

CHAPTER 13

Aviation Assessment

13. AVIATION ASSESSMENT

Existing aviation activity in the locality of the Project site was identified during planning and design through consultation with the Department of Defence (DoD), Civil Aviation Safety Authority (CASA), Airservices Australia (AA), Aerial Agricultural Association of Australia (AAAA) and the local community. This chapter presents a discussion on the aviation activity in the Study area, potential impacts from the Project and appropriate mitigation actions.

13.1 Existing Situation

13.1.1 *Department of Defence*

Following the submission of the Preliminary Environmental Assessment to the Department of Planning, the DoD requested the opportunity to assess the impact of the proposed wind farm on its activities including the safety of military flying operations and the possible impact on the operation of communications, navigation aids and radars.

Advice received from the DoD is that the proposed development will be outside any areas affected by the Defence (Area Control) Regulations (DACR). The DACR control the height of objects (both man-made structures and vegetation) and the purpose for which they may be used within approximately 15 km radius of Defence airfields. In addition, their assessment reveals that the proposed wind farm will not cause any unacceptable interference to Defence communications and the Project will not be located within line-of-sight of the nearest Defence airfield.

However the DoD have noted that there is an ongoing need to obtain and maintain accurate information about tall structures so that risks associated with inadvertent collision by low flying aircraft can be reduced. The Royal Australian Air Force Aeronautical Information Service (RAAF AIS) is responsible for recording the location and height of tall structures. The information is held in a central database managed by RAAF AIS and relates to the erection, extension or dismantling of tall structures the top measurement of which is 30 m or more above ground level, within 30 km of an aerodrome, and 45 m or more above ground level elsewhere.

The wind turbines and associated meteorological masts proposed for the development will meet the above definition of tall structure. RAAF AIS has therefore requested that the Proponent supply them with the location and height details once final design positions are known and before construction commences. After construction is complete, the DoD requests that the Proponent provide RAAF AIS with “as constructed” details.

DoD have no objection to the proposed wind farm subject to notification of location details as described above.

13.1.2 *CASA Requirements*

The Project has several airfields to the north, north-west and south of the site. These include the CASA certified Cooma airfield (35 km north), the uncertified Polo Flat airfield (40 km north) and the unlicensed airfields at Jindabyne (47 km north-west), Bombala (35 km south) and Delegate (40 km south). Only the Cooma and Polo Flat airfields have Instrument Approach Procedures with

associated Procedures for Air Navigation Services (PANS OPS) and Obstacle Limitation Services (OLS) extending to 4 km from the runway ends.

In essence, CASA is concerned with two main aviation issues with respect to wind farms. The first is the protrusion of wind turbines (obstacles) into the OLS of airfields. The OLS is essentially a defined area of airspace above and around a licensed aerodrome. The second issue is the height of turbines outside the OLS and PANS OPS, but still in areas of aviation activity (air traffic).

To assist with the second issue of the height of turbines outside of aerodromes and advice on turbine lighting CASA released Advisory Circular AC 139-18(0) in July 2007 (see **Appendix 13**) to require obstacle marking and lighting on obstacles under Civil Aviation Safety Regulations (CASR) Part 139, however as this only applies to obstacles within the vicinity of an aerodrome (approximately 30 km) and not outside the aerodrome, CASA subsequently withdrew this Advisory Circular in mid 2008. CASA is currently undertaking an appropriate safety study into the risk to aviation posed by wind farms and may develop a new set of guidelines after consulting with the industry and stakeholders on wind farms and conducting a risk management approach with respect to aviation. In the interim, wind farm developers may still require obstacle lighting, according to CASA Manual of Standards, Section 9.4.1.2 (b) if an object is 110m above ground level, unless CASA determines that it is being shielded by another lit object or is of no operational significance.

Under CASA's withdrawn Advisory Circular, a wind farm development would have required two red medium intensity obstacle lights placed on specified turbines at intervals not exceeding 900 m, lights on the most prominent turbine (highest for the terrain) and all lights were to flash synchronously. To minimise visual impact on the environment surrounding the wind turbines, some shielding of the obstacle lights below the horizontal plane would have been permitted.

However, with the withdrawal of CASA's Advisory Circular, the Proponent had the Ambidji Group prepare an independent Aeronautical Impact Assessment and Obstacle Lighting Review, **Appendix 14**, to determine whether the Project had an operational significance and would require obstacle lighting for the turbines.

