

## MacIntyre Wind Farm

EPBC Act threatened  
birds - habitat and  
regional assessment and  
targeted surveys

Prepared for ACCIONA Energy  
Australia Global Pty Ltd

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## 1. Executive summary

ACCIONA Energy Australia Global Pty Ltd engaged Nature Advisory Pty Ltd to conduct threatened bird habitat and regional assessments for Regent Honeyeater (*Anthochaera phrygia*), Painted Honeyeater (*Grantiella picta*), Swift Parrot (*Lathamus discolor*) and White-throated Needletail (*Hirundapus caudacutus*) as well as targeted surveys for Regent Honeyeater, Painted Honeyeater and Swift Parrot for the proposed MacIntyre Wind Farm. The proposed project covers an area of 31,910 hectares in Cement Mills, QLD as shown in Figure 1 (from here on referred to as the 'study area'). The study area is located approximately 33 kilometres south-west of Warwick within the Southern Downs Regional Council and Goondiwindi Regional Council local government areas. The development footprint is the area of disturbance for the proposed MacIntyre Wind Farm (1,207 hectares) as shown in Figure 1.

The threatened birds targeted in this habitat and regional assessment are listed below, including their status under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

- Regent Honeyeater (*Anthochaera phrygia*) - Critically Endangered
- Painted Honeyeater (*Grantiella picta*) - Vulnerable
- Swift Parrot (*Lathamus discolor*) - Critically Endangered
- White-throated Needletail (*Hirundapus caudacutus*) - Vulnerable and Migratory.

This report is based on data obtained from a review of background information, including documents prepared under the EPBC Act and previous ecological reporting for the study area, as well as field surveys conducted by Nature Advisory Pty Ltd between the 22<sup>nd</sup> and 30<sup>th</sup> of May, 15<sup>th</sup> and 19<sup>th</sup> of June and 21<sup>st</sup> and 24<sup>th</sup> of July, 2020.

Previous records and reports indicate that the targeted threatened species occur in the region at times. While extensive clearing has occurred within the study area, patches of remnant vegetation remain, some of which provides habitat for some of the targeted species. The quality and extent of this habitat has been characterised and mapped, refining the initial potential habitat mapping previously prepared for each species (GHD 2020a) to provide a more accurate understanding of the possible occurrence of these species on the site and of the impacts of the project on them.

Regent Honeyeater habitat (8.060 hectares, which is also considered habitat critical to the survival of the species), Painted Honeyeater habitat (19.677 hectares) and Swift Parrot habitat (12.423 hectares) has been mapped within the development footprint. This represents a small proportion of the development footprint and study area. The removal of this habitat is considered acceptable as evidence indicates these species are likely more consistently to be utilising habitat adjacent to the study area and within the region, particularly habitat in larger forest blocks, rather than more fragmented habitat within the study area itself. It is noted that no White-throated Needletail roosting habitat is present within the development footprint or study area. Regent Honeyeater, Painted Honeyeater and Swift Parrot were also not recorded on the site during targeted surveys for the species or during or incidental to bird utilisation surveys.

Mortality and indirect impacts to Regent Honeyeater, Painted Honeyeater and Swift Parrot during construction and operation of the proposed MacIntyre Wind Farm are considered unlikely. Small numbers of White-throated Needletail may collide occasionally with wind turbines but the population consequences are unlikely to be significant.

## 2. Introduction

ACCIONA Energy Australia Global Pty Ltd (ACCIONA) engaged Nature Advisory Pty Ltd (Nature Advisory) to conduct threatened bird habitat and regional assessments for Regent Honeyeater (*Anthochaera phrygia*), Painted Honeyeater (*Grantiella picta*), Swift Parrot (*Lathamus discolor*) and White-throated Needletail (*Hirundapus caudacutus*) as well as targeted surveys for Regent Honeyeater, Painted Honeyeater and Swift Parrot for the proposed MacIntyre Wind Farm which covers an area of 31,910 hectares in Cement Mills, QLD as shown in Figure 1 (from here on referred to as the study area). The study area is located approximately 33 kilometres south-west of Warwick within the Southern Downs Regional Council and Goondiwindi Regional Council local government areas. The development footprint is the area of disturbance for the proposed MacIntyre Wind Farm (1,207 hectares) as shown in Figure 1.

This report has been prepared in response to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) request for further information following the referral (EPBC 2020/8756) decision that the MacIntyre Wind Farm is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is to be assessed through the preliminary documentation approach.

The report is divided into the following sections.

**Section 3** describes the sources of information.

**Section 4** describes the field methodology and information review approach for the assessment.

**Section 5** presents the assessment results, including habitat mapping.

**Section 6** describes the regional context for each species

**Section 7** outlines the impacts on each species

**Section 8** presents the conclusions of the assessment.

This assessment was undertaken by a team from Nature Advisory comprising Tom Cotter (Zoologist), Ahmad Barati (Zoologist), Candice Larkin (Zoologist), Curtis Doughty (Senior Zoologist), Bernard O'Callaghan (Director) and Brett Lane (Principal Consultant). The team is very grateful for information on the species investigated provided by Dr Stephen Debus of the University of New England.

## 3. Existing information

Existing information used for this investigation is described below.

### 3.1. Existing reporting and documentation

- National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*) (Department of the Environment 2016)
- Conservation Advice *Anthochaera phrygia* Regent Honeyeater (Department of the Environment 2015)
- Conservation Advice *Grantiella picta* Painted Honeyeater (Department of the Environment 2015)
- National Recovery Plan for the Swift Parrot *Lathamus discolor* (Birds Australia 2011)
- Background Document - National Recovery Plan for the Swift Parrot *Lathamus discolor*. (Department of Environment, Climate Change and Water and Birds Australia 2010)
- Conservation Advice *Lathamus discolor* Swift Parrot (Threatened Species Scientific Committee 2016)
- Conservation Advice *Hirundapus caudacutus* White-throated Needletail (Threatened Species Scientific Committee 2019)
- Ecological assessment report of the MacIntyre Wind Farm (GHD 2020a)
- MacIntyre Wind Farm Project – MNES Assessment Report (GHD 2020b)
- MacIntyre and Karara Wind Farms – Threatened woodland bird assessment (Nature Advisory 2020a).

### 3.2. Background information

The following provides a background on the targeted bird species.

#### 3.2.1. Regent Honeyeater

The Regent Honeyeater is listed as Critically Endangered under the EPBC Act.

The species is highly nomadic and mobile, with a patchy distribution that extends from south-east Queensland to central Victoria. Records are widely distributed across the species' range, but it is only found regularly at a few localities in NSW and Victoria where most of the sightings have been recorded (Department of the Environment 2015a). There is one record of the species within the southern portion of the study area (100 metres in from the study area boundary) and there are records to the north, south, east and west of the study area, including breeding events in the Cement Mills-Durikai region (Department of the Environment 2016; Hines 2008). The central portion of the Traprock Important Bird Area for Regent Honeyeater (BirdLife International 2020) is located within study area.

The Regent Honeyeater is most commonly associated with box-ironbark eucalypt woodlands, spotted gum-ironbark woodlands and dry sclerophyll forest and seems to prefer more fertile sites with higher soil water content, including creek flats, broad river valleys and lower slopes. Mature, large individual trees tend to be more important as they produce more nectar more reliably. The species also uses road-side remnant vegetation, remnant patches in farmland and urban areas, and travelling stock routes. Nests are typically in the canopy of mature, rough-barked trees such as ironbarks, sheoaks and Rough-barked Apple (*Angophora floribunda*) (Department of the Environment 2015a, 2016; Geering and French, 1998; Oliver et al. 1998).

Key tree and mistletoe species for the Regent Honeyeater are listed below (Department of the Environment 2015a).

- Mugga Ironbark (*Eucalyptus sideroxylon*)
- Yellow Box (*E. melliodora*)
- White Box (*E. albens*)
- Yellow Gum (*E. leucoxylon*)
- Spotted Gum (*Corymbia maculata*)
- Swamp Mahogany (*E. robusta*)
- Needle-leaf Mistletoe (*Amyema cambagei*) on River Sheoak (*Casuarina cunninghamiana*)
- Box Mistletoe (*A. miquelianii*)
- Long-flower Mistletoe (*Dendrophthoe vitellina*).

Other tree species are considered regionally important for the species include Broad-leaved Ironbark (*E. fibrosa*) and Thin-leaved Stringybark (*E. eugenoides*) (Department of the Environment 2015a).

### **3.2.2. Painted Honeyeater**

The Painted Honeyeater is listed as Vulnerable under the EPBC Act.

The species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory, and exhibits seasonal north-south movements governed principally by the fruiting of mistletoe (Department of the Environment 2015b).

The highly specialised diet of Painted Honeyeater consists mainly of mistletoe fruit, although when there is a shortage of this food item, nectar and arthropods will also be consumed (Garnett et al. 2011, Higgins et al. 2001, Oliver et al. 2003). The species is strongly associated with the presence of mistletoe, particularly during the breeding season. The species prefers woodlands that contain a higher number of mature trees that host more mistletoe (Department of the Environment 2015b).

There are records of the species to the north of the study area outside the town of Karara and in Durikai State Forest.

### **3.2.3. Swift Parrot**

The Swift Parrot (*Lathamus discolor*) is listed as Critically Endangered under the EPBC Act.

The Swift Parrot breeds in Tasmania in summer and the entire population migrates north and leaves the island for the winter. While on mainland Australia, the Swift Parrot typically disperses through Victoria and New South Wales, however, smaller numbers are observed in south-east Queensland on a regular basis (Saunders & Tzaros 2011). The species preferentially forages in large, mature trees in eucalypt forests and woodlands, particularly box-ironbark forest and woodlands as well as grassy woodlands (Saunders & Tzaros 2011).

In south-east Queensland, records indicate that Swift Parrot typically feed on lerp and nectar from Yellow Box, Grey Box (*Eucalyptus microcarpa*), Forest Red Gum (*E. tereticornis*) and Swamp Mahogany. There is a strong association between Swift Parrot and Mugga Ironbark, White Box and Spotted Gum elsewhere in their mainland distribution (Saunders & Tzaros 2011). The species has been recorded in Durikai State Forest to the north of the study area.

### **3.2.4. White-throated Needletail**

The White-throated Needletail (*Hirundapus caudacutus*) is listed as Vulnerable and Migratory under the EPBC Act.

This species is widespread in eastern and south-eastern Australia and is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. The species is also widespread in Victoria and Tasmania and occurs in south-eastern South Australia (Threatened Species Scientific Committee 2019).

