

Utilisation of habitat by Brolga (*Grus rubicunda*)  
within the vicinity of the Oaklands Hill Wind Farm

Report to Suzlon Energy Australia

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## 1.0 INTRODUCTION

The Oaklands Hill Wind Farm consists of 32 wind turbines and is located approximately 8 km south of Glenthompson in south-west Victoria (Figure 1). The wind farm is located on three privately owned properties on the east and west of Glenthompson-Caramut Road and covers an area of approximately 2,320 ha. All properties within the wind farm boundary are used primarily for sheep and cattle grazing.

The landscape surrounding the Oaklands Hill Wind Farm consists mostly of cleared agricultural land with numerous wetlands, many of which may provide potential habitat for Brolga (*Grus rubicunda*). The Brolga is listed as threatened under the *Flora and Fauna Guarantee Act 1988* and classified as Vulnerable on the *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2013).

The Brolga breeding season occurs during winter and spring when bonded pairs of adult Brolgas construct nests from aquatic vegetation usually in relatively shallow (< 50cm deep) ephemeral wetlands. Either one or two eggs are incubated for approximately 30 days. Breeding success is typically very low, particularly as the chicks are unable to fly for approximately 100 days and are therefore very vulnerable to predation. In a study of Brolgas in northern Victoria, Herring (2005) reported an average of 0.28 chicks fledging per nest from 32 eggs produced on 24 nests, and 15.6% of eggs produced a fledged young.

In early summer, most Brolgas fly to flocking sites which typically consist of deep freshwater marshes and permanent open water where they may congregate in large numbers in excess of 200 individuals (Marchant and Higgins 1993). They typically remain at these site until early winter when bonded pairs disperse to breeding sites, often using the same territories over many breeding seasons (Marchant and Higgins 1993). Whilst many local movements occur daily between roosting and nearby feeding sites, longer movements occur annually between the breeding and flocking sites, however, in south western Victoria there is no information on what routes are taken or at what heights the flights occur.

To assess the risk of Brolgas colliding with wind turbines at the Oaklands Hill Wind Farm, the Planning Permit for the site stipulated that a Bat and Avifauna Management Plan (BAM Plan) be developed which incorporated specific monitoring of Brolgas within the vicinity of the wind farm for at least two years following completion of the wind farm.