13.1.3 *Airservices Australia*

AA has informed the Proponent that the Project will not affect any sector or circling altitude, nor any approach or departure or enroute Lowest Safe Altitude (LSALT) to and from Cooma Aerodrome (YCOM). They have also advised that the Project will not impact on Precision/Non-Precision Navigational Aids, HF/VHF Communications, Advanced Surface Movement Guidance and Control Systems (A-SMGCS), Radar or Satellite/Links.

13.1.4 *Aerial Agricultural Association of Australia and Other Activities*

Agricultural aerial spraying is known to occur in the region for crop pest management and to top-dress pastures (nutrient application). Pest management is likely to occur annually, while top-dressing may occur every five years or so.

Five landing grounds are known within the locality of the site (**Figure 13.1**), the closest being under a kilometre from the nearest turbine location within the Boco Cluster. The orientation of all landing grounds is such that aircraft would take-off either parallel or away from the Project.

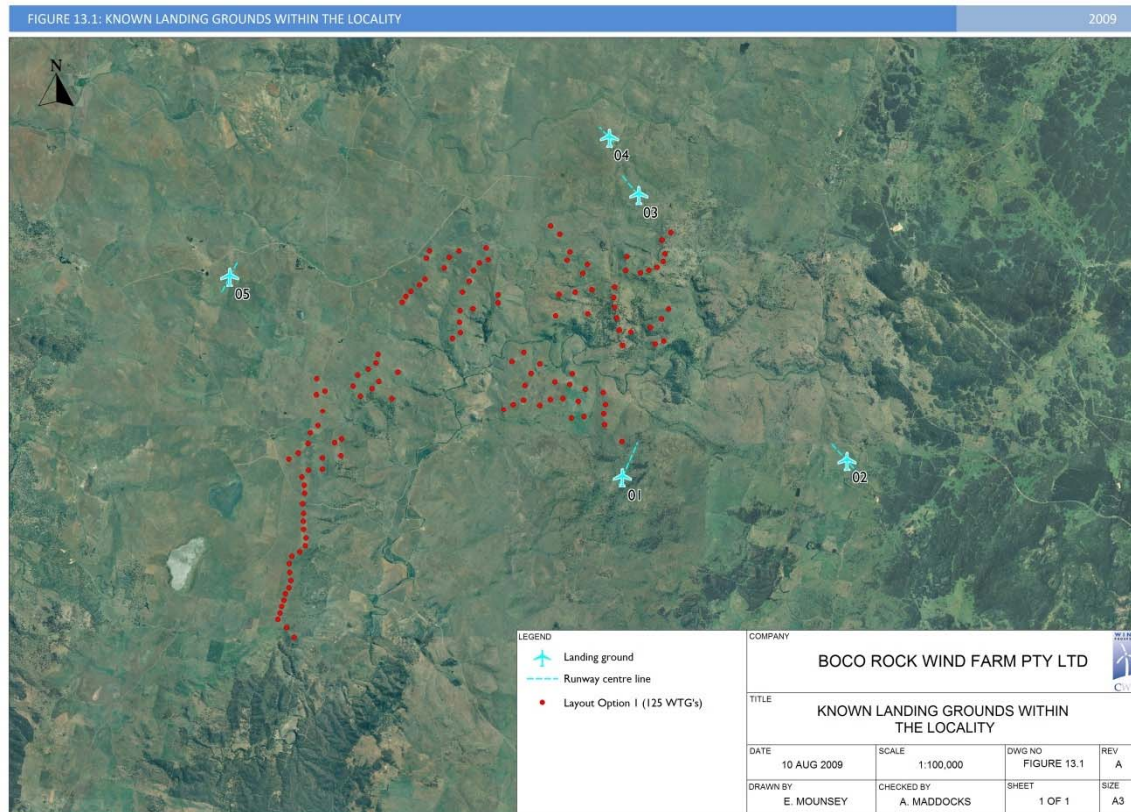


Figure 13.1 Known landing grounds within the locality of the Project
(An A3 size version of this Figure is displayed in Volume 2)

AAAA's policy is not to provide specific comment on particular development proposals as the operational implications of each development varies depending on numerous factors, including:

- the site, elevation and positioning of the turbines;
- orientation of affected paddocks relative to the turbines;
- the type of aerial application taking place;
- the aircraft used and the pilots experience, and;
- the meteorological conditions.