The White-throated Needletail subspecies that occurs in Australia is *Hirundapus caudacutus caudacutus*. This subspecies is a trans-equatorial migrant that breeds in the Northern Hemisphere summer and migrates south for the Southern Hemisphere summer. The White-throated Needletail is mostly aerial in Australia, flying at heights of less than one metre up to more than 1000 metres above the ground. It has been recorded eating a wide variety of insects, including beetles, cicadas, flying ants, bees, wasps, flies, termites, moths, locusts and grasshoppers (Threatened Species Scientific Committee 2019).

The species occurs over most habitat types and is recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. When flying above farmland, it is more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks (Threatened Species Scientific Committee 2019).

In Australia, confirmed and high confidence records of White-throated Needletail roosting indicate the species roosts in dense foliage of canopy trees in large tracts of treed remnant vegetation along or contiguous with mountain ranges as detailed in the records below:

- very dense foliage in the crown of a eucalypt (16 metre tall) on a spur at Mt Coot-tha, Brisbane Queensland (D'Aguilar Range) (Corben et al. 1982).
- fairly thick foliage in the crown of two acacias (14 metre tall) and one banksia at Little Waterloo Bay, Wilsons Promontory, Victoria (mainland southern extremity of Great Dividing Range) (Day 1993).
- eucalypt on a spur at Nearum, Queensland (Gongiberoo Range) (Tarburton 1993).
- outer branch of a large Narrow-leaved Ironbark (*Eucalyptus crebra*) and near the top of mid-sized White Cypress Pine (*Callitris glaucophylla*) in West Pilliga, New South Wales (remnant vegetation contiguous with Warrumbungle Mountain Range and mountain range within Pilliga Nature Reserve) (Stanton 2011).
- It is also noted the species has been recorded landing in the crown of a Rough-barked Apple at Munghorn Gap New South Wales (Great Dividing Range) where the individual remained for four minutes (Quested 1982) although this is not considered a confirmed or high confidence record of the species roosting as the individual was only observed in the tree for a short period of time.

The species is also reported to roost in tree hollows (Threatened Species Scientific Committee 2019), bark on trees or rock faces and is likely to have traditional roost sites (Department of the Environment 2015c). It has been noted that the number of references to White-throated Needletail roosting in trees possibly over-emphasizes such occurrences. During extreme conditions including bushfires and cold, hot or inclement weather, the species is also known to take refuge in tree hollows, trees and stunted scrub (Department of Agriculture, Water and the Environment 2021).

White-throated Needletail has been observed in the airspace above the study area at 17 locations.

## 4. Methodology

### 4.1. Field methods

#### 4.1.1. Habitat assessment

Habitat assessment and mapping was conducted in the study area by team members from Nature Advisory between the 22<sup>nd</sup> and 30<sup>th</sup> of May, 15<sup>th</sup> and 19<sup>th</sup> of June and the 21<sup>st</sup> and 24<sup>th</sup> of July, 2020. Habitat assessment and mapping for the study area was completed as part of a threatened woodland bird assessment (Nature Advisory 2020a).

A total of 62 habitat assessments were completed within and surrounding the study area (Figure 1). Habitat assessment locations were selected after a detailed review of the potential habitat mapping (based on field-verified Regional Ecosystem mapping) presented in the Ecological assessment report of the MacIntyre Wind Farm (GHD 2020a) and based on a review of aerial and satellite imagery to identify sections of the study area where larger trees were present. Areas with all characteristics consistent with the habitat requirements of the targeted species were identified as high quality habitat while those that had some characteristics were classed as potential habitat. Table 1 below describes the key criteria for these habitat classes for each threatened bird species. The habitat assessment criteria were derived from the Conservation Advice for Regent Honeyeater, Painted Honeyeater and Swift Parrot and the National Recovery Plans for Regent Honeyeater and Swift Parrot as listed in Section 3.1 and outlined in Section 3.2, applied to the particular vegetation and habitat on the site.

Once high quality and potential habitat was identified, it was assessed for its extent and habitat boundaries were mapped.

Habitat was characterised based on eucalypt community species composition, mistletoe community species composition, maximum canopy height, canopy crown cover, ground cover, percentage of old growth trees and proximity to riparian zones and potential disturbances. Whether eucalypts or mistletoes were in flower, was also documented and the flowering event scored. Eucalypt and mistletoe dieback was also noted.

The study area's habitat connectivity (i.e. degree of isolation/fragmentation), including linkages to other habitat in the region, was determined using field observations, recent aerial photography and previous sightings of the threatened species.

**Table 1: High quality and potential habitat assessment criteria for woodland bird species**

Habitat	Regent Honeyeater	Painted Honeyeater	Swift Parrot
High quality	<p>Areas with old Growth &gt;50-70%</p> <p>Abundant Mugga Ironbark <i>Eucalyptus sideroxylon</i> or White Box <i>E. albens</i> or mixed Mugga Ironbark–White Box patches, Yellow Box <i>E. melliodora</i> woodland areas, River She-oak <i>C. cunninghamiana</i> riparian zones with Angophora/Box and Blakely's Red Gum <i>E. blakelyi</i> and River Red Gum <i>E. camaldulensis</i>.</p> <p>Or Narrow-leaved Ironbark – Box woodlands, Abundance of Box with Drooping or Needle-leaf Mistletoe <i>Amyema cambagei</i> available. These areas were close to open patches as preferred by target species.</p>	<p>Areas with old Growth &gt;50-70%</p> <p>Abundant Mugga Ironbark or White Box or mixed Mugga Ironbark–White Box patches, riparian woodland zones with River Red Gum and/or casuarina species and abundance of mistletoe species. White Cypress Pine woodlands with abundance of Needle-leaved Mistletoe.</p>	<p>Areas with old Growth &gt;50-70%</p> <p>Abundant Mugga Ironbark or White Box or both species mixed, areas of Lemon-scented Gum <i>Corymbia citriodora</i> woodlands when in flower. Areas of abundant Grey Box <i>E. moluccana</i> and/or Yellow Box or River Red Gum. Areas of abundant White Box – Blackbutt with lerp infestations, Narrow-leaved Ironbark <i>E. crebra</i> woodlands with several mature high nectar-producing trees.</p>
Potential	<p>Old Growth &lt; 50%</p> <p>Areas that have limited presence of Mugga Ironbark or White Box, Areas with Narrow-leaved Ironbark or Broad-leaved Ironbark <i>E. fibrosa</i> or Lemon-scented Gum woodlands with scattered Box eucalypts or riparian zones with River She-oak and some Angophora. At all sites Mistletoe infrequent or dying. Immature eucalypt woodland patches.</p>	<p>Old Growth &lt; 50%</p> <p>Areas that have limited presence of Mugga Ironbark or White Box. Riparian woodland areas with casuarina species and/or River Red Gum and some mistletoe. In these zones, mistletoe totally absent or present but in low abundance or dying condition thus considered to be of lower quality.</p>	<p>Old Growth &lt; 50%</p> <p>Areas of low density of Mugga or White Box. Areas of box woodlands lacking mature flowering trees, with scattered ironbark species. Immature eucalypt woodland patches.</p>

**Note:** The habitat assessment criteria outlined above represent the habitat characteristics that are present within the study area consistent with the published habitat information . It is noted that Regent Honeyeater, Painted Honeyeater and Swift Parrot utilise other habitats with additional characteristics that are not present in the region or on the site..

Searches for White-throated Needletail were completed as part of Bird Utilisation Surveys (BUS) within the study area and Karara Wind Farm (which is immediately adjacent to the study area) between 3<sup>rd</sup> and 14<sup>th</sup> December 2020 and 1<sup>st</sup> and 12<sup>th</sup> February 2021 (Nature Advisory 2020b, Nature Advisory 2020c). During the habitat survey of the proposed MacIntyre Wind Farm transmission line corridor by Nature Advisory between the 26th and 29th of November 2020, searches for White-throated Needletail were also conducted. The number of individuals and minimum and maximum flight heights were recorded for each observation of the species.

Roosting habitat for White-throated Needletail was defined as treed remnant vegetation along or contiguous with a mountain range where the species may roost in dense foliage of canopy trees. It is also

possible that tree hollows, bark on trees or rock faces in such areas may also provide roosting habitat but this is not confirmed. High quality and potential roosting habitat categories for the species were not generated due to limited records and information on roosting habitat for the species in Australia. The habitat assessment criteria for White-throated Needletail were derived from a detailed review of the records of the species roosting in Australia and the Conservation Advice for the species as listed in Section 3.1 and outlined in Section 3.2.4.

#### **4.1.2. Targeted surveys**

The survey effort followed the survey guidelines for Australia's threatened birds (Department of the Environment, Water, Heritage and the Arts 2010). Two survey methods were adopted: a targeted point-count method; and an area-search method.

The former was modelled on survey methods typically used to monitor Regent Honeyeater, Swift Parrot and Painted Honeyeater. This method was chosen as several studies suggest that point counts may be more efficient at detecting more vocally active birds than transects or searches (Arnold 1984, Cunningham et al. 1999), and targeted surveys predefined by habitat preferences increase the probability of detecting rare and cryptic species. As the Regent Honeyeater is highly vocal and territorial in the months leading up to breeding, the species is conspicuous and can be successfully detected using the fixed-point survey technique.

The fixed-point bird survey method was used to detect the presence of Regent Honeyeater, Swift Parrot and Painted Honeyeater. This involved an observer stationed at a fixed-point for 10 minutes in high quality or potential habitat for the species and recording all bird species and numbers of individual birds heard or observed (Department of the Environment, Water, Heritage and the Arts 2010) within 100 metres of the fixed-point. Fixed-point bird survey points were completed in each patch of habitat for the targeted species except for the most southern patch of Regent Honeyeater high quality habitat along the southern boundary of the study area, where species was recorded in 1995. The majority of fixed-point bird surveys were completed along creeklines as recommended for Regent Honeyeater (Department of the Environment, Water, Heritage and the Arts 2010). Survey effort included a total of 12 hours across a total of 12 days.

The fixed-point bird surveys were completed during May, June and July 2020 which aligns with the survey guidelines for Australia's threatened birds (Department of the Environment, Water, Heritage and the Arts 2010) guideline that Regent Honeyeater surveys on the mainland be conducted between March and July. While the survey guidelines for Australia's threatened birds (Department of the Environment, Water, Heritage and the Arts 2010) do not specify a time of year for Swift Parrot surveys, the species has been recorded in the adjacent Durikai State Forest between July 2017 to September 2017 and from May 2018 to September 2018. It is noted that the survey guidelines for Australia's threatened birds (Department of the Environment, Water, Heritage and the Arts 2010) does not specify survey recommendations for Painted Honeyeater.