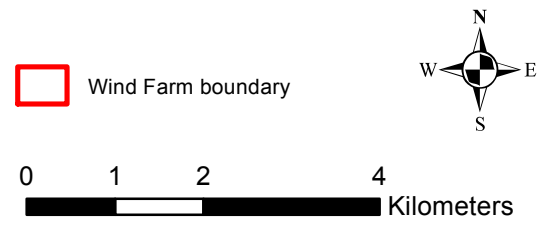
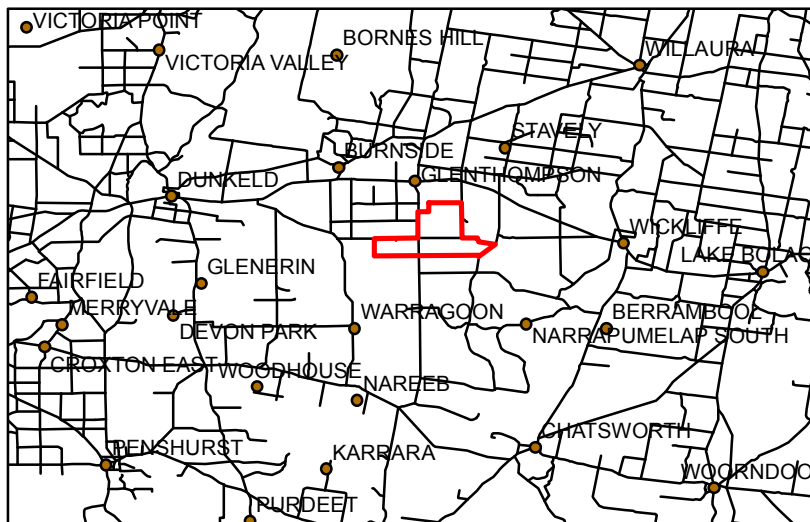
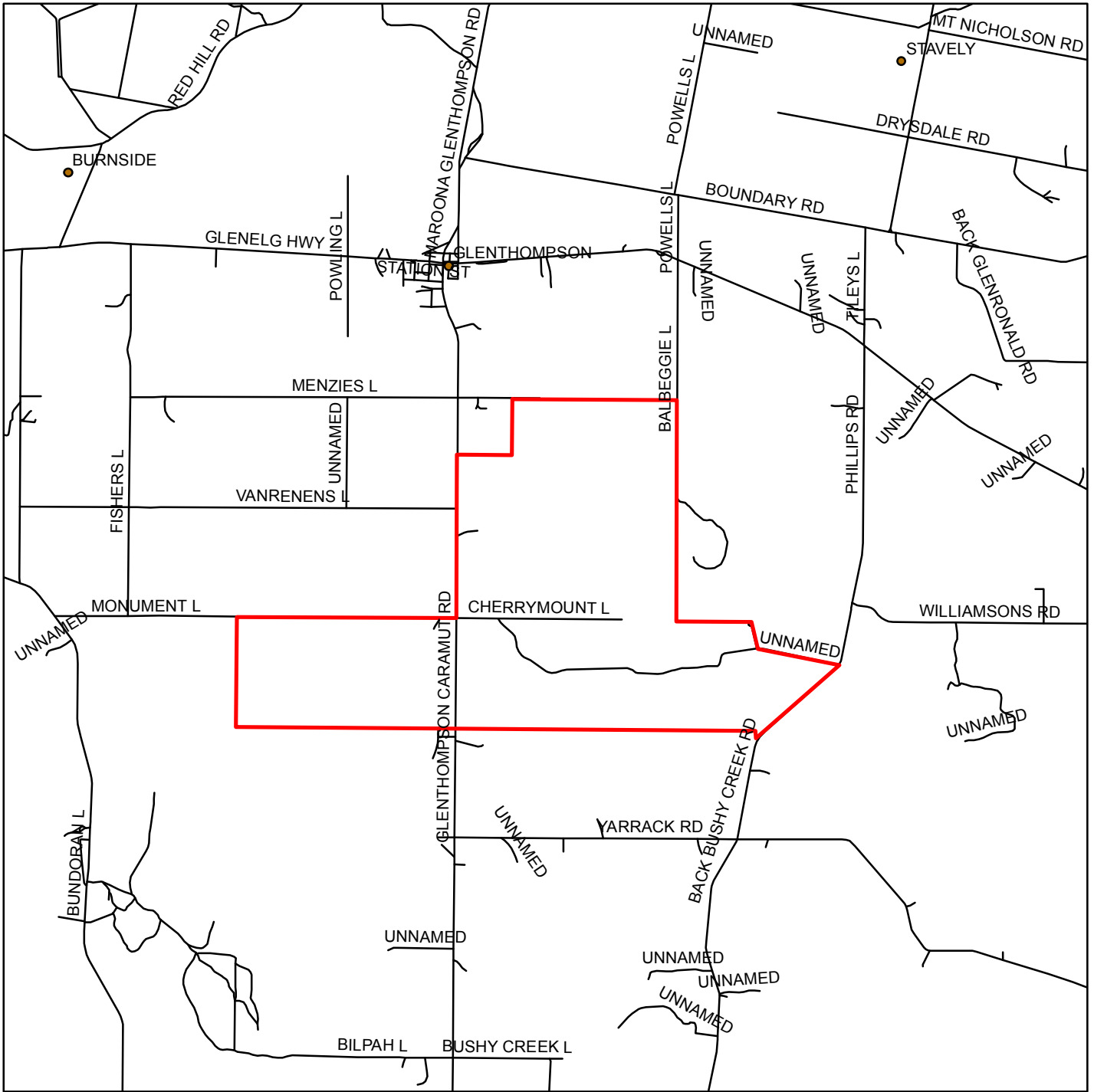
In accordance with the Planning Permit conditions and Bat and Avifauna Management Plan for the Oaklands Hill Wind Farm (Wood 2011), Suzlon Energy Australia engaged Australian Ecological Research Services to undertake surveys of Brolga within the vicinity of the wind farm to examine their abundance and spatial distribution. The following report details the results of the Brolga monitoring surveys undertaken within the vicinity of the Oaklands Hill Wind Farm from August 2012 to April 2014.