AAAA have advised that they do not have the resources to undertake on-site assessments, and therefore have advised that the Proponent talk to the local aerial applicators that may be affected by the development, whilst making the following observations:

- Positioning of wind farms may affect local aerial application operations, depending on the particular site. Impacts could vary from affecting flight lines to treatment height and accuracy, manoeuvring areas and possibly take-off and landing splays if an airfield is nearby.
- It may not be the land or farm that the Project is to be situated on that will be affected. Neighbouring farms, especially any with borders close to the Project site, would need to be liaised with closely to ensure there are no impacts.
- A key impact may not be the turbines themselves, but the positioning of any power lines that would lead from the Project collector substation back to the grid, or any other above ground power line that would be put in to support the development. Again, consultation with local

operators is the key, and if there are any concerns one alternative may be to mark any difficult to see sections of the wire with the new marking system developed by AAAA and Country Energy in NSW.

13.2 Potential Impacts

13.2.1 *Department of Defence*

None

13.2.2 *CASA Requirements*

Tall structures have the potential to obstruct or present a safety hazard for aircraft, if sited in an OLS or in areas with high levels of air traffic. The turbine height proposed for the Project is up to 152 m. Final turbine height will depend on the model of turbine deemed to be suitable (and successful) for installation. Although the Project is proposed to be located over 30 km from the nearest aerodrome and OLS, local air traffic levels still need to be considered. The report undertaken by the Ambidji Group, **Appendix 14**, determined that the highest turbine does not have any impact on local and nearby aviation activities, does not penetrate any air navigation services and the Project is not located in the vicinity of a regulated aerodrome. This means that the Project is not likely to be assessed as an "Obstacle" or hazard to the safety of aircraft and airport operations. The outcomes of the Aeronautical Impact Assessment and Obstacle Lighting Review will be submitted to CASA for their comment pending Development Approval.

Lighting facilities on turbines or around wind farms have the potential to have two main negative impacts. The first is the visual amenity of the Study area at night (see **Chapter 8** Visual), both for local residences and visitors. The second impact relates to local bird and bat populations (see **Chapter 10** Flora and Fauna). Some bird and bat species are known to be attracted to some types of lights, for either navigational purposes or for feeding. This attraction may increase the probability of interaction with the wind turbine blades.

13.2.3 *Airservices Australia*

None

13.2.4 *Aerial Agricultural Association of Australia and Other Activities*

The Project has the potential to impact on agricultural aerial spraying activities, as the turbines may potentially present physical obstacles that need to be negotiated when carrying out aerial spraying. This is likely to be more relevant to top-dressing activity, which can occur atop the ranges in the area. Pest management activities are more likely to occur over crops which are located on the lower slopes of the ranges away from the turbines.

The landowners of Landing Ground 01 closest to the Boco Cluster expressed concerns that turbines near their boundary will both render the use of their landing ground hazardous and/or unusable by aerial applicators on and along the property boundary. This impact has subsequently been mitigated through a layout change to the Boco Cluster (see **Chapter 6** Stakeholder Consultation) which can be seen in **Figure 13.2** below.