A total of 28 fixed-point survey locations were selected within and adjacent to the study area (Figure 1). Each fixed-point was surveyed twice during the survey period except for one site that was surveyed once as it was added later in the survey period. Targeted surveys were undertaken in areas of suitable habitat, including remnants consisting of mature growth box-ironbark or Lemon-scented Gum-ironbark, as well as riparian zones dominated by River She-oak and Rough-barked Apple, particularly in areas located nearer to historic sightings.

Fixed-point bird surveys were completed across different times throughout the day including during the morning, middle of the day and afternoon. This aligns with the recommendation for surveys to be completed preferably in the morning (but other times may also be appropriate) for Regent Honeyeater

and preferably in the early morning and afternoon when birds are most active and vocal for Swift Parrot (Department of the Environment, Water, Heritage and the Arts 2010).

In addition to fixed-point surveys, area searches were made in patches of high quality and potential habitat for the three targeted threatened bird species for an average of eight hours per day by two observers over eight days (128 person-hours).

In total, 134 hours of bird surveys were undertaken in high quality and potential habitat across the site (i.e. across several hundred hectares of such habitat). This survey effort is greater than that required for smaller areas of habitat in Department of the Environment, Water, Heritage and the Arts (2010).

If target species were recorded, an accurate count of individuals and any movements made was to be recorded, including flight distances, direction of flight, minimum and maximum heights above the ground and destination if known. Interaction between target species and other bird species was also to be documented. If nectarivorous birds were observed feeding the observer recorded the number of birds feeding and the species of tree they were feeding on.

As the presence of Regent Honeyeater and Swift Parrot is best predicted by high nectar abundance (Crates et al. 2017, Department of the Environment, Water, Heritage and the Arts 2010), isolated flowering eucalypts were monitored opportunistically to confirm the presence or absence of the species during flowering events. As the presence of Painted Honeyeater is usually associated with fruiting mistletoes, areas with more abundant mistletoe were targeted for searches. It is noteworthy however that the incidence of flowering eucalypts during the surveys was low, possibly in response to recent dry climatic conditions.

Observers also documented the presence and abundance of nectar feeding species, as competition for resources with more aggressive honeyeaters, particularly the Noisy Miner (*Manorina melanocephala*) and Noisy Friarbird (*Philemon corniculatus*), may be a factor in Regent Honeyeater decline (Department of the Environment 2016, Menkhorst et al. 1999). A high abundance of nectar feeding species may limit the value and suitability of some habitat, particularly if the habitat is highly fragmented.

#### **4.2. Limitations**

Wherever appropriate, a precautionary approach has been adopted. It is noted that limited flowering of foraging tree species was occurring during field surveys which limits ability to detect the targeted woodland bird species. As a result, the precautionary approach has been adopted that any high quality or potential habitat within the study area could be utilised by the target bird species.

The targeted surveys were undertaken during winter in 2020. This is an appropriate time to undertake the surveys for Regent Honeyeater and Swift Parrot as these species may be in the region during winter.

Due to the diet of Painted Honeyeater consisting of mistletoe, and the timing of their breeding coinciding with periods of mistletoe fruit and flower abundance, surveys should be conducted in early spring to late summer (Oliver et al. 2003). In addition, this is the period when birds are more likely to gather in aggregations, engage in displays, and become highly vocal and thus, more detectable (Watson 2012).

Call playback was not undertaken as part of this assessment as the appropriate license was not approved in time for the surveys. Notwithstanding this, the three target species are vocal and detectable, either visually or by their call by the experienced observers involved.

#### **4.3. Habitat critical to the survival of species**

Based on the outcome of the field habitat assessment, the presence of habitat critical to the survival of Regent Honeyeater, Swift Parrot, Painted Honeyeater and White-throated Needletail within the study area was assessed for each species against the EPBC Act documentation as listed below.

- National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*) (Department of the Environment 2016)
- National Recovery Plan for the Swift Parrot *Lathamus discolor* (Birds Australia 2011)
- Matters of National Environmental Significance - Significant impact guidelines 1.1 (Department of the Environment 2013).

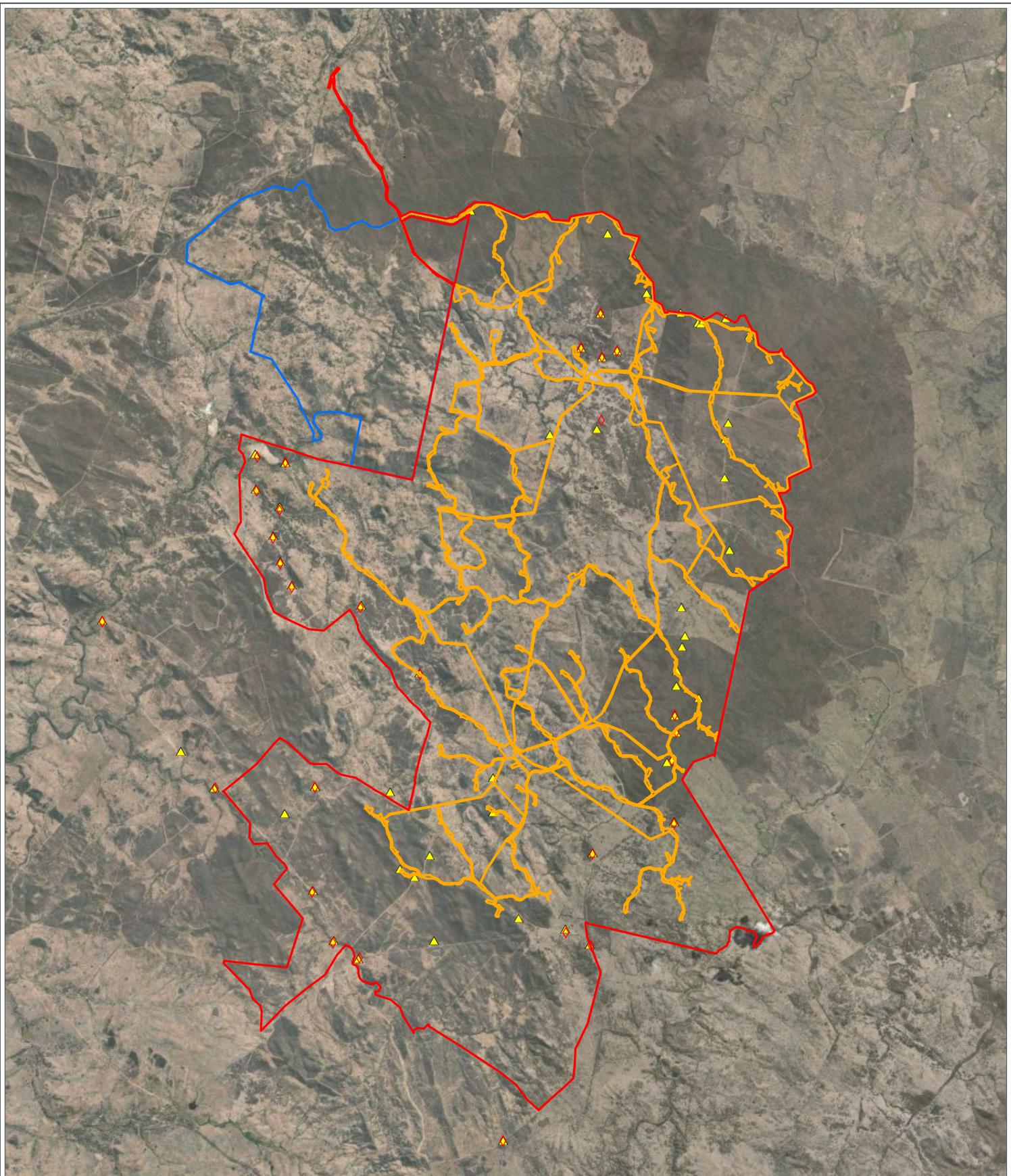
#### 4.4. Species database review

Records for Regent Honeyeater, Painted Honeyeater, Swift Parrot and White-throated Needletail were viewed and extracted where possible from the following databases:

- Queensland Government Department of Environment and Science WildNet
- Atlas of Living Australia
- BirdLife Australia Birddata.

#### 4.5. Expert input and review

Dr Stephen Debus (Adjunct Lecturer at University of New England) from the BirdLife Australia Regent Honeyeater Recovery Team has also provided input to and reviewed this report. Dr Debus has extensive expertise in research and survey of threatened forest and woodland birds (particularly Regent Honeyeater, Painted Honeyeater and Swift Parrot); ecology, biology and behaviour of birds; conservation and management of threatened bird species; editing ornithological papers and the review of ornithological documents and species impact statements. Nature Advisory Pty Ltd is very grateful for Dr Debus' advice and accepts responsibility for all conclusions presented in this report.



**Figure 1:** Survey Locations

**Project:** MacIntyre Wind Farm **Client:** ACCIONA Energy Australia Global Pty Ltd **Date:** 5/08/2021

█ Study Area

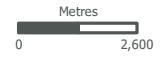
█ Development Footprint

█ Karara Wind Farm

◊ Fixed-point Survey

▲ Habitat Assessment

N



## 5. Results

### 5.1. Site description

The study area consists of diverse types of habitat from cleared, intensively grazed agricultural land to dense, mixed eucalypt/cypress pine forests. Overall, the vegetation structure within the study area is fragmented, open woodland with large eucalypts 25 metres tall and small grasses and shrubs. There is also a limited number of small farm dams within the study area that may provide habitat for small numbers of waterbirds.

Most of the habitat in the north and north-east section of the study area is dominated by Narrow-leaved Ironbark, White Box, Tumble-down Red Gum, Silver-leaved Ironbark and Lemon-scented Gum. Riparian zones are present in the western and southern sections of the site, typically consisting of patches of River She-oak/Yellow Box/Blakely's Red Gum and Rough-barked Apple woodland communities. Mugga Ironbark is present in smaller, scattered patches whereas Narrow-leaved Ironbark is more widespread and abundant. Two mistletoe species (an important nectar source when flowering) occur within the study area: Box Mistletoe and Drooping Mistletoe. Flowering was observed in White Box during the survey period.

During the assessments, the region was severely drought-affected, with significant canopy, low tree layer and shrub layer dieback present throughout the study area. Most of the lowlands within the study area have been cleared for cattle and sheep grazing with vegetation restricted to creek lines and scattered pasture trees. There is limited old growth treed habitat within the study area due to historical timber harvesting and thinning of the canopy for grazing throughout the lower slopes.