## 2.0 METHODS

Brolga surveys consisted of fortnightly inspections of wetlands and surrounding areas within 10 km of the wind farm boundary from August 2012 to the end of April 2014. Survey sites were selected by examining the Victorian Biodiversity Atlas to determine where Brolgas had previously been recorded in conjunction with wetland mapping undertaken by the Department of Sustainability and Environment to identify other potential Brolga habitat within the survey area. A total of 217 wetlands were mapped as occurring within the survey area, however, many were inaccessible, being located on private property outside the wind farm boundary and were not visible from public roads. As such, only those wetlands that could be viewed from public roads were inspected for the presence of Brolga. This restricted the number of wetlands surveyed to 91 (42% of wetlands in the survey area). The distribution of wetlands and those surveyed for Brolga within the survey area are shown in Figure 2.

Surveys were undertaken to coincide with the Brolga breeding (August – October) and flocking seasons (February – April) as well as during periods of migration between breeding and flocking sites (November – December and June – July). The locations of any Brolgas found were recorded using GIS on a laptop computer to plot their location over a digitised aerial image of the site. Notes were taken of the number of Brolgas present and their observed behaviour such as whether they were foraging, courting or nesting.

Figure 1. Location of the Oaklands Hill Wind Farm



Wind Farm boundary







## **3.0 RESULTS**

### **3.1 Breeding season 2012**

Two pairs of Brolgas were found during the breeding season of 2012. Both were found at relatively small wetlands just north of Marrona Glenthompson Road, approximately 10 km from the nearest boundary of the wind farm (Figure 3). One pair was seen on 5 September 2012 and the other on 14 October 2012. Neither pair was observed nesting, but foraging in and around the perimeter of the wetlands. As none of the birds were tagged, both observations may have been of the same pair. These birds were not seen again on subsequent surveys.

### **3.2 Flocking season 2013**

A total of 12 Brolgas were seen during the flocking season of 2013, approximately 11 km north of the wind farm. These consisted of a pair observed at a wetland just north of Marrona Glenthompson Road on 5 February 2013 and a flock of 10 birds observed on 19 February at a nearby wetland directly north of the intersection of Marrona Glenthompson Road and Stavley Road. The locations of these Brolgas are shown in Figure 4. These birds were not seen again on subsequent surveys.

Other Brolgas were seen during this flocking season at wetlands outside the designated survey area, such as at Blackwood Lake on Woolsthorpe Road where approximately 150 Brolgas were observed. This wetland is approximately 18.5 km from the nearest boundary of the wind farm.

