no objections to it proceeding. Air Traffic Control (ATC) Operations There are no additional instructions or concerns from our ATC. Summary – permanent impact (WF) Based on the above assessment, our view is that the proposed King Rocks Wind Farm would not have an impact on any	Complete the Vertical Obstacle Notification Form for tall structures and submit it to yod@airservicesaustralia.com as soon as the development reaches the maximum height. September 2025 This updated AIA should be provided to Airservices Australia and IDS Australasia. Mt Holland aerodrome was not considered in the original assessment

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Agency/Contact	Activity/Date	Response/ Date	Issues Raised During Consultation	Action Proposed
			Airservices designed instrument procedures, CNS facilities or ATC operations at any airport. Vertical Obstacle Notification If this wind farm receives approval, we request that the proponent advise the Vertical Obstacle team at VOD@airservicesaustralia.com of any requirement to increase Grid LSALT heights at least two (2) weeks prior to construction commencing. We also request that the proponent advise us of the following: • Approved wind turbine locations • Elevations at the top of the highest point of the turbine in metres AHD • A copy of this email As this proposed wind farm is in excess of 30m (99ft) AGL, we request that the proponent completes the Vertical Obstacle Notification Form for tall structures and submits it to VOD@airservicesaustralia.com as soon as the development reaches the maximum height. For further information regarding the reporting of tall structures, please contact (02) 6268 5622, email VOD@airservicesaustralia.com or refer to the web links below: Civil Aviation Safety Regulation Part 175 – Airservices and You - Airservices (airservicesaustralia.com) Vertical Obstacle Notification Form: https://www.airservicesaustralia.com/wp-content/uploads/Tall-Structure-Vertical-Obstacle-Form.pdf	

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Agency/Contact	Activity/Date	Response/ Date	Issues Raised During Consultation	Action Proposed
Department of Defence	Initial notification 21 April 2022 Follow-up email sent 2nd June 2022	No response received as of 23 June 2022		September 2025 This updated AIA should be provided to the Department of Defence. Mt Holland aerodrome was not considered in the original assessment. Further consultation was undertaken by GHD, and Defence has accepted the information and requires no further additional actions other than those required by this AIA.
WA Department of Fire and Rescue Services	26 September 2024	Meeting with DFES 17 February 2025	Ray Buchanan, Superintendent Aviation Services Steven Sartain, Manager Emergency Rescue Helicopter Services. - Aerial fire suppression activities are not prohibited within wind farms. There are currently no procedures specific to aerial fire suppression operations around wind farms. - Aerial firefighting around wind farms is not treated any differently to other aerial firefighting i.e. the same risk assessment processes are undertaken to ensure the aerial fire suppression operation can be undertaken safely as for all fires. - Aerial operations are via contractors, and they will have their own Standard Operating Procedures and risk assessment processes that form part of their Safety Management System.	The updated AIA have been advised to DFES, along with map of the wind farm and provided the same VOD survey data to the DFES team. DFES have requested to be copied into the updates to Airservices Australia VOD team Synergy has provided the wind farm construction emergency response plan to DFES. This will need to be updated with the Operations Emergency Response Plan once reach that stage.

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Agency/Contact	Activity/Date	Response/ Date	Issues Raised During Consultation	Action Proposed
			• Pilots will take the wind turbines into consideration in their risk assessments and will make a determination on the day whether it is safe to operate inside the wind farm envelope. • If the wind farm is operating during a bushfire, suppression operations will be modified or suspended. • If the wind farm is able to be shutdown / paused remotely (i.e. blades moving at approx. 1 RPM), then suppression operations will be considered based on a risk assessment and conditions on the day. • DFES acknowledges that due to the rapid onset of bushfires it is very difficult to achieve a 'Y' position, it is assumed that it cannot be achieved in a timely manner. However, pausing turbines to approx. 1 RPM is recommended. • DFES will prioritise static fresh water supplies over salt or brackish water i.e. preference is to not take salt water for firefighting • While aerial firefighting only operates during the day, rescue services operate day and night – 24/7/365 • DFES recommends medium intensity lighting on wind turbines for rescue purposes due to operating at night. Refer to 2017 NSW CASA guidance. • Emphasised the significance of operator and DFES/DBCA Incident Controllers in the decision-making process for firefighting operations near wind farms.	

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<i>Agency/Contact</i>	<i>Activity/Date</i>	<i>Response/ Date</i>	<i>Issues Raised During Consultation</i>	<i>Action Proposed</i>
Department of Biodiversity, Conservation and Attractions	26 April 2022	04 May 2022, from Michael Ayton, Acting Fire Aviation Services Coordinator	- Provision of information regarding tall objects within the wind farm at the point of construction is critical in being able to assess the risk during a bushfire emergency. - Emphasised importance of local/regional involvement in the planning and development of the wind farm. Emergency Response Plan to be developed and shared with DFES. Must have contact details for wind farm and available 24/7 to first responders and Incident Controllers. Thanks for the opportunity to consider impacts on fire aviation activities. I have discussed with our chief pilot who manages detection services and the chief pilot of our fixed wing waterbomber contractor for aerial suppression. Overall we have no specific concerns and I have made some dot points below. There is no impact on aerial detection operations. It seems to be well into the wheatbelt area where we do not run regular detection services From an aerial suppression perspective, the wind turbines would be hazards to avoid for bombers if they were requested to operate in the area. If a fire was in the close vicinity this would impact suppression operations as any other elevated hazard. This is not a concern for DBCA and would be managed as any other elevated hazard. We do use Hyden as a Forward Operating Base but the installation is far enough away not to be an impact on local operations.	Not applicable

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Agency/Contact	Activity/Date	Response/ Date	Issues Raised During Consultation	Action Proposed
Department of Biodiversity, Conservation and Attractions		Meeting on 24 February 2025	Erin Tassel – Fire Aviation Manager: • DBCA and DFES share similar fire suppression contractors. • Aerial fire suppression and pest control operate under daytime VFR (visual flight rules). No rescue services operated by DBCA. • Aerial fire suppression will consider the risk on the day and location, will be at the pilot's discretion. Dispatch operators will always flag the coordinates of any obstacles / tall objects (such as wind turbines). • DBCA also acknowledges that due to the rapid onset of bushfires it is very difficult to achieve a Y position, it is assumed that it cannot be achieved in a timely manner. • There are currently no procedures specific to wind farms. • Need to confirm secondary airstrips have been assessed. • Feedback from DBCA forum with Chief pilots is that there is no special consideration for wind farms but as the decision to is at the pilot's discretion. • DBCA and DFES share similar fire suppression contractors. DFES and DBCA Process • Operator and incident control decision making operation • Pilot's pre-briefing • Risk assessment by operator at site taking into account the conditions on the day	Synergy will support with any information required to assist them in developing their procedures.

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Agency/Contact	Activity/Date	Response/ Date	Issues Raised During Consultation	Action Proposed
Royal Flying Doctor Service	Initial notification 21 April 2022 Follow-up email sent 2nd June 2022	11 May 2026, from Deputy Head of Flying Operations	AOC to determine operating procedures DFES and DBCA procedures may not be the same as Operator procedures. The RFDS has no feedback on this project.	No action required
Hyden Hotel (Wave Rock aerodrome operator)	Phone call and email 4 May 2022 Follow-up email sent 2nd June 2022 Several follow-up phone calls in 2026 from March to June		A phone call received in late June 2026 indicated that feedback would be provided; however, no email response had been received as at 8 July 2026.	No action required, unless feedback received.
Southeast Air Ag	Initial notification 04 May 2022	11 May 2026, from Director/ Chief Pilot	Our business provides aerial application services and covers the eastern wheatbelt of Western Australia and may include from time to time the area where the proposed wind farm may be sited. Wind farms make the operation of aircraft that operate at low levels, such as ours unsafe as they present as huge moving obstacles, at the same working height in which we operate. They present a huge hazard to the safety of our aircrew and to the aircraft we operate and also present a hazard to neighbouring	

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Agency/Contact	Activity/Date	Response/ Date	Issues Raised During Consultation	Action Proposed
			properties who may wish to engage the services of aerial applicators such as ourselves We therefore in no way condone them.	

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6. AVIATION IMPACT STATEMENT

6.1. Overview

Potential safety risks include (but are not limited to) impacts on flight procedures and aviation communications, navigation, and surveillance (CNS) facilities, which require assessment by Airservices Australia.

To facilitate these assessments, all wind farm proposals submitted to Airservices Australia must include an AIS.

This analysis considers the aeronautical impact of the WTGs on the following:

- The operation of certified aerodromes within 30 nm of the wind farm
- Grid and air route LSALTs
- Airspace protection
- Aviation navigation and communication facilities
- ATC surveillance radar installations
- Local aircraft operations.

6.2. Nearby certified aerodromes

A certified aerodrome is an aerodrome regulated by the Civil Aviation Safety Authority (CASA) under Part 139 of the Civil Aviation Safety Regulations (CASR), with defined standards established in Part 139 (Aerodromes) Manual of Standards (MOS) 2019.

There is one (1) certified aerodrome located within 30 nm of the proposed site: Mt Holland Airport (YHML), which is located at the Mt Holland mine site. It is located approximately 29 nm (53 km) to the north-east of the nearest proposed WTG in the Project Site.

Forrestania Aerodrome is located 31 nm (57 km) southeast of the Project. No other certified aerodromes are located within 30 nm of the Project.

The 30 nm radius represents the 25 nm minimum sector altitude (MSA) for aerodromes with terminal instrument flight procedures. The 25 nm MSA is determined by assessing obstacles within 30 nm (25 nm plus 5 nm buffer) of the aerodrome reference point or navigational aid on which the MSA is based.

The location of the project site relative to Forrestania (YFTA) and Mt Holland Airport (YHML) is shown in Figure 9 (Source: SynergyRED, Google Earth). The orange circle around the airport represents a distance of 30 nm from the aerodrome reference point of the airport.

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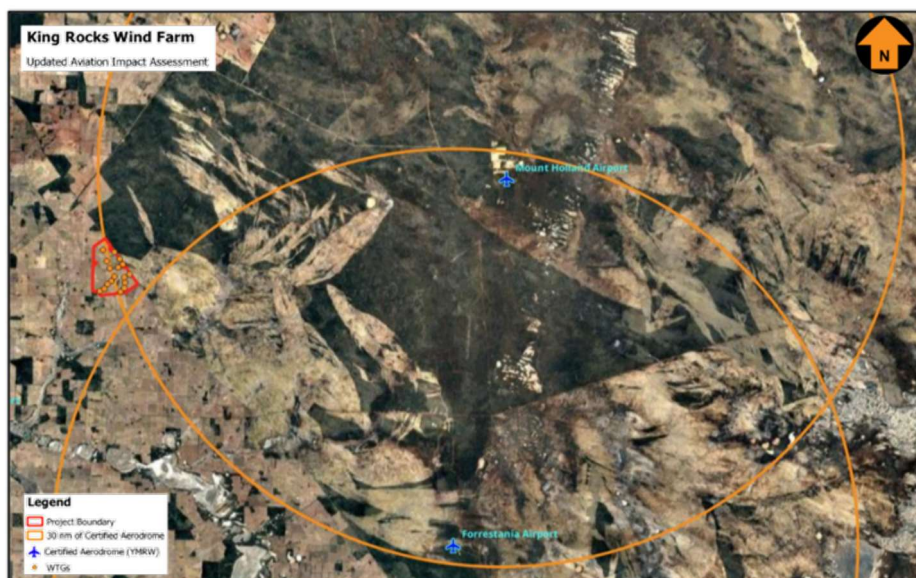


Figure 9 Location of Certified Airports in relation to Project Site

The 25 nm minimum sector altitude (MSA) of Mount Holland (YMHL) airport is shown at Figure 10 (source: Airservices Australia, Google Earth).

Obstacles within 30 nm (25 nm MSA + 5 nm buffer) of YMHL's aerodrome reference point (ARP) define the minimum altitude at which an aircraft can fly when within 25 nm without the required visual reference to the ground or water until they commence the instrument approach procedure. The 25 nm MSA minimum altitude is 2800 ft AMSL with a protection surface of 1800 ft AMSL.

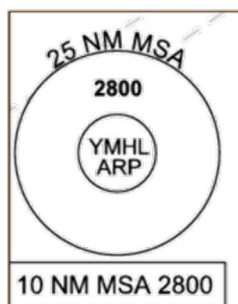


Figure 10 Mount Holland 25 nm MSA diagram

At a maximum height of 2066.9 ft AMSL, the highest WTG will infringe this protection surface by 266.9 ft, requiring the 25 nm MSA minimum altitude to be increased by 300 ft to 3100 ft AMSL.

The RNP RWY 08 instrument approach procedure (effective 09 July 2026) already commences at 3100ft, so the amendment to the 25 nm minimum altitude would be an editorial change only and not affect the efficiency



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of the instrument approach procedure. All instrument approach procedures at Mount Holland have a minimum holding altitude of 3100 ft, which will not need to be amended.

IDS Australasia is certified under CASR Part 173 to design instrument approach procedures. They designed and are responsible for the upkeep of instrument approach procedures at Mt Holland Airport. They will need to be informed of the Project and provided with this AIA to update the procedure. IDS Australia will likely charge a fee to amend the procedure.

Obstacle limitation surfaces (OLS) at Mount Holland aerodrome extend to approximately 4000 m from a runway end. King Rocks Wind Farm Project is located 57 km from the airport and therefore will not impact any Certified aerodrome's obstacle limitation surface (OLS).

6.3. Airports Act 1996

The Airports Act 1996 (the Act) establishes the regulatory arrangements which apply to the airports designated as core regulated airports, or an airport specified in the regulations, where the site of the airport is a Commonwealth place formerly owned and operated on behalf of the Commonwealth by the Federal Airports Corporation. The Department of Infrastructure, Transport, Regional Development and Communications (the Department) regulates issues of ownership and control of the federal leased airports through restrictions provided under the Airports Act 1996. (The Act)

The effect of the Act and Regulations is to establish limitations on activities which result in infringements into prescribed airspace.