### 5.2. Habitat assessment

The study area contains habitat for the targeted species listed below.

- Regent Honeyeater
- Painted Honeyeater
- Swift Parrot

The quantity of habitat for each species within the study area and development footprint is presented in Table 2 below.

**Table 2: Targeted species habitat within the study area and development footprint.**

Species	Development Footprint (ha)			Study Area (ha)			Proportion impacted
	High quality	Potential	Total	High quality	Potential	Total	
Regent Honeyeater	0.169	7.891	8.060	329.603	233.418	563.021	1.432
Painted Honeyeater	0.143	19.534	19.677	294.172	637.333	931.505	2.112
Swift Parrot	3.121	9.302	12.423	145.690	382.896	528.586	2.350
White-throated Needletail	N/A	N/A	0	N/A	N/A	0	0

### 5.2.1. *Regent Honeyeater*

Areas of high quality and potential habitat for Regent Honeyeater were identified and mapped based on the methodology described in Section 4.

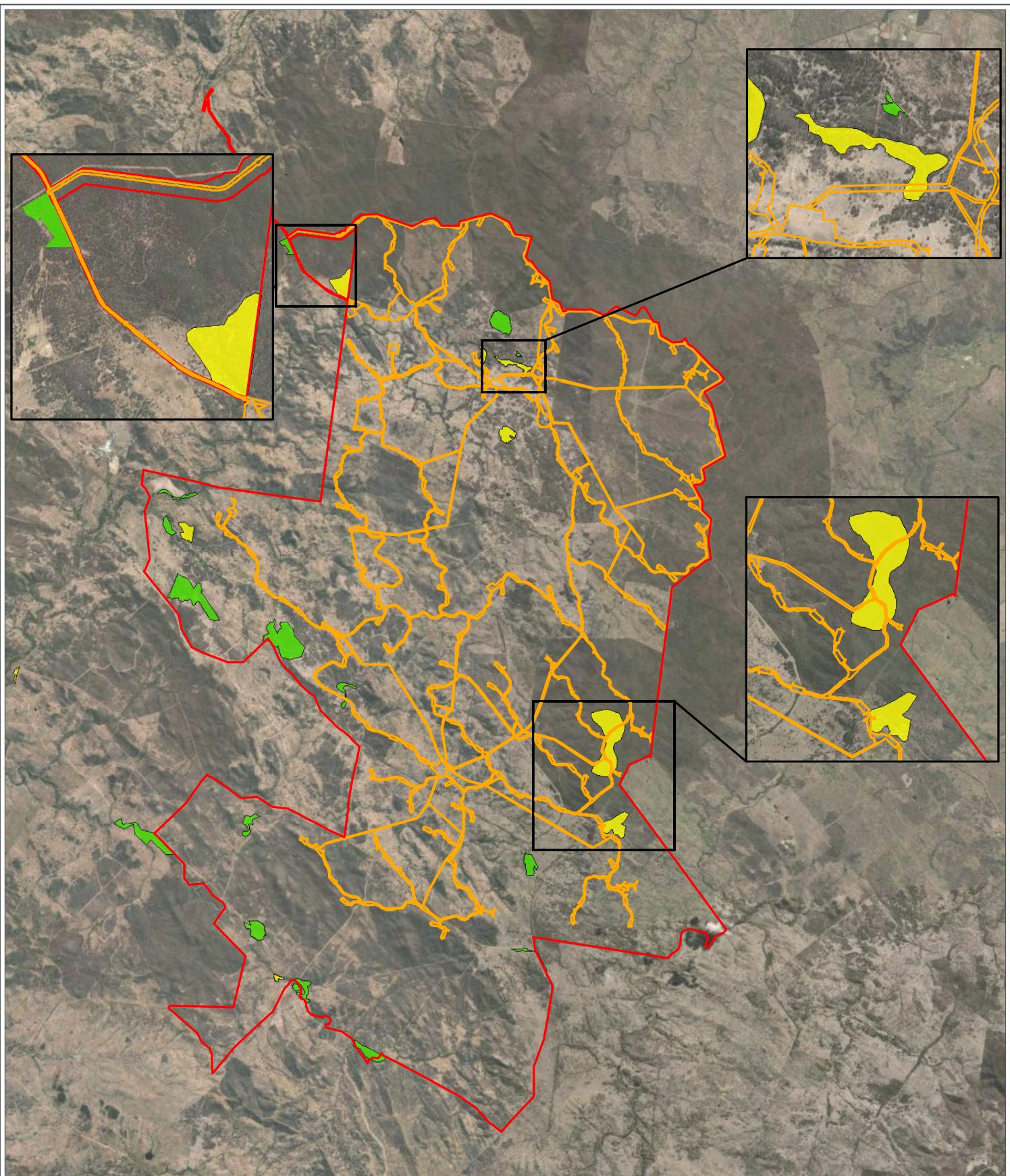
High quality habitat for Regent Honeyeater occurs mostly in lowlands and riparian zones within the study area (Figure 2), particularly along tributaries of MacIntyre Brook, consisting of mature River She-oak and Blakeley's Red Gum riparian strips, with scattered Angophora, Yellow Box and White Box. These riparian zones have connection with the location of known breeding records and sightings directly adjacent to the study area, on the neighbouring property, Glenelg. Some potential habitat, consisting of Ironbark/Box/Lemon-scented Gum woodland habitat is also present.

Isolated patches of Mugga Ironbark occur within the study area and White Box was flowering sporadically across the study area during the field survey.

Habitat critical to the survival of the Regent Honeyeater includes the following (Department of the Environment 2016).

- any breeding or foraging habitat in areas where the species is likely to occur (as defined by the distribution map provided in the National Recovery Plan for the Regent Honeyeater)
- any newly discovered breeding or foraging locations.

As the high quality and potential Regent Honeyeater within the study area is within the 'likely to occur' portion of the distribution map in the National Recovery Plan for the Regent Honeyeater, the high quality and potential habitat within the study area is considered habitat critical to the survival of the species.



**Figure 2:** Regent Honeyeater Habitat

Project: MacIntyre Wind Farm Client: ACCIONA Energy Oceania Pty Ltd Date: 5/08/2021

█ Study Area

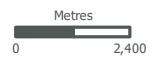
█ Development Footprint

#### Regent Honeyeater Habitat

█ High Quality

█ Potential

N



### 5.2.2. *Painted Honeyeater*

Areas of high quality and potential habitat for Painted Honeyeater were identified and mapped based on the methodology described in Section 4. Areas of high quality habitat were mapped under the assumption that they would provide good habitat during the summer months, corresponding with mistletoe flowering and fruiting.

High quality habitat occurs mostly in lowlands and riparian zones (Figure 3), particularly along tributaries of MacIntyre Brook, consisting largely of mature River She-oak and Blakely's Red Gum with scattered Angophora, Yellow and White Box and with a higher density of Drooping and Box Mistletoe. Isolated patches of cypress pine in the eastern section of the study area also provide habitat due to their increased abundance of mistletoe, and proximity to known sightings further north in the Durikai State Forest. It is noted that Weeping Myall (*Acacia pendula*) with Grey Mistletoe (*Amyema quandang*) was not observed within the study area.

Habitat critical to the survival of Painted Honeyeater refers to areas that are necessary (Department of the Environment 2013):

- for activities such as foraging, breeding, roosting or dispersal;
- for the long-term maintenance of the species (including the maintenance of species essential to the survival of the species, such as pollinators);
- to maintain genetic diversity and long term evolutionary development; or
- for the reintroduction of populations or recovery of the species.

Areas that are considered *necessary* for the processes outlined immediately above to function in a region contain the following characteristics:

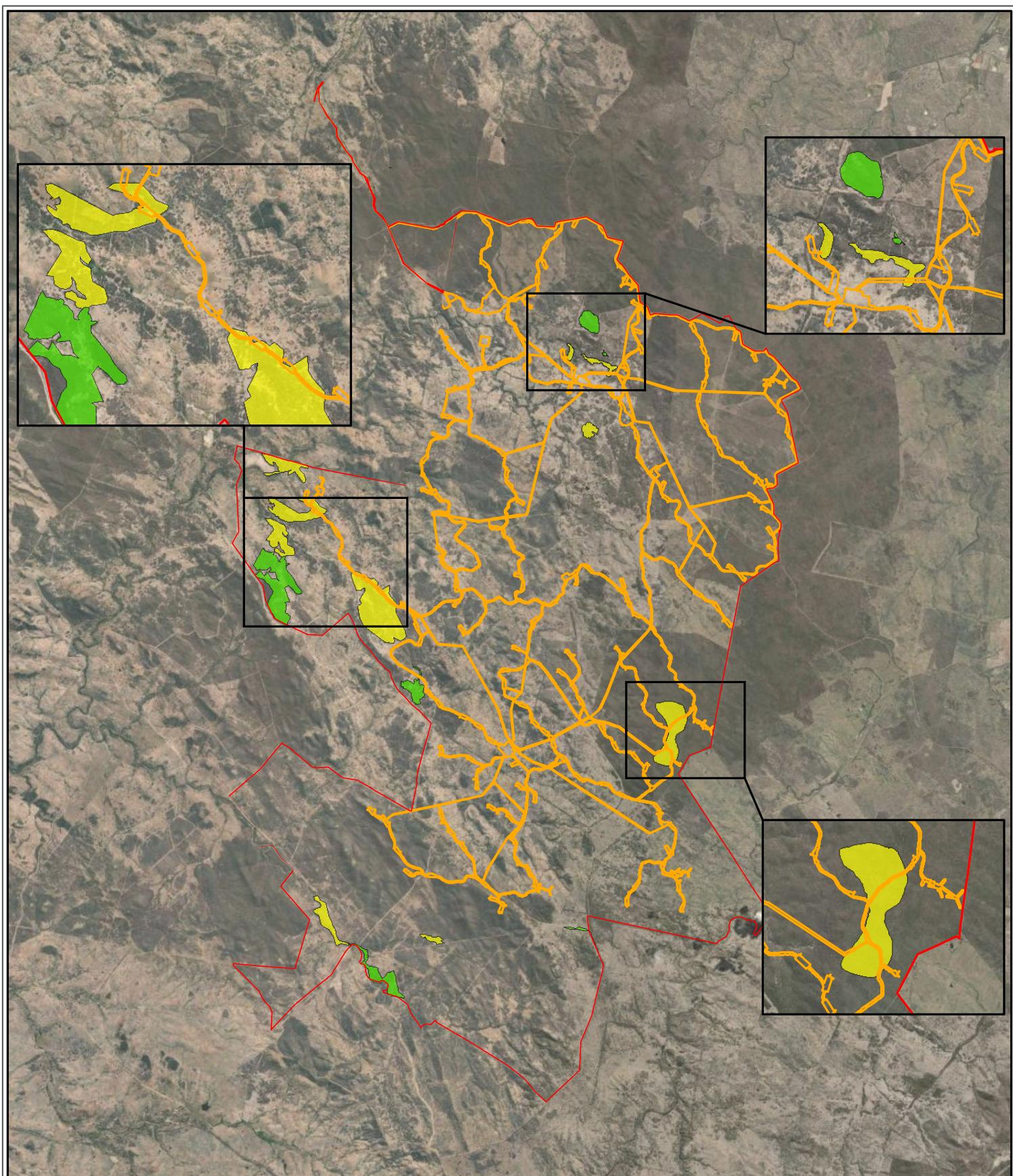
- large, continuous blocks of remnant woodland (Department of the Environment 2015b);
- contains a significant quantity of mistletoe for Painted Honeyeater; and/or
- records of the species within or adjacent to the habitat.