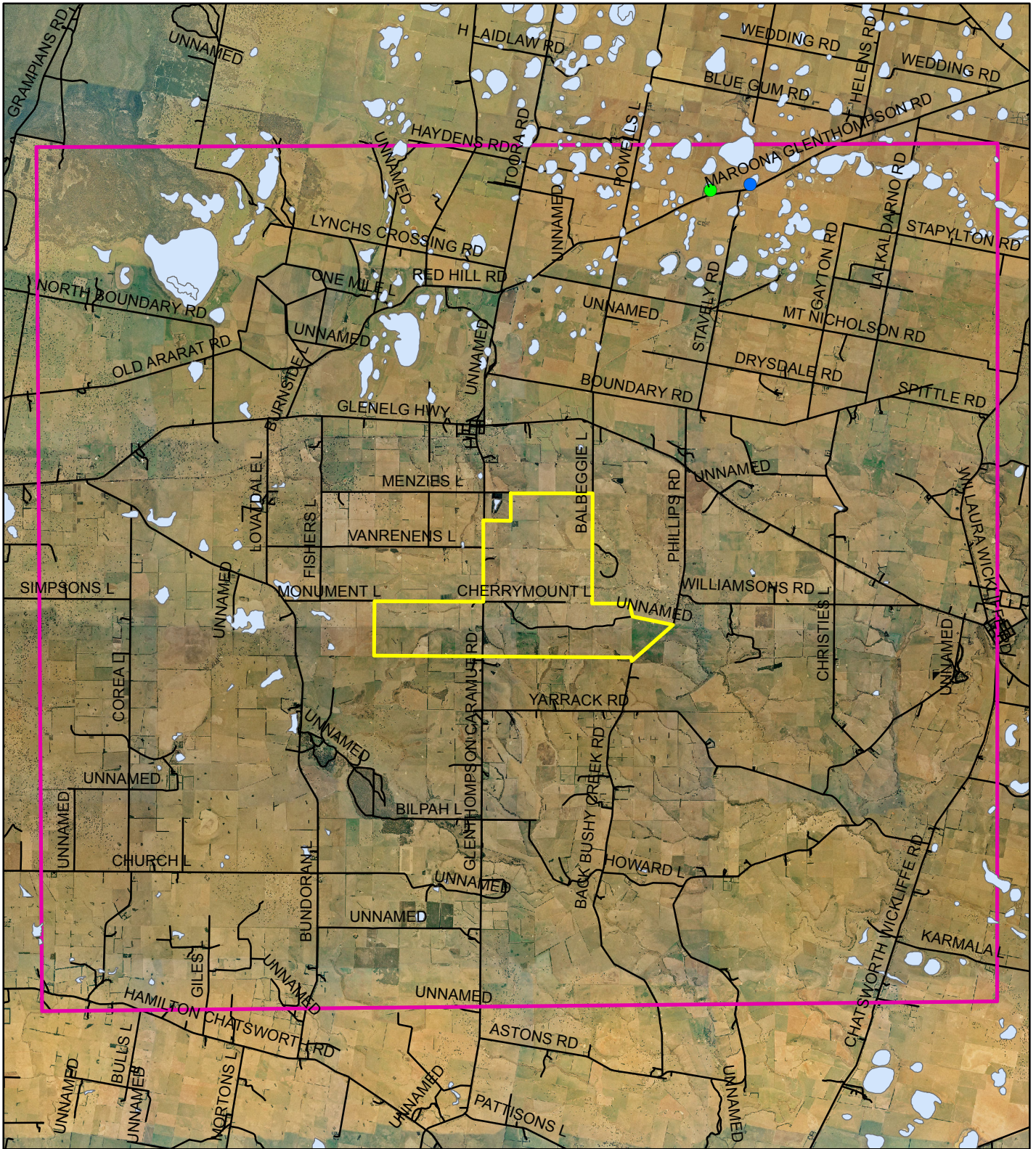
### **3.3 Breeding season 2013**

Three pairs of Brolgas were found during the 2013 breeding season. One pair was seen at Walker Swamp on 24 June (12.9 km from the nearest wind farm boundary), one pair was later seen at Green Swamp on 8 July (6.2 km from the nearest wind farm boundary) and another pair was seen in a dry paddock near Brady Swamp (12.7 km from the nearest wind farm boundary) on 29 September (Figure 5). None of the Brolga pairs were nesting nor seen again on subsequent surveys.

### **3.4 Flocking season 2014**

One pair of Brolgas was found during the flocking season of 2014, located approximately 10 km north of the wind farm. This pair was first found on 27 November 2013 at a wetland east of Powells Lane approximately 2.3 km north of Marrona Glenthompson Road. This pair was seen at the same wetland on all subsequent surveys up until the end of the monitoring program on 27 April 2014. On one occasion they were observed to fly approximately 1 km east to a nearby wetland. The locations of these birds are shown in Figure 6.