Prescribed Airspace is defined in The Airports (Protection of Airspace) Regulations 1996:

(1) For section 181 of the Act, prescribed airspace for an airport is:

- (a) the airspace above any part of either an OLS or a PANS OPS surface for the airport; and*
- (b) airspace declared in a declaration, under regulation 5, relating to the airport.*

The only airports located in Western Australia that are regulated under the Airports Act 1996 are Perth Airport (YPPH) and Jandakot Airport (YPJT).

The Project is not located in the vicinity of and does not impact any airport subject to the Airports Act 1996.

6.4. Grid and Air routes LSALT

CASR Part 173 MOS requires that a minimum obstacle clearance of 1000 ft below the published lowest safe altitude (LSALT) is maintained along each air route. The LSALT published for the route is the lowest altitude that an IFR aircraft can fly on that route, without visual reference to the ground or water.

The Project is in the vicinity of 2 air routes – J21 and Q10

- J 21, between DOTOP and SORTU waypoints. J21 has a LSALT of 3000 ft and a protection surface of 2000 ft AMSL.
- Q10, between MUBID to URGEX and waypoints. Q10 has a LSALT of 3100 ft and a protection surface of 2100 ft AMSL

Airservices Australia updates the AIP every three months. These updates include a range of aeronautical information, including, but not limited to, changes to minimum altitudes, air routes and waypoint information.

Based on the latest AIP data, the highest wind turbine (WTG08) is now located just outside the protection surface of Air Route J21 (approximately 1 km beyond the protection area). The highest wind turbine within the

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J21 protection surface is now WTG04, with a maximum overall height of 592 m AHD (1,942.3 ft AMSL), which does not infringe the J21 protection surface.

The highest wind turbine within the protection area of Q10 would be WTG08, with a maximum overall height of 630 m AHD (2066.9 ft AMSL), which would not infringe the protection surface of Q10.

The Project is in a grid identified in the EnRoute Chart with an LSALT of 3100 ft AMSL and a protection surface of 2100 ft AMSL. The Grid LSALT provides an LSALT for aircraft that are not tracking along a published air route, such as an IFR aircraft flying to Mount Holland or Forresteria.

An IFR aircraft would be required to maintain 3100 ft AMSL until commencing an instrument approach at Mount Holland or Forresteria aerodrome.

The Project will not impact upon the Grid LSALT in the area surrounding the Project.

Figure 11 provides the Grid LSALT and low-level air routes in proximity to the proposed Project on ERCL 8 (source: SynergyRED, Google Earth, Aiservices ERC Low 8 Chart, 12 June 2025).

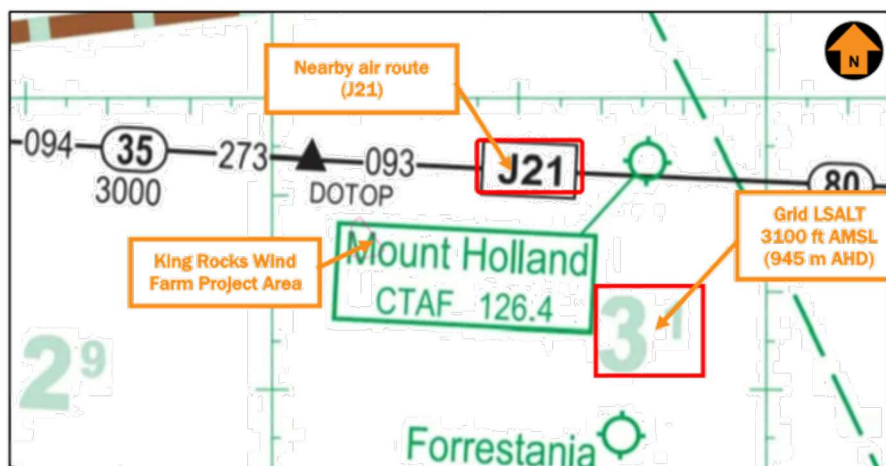


Figure 11 Grid LSALT and air routes published in Aiservices Enroute Chart – Low (8)

Figure 12 shows the high-level air routes and grid LSALT in proximity to the Project (SynergyRED, Aiservices ERC High 3 Chart, July 2026).

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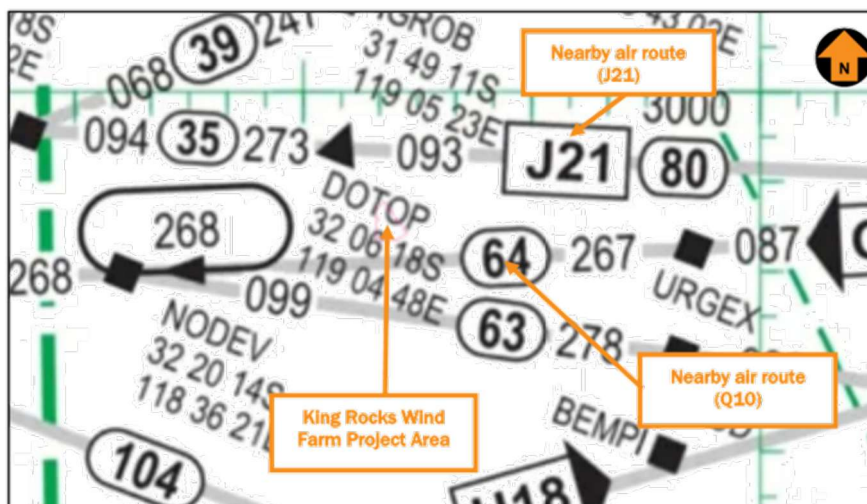


Figure 12 Grid LSALT and air routes published in Airservices Enroute Chart – High (3)

An impact analysis of the surrounding air routes and applicable Grid LSALT is provided in Table 3.

Table 3 Air route and Grid LSALT impact analysis

Air route / Grid	Waypoint pair	Route or Grid LSALT	Protection Surface	Impact on airspace design	Potential solution	Impact on aircraft ops
J21 (ERC-L & ERC-H)	DOTOP - SORTU	3000 ft AMSL	2000 ft AMSL 610 m AHD	Nil – proposed objects below protection surface	Nil	No impact
Q10 (ERC-H)	MUBID – GRABL	3100 ft AMSL (GRID)	2100 ft AMSL 640 m AHD	Nil – proposed objects below protection surface	Nil	No impact
ERC-L (8) Grid	N/A	3100 ft AMSL	2100 ft AMSL 640 m AHD	All WTGs are lower than 2100 ft AMSL	Nil	No impact

Summary

Based on the latest AIP information, Air Route J21 is no longer infringed. There are no infringements of the Grid LSALT or Air Route LSALT

6.5. Airspace Protection

The project site is located in Class G airspace which is uncontrolled airspace, and is not located in any Prohibited, Restricted and Danger areas.

The Project would not have an impact on controlled or designated airspace.

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6.6. Aviation facilities

NASF Guideline G *Protecting Aviation Facilities – Communication, Navigation and Surveillance (CNS)* provides guidance regarding the assessment and potential impact on aviation facilities. A building restriction area (BRA) is specified for certain CNS facilities, which prescribes the space where development has the potential to cause unacceptable interference to CNS facilities.

CASR Part 139 MOS also establishes requirements for the protection of CNS facilities.

The nearest aviation facilities identified to the Project are Airservices Australia VHF towers located approximately 96 km north-northwest and 132 km southwest of the Project, and the non-directional beacon (NDB) located at Cunderdin aerodrome approximately 195 km to the northwest. All other CNS aviation facilities identified are greater than 260 km from the Project.

Figure 13 shows the location of the Project Area relative to the nearest aviation facilities (source: Synergy RED, Airservices Australia, Google Earth).



Figure 13 Project area relative to nearby aviation facilities

The Project will not infringe any protection areas associated with aviation facilities.

6.7. ATC Surveillance Radar installations

Airservices Australia currently requires an assessment of the potential for wind turbines to affect radar line of sight.

With respect to Airservices Australia ATC radar facilities, the closest radar is located at Kalamunda, which is located approximately 158 nm (293 km) west of the Project Area.

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The proposed Project Area is located in Zone 4 and outside the radar line of sight of the Secondary Surveillance Radar (SSR). The EUROCONTROL guidelines state:

When further than 16 km from an SSR the impact of a wind turbine (3-blades, 30-200 m height, and horizontal rotation axis) is considered to be tolerable.

Given the distance of the Project Area from radar facilities, it is not anticipated that the Project will impact any aviation radar facilities.

6.8. AIS Summary

Based on the WTG layout and maximum blade tip height of up to 206 m AGL, the blade tip elevation of the highest WTG, would not exceed 630 m AHD (2066.9 ft AMSL) and;

- There is one (1) certified airport located within 30 nm (56 km) from the Project Site – Mt Holland (YHML).
 - The WTGs would not infringe any OLS surfaces.
 - The WTGs would infringe the PANS-OPS surface related to the 25 nm MSA for Mount Holland aerodrome, requiring an increase to the minimum altitude to 3100 ft AMSL. This increase should be editorial and would not cause an adverse impact on flight safety or flight path efficiency.
- The WTGs would not infringe the Grid LSALT of 3100 ft specified in Enroute Chart – Low (8).
- Based on the latest AIP information, Air Route J21 is no longer infringed. The WTGs would not infringe any LSALT of air route designated in Enroute Chart – Low (8).
- The project area is located within Class G airspace and outside all controlled airspace, Prohibited Restricted and Danger areas.
- The WTGs would not impact the aviation navigation facilities.
- The WTGs would not impact the closest ATC surveillance radar installations.
- The WTGs must be reported to CASA, and construction details must be provided to Airservices.

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7. UNCERTIFIED AERODROMES

Searching various aviation datasets will identify uncertified aerodromes near the project area. They are not subject to CASR Part 139 regulations.

The aviation datasets used for the search are:

- AIP aeronautical charts effective 09 July 2026
- OzRunways - which sources its data from Airservices Australia (AIP). The aeronautical data provided by OzRunways is approved under CASR Part 175

As a guide, an area of interest within a 3 nm radius of an uncertified aerodrome is used to assess the potential impacts of proposed developments on aircraft operations at or within the vicinity of the uncertified aerodrome. The 3 nm radius is considered to be the area in which aircraft are making preparations to join the circuit prior to landing and within which to manoeuvre after take-off to depart from the aerodrome.

The closest uncertified aerodrome observed in relation to the Project Site is Wave Rock (YWRC). Figure 14 shows the location of Wake Rock Aerodrome in relation to the Project Site (Source SynergyRED, Google Earth). All uncertified aerodromes identified as being further than 3 nm from the Project Site, and will not be adversely affected by any wind turbines of the Project.

No private aerodromes were identified near the Project during this assessment, both during the desktop analysis and site visit.

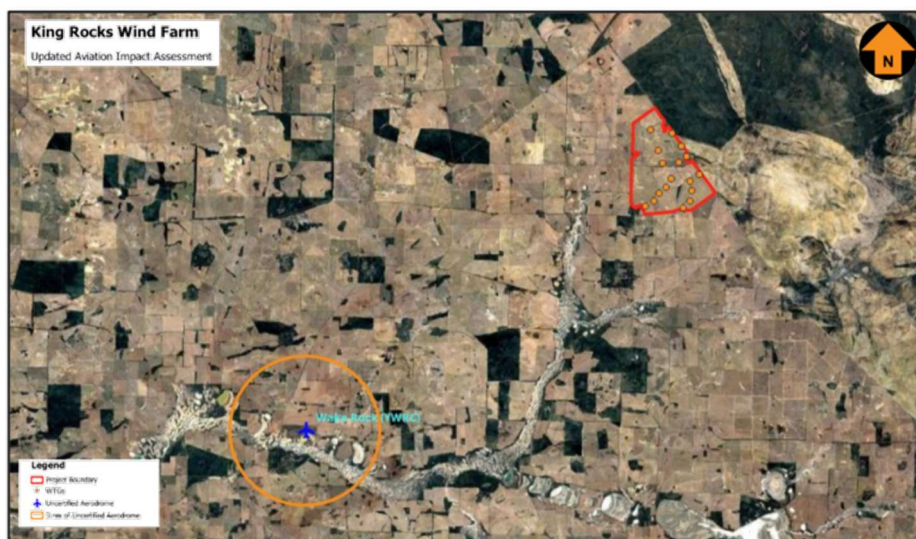


Figure 14 Project related to the closest ALAs identified

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8. POTENTIAL WAKE TURBULENCE IMPACTS

National Airports Safeguarding Framework (NASF) Guideline D – *Managing the Risk to Aviation Safety of Wind Turbine Installations (Wind Farms)/Wind Monitoring Towers* 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 WMTs.

NASF Guideline D provides guidance regarding WTG wake turbulence which states:

Wind farm operators should be aware that wind turbines may create turbulence which noticeable up to 16 rotor diameters from the turbine. In the case of one of the larger wind turbines with a diameter of 150 metres, turbulence may be present two kilometres downstream. At this time, the effect of this level of turbulence on aircraft in the vicinity is not known with certainty. However, wind farm operators should be conscious of their duty of care to communicate this risk to aviation operators in the vicinity of the wind farm...

The key wording in the NASF guidance is “noticeable” and that “the level of turbulence in the vicinity is not known with certainty.”

There are many situations in aviation where pilots “notice” their aircraft moving away from the desired flight path or altitude and take appropriate action to maintain control of the aircraft with minimal input.

Pilot training standards are regulated by CASA to ensure that all qualified pilots have demonstrated to a suitably qualified and authorised check pilot that they can maintain control of their aircraft along the chosen flight path, across a significant range of atmospheric conditions that cause the aircraft to deviate from the pilot’s chosen flight path.

Aircraft are designed to withstand a significant variation in atmospheric disturbances to ensure airframe integrity is maintained. The limits of the airframe’s integrity are known by the pilot and considered in every flight activity. Significant weather events such as thunderstorms are avoided because of the likelihood of airframe limits being exceeded by the strong wind shear type conditions within, beneath and surrounding thunderstorm cells.