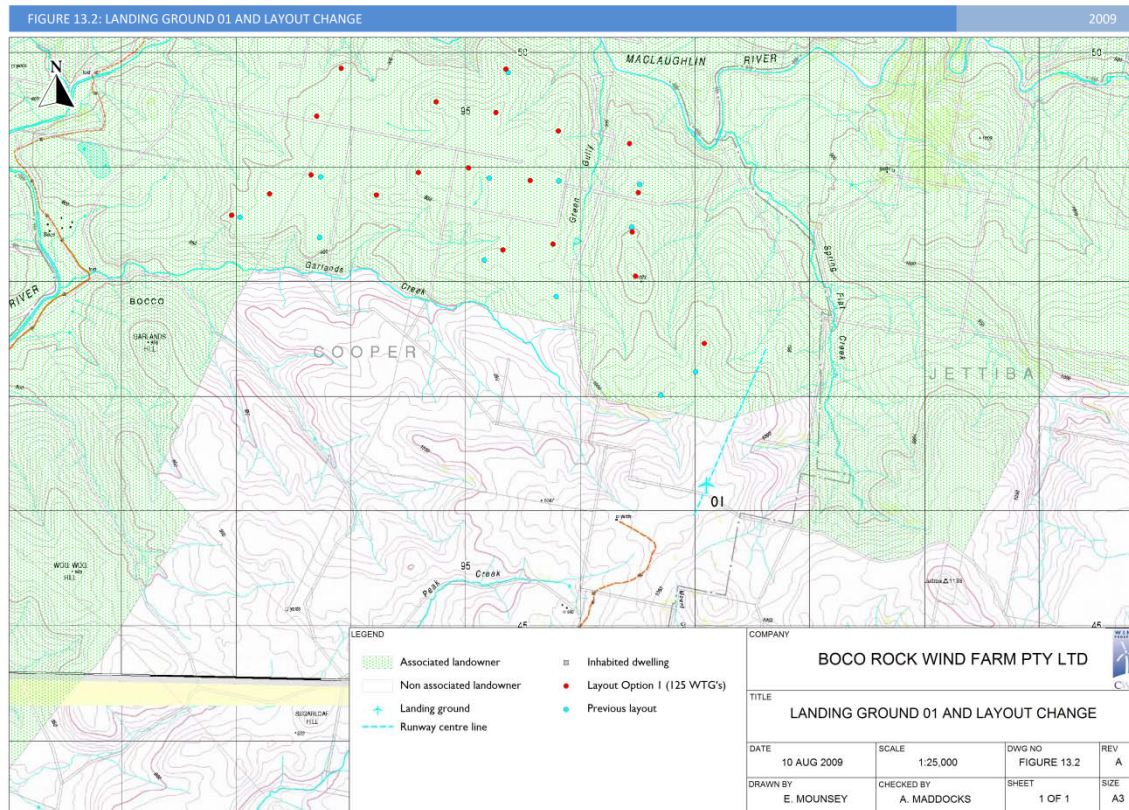


Figure 13.2 Landing Ground 01 and layout change
(An A3 size version of this Figure is displayed in Volume 2)

13.2.5 Independent Assessment of Risk Posed by Previous Layout

Prior to the layout change, input from two NSW based aerial operators was sought to assess the risks posed. Their responses were similar, in particular both expressed that there would be an increased risk to safety and possible increase in the cost of aerial spraying activities during the construction and operational phases of the Project (H. McKillop, Pays Airservice, personal communication, and E. McIntosh, personal communication). However it was also noted that the level of risk and expense are a function of the aerial operator's experience and competence, and that physical features such as trees and power lines are every day obstacles that are avoided, and as such the proximity of wind turbines in the vicinity of Landing Ground 01 should be treated no differently (H. McKillop, Pays Airservice, personal communication). Neither aerial operator indicated that the location of the three turbines from the previous layout closest to Landing Ground 01 would prohibit use of the landing ground or ability to utilise an aerial applicator.

AAAA provided further guidance on this matter with respect to CAAP 92-1(1), *Guidelines for Aeroplane Landing Areas* (1992) (see **Appendix 15**), with particular regard to runway splay or "clearway" distances for agricultural runways. A "clearway" is defined as an area in which there are no obstacles penetrating a slope of 2.5 % rising from the end of the runway over a width of 45 m, see **Figures 13.3** and **13.4** below. In relation to this guidance, advice from AAAA was to estimate the clearway distance with respect to the three turbines of concern to the neighbouring landowner. In doing so, extend the centre line of the landing ground runway in order to determine whether the

perpendicular distance to the maximum swept radius of the three turbines is greater than 22.5 m (i.e. half of the 45 m considered necessary for a clearway).

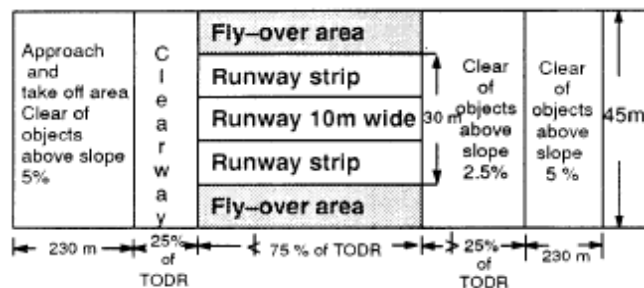


Figure 13.3 Landing ground dimensions – Agricultural Day Operations

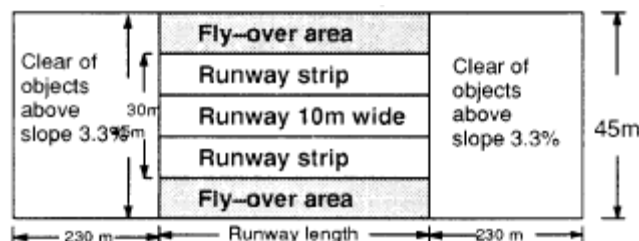


Figure 13.4 Landing ground dimensions – Agricultural Night Operations

Source: CAAP 92-1(1), *Guidelines for Aeroplane Landing Areas (1992)* (**Appendix 14**)