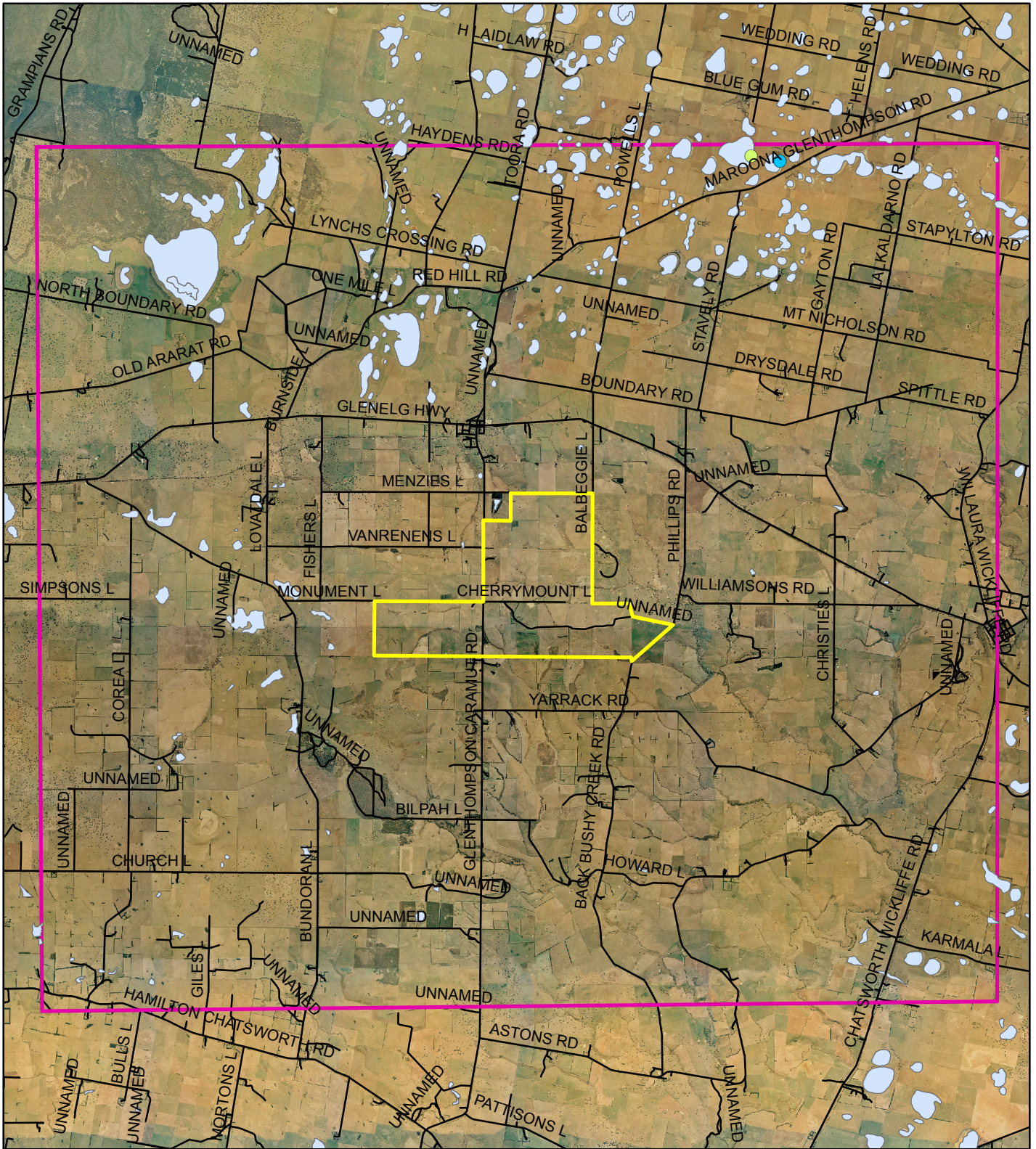


- Brolga pair 5/09/2012
- Brolga pair 14/10/2012
- Wetlands
- Brolga survey area
- Wind Farm boundary