Wind turbines have been assessed in a limited number of studies, in which the highest classification of hazard is considered to be medium only within approximately 7 rotor diameters (RD) downwind of the wind turbine. There are no assessments that consider that the downwind turbulence is significant and outside the ability of the aircraft to endure the impacts and for the pilot to be able to control the aircraft using normal control inputs.

There also have been no reported aircraft accidents or incidents involving an aircraft encounter with the turbulence downwind of a wind turbine.

No uncertified aerodrome has been identified within 16 RD of the Project area. There is no potential wake turbulence impact from the Project.



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9. HAZARD LIGHTING AND MARKING

Based on the risk assessment set out in Section 11 It is concluded that aviation lighting is not likely to be required.

For completeness, relevant lighting standards and guidelines are summarised in **Annexure 3**.

Once the details of the wind farm, along with this report, are provided by the planning authority to CASA, CASA is likely to recommend obstacle lighting be fitted to sufficient obstacles to delineate the outline of the wind farm and the highest WTGs within it.

WA Department of Fire and Emergency Services normally recommends aviation obstacle lighting and markings be placed on the wind farms to protect emergency services aviation aircraft

9.1. Wind monitoring towers

In terms of obstacle marking and lighting requirements, relevant requirements set out in Part 139 MOS 2019 and NASF are provided below.

The specific requirements established in Part 139 MOS 2019 don't technically apply to the Project as there is no impact to a certified aerodrome. Given their inconspicuous nature, consideration should be given to marking any WMT and communication towers according to the requirements set out in Part 139 MOS 2019 Chapter 8 Division 10 Obstacle Markings to make them more visible to aircraft during the day; specifically:

8.109 Obstacles and hazardous obstacles

(1) The following objects or structures at an aerodrome are obstacles and must be marked in accordance with this Division unless CASA determines otherwise under subsections (3) and (5):

any fixed object or structure, whether temporary or permanent in nature, extending above the obstacle limitation surfaces. Note an ILS building is an example of a fixed object;

any object or structure on or above the movement area that is removable and is not immediately removed.

8.110 Marking of hazardous obstacles

(5) long, narrow structures like masts, poles and towers which are hazardous obstacles must be marked in contrasting colour bands so that:

(a) the darker colour is at the top; and

(b) the bands:

i. are, as far as physically possible, marked at right angles along the length of the long, narrow structure; and

ii. have a length ("z" in Figure 8.110 (5)) that is, approximately, the lesser of:

(A) 1/7 of the height of the structure; or

(B) 30 m.

(7) Hazardous obstacles in the form of wires or cables must be marked using 3-dimensional coloured objects attached to the wire or cables. Note: Spheres and pyramids are examples of 3-dimensional objects.

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(8) The objects mentioned in subsection (7) must:

- (a) be approximately equivalent in size to a cube with 600 mm sides; and
- (b) be spaced 30 m apart along the length of the wire or cable.

NASF Guideline D suggests consideration of the following measures specific to the marking and lighting of WMTs:

- the top 1/3 of wind monitoring towers to be painted in alternating contrasting bands of colour. Examples of effective measures can be found in the Manual of Standards for Part 139 of the Civil Aviation Safety Regulations 1998. In areas where aerial agriculture operations take place, marker balls or high visibility flags can be used to increase the visibility of the towers;
- marker balls or high visibility flags or high visibility sleeves placed on the outside guy wires;
- ensuring the guy wire ground attachment points have contrasting colours to the surrounding ground/vegetation; or
- a flashing strobe light during daylight hours.

There is no regulatory requirement to mark the WMTs.

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10. ACCIDENT STATISTICS

This section establishes the external context to ensure that stakeholders and their objectives are considered when developing risk management criteria and that externally generated threats and opportunities are properly considered.

10.1. General aviation operations

The general aviation (GA) activity group is considered by the Australian Transport Safety Bureau (ATSB) to be all flying activities that do not involve commercial air transport (activity group), which includes scheduled (RPT) and non-scheduled (charter) passenger and freight type. It may involve Australian civil (VH-) registered aircraft, or aircraft registered outside of Australia. General aviation/recreational encompasses:

- Aerial work (activity type). Includes activity subtypes: agricultural mustering, agricultural spreading/spraying, other agricultural flying, photography, policing, firefighting, construction – sling loads, other construction, search and rescue, observation and patrol, power/pipeline surveying, other surveying, advertising, and other aerial work.
- Own business travel (activity type).
- Instructional flying (activity type). Includes activity subtypes: solo and dual flying training, and other instructional flying.
- Sport and pleasure flying (activity type). Includes activity subtypes: pleasure and personal transport, glider towing, aerobatics, community service flights, parachute dropping, and other sport and pleasure flying.
- Other general aviation flying (activity type). Includes activity subtypes: test flights, ferry flights and other flying.

10.2. ATSB occurrence taxonomy

The ATSB uses a taxonomy of occurrence sub-type. Of specific relevance to the subject assessment are terms associated with **terrain collision**. Definitions sourced from the ATSB website are provided below:

- **Collision with terrain:** Occurrences involving a collision between an airborne aircraft and the ground or water, where the flight crew were aware of the terrain prior to the collision.
- **Controlled flight into terrain (CFIT):** Occurrences where a serviceable aircraft, under flight crew control, is inadvertently flown into terrain, obstacles, or water without either sufficient or timely awareness by the flight crew to prevent the event.
- **Ground strike:** Occurrences where a part of the aircraft drags on, or strikes, the ground or water while the aircraft is in flight, or during take-off or landing.
- **Wirestrike:** Occurrences where an aircraft strikes a wire, such as a powerline, telephone wire, or guy wire, during normal operations.

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10.3. National aviation occurrence statistics 2010-2019

The Australian Transport Safety Bureau (ATSB) published a summary of aviation occurrence statistics for the period 2010-2019 (AR-2020-047, Final - 4 November 2020). A later version of this report is not yet available. Aviation Projects subscribes to the ATSB occurrence reports. There have been no collisions or incidents involving wind farms since 2019.

According to the report, there were no fatalities in high or low capacity RPT operations during the period 2010-2019. In 2019, 220 aircraft were involved in accidents in Australia, and a further 154 aircraft involved in serious incidents (an incident with a high probability of becoming an accident). In 2019 there were 35 fatalities from 22 fatal accidents. There have been no fatalities in scheduled commercial air transport in Australia since 2005.

Of the 326 fatalities recorded in the 10-year period, almost two thirds (175 or 53.68%) occurred in the general aviation segment. On average, there were 1.51 fatalities per aircraft associated with a fatality in this segment. The fatalities to aircraft ratio ranges from 1.09 to 177:1. Whilst it can be inferred from the data that the majority of fatal accidents are single person fatalities, it is reasonable to assert that the worst credible effect of an aircraft accident in the general aviation category will be multiple fatalities.

A breakdown of aircraft and fatalities by general aviation sub-categories is provided in Table 4 (source: ATSB).

Table 4 Number of fatalities by General Aviation sub-category – 2010 to 2019

<i>Sub-category</i>	<i>Aircraft assoc. with fatality</i>	<i>Fatalities</i>	<i>Fatalities to aircraft ratio</i>
Aerial work	37	44	1.18:1
Instructional flying	11	19	1.72:1
Own business travel	3	5	1.6:1
Sport and pleasure flying	53	94	1.77:1
Other general aviation flying	11	12	1.09:1
Totals	115	174	1.51:1

Figure 15 refers to Fatal Accident Rate by operation type per million departures over the 6-year period (source: ATSB). Note the rates presented are not the full year range of the study (2010–2019). This was due to the availability of exposure data (departures and hours flown) which was only available between these years. According to the ATSB report, the number of fatal accidents per million departures for GA aircraft over the 6-year reporting period ranged between 6.6 in 2014 and 4.9 in 2019.

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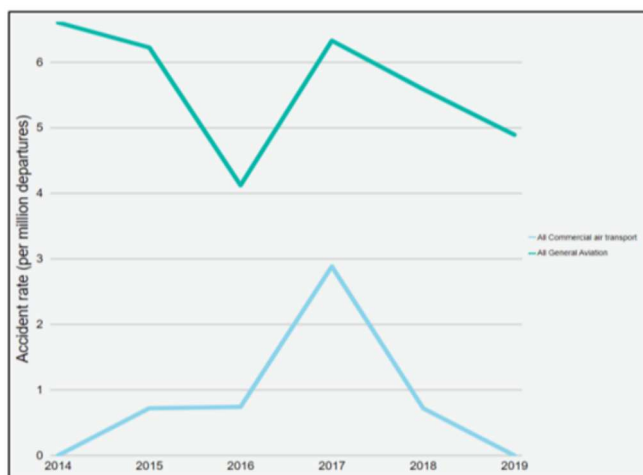


Figure 15 Fatal Accident Rate (per million departures) by Operation Type

In 2018, there were 9 fatal accidents and 9 fatalities involving GA aircraft, resulting in a rate of 5.6 fatal accidents per million departures and 7.7 fatal accidents per million hours flown.

In 2019, there were 1,760,000 landings, and 1,320,000 hours flown by VH-registered general aviation aircraft in Australia, with 8 fatal accidents and 17 fatalities. Based on these results, in 2019 there were 4.9 fatal accidents per million departures and 6.4 fatal accidents per million hours flown. A summary of fatal accidents from 2010-2019 by GA sub-category is provided in Table 5 (source: ATSB).

Table 5 Fatal accidents by GA sub-category – 2010 -2019

Sub-category	Fatal accidents	Fatalities
Agricultural spreading/spraying	13	13
Agricultural mustering	11	12
Other agricultural	1	1
Survey and photographic	5	10
Search and rescue	2	2
Firefighting	2	2
Other aerial work	3	4
Instructional flying	11	19
Own business travel	3	5
Sport and pleasure flying	53	94
Other general aviation flying	11	12
Total	115	174

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Over the 15-year period, no aircraft collided with a WTG or a WMT in Australia.

Of the 20,529 incidents, serious incidents and accidents in GA operations in the 10-year period, 1,404 (6.83%) were terrain collisions.

The underlying fatality rate for GA operations discussed above is considered tolerable within Australia's regulatory and social context.

10.4. Worldwide accidents involving wind farms

Worldwide since aviation accident statistics have been recorded, there have been a total of 5 aviation accidents involving a wind farm (i.e. where WTGs were erected). To provide some perspective on the likelihood of a VFR aircraft colliding with a WTG, a summary of the 5 accidents and the relevant factors applicable to this assessment is incorporated in this section.

Based on the statistics set out in the Global Wind Energy Council (GWEC) report 2024, Total installations of 117GW in 2023 represents a 50% year-on-year increase from 2022..

Based on the Australia's Clean Energy Council statistics there were 110 wind farms in Australia at 2023. Aviation Projects has researched public sources of information, accessible via the world wide web, regarding aviation safety occurrences associated with wind farms. Occurrence information published by Australia, Canada, Europe (Belgium, Denmark, France, Germany, Norway, Sweden and The Netherlands), New Zealand, the United Kingdom and the United States of America was reviewed.

The 5 recorded aviation accidents involving a wind farm are summarised as follows:

- One accident occurred in Texas, United States in October 2019 resulting in minor aircraft damage no injury to the pilot and significant injury to a person on the ground. The aircraft, an Air Tractor AT502, was returning from a local aerial application flight and was flown deliberately at low-level in close vicinity to a wind turbine generator (WTG) because the pilot believed his friend was working on the turbine. The aircraft collided with a tagline rope that was attached to a blade of the WTG and which was being held by a person working on the ground. The worker was thrown about 20 ft in the air and experienced significant non-life-threatening injuries. The aircraft sustained minor damage however the pilot landed the aircraft without further incident.
- One accident, which resulted in 2 fatalities, occurred in Palm Springs in 2001. This accident involved a wind farm but was not caused by the wind farm. The cause of the accident was the inflight separation of the majority of the right canard and all of the right elevator resulting from a failure of the builder to balance the elevators per the kit manufacturer's instructions. The accident occurred above a wind farm, and the aircraft struck a WTG on its descent and therefore the cause of the accident was not attributable to the wind farm and not applicable to this AIA.
- Two accidents involving collision with a WTG were during the day, as follows:
 - One accident occurred in Melle, Germany in 2017 as the result of a collision with a WTG mounted on a steel lattice tower at a very low altitude during the day with good visibility and no cloud. The accident resulted in one fatality. If the tower was solid and painted white, as is standard on contemporary wind farms, then it more than likely would have been more visible than if it were to be equipped with an obstacle light which in all likelihood would not have been operating during daylight with good visibility conditions.
 - One accident occurred in Plouguin, France in 2008 when the pilot decided to descend below cloud in an attempt to find the destination aerodrome. The aircraft was flying in conditions of significantly reduced horizontal visibility in fog where the top of the WTGs were obscured by cloud. The WTGs became visible too late for avoidance manoeuvring and the aircraft

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made contact with two WTGs. The aircraft was damaged but landed safely. No fatalities were recorded.

- In both of the above cases, it is difficult to conclude that obstacle lighting would have prevented the accidents.
- One fatal accident, near Highmore, South Dakota in 2014 occurred at night in Instrument Meteorological Conditions (IMC).

There is one other accident mentioned in a database compiled by an anti-wind farm lobby group (wind-watch.org), which suggests a Cessna 182 collided with a WTG near Baraboo, Wisconsin, on 29 July 2000. The NTSB database records details of an accident involving a Cessna 182 that occurred on 28 July 2000 in the same area. For this particular accident, NTSB found that the probable cause of the accident was VFR flight into IMC encountered by the pilot and exceeding the design limits of the aircraft. A factor was flight to a destination alternate not performed by the pilot. No mention in the NTSB database is made of WTGs or a wind farm.

There is one accident occurred in near Nettersheim, Kreis Euskirchen, North Rhine Westphalia, Germany in August 2024. Unconfirmed information suggests that the aircraft impacted a wind turbine in poor visibility conditions. The accident resulted in one fatality and 2 occupants.



11. RISK ASSESSMENT

A risk management framework comprises likelihood and consequence descriptors, a matrix used to derive a level of risk, and actions required of management according to the level of risk.