Having performed the measurement, the distance from the centreline to each of the three turbine points previously proposed was (from south to north); 670 m, 470 m and 500 m. Even with consideration of the maximum swept radius from the blades, which can extend up to 52 m from the turbine centre point, it is clearly evident that the distances exceeded the specified minimum runway splay/clearway distance set out in the CAAP.

In addition to the views sought from the two aerial operators and AAAA, the Proponent received additional advice from Argus Consulting Group with respect to the previous layout. The full report can be found in **Appendix 16**, however summarised below are key points relating to 1, the relative Risk to aviation and 2, Operations and 3, Firebombing:

1. Any obstacle protruding above the terrain represents some risk to aviation. In this instance, obstacles up to 150 m high introduce an obstacle which cannot be flown over the top of by heavily laden aerial application aircraft taking off heading 015° magnetic and turning towards the towers. The highest climb gradient required to out climb the towers would be 20 % which is beyond the performance capability of most aerial application aircraft in a fully laden state.

There is nothing preventing an aerial application aircraft from flying between the towers given that the closest pair is approximately 300 m apart. Given that aerial application aircraft routinely fly close (within 5 metres) to obstacles such as trees, power lines, radio towers and any other obstacles found in a rural environment, it is reasonable to expect that a pilot would be able to safely manoeuvre around these obstacles.

*Using the matrix at Appendix 1 (of **Appendix 16**) in terms of probability and consequence and relating that to the table of consequence severity, a score of 5 is possible using the most pessimistic estimates. With this in mind, the construction of the towers would not create an unacceptable risk to aviation activities from the aircraft landing area in question."*

2. *The question whether the construction of three wind turbines as proposed prohibits the use of this landing area is very simple. None of the turbines in any way impinge on the extended centreline of the landing area. The fact that the smallest angle between the extended centreline and a line drawn from the northern end of the landing area to each of the turbines is 29° is conclusive evidence that construction of the wind turbines does not compromise the use of the landing area for aerial application operations. Using the more restrictive requirements for aircraft charter operations, if this landing area had the other requirements for charter, the obstacles would still not pose any restriction on operations. For these operations, a clear area 900 m long and 30 m wide from the centreline of the runway with a 5° splay on the outer limit commencing from northern end of the landing area would be required. The wind turbines do not fall in this area.*

Aerial application around the wind turbines could be conducted safely, considering each of the turbines as an obstacle. Obstacles are routine in aerial application and pilots are trained to deal with them appropriately.

Aerial application of fertiliser to the non-associated landowner's property would not be compromised. From the maps provided, there is evidence of ample room to manoeuvre an aircraft along the boundary of the property the purposes of aerial application without markedly changing the flight patterns to deal with the wind turbines.

3. *In the unlikely event that the landing area close to Boco Cluster was used to firebombing, the aircraft operating would be restricted to reduced loads limited by the landing area length. This would give the aircraft significantly more manoeuvrability, once airborne and again the ability to manoeuvre around the wind turbines.*

To summarise the issue of firebombing, it is unlikely that operations would be conducted from the Boco Cluster location and if they were, the aircraft would be very lightly loaded with high manoeuvrability.

In summary, Argus Consulting Group considered the construction of the three wind turbines at the south eastern end of the Boco Cluster in no way compromised the safety of using Landing Ground 01 nor would they have compromised the aerial application of fertiliser on the non-associated landowners property.

Agricultural operations that involve low level flying can only occur in good conditions (high visibility) in accordance with the aviation regulations, where wind turbines would be highly visible. Aerial operators are engaged in low level flying and agricultural operations are required to undertake a risk assessment for each flight. This would identify specific hazards such as trees and power lines. Wind turbines would be treated no differently. Therefore the operation of low flying aircraft in the vicinity

of wind turbines does not represent an unacceptable risk if normal operational procedures are followed.

13.2.6 *Cumulative Impacts*

An assessment of cumulative environmental impacts considers the potential impact of a proposal in the context of existing developments and future developments to ensure that any potential environmental impacts are not considered in isolation. It is anticipated that there will be no cumulative effect to aviation from the introduction of the proposed development into the area.