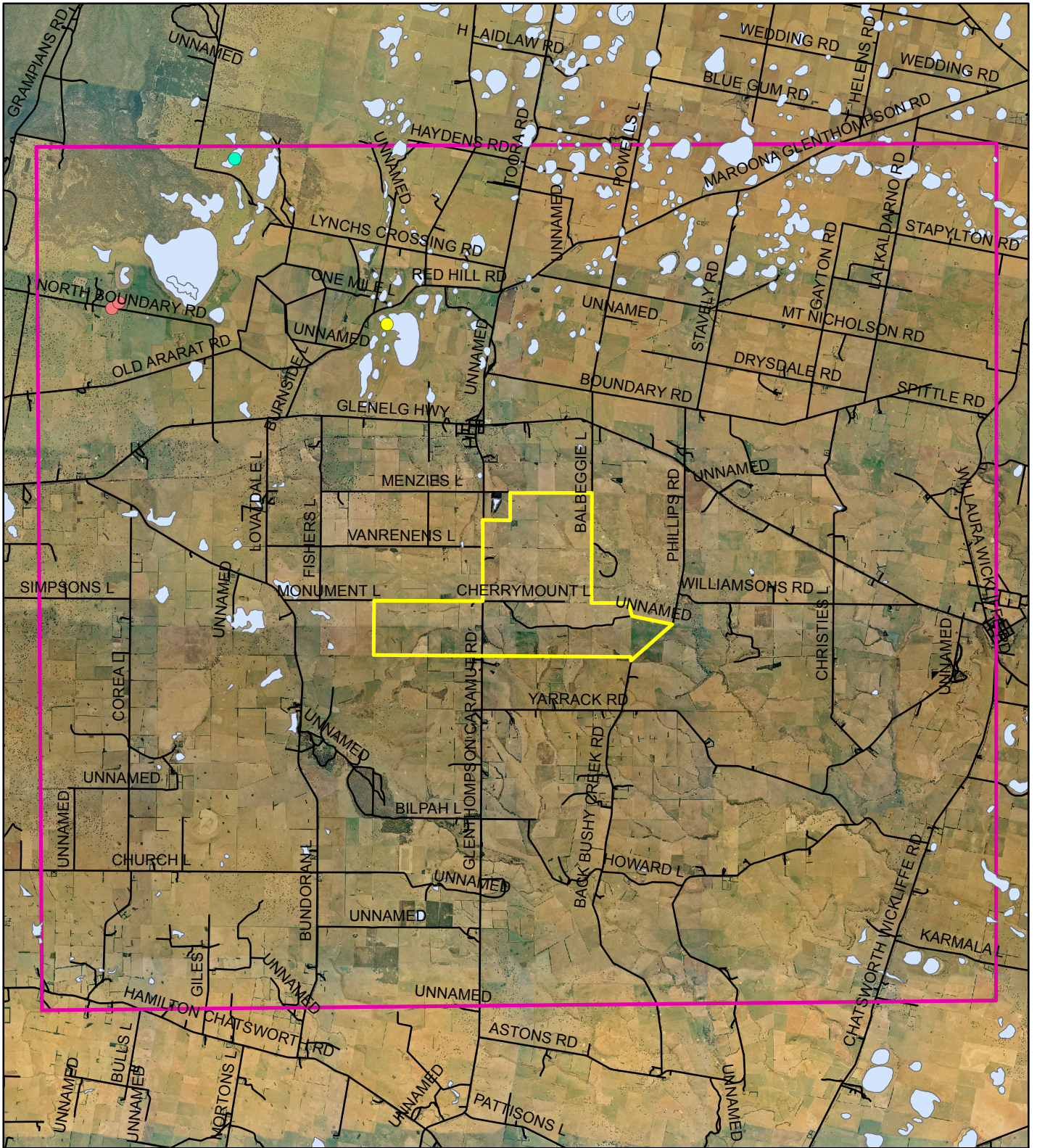
Figure 4. Locations of Brolgas observed during the 2013 flocking season



- Brolga pair 5/02/2013
- Flock of 10 birds 19/02/2013
- Wetlands
- Brolga survey area
- Wind Farm boundary



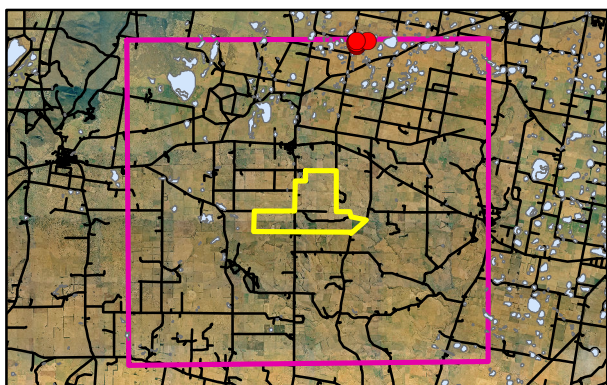




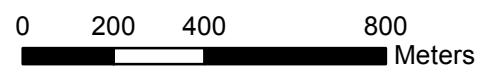
- Brolga pair 24/06/2013
- Brolga pair 8/07/2013
- Brolga pair 29/09/2013
- Wetlands
- Brolga survey area
- Wind Farm boundary







- Brolga pair
- Wetlands
- Brolga survey area
- Wind Farm boundary





## 4.0 CONCLUSION

A total of 36 surveys for Brolga were conducted within the survey area surrounding the Oaklands Hill Wind Farm from August 2012 to end of April 2014. During these surveys, a total of 24 Brolgas were recorded, half of which were found during the flocking season of 2013. With the exception of one flock consisting of 10 Brolgas, all other Brolga observations were of pairs during both the flocking and breeding seasons. No Brolgas were found within the wind farm boundary. It is possible that other Brolgas were in the survey area but not seen due to the restricted visibility of wetlands, particularly those hidden within Blue Gum plantations or located on inaccessible private property and hidden within the undulating terrain.