The risk assessment framework used by Aviation Projects and risk event description is provided in **Annexure 4**.

11.1. Risk Identification

The primary risk being assessed is that of aviation safety associated with the height and location of WTGs and WMTs proposed by the Project.

Based on an extensive review of accident statistics data (see summary in Section 8 above) and stakeholders who were consulted during the preparation of this AIA (see Section 5), 4 identified risk events associated with WTGs and WMTs relate to aviation safety or potential visual impact, and are listed as follows:

1. Potential for an aircraft to collide with a WTG, controlled flight into terrain (CFIT) (related to aviation safety).
2. Potential for an aircraft to collide with a WMT (CFIT) (related to aviation safety).
3. Potential for a pilot to initiate manoeuvring in order to avoid colliding with a WTG or WMT resulting in collision with terrain (related to aviation safety).
4. Potential for the hazards associated with the Project to invoke operational limitations or procedures on operating crew (related to aviation safety).
5. Potential effect of obstacle lighting on neighbours (related to potential visual impact).

It should be noted that according to guidance provided by the Commonwealth Department of Infrastructure Transport, Regional Development, Communications and the Arts (Airspace and Air Traffic Management Risk Management Policy Statement), and in line with generally accepted practice, the risk to be assessed should primarily be associated with passenger transport services. Therefore, the risk being assessed herein is primarily associated with smaller aircraft likely to be flying under the VFR, and so the maximum number of passengers exposed to the nominated consequences is likely to be limited.

The five risk events identified here are assessed in detail in the following section.

11.2. Risk Analysis, Evaluation and Treatment

For the purpose of considering applicable consequences, the concept of worst credible effect has been used. Untreated risk is first evaluated, then, if the resulting level of risk is unacceptable, further treatments are identified to reduce the residual level of risk to an acceptable level.

A summary of the level of risk associated with the Project, under the proposed treatment regime, with specific consideration of the effect of obstacle lighting, is provided in Table 6 through to Table 10.

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Table 6 Aircraft collision with wind turbine generator (WTG)

<i>Risk ID:</i>	1. Aircraft collision with wind turbine generator (WTG) (CFIT)
Discussion An aircraft collision with a WTG would result in harm to people and damage to property. Property could include the aircraft itself, as well as the WTG. There have been 5 reported occurrences worldwide of aircraft collisions with a component of a WTG structure since the year 2000 as discussed in Section 10. These reports show a range of situations where pilots were conducting various flying operations at low level and in the vicinity of wind farms in both IMC and VMC. No reports of aircraft collisions with wind farms in Australia have been found. In consideration of the circumstances that would lead to a collision with a WTG: - GA VFR aircraft operators generally don't individually fly a significant number of hours in total, let alone in the area in question - There is a very small chance that a pilot, suffering the stress of weather, will continue into poor weather conditions (contrary to the rules of flight) rather than divert away from it, is not aware of the wind farm, will not consider it or will not be able to accurately navigate around it. - If the aircraft was flown through the wind farm, there is still a very small chance that it would hit a WTG. There are no known aerial application operations conducted at night in the vicinity of the Project site. If a proposed object or structure is identified as likely to be an obstacle, details of the relevant proposal must be referred to CASA for CASA to determine, in writing: (a) Whether the object or structure will be a hazard to aircraft operations (b) Whether it requires an obstacle light that is essential for the safety of aircraft operations The Project site is clear of the OLS of any aerodrome.	
Consequence If an aircraft collided with a WTG, the worst credible effect would be multiple fatalities and damage beyond repair. This would be a Catastrophic consequence.	
	<i>Consequence</i> Catastrophic
Untreated Likelihood There have been 5 reports of aircraft collisions with WTGs worldwide, which have resulted in a range of consequences, where aircraft occupants sustained minor injury in some cases and fatal injuries in others (see Section 10). Similarly, aircraft damage sustained ranged from minor to catastrophic. One of these accidents resulted from structural failure of the aircraft before the collision with the WTG. Only two relevant accidents occurred during the day, and only one resulted in a single fatality. It is assessed that collision with a WTG resulting in multiple fatalities and damage beyond repair is unlikely to occur, but possible (has occurred rarely), which is classified as Possible.	
	<i>Untreated Likelihood</i> Possible

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Current Treatments (without lighting)

- The Project site is clear of the OLS of any certified aerodrome.
- Aircraft are restricted to a minimum height of 500 ft (152.4 m) AGL above the highest point of the terrain and any object on it within a radius of 300 m in visual flight during the day when not in the vicinity of built-up areas. The proposed WTGs would be a maximum height of 206 m (675.8 ft) AGL at the top of the blade tip. The rotor blade at its maximum height would be approximately 53.6 m (175.9 ft) above aircraft flying at the minimum altitude of 152.4 m AGL (500 ft).
- Aircraft are restricted to a minimum height of 304.8 m (1,000 ft) above obstacles (including terrain) which are within 10 nm of the aircraft in visual flight at night and potentially even higher during instrument flight (day or night).
- Aircraft authorised to intentionally fly below 152.4 m (500 ft) AGL (day) or below safety height (night) are operated in accordance with procedures developed as an outcome of thorough risk management activities undertaken specifically for and prior to undertaking such authorised flights. Any obstacle including WTGs in the path of the authorised flight would be specifically risk assessed during that process.
- The WTGs are typically coloured white so they should be visible to pilots during the day.
- Final details of WTG coordinates and elevation should be provided to Airservices Australia at least two weeks prior to construction commencing, so that the location and height of all WTGs can be noted on aeronautical maps and charts.
- Because the Project WTGs are proposed to be above 100 m AGL, there is a statutory requirement to report the WTGs to CASA and notified to Airservices Australia prior to construction.

Level of Risk

The level of risk associated with a Possible likelihood of a Catastrophic consequence is 8 (Unacceptable).

Current Level of Risk	8 - Unacceptable
------------------------------	------------------

Risk Decision

A risk level of 8 is classified as Unacceptable; Immediate action required by either treating or avoiding risk. Refer to executive management.

Risk Decision	Unacceptable
----------------------	--------------

Recommended Treatments

The following treatments which can be implemented at little cost will provide an acceptable level of safety:

- Details of the Project should be communicated to local and regional aircraft operators prior to construction to heighten their awareness of its location and so that they can plan their operations accordingly. Specifically:
 - a. Engage with local aerial agricultural and aerial firefighting operators to develop procedures, which may include, for example, stopping the rotation of the WTG blades prior to the commencement of the subject aircraft operations within the Project site.



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- b. Arrangements should be made to publish details of the Project in ERSa for surrounding aerodromes, which would involve notification to Airservices Australia.

Residual Risk

With the implementation of the Recommended Treatments listed above, the likelihood of an aircraft collision with a WTG resulting in multiple fatalities and damage beyond repair will be **Unlikely**, and the consequence remains **Catastrophic**, resulting in an overall risk level of **7 - Tolerable**.

It is considered that the significant cost of obstacle lighting (which is not a preventative control), may only slightly reduce the likelihood of a collision given that the pilot is already in a highly undesirable situation (and not in all situations – such as where the obstacle light may be obscured by cloud) and hence is not justified.

In the circumstances, the level of risk under the proposed treatment plan is considered **as low as reasonably practicable (ALARP)**.

It is our assessment that there will be an acceptable level of aviation safety risk associated with the potential for an aircraft collision with a wind turbine, without obstacle lighting on the turbines of the Project.

Residual Risk **7 - Tolerable**

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Table 7 Aircraft collision with wind monitoring tower (WMT)

Risk ID:	2. Aircraft collision with a wind monitoring tower (WMT) (CFIT)	
Discussion		
An aircraft collision with a WMT would result in harm to people and damage to property. The final location of the WMTs would be determined as part of the final construction design and the details would be reported to Airservices Australia. There are only a few instances of aircraft colliding with a WMT, but they were all during the day with good visibility, and no instance was in Australia. There are no known aerial application operations conducted at night in the vicinity of the wind farm. If a proposed object or structure is identified as likely to be an obstacle, details of the relevant proposal will be referred to CASA for CASA to determine, in writing: • Whether the object or structure will be a hazard to aircraft operations • Whether it requires an obstacle light that is essential for the safety of aircraft operations.		
Consequence		
If an aircraft collided with a WMT, the worst credible effect would be multiple fatalities and damage beyond repair. This would be a Catastrophic consequence.		
Consequence		Catastrophic
Untreated Likelihood		
There are a few occurrences of an aircraft colliding with a WMT, but all were during the day with good visibility when obstacle lighting would arguably be of no effect, and none were in Australia. It is assessed that collision with a WMT without obstacle lighting that would be effective in alerting the pilot to its presence is unlikely to occur, but possible (has occurred rarely), which is classified as Possible.		
Untreated Likelihood		Possible
Current Treatments		
• The temporary and permanent WMT locations will be advised to CASA and Airservices Australia prior to construction. • Aircraft are restricted to a minimum height of 152.4 m (500 ft) AGL above the highest point of the terrain and any object on it within a radius of 300 m in visual flight during the day when not in the vicinity of built-up areas. • Aircraft are restricted to a minimum height of 304.8 m (1,000 ft) above obstacles within 10 nm of the aircraft in visual flight at night and potentially even higher during instrument flight (day or night). • Aircraft authorised to intentionally fly below 152.4 m (500 ft) (day) or below safety height (night) are operated in accordance with procedures developed as an outcome of thorough risk management activities.		

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If the WMTs would be higher than 100 m AGL, there is a statutory requirement to report them to CASA and Airservices Australia prior to construction.	
Level of Risk The level of risk associated with a Possible likelihood of a Catastrophic consequence is 8.	
Current Level of Risk	8 - Unacceptable
Risk Decision A risk level of 8 is classified as Unacceptable: Immediate action required by either treating or avoiding risk. Refer to executive management.	
Risk Decision	Unacceptable
Recommended Treatments The following treatments which can be implemented at little cost will provide an acceptable level of safety: - Details of any WMTs when they are constructed should be advised to Airservices Australia. - Consideration could be given to marking any wind monitoring towers according to the requirements set in MOS 139 Chapter 8 Division 10 Obstacle Markings (as modified by the guidance in NASF Guideline D); specifically: 8.110 (5) As illustrated in Figure 8.110 (5), long, narrow structures like masts, poles and towers which are hazardous obstacles must be marked in contrasting colour bands so that the darker colour is at the top; and the bands are, as far as physically possible, marked at right angles along the length of the long, narrow structure; and have a length ("z" in Figure 8.110 (5)) that is, approximately, the lesser of: 1/7 of the height of the structure; or 30 m. 8.110 (7) Hazardous obstacles in the form of wires or cables must be marked using 3-dimensional coloured objects attached to the wire or cables. Note: Spheres and pyramids are examples of 3-dimensional objects. (8) The objects mentioned in subsection (7) must: be approximately equivalent in size to a cube with 600 mm sides; and be spaced 30 m apart along the length of the wire or cable. - WMTs that are not in close proximity to a WTG, should be fitted with a medium intensity steady red obstacle light at the top of the tower to ensure visibility in low light and deteriorated atmospheric conditions. Characteristics of medium-intensity lights are specified in MOS 139 Section 9.33: - Medium-intensity obstacle lights must: - be visible in all directions in azimuth; and - if flashing — have a flash frequency of between 20 and 60 flashes per minute. - The peak effective intensity of medium-intensity obstacle lights must be 2 000 $\square$ 25% cd with a vertical distribution as follows: - for vertical beam spread — a minimum of 3 degrees; - at -1 degree elevation — a minimum of 50% of the lower tolerance value of the peak intensity;	



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- c) at 0 degrees elevation — a minimum of 100% of the lower tolerance value of the peak intensity.
- 3) For subsection (2), **vertical beam spread** means the angle between 2 directions in a plane for which the intensity is equal to 50% of the lower tolerance value of the peak intensity.
- 4) If, instead of obstacle marking, a flashing white light is used during the day to indicate temporary obstacles in the vicinity of an aerodrome, the peak effective intensity of the light must be increased to $20\,000 \pm 25\%$ cd when the background luminance is 50 cd/m^2 or greater.
- Ensure details of any additional WMTs at the Project site have been communicated to Airservices Australia, and local and regional aerodrome and aircraft operators before, during and following construction.

Residual Risk

With the additional Recommended Treatments listed above, the likelihood of an aircraft collision with a WMT resulting in multiple fatalities and damage beyond repair will be **Unlikely**, and the consequence remains **Catastrophic**, resulting in an overall risk level of **7 – Tolerable**.

It is considered that the significant cost of obstacle lighting (which is not a preventative control), may only slightly reduce the likelihood of a collision given that the pilot is already in a highly undesirable situation (and not in all situations – such as where the obstacle light may be obscured by cloud) and hence is not justified.

Under these circumstances, the level of risk under the proposed treatment plan is considered **ALARP**.

It is our assessment that there will be an acceptable level of aviation safety risk associated with the potential for an aircraft collision with the WMTs that are in close proximity to a WTG without obstacle lighting on the WMTs.

For WMTs that are not in close proximity to a WTG, there will be an acceptable level of aviation safety risk associated with the potential for an aircraft collision provided obstacle lighting is fitted to ensure visibility in low light and deteriorating atmospheric conditions.