Examples of areas that meet the characteristics outlined immediately above are the larger tracts of remnant vegetation in the region (such as Durikai State Forest where the species has been recorded) with fruiting and flowering mistletoe. Painted Honeyeater preferentially forage and breed in these areas where and when ample mistletoe fruit and flower are available (Department of the Environment 2015b).

The Painted Honeyeater habitat mapped within the study area is not considered *necessary* for the processes outlined above to function in the region as:

- the patches of Painted Honeyeater habitat that occur within the study area are small and fragmented rather than large, continuous blocks of remnant woodland; and
- the majority of habitat within the study area does not contain a significant quantity of mistletoe for Painted Honeyeater.

As a result, Painted Honeyeater habitat within the study area is not considered habitat critical to the survival of the species.



**Figure 3:** Painted Honeyeater Habitat

Project: MacIntyre Wind Farm Client: ACCIONA Energy Oceania Pty Ltd Date: 5/08/2021

Study Area

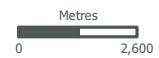
Development Footprint

#### **Painted Honeyeater Habitat**

High Quality

Potential

N



Metres  
0 2,600

#### 5.2.4. Swift Parrot

Areas of high-quality and potential habitat for this species were identified and mapped based on the methodology described in Section 4.

High quality habitat was observed in patches throughout the study area (Figure 4) containing Ironbark–Lemon-scented Gum woodland as well as one patch of Swift Parrot high quality containing White Box in heavy flower with an abundance of Scaly-breasted Lorikeet (*Trichoglossus chlorolepidotus*). This patch may provide higher nectar and lerp yields. Isolated high-quality patches of Mugga Ironbark were present within the study area, however, were not flowering during the survey.

Habitat critical to the survival of the Swift Parrot includes (Saunders & Tzaros 2011):

- those areas of priority habitat for which the Swift Parrot has a level of site fidelity or possess phenological characteristics likely to be of importance to the Swift Parrot; or
- are otherwise identified by the recovery team.

Priority habitat for Swift Parrot are areas of particular importance for conservation management which are used (Saunders & Tzaros 2011):

- for nesting;
- by large proportions of the Swift Parrot population;
- repeatedly between seasons (site fidelity); or
- for prolonged periods of time (site persistence).

The Swift Parrot habitat within the study area is not considered priority habitat for the species as the patches of Swift Parrot habitat within the study area are:

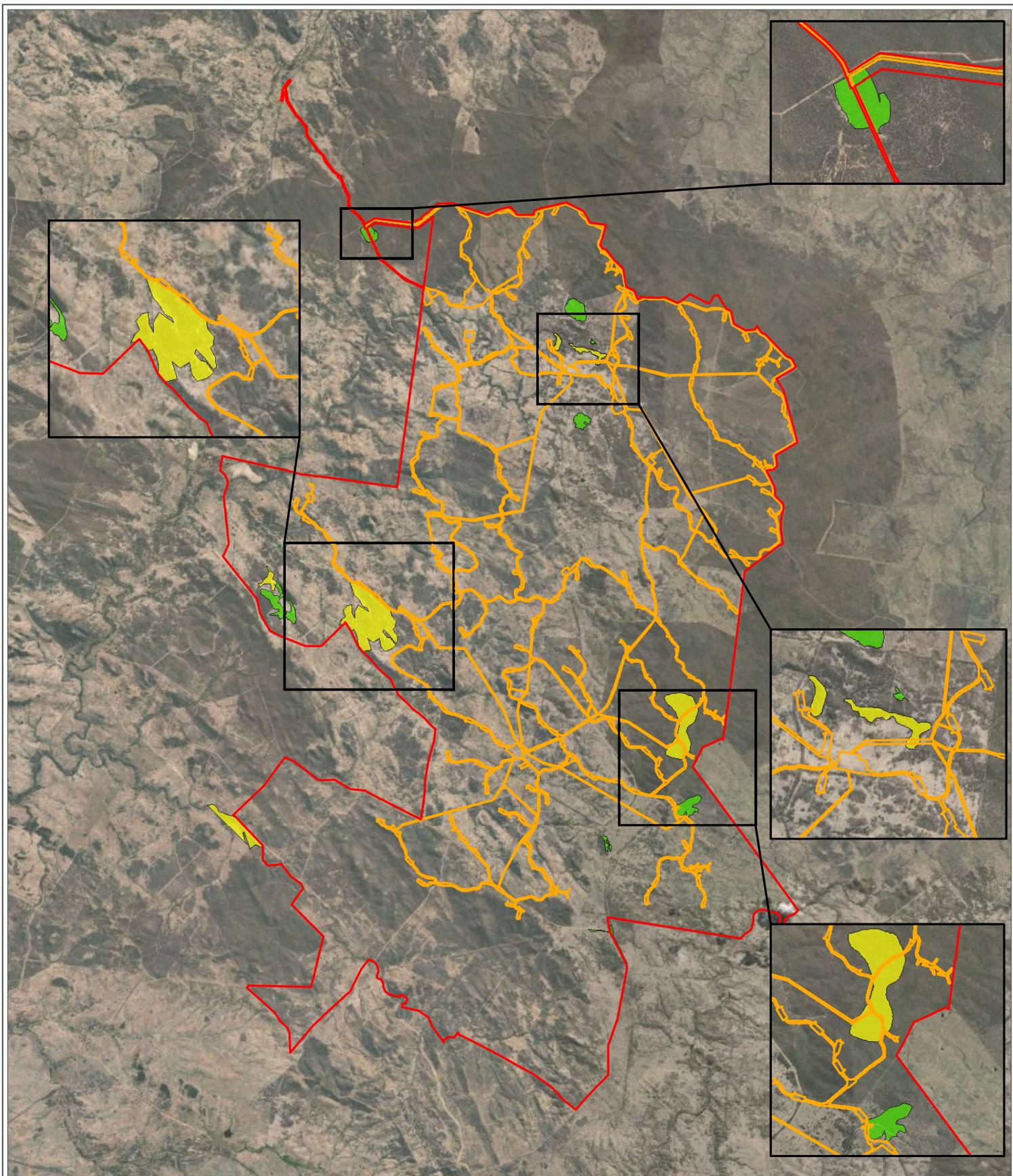
- not used for nesting with nesting occurring in Tasmania (Saunders & Tzaros 2011);
- not used by large proportions of the Swift Parrot population with no records of the species within the study area from WildNet, BirdData and Atlas of Living Australia databases and following targeted surveys for the species as well as following Bird Utilisation Surveys and fauna surveys throughout the study area (GHD 2020b, Nature Advisory 2020b). It is noted there are some Swift Parrot records within the adjacent Durikai State Forest (as shown in Figure 7 and detailed in Section 6.3);
- not repeatedly used between seasons (lack of site fidelity) with no records of the species within the study area. It is noted there are some Swift Parrot records within the adjacent Durikai State Forest with records from July 2017 to September 2017, from May 2018 to September 2018 and in June 2021; and
- not used for prolonged periods of time (lack of site persistence) with no records of the species within the study area.

The Swift Parrot habitat within the study area is also not identified by the recovery team as priority habitat for the species (Saunders & Tzaros 2011). It is noted that the WildNet, BirdData and Atlas of Living Australia records for the species in the adjacent Durikai State Forest indicate a level of Swift Parrot site fidelity with records from July 2017 to September 2017, from May 2018 to September 2018 and in June 2021, and as a result these areas within Durikai State Forest are considered priority habitat and habitat critical to the survival of the species.

It is noted that the Swift Parrot habitat within the study area may possess phenological characteristics that may support Swift Parrot foraging if sufficient levels of lerp and nectar are available in winter flowering eucalypt species, however, there are no Swift Parrot records within any of these patches (noting that heavy flowering of the winter flowering species White Box was observed in one patch within the study area and outside the development footprint) and high quantities of lerp was not observed in these

patches. This indicates that these patches may not produce sufficient levels of lerp and/or nectar to allow the species to forage and are therefore not considered likely to be of importance to the Swift Parrot. If one or more of the patches of Swift Parrot habitat within the study area (or within the adjacent proposed Karara Wind Farm or proposed MacIntyre Wind Farm transmission line corridor) contained one or more records of Swift Parrot and/or high quantities of lerp or very heavy flowering in winter flowering eucalypt species had been observed within these patches, the Swift Parrot habitat within the study area would be considered to possess phenological characteristics likely to be of importance to the Swift Parrot and therefore habitat critical to the survival of the species.

As a result of the above, Swift Parrot habitat mapped within the study area is not considered habitat critical to the survival of the species.



**Figure 4:** Swift Parrot Habitat

Project: MacIntyre Wind Farm Client: ACCIONA Energy Oceania Pty Ltd Date: 5/08/2021

Study Area

Development Footprint

#### Swift Parrot Habitat

High Quality

Potential



Metres  
0 2,600

### 5.2.5. *White-throated Needletail*

No roosting habitat for White-throated Needletail was present within the study area based on the methodology described in Section 4.

While treed remnant vegetation is present within the study area consisting of low eucalypt woodland on rocky rises, ironbark open woodland, mixed eucalypt woodland/forest and mixed eucalypt woodland on alluvial flats, it did not occur along or was contiguous with a mountain range. Confirmed and high confidence records of the species roosting in Australia are in treed remnant vegetation along or contiguous with a mountain range. During extreme conditions including bushfires and cold, hot or inclement weather, the species may infrequently take refuge in trees within the study area.