13.3 **Management and Mitigation**

13.3.1 *Department of Defence*

The Proponent will provide the RAAF AIS with the location and height details once final design positions are known and before construction commences. After construction is complete, the Proponent will provide RAAF AIS with “as constructed” details.

13.3.2 *CASA Requirements*

The Proponent will provide CASA with turbine location and height details once final design positions are known and before construction commences. During construction, additional and separate notification will be required for the use of cranes (temporary obstacles) that exceed 110 m above ground level. After construction is complete, the Proponent will provide CASA with “as constructed” details.

On receipt of Development Approval for the Project, and with particular regard to the Aeronautical Impact Assessment and Obstacle Lighting Review, the Proponent will consult with CASA on the issue of obstacle lighting. The Proponent will be seeking a solution, which is in line with the recommendations made by the Ambidji Group; that the Project does not have any operational justification for the provision of obstacle lighting, and therefore will not require any turbines to have hazard lighting. If CASA insist on full compliance with the requirements of the now withdrawn CASA Circulatory AC 139-18, approximately 80 turbines will require hazard lighting. If lighting is required, the Proponent will commit to shielding provisions allowed under existing CASA guidelines. The shielding restricts the downward component of light to 5 % of nominal intensity emitted below 5° below horizontal and zero light emission below 10° below horizontal.

13.3.3 *Airservices Australia*

The Proponent will provide AA with the location and height details once final turbine locations are known and before construction commences. After construction is complete, the Proponent will provide AA with “as constructed” details.

13.3.4 *Aerial Agricultural Association of Australia and Other Activities*

The Proponent will provide AAAA with the location and height details once final turbine locations are known and before construction commences. After construction is complete, the Proponent will provide AAAA with “as constructed” details.

Agricultural aerial spraying activities will be largely unaffected by the Project, and in relation to the assessment made in this chapter, no neighbouring properties will be unduly affected.

Appropriate information regarding the wind turbine layout and dimensions will be supplied to the Rural Fire Service, if required, to assist in their planning and execution of fire response.

13.4 Summary

There are no aerodromes within or in the vicinity of the Project Study area, so there are no concerns with regards to the Project impacting on OLS and PANS OPS of airfields. CASA administers regulations for the intrusion of obstacles into aerodrome OLS and PANS OPS and obstacles 110 m above ground level outside of aerodromes. The proposed turbine height for the Project is up to 152 m, which requires that CASA assess the Project.

Prior to the writing of this Project's EA, the Proponent and other entities involved in the wind energy industry, together with the Clean Energy Council, lobbied CASA and the Federal Minister for Infrastructure, Transport, Regional Development and Local Government to review the number and intensity of lights required under current guidelines. CASA subsequently withdraw Circulatory AC 139-18, with the intention of producing new guidelines that better integrate the concerns of not only the aviation industry but also the wind industry, particularly in terms of visual impacts as a result of turbine lighting. In the meantime, wind farm developers are guided by the CASA Manual of Standards Section 9.4.1.2 (b).

To assess the Project under Section 9.4.1.1 (b), the independent Aeronautical Impact Assessment and Obstacle Lighting Review (**Appendix 14**), determined that the Project does not have any operational justification for the provision of obstacle lighting, and therefore will not require any turbines to have hazard lighting. The Proponent will negotiate with CASA based on the recommendations of the Ambidji Group report (and pending Development Approval), to avoid the provision of turbine lighting.

Agricultural aerial spraying activity occurs for pest management and pasture top-dressing. Pest management spraying is unlikely to be affected by the Project. Top-dressing activity will require care by pilots applying the material to properties along the ridgelines.

Some private landing strips are present, located and orientated away from turbine areas. As such the proposed turbines are unlikely to present a hazard to the use of these strips.

13.5 Proposed Transmission Line

The proposed transmission line will be assessed apart from this EA under Part 5 of the *EP&A Act*. The chosen route and design will be such that impacts to aerial applicators will be minimised where necessary.

13.5.1 Cumulative Impacts

The proposed transmission line development will occur in parallel with the planned upgrade to the existing 66 kV network as described in **Chapter 3** Project Description and the Boco Rock Wind Farm. It is anticipated that there will be no cumulative effect to aviation from the introduction of the

proposed transmission line into the area. However, if necessary, an assessment will be included in the Review of Environmental Factors for the Project.

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