Residual Risk **7 - Tolerable**

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Table 8 Harsh manoeuvring leading to controlled flight into terrain

Risk ID:	3. Harsh manoeuvring leads to controlled flight into terrain (CFIT)		
Discussion An aircraft colliding with terrain as a result of manoeuvring to avoid colliding with a WTG would result in harm to people and damage to property. There are a few ground collision accidents resulting from manoeuvring to avoid wind farms, but none in Australia, and all were during the day. The Project is clear of the OLS of any aerodrome. Aircraft are restricted to a minimum height of 152.4 m (500 ft) above the highest point of the terrain and any object on it within a radius of 300 m in visual flight during the day when not in the vicinity of built up areas. The proposed WTGs would be a maximum of 206 m (675.8 ft) AGL at the top of the blade tip. The rotor blade at its maximum height would be approximately 53.6 m (175.8 ft) above aircraft flying at the minimum altitude of 152.4 m (500 ft) AGL. Nevertheless, the minimum visibility of 5000 m required for visual flight during the day should provide adequate time for pilots to observe and manoeuvre their aircraft clear of WTGs. Aircraft are restricted to a minimum height of 304.8 m (1000 ft) above obstacles within 10 nm of the aircraft in visual flight at night and potentially even higher during instrument flight (day or night). Aircraft authorised to intentionally fly below 152.4 m (500 ft) AGL (day) or below safety height (night) are operated in accordance with procedures developed as an outcome of thorough risk management activities. Assumed risk treatments - The WTGs are typically coloured white so they should be visible during the day. - The 'as constructed' details of WTGs are required to be notified to Airservices Australia so that the location and height of WTGs can be noted on aeronautical maps and charts. - Since the WTGs will be higher than 100 m AGL, there is a statutory requirement to report the WTG to CASA.			
Consequence If an aircraft collided with terrain, the worst credible effect would be multiple fatalities and damage beyond repair. This would be a Catastrophic consequence.			
	<table> <tr> <td>Consequence</td><td>Catastrophic</td></tr> </table>	Consequence	Catastrophic
Consequence	Catastrophic		
Untreated Likelihood There are a few ground collision accidents resulting from manoeuvring to avoid WTGs, but none in Australia, and all were during the day (see Section 10). It is assessed that a ground collision accident following manoeuvring to avoid a WTG is unlikely to occur, but possible (has occurred rarely), which is classified as Possible.			
	<table> <tr> <td>Untreated Likelihood</td><td>Possible</td></tr> </table>	Untreated Likelihood	Possible
Untreated Likelihood	Possible		
Current Treatments (without lighting) The Project is clear of the OLS of any aerodrome.			

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- Aircraft are restricted to a minimum height of 152.4 m (500 ft) above the highest point of the terrain and any object on it within a radius of 300 m in visual flight during the day when not in the vicinity of built-up areas.
- WTGs would be a maximum of 206 m (675.8 ft) AGL at the top of the blade tip. The rotor blade at its maximum height would be approximately 53.6 m (175.9 ft) above aircraft flying at the minimum altitude of 152.4 m AGL (500 ft).
- Nevertheless, the minimum visibility of 5000 m required for visual flight during the day should provide adequate time for pilots to observe and manoeuvre their aircraft clear of WTGs.
- The WTGs and masts will be shown on aeronautical charts at the next publication cycle date available and NOTAMS prior to the publication date. This allows pilots to be aware of the existence of the wind farm at the pre-flight planning stage and during flight with reference to the aeronautical chart.
- If cloud descends below the WTG hub, obstacle lighting would be obscured and therefore ineffective.
- Aircraft are restricted to a minimum height of 304.8 m (1000 ft) above obstacles within 10 nm of the aircraft in visual flight at night and potentially even higher during instrument flight (day or night).
- Aircraft authorised to intentionally fly below 152.4 m AGL (500 ft) (day) or below safety height (night) are operated in accordance with procedures developed as an outcome of thorough risk management activities.
- The WTGs are typically coloured white, typical of most WTGs operational in Australia, so they should be visible during the day.
- Final details of WTG coordinates and elevation should be provided to Airservices Australia at least two weeks prior to construction commencing, so that the location and height of all WTGs can be noted on aeronautical maps and charts.
- Since the WTGs would be higher than 100 m AGL, there is a statutory requirement to report the WTGs to CASA.

Level of Risk

The level of risk associated with a Possible likelihood of a Catastrophic consequence is 8.

Current Level of Risk

8 – Unacceptable

Risk Decision

A risk level of 8 is classified as Unacceptable: Immediate action required by either treating or avoiding risk. Refer to executive management.

Risk Decision

Unacceptable

Recommended Treatments

The following treatments which can be implemented at little cost will provide an acceptable level of safety:

- Ensure details of the Project WTGs have been communicated to Airservices Australia, and local and regional aerodrome and aircraft operators prior to construction.

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- Although there is no requirement to do so, the Proponent may consider engaging with local aerial agricultural and aerial firefighting operators to develop procedures for their safe operation within the Project site.

With the additional recommended treatments, the likelihood of ground collision resulting from manoeuvring to avoid a wind turbine resulting in multiple fatalities and damage beyond repair will be **Unlikely**, and the consequence remains **Catastrophic**, resulting in an overall risk level of **7 – Tolerable**.

It is considered that the significant cost of obstacle lighting (which is not a preventative control), may only slightly reduce the likelihood of a collision given that the pilot is already in a highly undesirable situation (and not in all situations – such as where the obstacle light may be obscured by cloud) and hence is not justified.

In the circumstances, the level of risk under the proposed treatment plan is considered **ALARP**.

It is our assessment that there is an acceptable level of aviation safety risk associated with the potential for ground collision resulting from manoeuvring to avoid a wind turbine, without obstacle lighting on the turbines of the Project.

Residual Risk **7 – Tolerable**

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Table 9 Effect of the Project on operating crew

Risk ID:	4. Effect of the Project on operating crew	
Discussion		
Introduction or imposition of additional operating procedures or limitations can affect an aircraft's operating crew.		
There are no known aerial application operations conducted at night in the vicinity of the Project site.		
Consequence		
The worst credible effect a wind farm could have on flight crew would be the imposition of operational limitations, and in some cases, the potential for use of emergency procedures. This would be a Minor consequence.		
Consequence		Minor
Untreated Likelihood		
The imposition of operational limitations is unlikely to occur, but possible (has occurred rarely), which is classified as Possible.		
Untreated Likelihood		Possible
Current Treatments		
• The Project is clear of the OLS of any aerodrome. • Aircraft are restricted to a minimum height of 152.4 m (500 ft) above the highest point of the terrain and any object on it within a radius of 300 m in visual flight during the day when not in the vicinity of built-up areas. • The WTGs and masts will be shown on aeronautical charts at the next publication cycle date available and NOTAMS prior to the publication date. This allows pilots to be aware of the existence of the wind farm at the pre-flight planning stage and during flight with reference to the aeronautical chart. • WTGs would be a maximum of 206 m (675.8 ft) AGL at the top of the blade tip. The rotor blade at its maximum height would be approximately 53.6 m (175.9 ft) above aircraft flying at the minimum altitude of 152.4 m AGL (500 ft). • Nevertheless, the minimum visibility of 5000 m required for visual flight during the day should provide adequate time for pilots to observe and manoeuvre their aircraft clear of WTGs. • Aircraft are restricted to a minimum height of 304.8 m (1000 ft) above obstacles within 10 nm of the aircraft in visual flight at night and potentially even higher during instrument flight (day or night). • Aircraft authorised to intentionally fly below 152.4 m AGL (500 ft) (day) or below safety height (night) are operated in accordance with procedures developed as an outcome of thorough risk management activities. • The WTGs are typically coloured white so they should be visible during the day.		

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- Final details of WTG coordinates and elevation should be provided to Airservices Australia at least two weeks prior to construction commencing, so that the location and height of all WTGs can be noted on aeronautical maps and charts. - Since the WTGs would be higher than 100 m AGL, there is a statutory requirement to report the WTGs to CASA.	
Level of Risk The level of risk associated with a Possible likelihood of a Moderate consequence is 5.	
Current Level of Risk	5 - Tolerable
Risk Decision A risk level of 6 is classified as Tolerable: Treatment action possibly required to achieve ALARP - conduct cost/benefit analysis. Relevant manager to consider for appropriate action.	
Risk Decision	Accept, conduct cost benefit analysis
Recommended Treatments WMTs installed prior to WTG installation and those that are not in relatively close proximity to a WTG should be lit to ensure they are visible in low light and deteriorating atmospheric conditions. (see Risk ID: 2) The following additional treatments will provide an additional margin of safety: - Ensure details of the Project WTGs and WMTs have been communicated to Airservices Australia, and local and regional aerodrome and aircraft operators prior to construction. - Although there is no requirement to do so, the Proponent may consider engaging with local aerial agricultural and aerial firefighting operators to develop procedures for such aircraft operations in the vicinity of the Project site.	
Residual Risk Notwithstanding the current level of risk is considered Tolerable , the additional Recommended Treatments listed above will enhance aviation safety. The likelihood remains Possible , and consequence remains Minor . In the circumstances, the risk level of 5 is considered Tolerable . It is our assessment that there is an acceptable level of aviation safety risk associated with the potential for operational limitations to affect aircraft operating crew, without obstacle lighting on the Project WTGs and WMTs in close proximity to a WTG. For WMTs that are not in close proximity to a WTG, there will be an acceptable level of aviation safety risk associated with the potential for an aircraft collision provided obstacle lighting is fitted to ensure visibility in low light and deteriorating atmospheric conditions..	
Residual Risk	5 - Tolerable

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Table 10 Effect of obstacle lighting on neighbours

Risk ID:	5. Effect of obstacle lighting on neighbours
Discussion This scenario discusses the consequential impact of a decision to install obstacle lighting on the wind farm. Installation and operation of obstacle lighting on WTGs or WMT can have an effect on neighbours' visual amenity and enjoyment, specifically at night and in good visibility conditions. If a proposed object or structure is identified as likely to be an obstacle, details of the relevant proposal must be referred to CASA for CASA to determine, in writing: (a) Whether the object or structure will be a hazard to aircraft operations (b) Whether it requires an obstacle light that is essential for the safety of aircraft operations. In general, objects outside an OLS and above 100 m would require obstacle lighting unless CASA, in an aeronautical study, assesses it is shielded by another lit object or it is of no operational significance.	
Consequence The worst credible effect of obstacle lighting specifically at night in good visibility conditions would be: • Moderate site impact, minimal local impact, important consideration at local or regional level, possible long-term cumulative effect. Not likely to be decision making issues. Design and mitigation measures may ameliorate some consequences. This would be a Moderate consequence.	
	Consequence Moderate
Untreated Likelihood The likelihood of moderate site impact, minimal local impact is Almost certain - the event is likely to occur many times (has occurred frequently).	
	Untreated Likelihood Almost certain
Current Treatments If the WTGs or WMTs would be higher than 150 m (492 ft) AGL, they must be regarded as obstacles unless CASA assess otherwise. In general, objects outside an OLS and above 100 m would require obstacle lighting unless CASA, in an aeronautical study, assesses it is shielded by another lit object or it is of no operational significance.	
Level of Risk The level of risk associated with an Almost certain likelihood of a Moderate consequence is 8.	
	Current Level of Risk 8 - Unacceptable
Risk Decision A risk level of 8 is classified as Unacceptable: Immediate action required by either treating or avoiding risk. Refer to executive management.	
	Risk Decision Unacceptable



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Recommended Treatments

As per the above safety risk assessment, the provision of lighting for the WTGs and permanent WMTs is not necessary to provide an acceptable level of safety. For temporary WMTs installed prior to WTG installation and WMTs that are not in close proximity to a WTG, obstacle lighting is recommended to ensure visibility in low light and deteriorating atmospheric conditions.

If CASA or a planning authority decide that obstacle lighting is required there are impact reduction measures that can be implemented to reduce the impact of lighting on surrounding neighbours, including:

- Reducing the number of WTGs with obstacle lights
- Specifying an obstacle light that minimises light intensity at ground level
- Specifying an obstacle light that matches light intensity to meteorological visibility
- Mitigating light glare from obstacle lighting through measures such as baffling.

These measures are designed to optimise the benefit of the obstacle lights to pilots while minimising the visual impact to residents within and around the Project site.

Consideration may be given to activating the obstacle lighting via a pilot activated lighting system.

An option is to consider using Aircraft Detection Lighting Systems (referred in the United States Federal Aviation Administration Advisory Circular AC70/7460-1L CHG1 – *Obstruction Marking and Lighting*). Such a system would only activate the lights when an aircraft is detected in the near vicinity and deactivate the lighting once the aircraft has passed. This technology reduces the impact of night lighting on nearby communities and migratory birds and extends the life expectancy of obstruction lights.

Residual Risk

Not installing obstacle lights would clearly be an acceptable outcome to those potentially affected by visual impact.

If lighting is required, consideration of visual impact in the lighting design should enable installation of lighting that reduces the impact to neighbours.

The likelihood of a **Moderate** consequence remains **Likely**, with a resulting risk level of **7 – Tolerable**.

It is our assessment that visual impact from obstacle lights can be negated if they are not installed. If obstacle lights are to be installed, they can be designed so that there is an acceptable risk of visual impact to neighbours.

Residual Risk **7 - Tolerable**



12. CONCLUSIONS

The key conclusions of this AIA are summarised as follows:

12.1. Planning considerations

The Project as proposed satisfies the provisions of the Shire of Kondinin Planning Scheme regarding the Wave Rock air strip and will not impact on the current and planned aerodrome operation.

12.2. Aviation Impact Statement

Based on the WTG layout and maximum blade tip height of up to 206 m AGL, the blade tip elevation of the highest WTG, would not exceed 630 m AHD (2066.9 ft AMSL) and;

- There is one (1) certified airport located within 30 nm (56 km) from the Project Site – Mt Holland (YHML).
 - The WTGs would not infringe any OLS surfaces
 - The WTGs would infringe the PANS-OPS surface related to the 25 nm MSA for Mount Holland aerodrome, requiring an increase to the minimum altitude to 3100 ft AMSL. This increase should be editorial and would not cause an adverse impact on flight safety or flight path efficiency
- The WTGs would not infringe the Grid LSALT of 3100 ft specified in Enroute Chart – Low (8).
- Based on the latest AIP information, Air Route J21 is no longer infringed. The WTGs would not infringe any LSALT of air route designated in Enroute Chart – Low (8).
- The project area is located within Class G airspace and outside all controlled airspace, Prohibited Restricted and Danger areas.
- The WTGs would not impact the aviation navigation facilities.
- The WTGs would not impact the closest ATC surveillance radar installations.
- The WTGs must be reported to CASA, and construction details must be provided to Airservices

12.3. Aircraft operator characteristics

Aircraft will be required to navigate around the Project site in low cloud conditions where aircraft need to fly at 500 ft AGL.