White-throated Needletail has been observed over the study area (Figure 8). Individuals have been recorded flying between 10 metres and 300 metres above ground level (Nature Advisory 2020b). The species is considered likely to occupy the airspace throughout the study area.

Habitat critical to the survival of White-throated Needletail refers to areas that are necessary (Department of the Environment 2013):

- for activities such as foraging, breeding, roosting, or dispersal;
- for the long-term maintenance of the species (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
- to maintain genetic diversity and long term evolutionary development; or
- for the reintroduction of populations or recovery of the species.

While the airspace above the study area provides an area for White-throated Needletail to forage and disperse; will assist with the long-term maintenance of the species; will help to maintain genetic diversity and long-term evolutionary development; and provides habitat for the recovery of the species; the airspace above the study area is not considered necessary for these processes to occur. The species also breeds in the Northern Hemisphere and roosting habitat is not considered to be present within the study area. As a result, habitat critical to the survival of the species is not considered to be present within or above the study area.

### 5.3. Targeted surveys

No Regent Honeyeater, Painted Honeyeater or Swift Parrot were recorded during the autumn and winter survey periods. This was expected for Painted Honeyeater due to the lack of flowering and fruiting mistletoe.

Flowering trees were typically dominated by Scaly-breasted Lorikeet, Noisy Friarbird and Fuscous Honeyeater.

While much of the study area is cleared agricultural land, remnant vegetation is scattered throughout and around the perimeter of the study area, allowing for the potential movement of Regent Honeyeater, Painted Honeyeater and Swift Parrot across agricultural land between patches of habitat.

The riparian zones from the south-west to north-west portion of the study area are relatively contiguous, and would likely form the most obvious wildlife corridor for Regent Honeyeater. These lie in lower parts of the landscape and may not therefore be as exposed to turbine impacts as ridges are preferred as turbine sites.

Likely due to drought, many of the mistletoe observed were in poor condition or dying, and this may have reduced the likelihood of Painted Honeyeater utilising the study area at the time. Selective logging has occurred throughout the study area, including on properties bordering the Durikai State Forest which may

impact the quality of habitat for these species. The properties with cypress pine woodland bordering on state forest from the south-east to north-east sections of the study area support relatively continuous tree cover, and would likely form the most obvious wildlife corridor for Painted Honeyeater.

Nectivorous birds recorded in the study area included the following:

- Brown-headed Honeyeater
- Fuscous Honeyeater
- Noisy Friarbird
- Noisy Miner
- Rainbow Lorikeet
- Scaley-breasted Lorikeet
- White-plumed Honeyeater.

It is also noted that during four Bird Utilisation Surveys (BUS) completed by Nature Advisory to date within the study area in 2020 and 2021, Noisy Miner was recorded in the top four most abundant bird species (Nature Advisory 2020b, Nature Advisory 2020c). Noisy Miner benefits from smaller and fragmented patches of habitat and is a competitive excluder of Regent Honeyeater, Painted Honeyeater and Swift Parrot. The abundance of Noisy Miner is likely a key contributor to the absence of Regent Honeyeater, Painted Honeyeater and Swift Parrot from the study area (S Debus 2021, pers. comm. 10 February 2021).

## 6. Regional context

### 6.1. Regent Honeyeater

Regent Honeyeater records are widely distributed across the species' range from south-eastern Queensland to central Victoria. There is one record of the species within the southern portion of the study area (two individuals observed 100 metres in from the study area boundary in 1995) and there are records to the north, south, east and west of the study area, including breeding events in the Cement Mills-Durikai region. The species is only found regularly at a few localities in NSW and Victoria, where most of the sightings have been recorded (Department of the Environment 2015a; Department of the Environment 2016; Hines 2008).

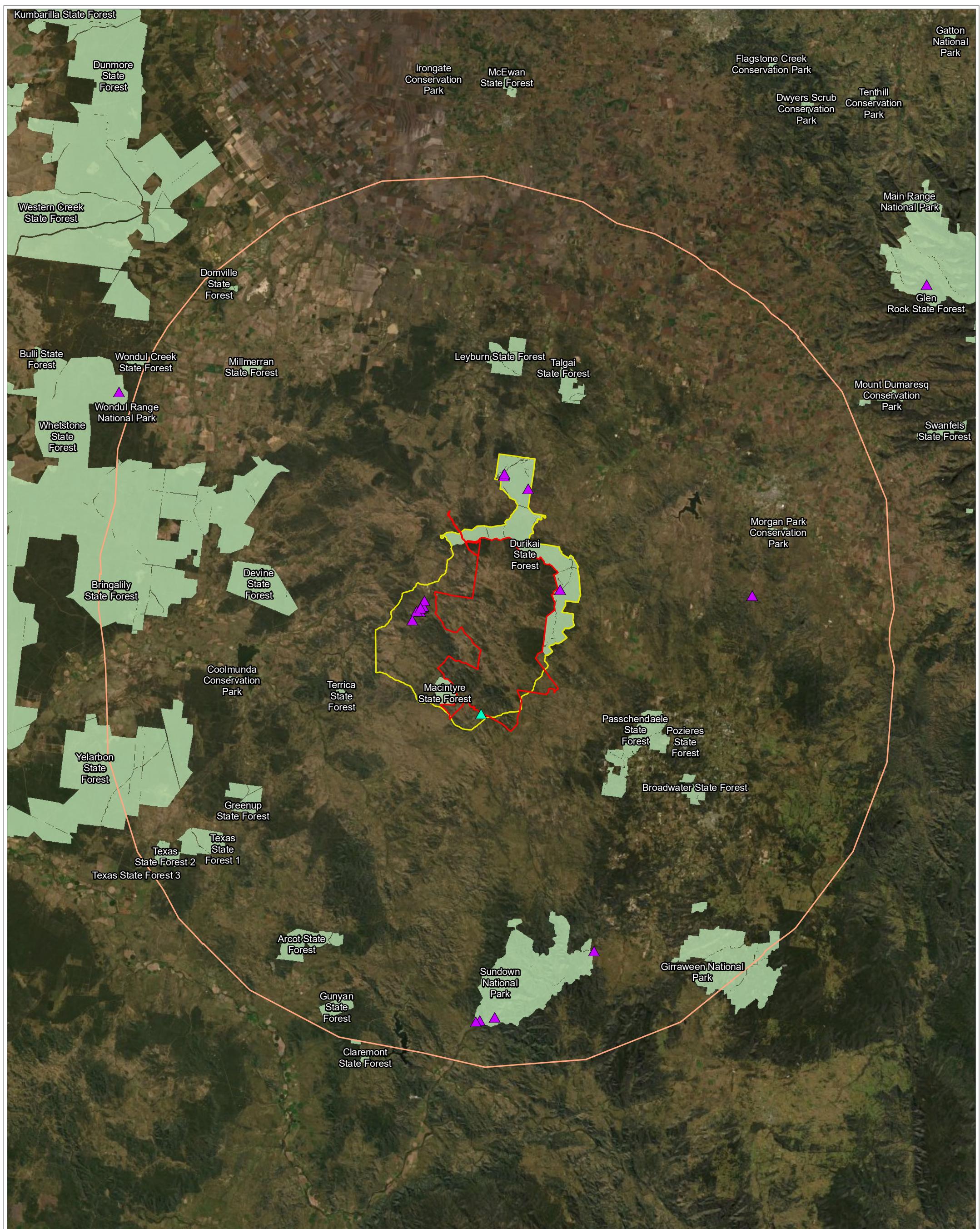
Within 50 kilometres of the study area there are 19 records of Regent Honeyeater (18 Birddata records and one record from Dr Stephen Debus) with 14 records within the Traprock Important Bird Area for Regent Honeyeater (Figure 5). While most of the study area is within the Traprock Important Bird Area, habitat within the development footprint for the species is restricted to five smaller and fragmented patches for a total of 8.060 hectares (0.169 hectares of high quality habitat and 7.891 hectares of potential habitat) (Figure 2).

The Durikai State Forest and MacIntyre State Forest are within the Traprock Important Bird Area and contain significant tracts of selectively logged (in places) eucalypt forest and woodlands comprised mainly of Lemon-scented Gum (*Corymbia citriodora*) associations and box-ironbark associations (BirdLife International 2020). The Durikai State Forest totals 12,357 hectares and MacIntyre State Forest totals 1,002 hectares. Thirteen of the 14 records of Regent Honeyeater within the Traprock Important Bird Area are within larger tracts of Regent Honeyeater habitat within Durikai State Forest and along MacIntyre Brook. There is one record of Regent Honeyeater within the Traprock Important Bird Area and within the study area from a patch of habitat on Coopers Creek that is connected to larger tracts of Regent Honeyeater habitat along Branch Creek (tributary of MacIntyre Brook), the majority of which is outside the study area. The three Regent Honeyeater records outside the Traprock Important Bird Area and within 50 kilometres of the study area are within large tracts of Regent Honeyeater habitat within Wondul Range National Park and Connolly Dam, and immediately adjacent to Sundown National Park which are between 36 kilometres and 46 kilometres from the study area.

At times when key tree and mistletoe species are flowering within the Regent Honeyeater habitat in the study area, the species may forage in these patches. It is noted that there have been no records of the species within these smaller and fragmented patches (including after targeted surveys for the species within the study area as part of this assessment) since 1995 where two individuals were recorded 100 metres in from the southern boundary of the study area, indicating that these patches may not provide sufficient quantities of reliable nectar for the species. It is also noted there have been no records of the species within the smaller and fragmented patches within the development footprint. There is also no evidence that the Regent Honeyeater utilises these patches for roosting or breeding. These smaller and fragmented patches provide areas which may be utilised by the species, although the majority of Regent Honeyeater activity within the region is within larger tracts of Regent Honeyeater habitat within Protected Areas and along waterways. It is also noted that the species is most often recorded in a few localities in NSW and Victoria. While breeding events have been recorded in the Cement Mills-Durikai area, which has significance as the only remaining outpost of Regent Honeyeater breeding in Queensland (S Debus 2021, pers. comm. 15 January), there are no key breeding areas or other breeding areas for the species mapped within Queensland (Department of the Environment 2016).

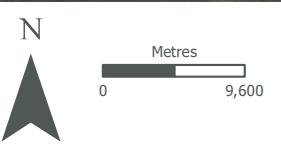
While the 8.060 hectares of Regent Honeyeater habitat within the development footprint is considered to be habitat critical to the survival of the species, much larger tracts of habitat critical to the survival of

the species are located in the region and within the Traprock Important Bird Area including Durikai State Forest. Regent Honeyeater appear to utilise these areas preferentially rather than smaller and more fragmented patches of habitat, such as those occurring within the study area.