Whilst few Brolgas were found during this monitoring project, larger numbers of Brolgas have previously been recorded at Brady's Swamp and also at the wetland, herein referred to as the Stavely wetland, where a flock of 10 Brolgas was observed during this project in February 2013. In November 2006, 91 Brolgas were observed foraging at Brady's Swamp and 40 were observed near the Stavely wetland foraging on grain stubble south of Marrona Glenthompson Road (Venosta 2007). The Victorian Biodiversity Atlas indicates that up to 210 Brolgas have been recorded near the Stavely wetland in the early 1990's but lower numbers are more commonly recorded in recent years.

There are no records of Brolgas breeding within 10 km of the Oaklands Hill Wind Farm. Whilst some Brolga pairs were observed during the 2012 and 2013 breeding seasons within 10 km of the wind farm, none were nesting or had offspring. It appears that the majority of wetlands within the survey area do not provide suitable breeding habitat for Brolga. Suitable breeding habitat for Brolga generally consists of shallow freshwater wetlands, less than 0.5m deep, with adequate cover of herbs, tussock grasses and sedges to provide material for nest construction (Merchant and Higgins 1993). Many of the shallow wetlands in the Glenthompson region are relatively saline and do not support aquatic vegetation.

In conjunction with previous records of Brolga sightings, the results of this monitoring project has indicated that very few Brolgas utilise habitat within 10 km of the Oaklands Hill Wind Farm. Given the Oaklands Hill Wind Farm does not contain suitable habitat for Brolga and little suitable habitat occurs within close proximity to the site, it is unlikely that Brolgas will fly through the site and collide with the blades of wind turbines. The main flocking sites in the region occur at Lake Linlithgow and Lake Kennedy near Penshurst, Blackwood Lake near Woolsthorpe Road, Bryans Swamp in Victoria Valley, Brady's Swamp and at wetlands near Willaura, all of which occur at least 10 km from the Oaklands Hill Wind Farm. Non-breeding Brolgas may make regular movements from the flock roosting wetland to foraging areas up to 3 km away but rarely travel more than 5 km (Herring 2005) and are therefore unlikely to fly through the wind farm site. The greatest movements of Brolgas occur when migrating between their flocking and breeding sites. It is during these periods when the wind farm may pose the greatest threat to Brolga although it is not known whether the wind farm is situated within any such flight paths. No migratory flights were observed during the monitoring period.

This Brolga monitoring project has determined that relatively few Brolgas utilise habitat within 10 km of the Oaklands Hill Wind Farm. Whilst a number of wetlands in the region are used as flocking sites by up to 200 Brolga at each site, all are located beyond 10 km from the wind farm. It is unlikely that the wind farm will impact the Brolga population due to the lack of suitable habitat on site and spatial distance from Brolga flocking sites.

## 5.0 REFERENCES

DSE (2013). *Advisory List of Threatened Vertebrate Fauna in Victoria*. Department of Sustainability and Environment.

Herring, M.W. (2005). *Threatened Species and Farming – Brolga: Management of breeding wetlands in northern Victoria*. Ecologically Sustainable Agriculture Initiative. Department of Sustainability and Environment.

Marchant, S and P. Higgins (1993). *The Handbook of the birds of Australia, New Zealand and Antarctic. Volume II*. Oxford University Press, Melbourne.

Venosta, M. (2007). *Bird utilisation, Brolga and Bat studies at the Oaklands Hill Wind Farm site, Glenthompson Victoria*. Biosis Research Pty Ltd.

Wood, M. (2011). *Oaklands Hill Wind Energy Facility – Bat and Avifauna Management Plan*. Australian Ecological Research Services Pty Ltd.