The Proponent may consider engaging with local aerial agricultural and aerial firefighting operators to develop procedures, which may include, for example, stopping the rotation of the wind turbine rotor blades prior to the commencement of the subject aircraft operations within the Project Area.

Wind turbines are generally not a safety concern to aerial agricultural operators because they are highly visible and aircraft would not normally operate in the immediate vicinity, although it is understood the presence of WTGs will limit certain operations. WMTs remain the primary safety concern to aerial agricultural operators, who have expressed a general desire for these towers to be more visible.

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12.4. Hazard marking and lighting

The following conclusions apply to hazard marking and lighting:

- With respect to CASR Part 139 MOS Chapter 8 Division 10 8.109, the proposed wind turbines, wind monitoring towers and communication towers must be reported to CASA as they are 100 m or more AGL. Wind turbines, wind monitoring towers and communication towers should be marked in accordance with CASR Part 139 MOS Chapter 8 Division 10 section 8.110.
- Wind turbines should be lit in accordance with CASR Part 139 MOS Chapter 9 Division 4 9.30 and 9.31, unless an aeronautical study assesses they are of no operational significance.
- With respect to marking of turbines, a white, off-white or light grey colour will provide sufficient contrast with the surrounding environment to maintain an acceptable level of safety while lowering visual impact to the neighbouring residents.

12.5. Summary of risks

A summary of the level of residual risk associated with the Project with the Recommended Treatments implemented is provided in Table 11.

Table 11 Summary of Residual Risks

Identified Risk	Consequence	Likelihood	Risk	Actions Required
Aircraft collision with wind turbine generator (WTG)	Catastrophic	Unlikely	7	Acceptable without obstacle lighting (ALARP). Communicate details of the Project WTGs to local and regional operators and make arrangements to publish details in ERSA for surrounding aerodromes before, during and following construction.
Aircraft collision with wind monitoring tower (WMT)	Catastrophic	Unlikely	7	Acceptable without obstacle lighting (ALARP). Although there is no obligation to do so, consideration has been made for marking the WMTs according to the requirements set out in MOS 139 Chapter 8 Division 10 Obstacle Markings, specifically 8.110 (5), (7) and (8). Communicate details of WMTs to local and regional operators and make arrangements to publish details in ERSA for surrounding aerodromes following construction.
Avoidance manoeuvring leads to ground collision	Catastrophic	Unlikely	7	Acceptable without obstacle lighting (ALARP). Communicate details of the Project WTGs and WMTs to local and regional operators and make arrangements to publish details in ERSA for surrounding aerodromes before, during and following construction.
Effect on crew	Minor	Possible	5	Acceptable without obstacle lighting (ALARP) Communicate details of the Project WTGs and WMTs to local and regional operators and make

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<i>Identified Risk</i>	<i>Consequence</i>	<i>Likelihood</i>	<i>Risk</i>	<i>Actions Required</i>
				arrangements to publish details in ERSA for surrounding aerodromes before, during and following construction.
Visual impact from obstacle lights	Moderate	Likely	7	Acceptable without obstacle lighting (zero risk of visual impact from obstacle lighting). If lights are installed, design to minimise impact.



13. RECOMMENDATIONS

Recommended actions resulting from the conduct of this assessment are provided below.

Notification and reporting

1. Details of WTGs 100 m or more AGL must be reported to CASA as soon as practicable after forming the intention to construct or erect the proposed object or structure, in accordance with CASR Part 139.165(1)(2).
2. This updated AIA should be provided to Airservices Australia and IDS Australasia due to the changed nature of the infringements to LSALTS and instrument approach procedures.
3. Final details of WTG coordinates and elevation should be provided to Airservices Australia at least two weeks prior to construction commencing, by submitting the form at this webpage: https://www.airservicesaustralia.com/wp-content/uploads/ATS-FORM-0085_Vertical_Obstruction_Data_Form.pdf to the following email address: vod@airservicesaustralia.com
4. Any obstacles 100 m or more AGL (including temporary construction equipment) should be reported to Airservices Australia NOTAM office until they are incorporated in published operational documents. With respect to crane operations during the construction of the Project, a notification to the NOTAM office may include, for example, the following details:
 - a. The planned operational timeframe and maximum height of the crane; and
 - b. Either the general area within which the crane will operate and/or the planned route with timelines that crane operations will follow.
5. Details of the wind farm should be provided to local and regional aircraft operators prior to construction in order for them to consider the potential impact of the wind farm on their operations.
6. To facilitate the flight planning of aerial application operators, details of the Project, including the 'as constructed' location and height information of WTGs and overhead transmission lines should be provided to landowners so that, when asked for hazard information on their property, the landowner may provide the aerial application pilot with all relevant information.

Operation

7. Whilst not a statutory requirement, the Proponent should consider engaging with local aerial agricultural operators and aerial firefighting operators in developing procedures for such aircraft operations in the vicinity of the Project.

Marking of WTGs

8. The rotor blades, nacelle and the supporting mast of the WTGs should be painted in a low-reflective white, off-white or light grey, as is typical of most WTGs operational in Australia. No additional marking measures are required for WTGs.

Lighting of WTGs

9. Aviation Projects has assessed that the Project will not require obstacle lighting to maintain an acceptable level of safety to aircraft. Once amended, the LSALT and 25 NM MSA altitudes will not be infringed by the Project.

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10. It is not mandatory to mark the WMT, however the following markings are recommended to be implemented in consideration of potential day VFR aerial work operations in accordance with NASF Guideline D:
 - a. Obstacle marking for at least the top 1/3 of the mast and be painted in alternating contrasting bands of colour
 - b. Marker balls or high visibility flags or high visibility sleeves placed on the outside guy wires; and
 - c. Guy wire ground attachment

Lighting of WMTs

11. Aviation Project consider that there will be an acceptable level of aviation safety risk associated with the potential for an aircraft collision with the WMTs.

Micrositing

12. Providing the micrositing of the planned WTGs it is not likely to result in a change in the maximum overall blade tip height of the Project. No further assessment is likely to be required from micrositing and the conclusions of this AIA would remain the same.

Overhead transmission line

13. It is understood the Project will connect with the existing 132 kV transmission line that travels across the central Project Area. Any additional overhead transmission lines and/or supporting poles that are located where they could adversely affect aerial application operations should be identified in consultation with local aerial agriculture operators and marked in accordance Standards Australia guidelines (ISO 31000:2018 *Risk management – Guidelines*).

Aerial firefighting

14. The developer or operator should consider the guidance contained in the National Council for Fire and Emergency Services, Wind Farms and Bushfire Operations to ensure:
 - a. Liaison with the relevant fire and land management agencies is ongoing and effective
 - b. Access is available to the wind farm site by emergency services for on-ground firefighting operations
 - c. Wind turbines are shut down immediately during emergency operations.
 - d. Where possible, blades should be stopped in the 'Y' or 'rabbit ear' position, as this positioning allows for the maximum airspace for aircraft to manoeuvre underneath the blades and removes one of the blades as a potential obstacle. This may not always be possible due to the risk to equipment and personnel as a fire approaches or exists in or near to the WTGs.

Aviation Projects considers that it may be impractical to stop and lock the turbine blades in a Y configuration due to the time needed to stop and lock the turbine and the risk to personnel having to climb into the WTG tower as a bush fire approaches. WTG blades can be feathered to effectively stop or reduce the rotation rate of the turbine to a very slow speed.

**Triggers for review**

15. Triggers for review of this risk assessment are provided for consideration:

- a. Prior to construction to ensure the regulatory framework has not changed
- b. Following any significant changes to the context in which the assessment was prepared
- c. Following any near miss, incident or accident associated with operations considered in this risk assessment.



ANNEXURES

1. References
2. Definitions
3. CASA regulatory requirements – Lighting and Marking
4. Risk Framework
5. WTG coordinates and heights



ANNEXURE 1 – REFERENCES

References used or consulted in the preparation of this report include:

- Airservices Australia
 - Aeronautical Information Package, AIP Book, effective 09 July 2026.
 - Designated Airspace Hand, effective 09 July 2026
- Civil Aviation Safety Authority
 - Civil Aviation Regulations 1988 (CAR)
 - Civil Aviation Safety Regulations 1998 (CASR)
 - Advisory Circular (AC) 91-02 V1.2, *Guidelines for aeroplanes with MTOW not exceeding 5700 kg – suitable places to take off and land*, dated November 2022
 - Advisory Circular (AC) 91-10 v1.7: *Operations in the vicinity of non-controlled aerodromes*, dated April 2026
 - CASR Part 173 MOS– *Standards Applicable to Instrument Flight Procedure Design*, version 1.8, dated August 2022
 - CASR Part 139 MOS– *Aerodromes*, F2024C00161 registered 16/02/2024
 - AC 139.E-01 and AC 175.E-02 V2.0—*Objects and structures that affect aviation safety*, dated April 2026
 - Advisory Circular (AC) 139.E-05 v1.1 *Obstacles (including wind farms) outside the vicinity of a CASA certified aerodrome* (October 2022)
- Department of Infrastructure, Transport, Regional Development, Communications and Arts, Australian Government, National Airport Safeguarding Framework, Guideline D *Managing the Risk to aviation safety of wind turbine installations (wind farms)/Wind Monitoring Towers*, dated July 2012
- The Department of Planning, Lands and Heritage has published *Position Statement: Renewable energy facilities* (March 2020)
- International Civil Aviation Organization (ICAO):
 - Annex 14—*Aerodromes*
 - Doc 8168 *Procedures for Air Navigation Services—Aircraft Operations* (PANS-OPS)
- OzRunways, dated July 2026
- Standards Australia, ISO 31000:2018 *Risk management – Guidelines*
- Shire of Kondinin Local Planning Scheme, 10 December 2024 (Updated to include AMD 8 GG 09/01/18).

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ANNEXURE 2 – DEFINITIONS

<i>Term</i>	<i>Definition</i>
Aerial Agricultural Operator	Specialist pilot and/or company who are required to have a commercial pilot's licence, an agricultural rating and a chemical distributor's licence
Aerodrome	A defined area on land or water (including any buildings, installations, and equipment) intended to be used either wholly or in part for the arrival, departure, and surface movement of aircraft.
Aerodrome facilities	Physical things at an aerodrome which could include: - the physical characteristics of any movement area including runways, taxiways, taxilanes, shoulders, aprons, primary and secondary parking positions, runway strips and taxiway strips; - infrastructure, structures, equipment, earthing points, cables, lighting, signage, markings, visual approach slope indicators.
Aerodrome reference point (ARP)	The designated geographical location of an aerodrome.
Aeronautical Information Publication (AIP)	Details of regulations, procedures, and other information pertinent to the operation of aircraft
Aeronautical Information Publication En-route Supplement Australia (AIP ERSa)	Contains information vital for planning a flight and for the pilot in flight as well as pictorial presentations of all licensed aerodromes
Civil Aviation Safety Regulations 1998 (CASR)	Contain the mandatory requirements in relation to airworthiness, operational, licensing, enforcement.
Instrument meteorological conditions (IMC)	Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minimum specified for visual meteorological conditions.
Manual of Standards (MOS)	The means CASA uses in meeting its responsibilities under the Act for promulgating aviation safety standards
National Airports Safeguarding Framework (NASF)	The Framework has the objective of developing a consistent and effective national framework to safeguard both airports and communities from inappropriate on and off airport developments.
Obstacles	All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight.

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<i>Term</i>	<i>Definition</i>
Runway	A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.
Runway strip	A defined area including the runway and stopway, if provided, intended: a. to reduce the risk of damage to aircraft running off a runway; and b. to protect aircraft flying over it during take-off or landing operations.
Safety Management System	A systematic approach to managing safety, including organisational structures, accountabilities, policies and procedures.



ANNEXURE 3 – CASA REGULATORY REQUIREMENTS – LIGHTING AND MARKING

In considering the need for aviation hazard lighting and marking, the applicable regulatory context was determined.

The Civil Aviation Safety Authority (CASA) regulates aviation activities in Australia. Applicable requirements include the Civil Aviation Regulations 1988 (CAR), Civil Aviation Safety Regulations 1998 (CASR) and associated Manual of Standards (MOS) and other guidance material. Relevant provisions are outlined in further detail in the following section.

Civil Aviation Safety Regulations 1998, Part 139—Aerodromes

CASR 139.165 requires the owner of a structure (or proponents of a structure) that will be 100 m or more above ground level to inform CASA. This must be given in written notice and contain information on the proposal, the height and location(s) of the object(s) and the proposed timeframe for construction. This is to allow CASA to assess the effect of the structure on aircraft operations and determine whether the structure will be hazardous to aircraft operations.

Manual of Standards Part 139—Aerodromes

Chapter 9 sets out the standards applicable to Visual Aids Provided by Aerodrome Lighting.

Section 9.30 provides guidance on Types of Obstacle Lighting and Their Use:

1. *The following types of obstacle lights must be used, in accordance with this MOS, to light hazardous obstacles:*
 - a. *low-intensity;*
 - b. *medium-intensity;*
 - c. *high-intensity;*
 - d. *a combination of low, medium or high-intensity.*
2. *Low-intensity obstacle lights:*
 - a. *are steady red lights; and*
 - b. *must be used on non-extensive objects or structures whose height above the surrounding ground is less than 45 m.*
3. *Medium-intensity obstacle lights must be:*
 - a. *flashing white lights; or*
 - b. *flashing red lights; or*
 - c. *steady red lights.*

Note CASA recommends the use of flashing red medium-intensity obstacle lights.
4. *Medium-intensity obstacle lights must be used if:*
 - a. *the object or structure is an extensive one; or*



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- b. the top of the object or structure is at least 45 m but not more than 150 m above the surrounding ground; or
- c. CASA determines in writing that early warning to pilots of the presence of the object or structure is desirable in the interests of aviation safety.

Note For example, a group of trees or buildings is regarded as an extensive object.