**Figure 5:** Regent Honeyeater Records

Project: MacIntyre Wind Farm Client: ACCIONA Energy Australia Global Pty Ltd Date: 5/08/2021



- | Regent Honeyeater            |          |
|------------------------------|----------|
| Study Area                   | Birddata |
| Study Area Buffer (50km)     |          |
| Traprock Important Bird Area | Debus    |
| Protected Area               |          |

## 6.2. Painted Honeyeater

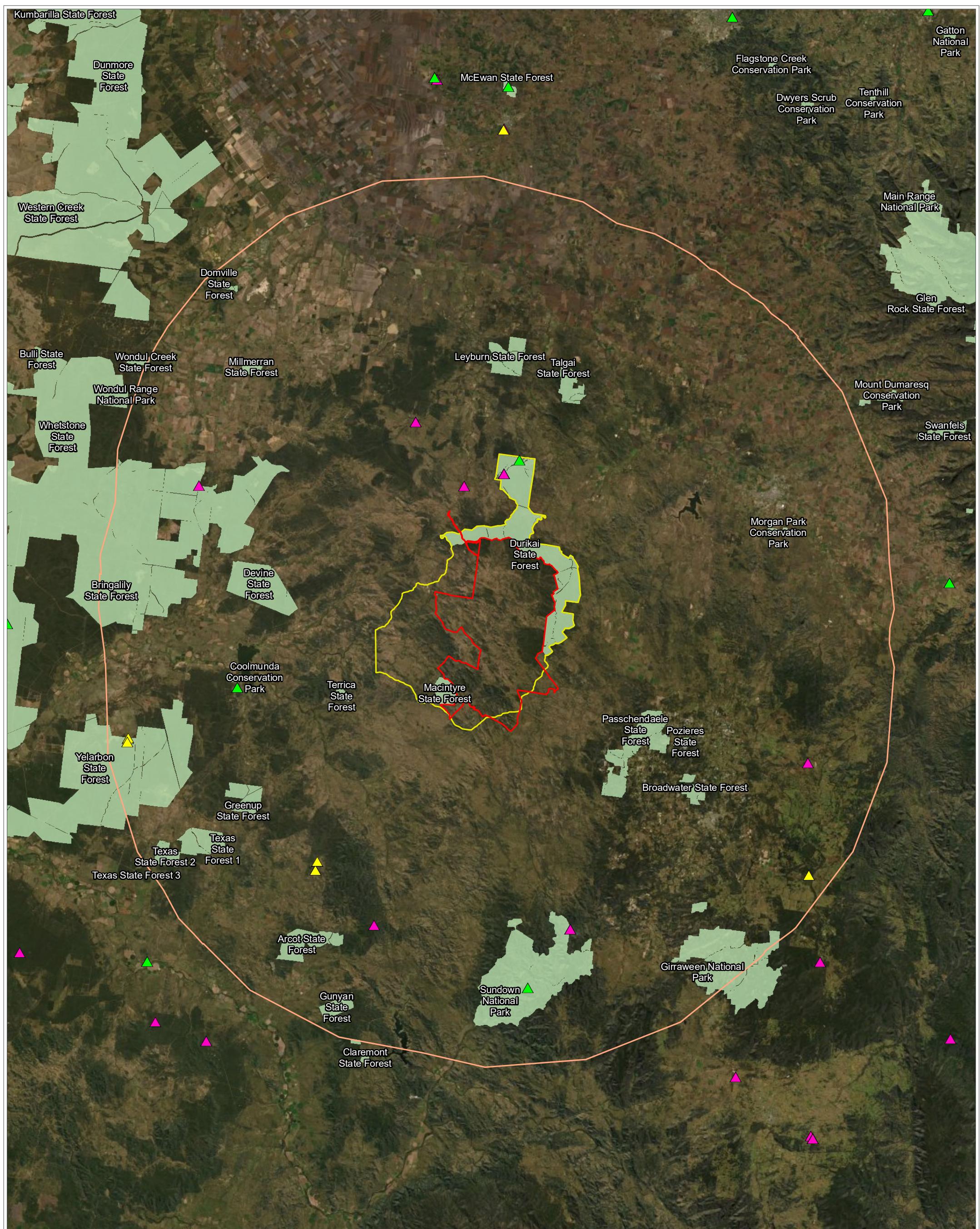
The Painted Honeyeater is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory. The species exhibits seasonal north-south movements governed principally by the fruiting of mistletoe, with which its breeding season is closely matched (Department of the Environment 2015b).

Within 50 kilometres of the study area there are 20 records of Painted Honeyeater (three WildNet records, six Birddata records and 11 Atlas of Living Australia records) (Figure 6). Two records of the species come from within the Traprock Important Bird Area (BirdLife International 2020) in Durikai State Forest and an additional two records of the species from Karara, to the north of the study area.

Smaller and more fragmented patches of Painted Honeyeater potential habitat occur within the study area. A total of 19.677 hectares within six of these patches are within the development footprint with the largest portion within the development footprint being 7.507 hectares. It is noted that removal of this habitat does not remove these patches. There is also a total of 15 patches of Painted Honeyeater habitat covering 931.505 hectares (294.172 high quality habitat and 637.333 hectares of potential habitat) within the study area. Only 2.112 percent of Painted Honeyeater habitat within the study area is proposed to be removed.

Painted Honeyeater is more common in more extensive blocks of remnant woodland than in narrower strips, although it breeds in quite narrow roadside strips if ample mistletoe fruit is available (Department of the Environment 2015b). The distribution of records of the species within 50 kilometres of the study area (Figure 6) demonstrates this with more records in Protected Areas (particularly noting Durikai State Forest which is the closest Protected Area to the study area and covers an area of 12,357 hectares) and larger tracts of remnant vegetation compared with one record within remnant vegetation in the Millmerran Road corridor.

At times, when mistletoe is fruiting and flowering within the smaller and more fragmented patches of Painted Honeyeater potential habitat within the study area, the species may occasionally forage in these areas. These patches contain small amounts of mistletoe and there are no records of the species within them. When mistletoe is fruiting and flowering in the larger tracts of remnant vegetation in the surrounding area (such as Durikai State Forest), the species would prefer these areas to the smaller and more fragmented areas of potential habitat within the study area. Painted Honeyeater would also preferentially breed in these areas, as well as narrow roadside remnants if ample mistletoe fruit is available (Department of the Environment 2015b) rather than within the study area.



**Figure 6:** Painted Honeyeater Records

Project: MacIntyre Wind Farm

Client: ACCIONA Energy Australia Global Pty Ltd

Date: 5/08/2021

- Study Area
- Study Area Buffer (50km)
- Traprock Important Bird Area
- Protected Area

- | Painted Honeyeater        |   |
|---------------------------|---|
| WildNet                   | ▲ |
| Birddata                  | ▲ |
| Atlas of Living Australia | ▲ |



### 6.3. Swift Parrot

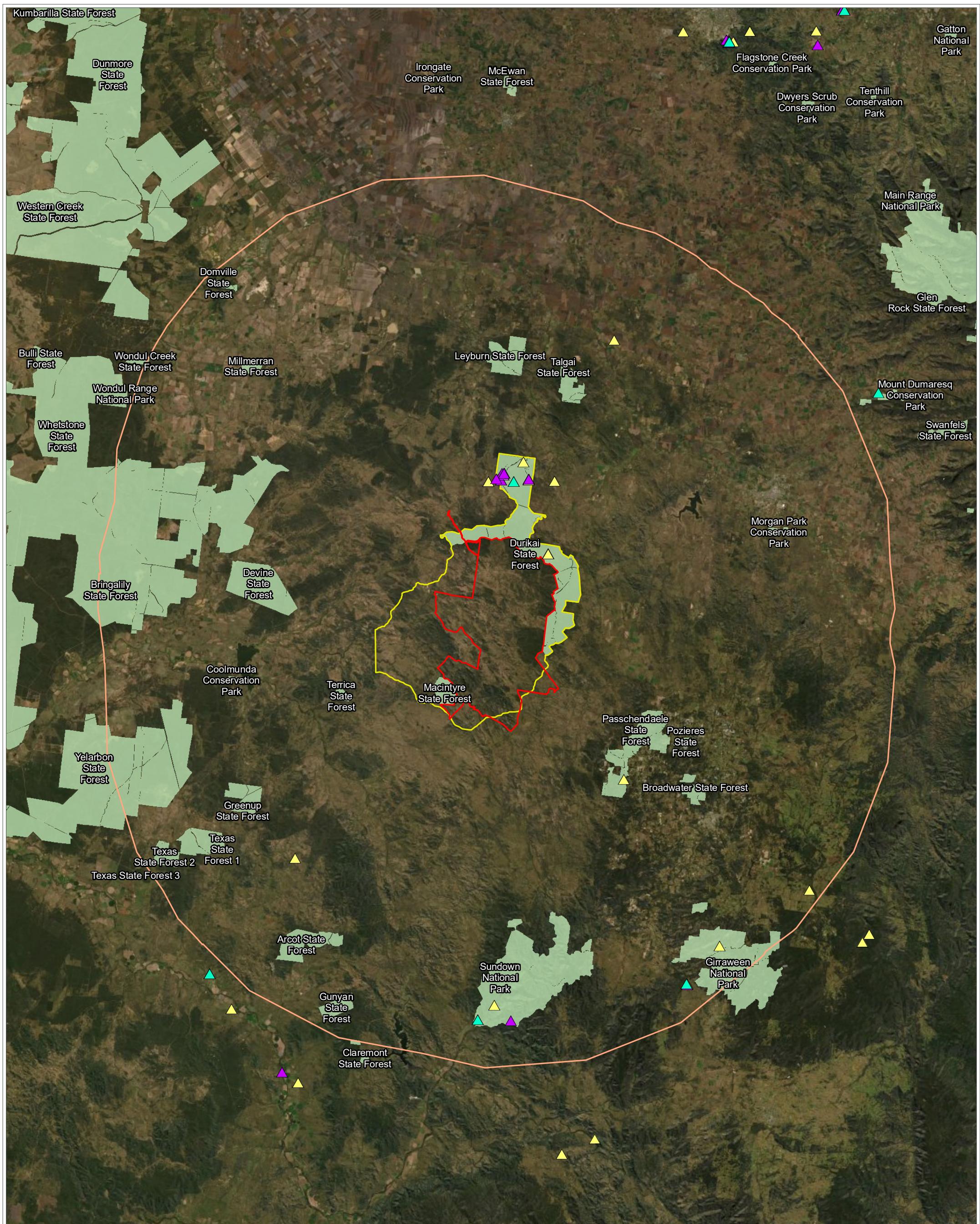
The Swift Parrot breeds in Tasmania in summer and the entire population leaves the island and migrates north for the winter. While on mainland Australia, the Swift Parrot typically disperses through Victoria and New South Wales, however, smaller numbers are observed in south-east Queensland on a regular basis (Saunders & Tzaros 2011). The species exhibits high site fidelity, returning to locations on an irregular cyclic basis (Threatened Species Scientific Committee 2016).