- 5. For subsection (4), low-intensity and medium-intensity obstacle lights may be used in combination.
- 6. High-intensity obstacle lights:
 - a. must be used on objects or structures whose height exceeds 150 m; and
 - b. must be flashing white lights.
- 7. Despite paragraph (6) (b), a medium-intensity flashing red light may be used if necessary, to avoid an adverse environmental impact on the local community.

Sections 9.31 (8) and (9) provide guidance on obstacle lighting specific to 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.
- 10. If the top of an object or structure is more than 45 m above:
 - a. the surrounding ground (ground level); or
 - b. the top of the tallest nearby building (building level); then the top lights must be medium-intensity lights, and additional low-intensity lights must be:
 - c. provided at lower levels to indicate the full height of the structure; and
 - d. spaced as equally as possible between the top lights and the ground level or building level, but not so as to exceed 45 m between lights.

Advisory Circular 139.E-01 v1.0—Reporting of Tall Structures

In Advisory Circular (AC) 139.E-01 v1.0—Reporting of Tall Structures, CASA provides guidance to those

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authorities and persons involved in the planning, approval, erection, extension or dismantling of tall structures so that they may understand the vital nature of the information they provide.

Airservices Australia has been assigned the task of maintaining a database of tall structures. RAAF and Airservices Australia require information on structures which are:

- a) 30 metres or more above ground level—within 30 kilometres of an aerodrome; or
- b) 45 metres or more above ground level elsewhere for the RAAF, or
- c) 30 m or more above ground level elsewhere for Airservices Australia.

The purpose of notifying Airservices Australia of these structures is to enable their details to be provided in aeronautical information databases and maps/charts etc used by pilots, so that the obstacles can be avoided.

The proposed WTGs must be reported to Airservices Australia. This action should occur once the final layout after micro-siting is confirmed and prior to construction.

International Civil Aviation Organisation

Australia, as a contracting State to the International Civil Aviation Organisation (ICAO) and signatory to the Chicago Convention on International Civil Aviation (the Convention), has an obligation to implement ICAO's standards and recommended practices (SARPs) as published in the various annexes to the Convention.

Annex 14 to the Convention — *Aerodromes, Volume 1*, Section 6.2.4 provides SARPs for the obstacle lighting and marking of WTGs, which is copied below:

6.2.4 Wind turbines

6.2.4.1 A wind turbine shall be marked and/or lighted if it is determined to be an obstacle.

Note 1. — Additional lighting or markings may be provided where in the opinion of the State such lighting or markings are deemed necessary.

Note 2. — See 4.3.1 and 4.3.2

Markings

6.2.4.2 Recommendation. — *The rotor blades, nacelle and upper 2/3 of the supporting mast of wind turbines should be painted white, unless otherwise indicated by an aeronautical study.*

Lighting

6.2.4.3 Recommendation. — *When lighting is deemed necessary, in the case of a wind farm, i.e. a group of two or more wind turbines, the wind farm should be regarded as an extensive object and the lights should be installed:*

- a) to identify the perimeter of the wind farm;
- b) respecting the maximum spacing, in accordance with 6.2.3.15, between the lights along the perimeter, unless a dedicated assessment shows that a greater spacing can be used;
- c) so that, where flashing lights are used, they flash simultaneously throughout the wind farm;
- d) so that, within a wind farm, any wind turbines of significantly higher elevation are also identified wherever they are located; and
- e) at locations prescribed in a), b) and d), respecting the following criteria:

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i) for wind turbines of less than 150 m in overall height (hub height plus vertical blade height), medium-intensity lighting on the nacelle should be provided;

ii) for wind turbines from 150 m to 315 m in overall height, in addition to the medium-intensity light installed on the nacelle, a second light serving as an alternate should be provided in case of failure of the operating light. The lights should be installed to assure that the output of either light is not blocked by the other; and

iii) in addition, for wind turbines from 150 m to 315 m in overall height, an intermediate level at half the nacelle height of at least three low-intensity Type E lights, as specified in 6.2.1.3, should be provided. If an aeronautical study shows that low-intensity Type E lights are not suitable, low-intensity Type A or B lights may be used.

Note. — The above 6.2.4.3 e) does not address wind turbines of more than 315 m of overall height. For such wind turbines, additional marking and lighting may be required as determined by an aeronautical study.

6.2.4.4 Recommendation. — The obstacle lights should be installed on the nacelle in such a manner as to provide an unobstructed view for aircraft approaching from any direction.

6.2.4.5 Recommendation. — Where lighting is deemed necessary for a single wind turbine or short line of wind turbines, the installation should be in accordance with 6.2.4.3 e) or as determined by an aeronautical study.

As referenced in Section 6.2.4.3(e)(iii), Section 6.2.1.3 is copied below:

6.2.1.3 The number and arrangement of low-, medium- or high-intensity obstacle lights at each level to be marked shall be such that the object is indicated from every angle in azimuth. Where a light is shielded in any direction by another part of the object, or by an adjacent object, additional lights shall be provided on that adjacent object or the part of the object that is shielding the light, in such a way as to retain the general definition of the object to be lighted. If the shielded light does not contribute to the definition of the object to be lighted, it may be omitted.

As referenced in Section 6.2.4.3(b), Section 6.2.3.15 is copied below:

6.2.3.15 Where lights are applied to display the general definition of an extensive object or a group of closely spaced objects, and

a) low-intensity lights are used, they shall be spaced at longitudinal intervals not exceeding 45 m; and

b) medium-intensity lights are used, they shall be spaced at longitudinal intervals not exceeding 900 m.

Section 4.3 Objects outside the OLS states the following:

4.3.1 Recommendation.— Arrangements should be made to enable the appropriate authority to be consulted concerning proposed construction beyond the limits of the obstacle limitation surfaces that extend above a height established by that authority, in order to permit an aeronautical study of the effect of such construction on the operation of aeroplanes.

4.3.2 Recommendation. — In areas beyond the limits of the obstacle limitation surfaces, at least those objects which extend to a height of 150 m or more above ground elevation should be regarded



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as obstacles, unless a special aeronautical study indicates that they do not constitute a hazard to aeroplanes.

Note. — This study may have regard to the nature of operations concerned and may distinguish between day and night operations.

ICAO Doc 9774 Manual on Certification of Airports defines an aeronautical study as:

An aeronautical study is a study of an aeronautical problem to identify potential solutions and select a solution that is acceptable without degrading safety.

Light characteristics

If obstacle lighting is required, installed lights should be designed according to the criteria set out in the applicable regulatory material and taking CASA's recommendations into consideration in the case that CASA has reviewed this risk assessment and provided recommendations.

The characteristics of the obstacle lights should be in accordance with the applicable standards in Part 139 MOS 2019.

The characteristics of low and medium intensity obstacle lights specified in Part 139 MOS 2019, Chapter 9, are provided below.

CASR Part 139 MOS 2019 Chapter 9 Division 4 – Obstacle Lighting section 9.32 outlines Characteristics of Low Intensity Obstacle Lights.

1. Low-intensity obstacle lights must have the following:
 - a. fixed lights showing red;
 - b. a horizontal beam spread that results in 360-degree coverage around the obstacle;
 - c. a minimum intensity of 100 candela (cd);
 - d. a vertical beam spread (to 50% of peak intensity) of 10 degrees;
 - e. a vertical distribution with 50 cd minimum at +6 degrees and +10 degrees above the horizontal;
 - f. not less than 10 cd at all elevation angles between –3 degrees and +90 degrees above the horizontal.

Note: The intensity requirement in paragraph (c) may be met using a double-bodied light fitting. CASA recommends that double-bodied light fittings, if used, should be orientated so that they show the maximum illuminated surface towards the predominant, or more critical, direction of aircraft approach.

2. To indicate the following:
 - a. taxiway obstacles;
 - b. unserviceable areas of the movement area; low-intensity obstacle lights must have a peak intensity of at least 10 cd.

Part 139 MOS 2019 Chapter 9 Division 4 – Obstacle Lighting section 9.33 outlines Characteristics of Medium Intensity Obstacle Lights.

1. Medium-intensity obstacle lights must:



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- a. be visible in all directions in azimuth; and
 - b. if flashing — have a flash frequency of between 20 and 60 flashes per minute.
2. The peak effective intensity of medium-intensity obstacle lights must be $2\,000 \pm 25\%$ cd with a vertical distribution as follows:
 - a. for vertical beam spread — a minimum of 3 degrees;
 - b. at -1-degree elevation — a minimum of 50% of the lower tolerance value of the peak intensity;
 - c. at 0 degrees elevation — a minimum of 100% of the lower tolerance value of the peak intensity.
3. For subsection (2), vertical beam spread means the angle between 2 directions in a plane for which the intensity is equal to 50% of the lower tolerance value of the peak intensity.
4. If, instead of obstacle marking, a flashing white light is used during the day to indicate temporary obstacles in the vicinity of an aerodrome, the peak effective intensity of the light must be increased to $20\,000 \pm 25\%$ cd when the background luminance is 50 cd/m^2 or greater.

Visual impact of night lighting

Annex 14 Section 6.2.4 and Part 139 MOS 2019 Chapter 9 are specifically intended for WTGs and recommends that medium intensity lighting is installed.

Generally accepted considerations regarding minimisation of visual impact are provided below for consideration in this aeronautical study:

- To minimise the visual impact on the environment, some shielding of the obstacle lights is permitted, provided it does not compromise their operational effectiveness;
- Shielding may be provided to restrict the downward component of light to either, or both, of the following:
 - such that no more than 5% of the nominal intensity is emitted at or below 5 degrees below horizontal; and
 - such that no light is emitted at or below 10 degrees below horizontal;
- If a light would be shielded in any direction by an adjacent object or structure, the light so shielded may be omitted, provided that such additional lights are used as are necessary to retain the general definition of the object or structure.
- If flashing obstacle lighting is required, all obstacle lights on a wind farm should be synchronised so that they flash simultaneously; and
- A relatively small area on the back of each blade near the rotor hub may be treated with a different colour or surface treatment, to reduce reflection from the rotor blades of light from the obstacle lights, without compromising the daytime visibility of the overall WTG.

Marking of WTGs

ICAO Annex 14 Vol 1 Section 6.2.4.2 recommends that the rotor blades, nacelle and upper 2/3 of the supporting mast of the WTGs should be painted a shade of white, unless otherwise indicated by an aeronautical study.



It is generally accepted that a non-reflective shade of off-white colour will provide sufficient contrast with the surrounding environment to maintain an acceptable level of safety while lowering visual impact to the neighbouring residents.



ANNEXURE 4 – RISK FRAMEWORK

A risk management framework is comprised of likelihood and consequence descriptors, a matrix used to derive a level of risk, and actions required of management according to the level of risk.

The risk assessment framework used by Aviation Projects has been developed in consideration of ISO 31000:2018 *Risk management—Guidelines* and the guidance provided by CASA in its Safety Management System (SMS) for Aviation guidance material, which is aligned with the guidance provided by the International Civil Aviation Organization (ICAO) in Doc 9589 *Safety Management Manual*, Third Edition, 2013. Doc 9589 is intended to provide States (including Australia) with guidance on the development and implementation of a State Safety Programme (SSP), in accordance with the International SARPs, and is therefore adopted as the primary reference for aviation safety risk management in the context of the subject assessment.

Section 2.1 of the ICAO Doc 9589 *The concept of safety* defines safety as follows [author's underlining]:

2.1.1 Within the context of aviation, safety is "the state in which the possibility of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and safety risk management."

Likelihood

Likelihood is defined in ISO 31000:2018 as the chance of something happening. Likelihood descriptors used in this report are as indicated in Table 12.

Table 12 Likelihood Descriptors

No	Descriptor	Description
1	Rare	It is almost inconceivable that this event will occur
2	Unlikely	The event is very unlikely to occur (not known to have occurred)
3	Possible	The event is unlikely to occur, but possible (has occurred rarely)
4	Likely	The event is likely to occur sometimes (has occurred infrequently)
5	Almost certain	The event is likely to occur many times (has occurred frequently)

Consequence

Consequence is defined as the outcome of an event affecting objectives, which in this case is the safe and efficient operation of aircraft, and the visual amenity and enjoyment of local residents.

Consequence descriptors used in this report are as indicated in Table 13.

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Table 13 Consequence Descriptors

No	Descriptor	People Safety	Property/Equipment	Effect on Crew	Environment
1	Insignificant	Minor injury – first aid treatment	Superficial damage	Nuisance	No effects or effects below level of perception
2	Minor	Significant injury – outpatient treatment	Moderate repairable damage – property still performs intended functions	Operations limitation imposed. Emergency procedures used.	Minimal site impact – easily controlled. Effects raised as local issues, unlikely to influence decision making. May enhance design and mitigation measures.
3	Moderate	Serious injury – hospitalisation	Major repairable damage – property performs intended functions with some short-term rectifications	Significant reduction in safety margins. Reduced capability of aircraft/crew to cope with conditions. High workload/stress on crew. Critical incident stress on crew.	Moderate site impact, minimal local impact, and important consideration at local or regional level, possible long-term cumulative effect. Not likely to be decision making issues. Design and mitigation measures may ameliorate some consequences.
4	Major	Permanent injury	Major damage rendering property ineffective in achieving design functions without major repairs	Large reduction in safety margins. Crew workload increased to point of performance decrement. Serious injury to small number of occupants. Intense critical incident stress.	High site impact, moderate local impact, important consideration at state level. Minor long-term cumulative effect. Design and mitigation measures unlikely to remove all effects.
5	Catastrophic	Multiple Fatalities	Damaged beyond repair	Conditions preventing continued safe flight and landing. Multiple deaths with loss of aircraft	Catastrophic site impact, high local impact, national importance. Serious long-term cumulative effect. Mitigation measures unlikely to remove effects.

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Risk matrix

The risk matrix, which correlates likelihood and consequence to determine a level of risk, used in this report is shown in Table 14.

Table 14 Risk Matrix

		CONSEQUENCE				
		INSIGNIFICANT 1	MINOR 2	MODERATE 3	MAJOR 4	CATASTROPHIC
LIKELIHOOD	ALMOST CERTAIN 5	6	7	8	9	10
	LIKELY 4	5	6	7	8	9
	POSSIBLE 3	4	5	6	7	8
	UNLIKELY 2	3	4	5	6	7
	RARE 1	2	3	4	5	6

Actions required

Actions required according to the derived level of risk are shown in Table 15.

Table 15 Actions Required

8-10	Unacceptable Risk	Immediate action required by either treating or avoiding risk. Refer to executive management.
5-7	Tolerable Risk	Treatment action possibly required to achieve As Low As Reasonably Practicable (ALARP) - conduct cost/benefit analysis. Relevant manager to consider for appropriate action.
0-4/5	Broadly Acceptable Risk	Managed by routine procedures, and can be accepted with no action.



ANNEXURE 5 – PROJECT TURBINE COORDINATES AND HEIGHTS

Reference file: KRWF - Layout Coordinates and ground elevation.xlsx

Table 16 WTG locations and heights

WTG_ID	Easting - MGA2020, Zone 50	Northing – MGA2020, Zone 50	Base Elevation (m AHD)	Tip Height (m AGL)	Max Height (m AHD)	Max Height (ft AMSL)
WTG02	705039	6433235	364	206	570	1870.1
WTG04	706660	6432949	386	206	592	1942.3
WTG06	707361	6431981	402	206	608	1994.8
WTG07	705629	6431688	378	206	584	1916.0
WTG08	707769	6431263	424	206	630	2066.9
WTG09	707149	6430819	414	206	620	2034.1
WTG10	705972	6430711	392	206	598	1961.9
WTG14	708714	6429916	390	206	596	1955.4
WTG15	706615	6429565	390	206	596	1955.4
WTG16	707988	6429404	388	206	594	1948.8
WTG17	706195	6428943	386	206	592	1942.3
WTG18	708125	6428657	380	206	586	1922.6
WTG19	705689	6428478	380	206	586	1922.6
WTG20	707990	6427948	377	206	583	1912.7
WTG21	705298	6427898	380	206	586	1922.6
WTG22	704671	6427524	380	206	586	1922.6
WTG23	707516	6427412	380	206	586	1922.6



(+61) 7 3371 0788
enquiries@aviationprojects.com.au
www.aviationprojects.com.au

King Rocks Wind Farm – Aviation Impact Assessment (Supporting Documentation)

Table 2 - Stakeholder consultation details		
Agency/Contact	Action Proposed	Action status
Airservices Australia	Complete the Vertical Obstacle Notification Form for tall structures and submit it to VOD@airservicesaustralia.com as soon as the development reaches the maximum height. September 2025 This updated AIA should be provided to Airservices Australia and IDS Australasia. Mt Holland aerodrome was not considered in the original assessment	Synergy has provided the AIA, a site map and a description of construction activities (i.e. crane height and time frames) to Airservices Australia. VOD forms were initially submitted for the met mast. Subsequently VOD forms have been submitted for all WTGs based on the surveyed data for the foundations. We have agreed a process with Airservices VOD team to provide a monthly construction update advising which turbines have reached maximum height. We have also worked with Airservices Australia to get an AIP Supplement published on their notice system advising pilots of the construction activities.
Department of Defence	This updated AIA should be provided to the Department of Defence.	Synergy has provided the AIA, a site map and a description of construction activities (i.e. crane height and time frames) to Defence. DoD have acknowledged and had no further comment.
DFES	**no actions noted in the report	Synergy has provided the AIA, a site map and a description of construction activities (i.e. crane height and time frames) to DFES. Synergy has also held a subsequent meeting with DFES on construction status and ensure that the data provided is suitable for their mapping and planning systems. DFES requested to be included in the monthly updates to Airservices VOD team. DFES reiterated their position that lighting on one or more

			turbines was recommended for the purposes of their emergency rescue helicopter safety.
DBCA	**no actions noted in the report		Synergy has provided the AIA, a site map and a description of construction activities (i.e. crane height and time frames) to DBCA. DBCA had no further comment.
Royal Flying Doctor Service	Previous contact was unsuccessful		After multiple attempts to contact RFDS Synergy received a response on 11 May 2026 advising that RFDS has no feedback on this project. No further action
Hyden Hotel (Wave Rock aerodrome operator)	Previous contact was unsuccessful		Synergy made phone contact on 24 April and provided a follow up email with documentation. A follow up email was sent on 11 May. No further feedback has been received. Synergy will continue to seek further feedback.
Southeast Air Ag	Previous contact was unsuccessful		After multiple attempts to contact SouthEast ag Synergy received a response on 11 May 2026 advising that they do not support wind farms as they create a hazard at the same working height as their operations. They had no further feedback or suggestions. Synergy will continue to engage to provide any possible support.
Table 11 - Summary of residual risks			

Identified Risk	Actions Required	Action status
Aircraft collision with wind turbine generator (WTG)	Acceptable without obstacle lighting (ALARP). Communicate details of the Project WTGs to local and regional operators and make arrangements to publish details in ERSA for surrounding aerodromes before, during and following construction.	As per the table above Synergy has contacted the identified stakeholders and continues to update key stakeholders including: - Airservices Australia - IDS Australia (Aerodrome procedures) - Covalent Lithium (Aerodrome Operator) Synergy does not have carriage of the ERSA system updates. This process is dependent on the Mt Holland Aerodrome operator and their surveyor. Synergy has made contact and provided the AIA, construction details and timeframes. Covalent have accepted the information. We continue to work with IDS Australia to review and amend the Mt Holland Aerodrome procedures.
Aircraft collision with wind monitoring tower (WMT)	Acceptable without obstacle lighting (ALARP). Although there is no obligation to do so, consideration has been made for marking the WMTs according to the requirements set out in MOS 139 Chapter 8 Division 10 Obstacle Markings, specifically 8.110 (5), (7) and (8). Communicate details of WMTs to local and regional operators and make arrangements to publish details in ERSA for surrounding aerodromes following construction.	Synergy confirms the WMT is marked in accordance with these requirements. The location of the met mast has been advised to Airservices Australia VOD database at the time of installation. As per risk item above, Synergy has no control over the ERSA system but continues to support to Aerodrome operator.

Avoidance maneuvering leads to ground collision	Acceptable without obstacle lighting (ALARP). Communicate details of the Project WGTs and WMTs to local and regional operators and make arrangements to publish details in ERSA for surrounding aerodromes before, during and following construction.	As per the stakeholder section, all identified aviation stakeholders have been provided with the wind farm AIA. The location of the met mast and the WGTs have been advised to Airservices Australia VOD database team. We have worked with Airservices VOD team to post an AIP supplement advising of the wind farm construction. The AIP Supplement will be withdrawn once the VOD system has been updated with the construction of turbines (Airservices Australia will only update the system once the turbines are actually installed) As per risk item above, Synergy has no control over the ERSA system but continues to support to Aerodrome operator.
Effect on crew	Acceptable without obstacle lighting (ALARP) Communicate details of the Project WGTs and WMTs to local and regional operators and make arrangements to publish details in ERSA for surrounding aerodromes before, during and following construction.	As per the stakeholder section, all identified aviation stakeholders have been provided with the wind farm AIA. The location of the met mast and the WGTs have been advised to Airservices Australia VOD database team. We have worked with Airservices VOD team to post an AIP supplement advising of the wind farm construction. The AIP Supplement will be withdrawn once the VOD system has been updated with the construction of turbines (Airservices Australia will only update the system once the turbines are actually installed) As per risk item above, Synergy has no control over the ERSA system but continues to support to Aerodrome Operator.
Visual impact from obstacle lights	Acceptable without obstacle lighting (zero risk of visual impact from obstacle lighting). If lights are installed, design to minimise impact.	Synergy is not intending to install lighting therefore risk is eliminated.

Section 13 - Recommendations	
Recommendation	Action Status
1. Details of WTGs 100 m or more AGL must be reported to CASA as soon as practicable after forming the intention to construct or erect the proposed object or structure, in accordance with CASR Part 139.165(1)(2).	AIA, wind farm layout and construction details have been provided to CASA on 17 March 2026. CASA provided a response on 26 March 2026. They reviewed the AIA and advised a safety risk at the Mt Holland Aerodrome until such time as the LSALT is raised. As discussed above, we are in consultation with Covalent Lithium and IDS Australia with regards to impacts and required changes, as well as updating Airservices Australia with the details of the turbines so that the LSALT can be raised.
2. This updated AIA should be provided to Airservices Australia and IDS Australasia due to the changed nature of the infringements to LSALTS and instrument approach procedures.	Airservices Australia: The location of the met mast and the WTGs have been advised to Airservices Australia VOD database team. We have worked with Airservices VOD team to post an AIP supplement advising of the wind farm construction. The AIP Supplement will be withdrawn once the VOD system has been updated with the construction of turbines (Airservices Australia will only update the system once the turbines are actually installed). Airservices will not make changes to the LSALT until the infringing WTGs are installed. IDS Australia: We have engaged IDS Australia to undertake their own AIA for the purposes of reviewing the aerodrome procedures. This is ongoing with draft report expected imminently. Preliminary advice from IDS is that their report and findings aligns with the Aviation Projects AIA.
3. Final details of WTG coordinates and elevation should be provided to Airservices Australia at least two weeks prior to construction commencing, by submitting the form at this webpage: https://www.airservicesaustralia.com/wp-content/uploads/ATS-FORM-0085_Vertical_Obstruction_Data_Form.pdf to the following email address: vod@airservicesaustralia.com	Completed. VOD forms have been submitted. Ongoing monthly construction updates requested from Airservices Australia and DFES.

4. Any obstacles 100 m or more AGL (including temporary construction equipment) should be reported to Airservices Australia NOTAM office until they are incorporated in published operational documents. With respect to crane operations during the construction of the Project, a notification to the NOTAM office may include, for example, the following details: a. The planned operational timeframe and maximum height of the crane; and b. Either the general area within which the crane will operate and/or the planned route with timelines that crane operations will follow.	Completed. VOD forms have been submitted. AIP Supplement has been posted on Airservices notices. Ongoing monthly construction updates requested from Airservices Australia and DFES. All required information has been provided to Covalent Lithium (Mt Holland Aerodrome Operator) and IDS Australia (who write and update the procedures for Mt Holland Aerodrome) and IDS are in the process of publishing the NOTAM in addition to the AIP Supplement.
5. Details of the wind farm should be provided to local and regional aircraft operators prior to construction in order for them to consider the potential impact of the wind farm on their operations.	As per the stakeholder section, Synergy has sent the AIA to all key stakeholders. Synergy is committed to ongoing stakeholder engagement should any support be required.

6. To facilitate the flight planning of aerial application operators, details of the Project, including the 'as constructed' location and height information of WTGs and overhead transmission lines should be provided to landowners so that, when asked for hazard information on their property, the landowner may provide the aerial application pilot with all relevant information.	Synergy will provide an "as constructed" package of drawings and data to landowners to facilitate the ongoing operation of their farming activities. This will include wind turbine locations and surveyed cable routes.
7. Whilst not a statutory requirement, the Proponent should consider engaging with local aerial agricultural operators and aerial firefighting operators in developing procedures for such aircraft operations in the vicinity of the Project.	As per the stakeholder section, Synergy has provided the AIA to all key stakeholders. Synergy is committed to ongoing stakeholder engagement should any support be required.
8. The rotor blades, nacelle and the supporting mast of the WTGs should be painted in a low-reflective white, off-white or light grey, as is typical of most WTGs operational in Australia. No additional marking measures are required for WTGs.	Nacelle, blades and towers are painted RAL 7035 (light grey). There are no additional marking on any of the components.

9. Aviation Projects has assessed that the Project will not require obstacle lighting to maintain an acceptable level of safety to aircraft. Once amended, the LSALT and 25 NM MSA altitudes will not be infringed by the Project.	Synergy is not installing lighting on the WTGs. As discussed earlier, the LSALT will be raised once the turbines are installed.
10. It is not mandatory to mark the WMT, however the following markings are recommended to be implemented in consideration of potential day VFR aerial work operations in accordance with NASF Guideline D	Complete. Synergy confirms the met mast is marked accordingly.
11. Aviation Project consider that there will be an acceptable level of aviation safety risk associated with the potential for an aircraft collision with the WMTs (without lighting).	Complete. Synergy confirms there is no lighting associated with the met mast.
12. Providing the micrositing of the planned WTGs it is not likely to result in a change in the maximum overall blade tip height of the Project. No further assessment is likely to be required from micrositing and the conclusions of this AIA would remain the same.	Complete. Synergy confirms that the location of the turbines has not changed.

13. It is understood the Project will connect with the existing 132 kV transmission line that travels across the central Project Area. Any additional overhead transmission lines and/or supporting poles that are located where they could adversely affect aerial application operations should be identified in consultation with local aerial agriculture operators and marked in accordance Standards Australia guidelines (ISO 31000:2018 Risk management – Guidelines).	The wind farm connects with a tee into the existing 132kV transmission network with the new line being approximately 100m from the existing line to the wind farm substation. The new transmission lines are central to the wind farm. Survey files of the transmission lines will be provided to the landowner.
14. The developer or operator should consider the guidance contained in the National Council for Fire and Emergency Services, Wind Farms and Bushfire Operations to ensure: a. Liaison with the relevant fire and land management agencies is ongoing and effective b. Access is available to the wind farm site by emergency services for on-ground firefighting operations c. Wind turbines are shut down immediately during emergency operations. d. Where possible, blades should be stopped in the 'Y' or 'rabbit ear' position, as this positioning allows for	(a) Synergy is committed to supporting firefighting and land services agencies where possible. As per the stakeholder engagement table we have had additional discussions with DFES and DBCA. (b) Access is available to emergency services and the additional wind farm roads make access throughout the properties safer and easier. (c) Site contact details will be shared with DFES throughout construction and operations (as the contacts will change). (d) This is not possible, wind turbines do not have this capability during an emergency without someone climbing the turbine and locking the turbine in the "Y" position. Pausing the turbine and allowing it to slowly freewheel is the most practical option and was acknowledged by DFES and DBCA as being acceptable.