Within 50 kilometres of the study area there are 34 records of Swift Parrot (three WildNet record, 10 Birddata records and 21 Atlas of Living Australia records) (Figure 7). The species is reported occasionally within the Traprock Important Bird Area (BirdLife International 2020). A total of 23 records of Swift Parrot come from within the Traprock Important Bird Area, all of which are within Durikai State Forest.

The species preferentially forages in large, mature trees in eucalypt forests and woodlands, particularly box-ironbark forest and woodlands, as well as grassy woodlands (Saunders & Tzaros 2011). Within the development footprint 12.423 hectares of Swift Parrot habitat (3.121 hectares of high quality habitat and 9.302 hectares of potential habitat) has been found within five smaller and more fragmented patches. It is noted that there are no records of Swift Parrot within the patches of Swift Parrot habitat mapped within the study area.

The species exhibits high site fidelity and the production of lerp and nectar food resources are considered the main limiting factors to the species (Saunders & Tzaros 2011). At times, when sufficient levels of lerp and nectar are available, the species may occasionally forage within the smaller and more fragmented patches in the study area. It is noted though that the lack of records within these patches (including after targeted surveys for the species within the study area as part of this assessment) indicates that these patches may not produce sufficient levels of lerp and/or nectar to allow the species to forage. Based on the distribution of records in Figure 7, the species is preferentially foraging in habitat within the Durikai State Forest which covers an area of 12,357 hectares compared to the 12.423 hectares of Swift Parrot habitat within the development footprint.

Habitat characteristics of roosting sites for Swift Parrot are relatively unknown. Based on the lack of records within the study area, the Swift Parrot habitat within the study area is not considered roosting habitat. The species is likely roosting in areas such as Durikai State Forest where it has been recorded, as proximity to foraging habitat is likely to be important in roost site selection (Saunders & Tzaros 2011).



**Figure 7:** Swift Parrot Records

Project: MacIntyre Wind Farm Client: ACCIONA Energy Australia Global Pty Ltd Date: 5/08/2021

- Study Area
- Study Area Buffer (50km)
- Traprock Important Bird Area
- Protected Area

- Swift Parrot**
- WildNet
  - Birddata
  - Atlas of Living Australia



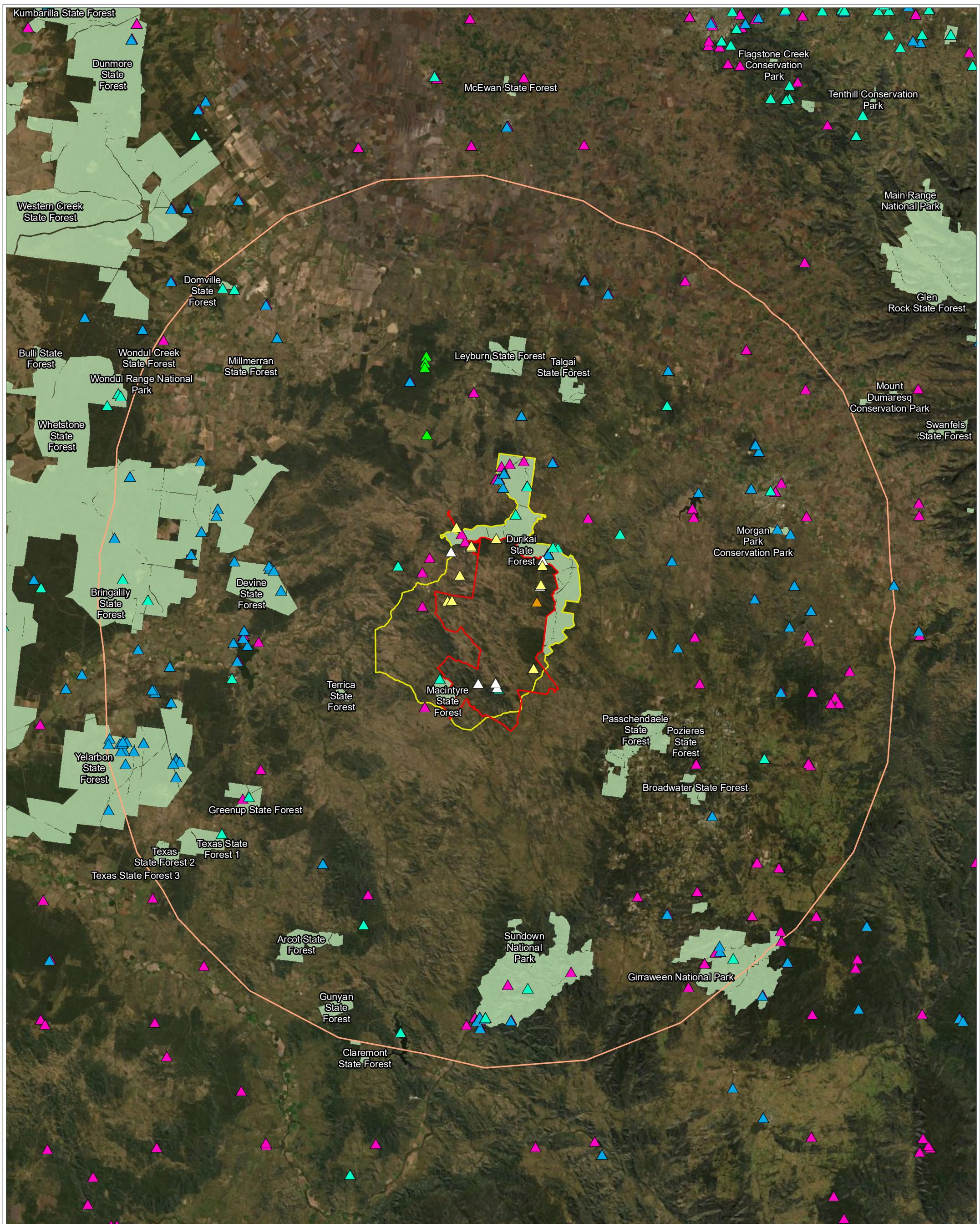
#### 6.4. White-throated Needletail

The White-throated Needletail is widespread in eastern and south-eastern Australia with the species being mostly aerial over most habitat types while in Australia (Threatened Species Scientific Committee 2019). Within 50 kilometres of the study area, there are 274 records of White-throated Needletail (23 Nature Advisory records, one GHD record, 29 WildNet records, 96 Birddata records and 125 Atlas of Living Australia records) as shown in Figure 8. White-throated Needletail has been recorded over the study area with a total of 17 records consisting of between one to 19 individuals (Nature Advisory 2020b, Nature Advisory 2020c; GHD 2020b). Within 50 kilometres of the study area, records are generally distributed evenly, with some clustering of records over state forests. The species is considered to occupy the airspace throughout the study area.

White-throated Needletail roosting habitat is considered to be absent from the study area. The Sundown National Park is located 28 kilometres to the south of the study area and contains a large tract of treed remnant vegetation along a mountain range that has potential roosting habitat for White-throated Needletail. If the species is roosting within the region, it is most likely to be in this location.

During extreme conditions, including bushfires and cold, hot or inclement weather, the species may infrequently take refuge in trees within the study area. It is noted that there are larger tracts of treed remnant vegetation immediately adjacent to the study area in Durikai State Forest and MacIntyre State Forest where the species may preferentially seek refuge during extreme conditions rather than within the more fragmented, less sheltered patches of treed vegetation in the study area.

In addition to the 17 records over the study area, there are also eight records of the species within the immediately adjacent proposed Karara Wind Farm (Nature Advisory 2020c). Each time White-throated Needletail has been recorded by Nature Advisory (including close to dusk) over the study area and proposed Karara Wind Farm, the species has been observed foraging and it has not been recorded within the tree canopy searching for or landing at a roosting location. In locations elsewhere in Australia where roosting locations have been confirmed or there is high confidence of the species roosting at a location, the species has been observed exhibiting roost searching behaviour close to dusk which includes flying through the tree canopy and landing and leaving a location a number of times before settling to roost (Corben et al. 1982; Day 1993; Tarburton 1993; Stanton 2011).



**Figure 8: White-throated Needletail Records**

Project: MacIntyre Wind Farm Client: ACCIONA Energy Australia Global Pty Ltd

Date: 5/08/2021



- |                              |                            |                 |
|------------------------------|----------------------------|-----------------|
| Study Area                   | White-throated Needletail  | Birddata        |
| Study Area Buffer (50km)     | Nature Advisory (Oct 2020) | Pink Triangle   |
| Traprock Important Bird Area | Nature Advisory (Dec 2020) | Blue Triangle   |
| Protected Area               | Nature Advisory (Feb 2021) | White Triangle  |
|                              | GHD (Jan 2019)             | Yellow Triangle |
|                              | WildNet                    | Cyan Triangle   |



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## 7. Impact assessment

### 7.1. Direct impacts

#### 7.1.1. Regent Honeyeater

The development footprint contains 8.060 hectares of Regent Honeyeater habitat (0.169 hectares of high quality habitat and 7.891 hectares of potential habitat) that is proposed to be removed (Figure 2). This habitat is also considered habitat critical to the survival of the species. Five patches of Regent Honeyeater habitat occur within the development footprint and the removal of part of these patches is considered acceptable for the reasons summarised below based on the detailed findings in Sections 5 and 6:

- larger tracts of Regent Honeyeater habitat that are also considered habitat critical to the survival of the species are located within Protected Areas and along waterways within close proximity to the study area, including in Durikai State Forest and along MacIntyre Brook and Branch Creek;
- habitat for the species within the development footprint is restricted to five smaller and more fragmented patches;
- the species is only found regularly at a few localities in NSW and Victoria where most of the sightings have been recorded (Department of the Environment 2015a; Department of the Environment 2016);
- the species has not been recorded within the patches of habitat within the development footprint, although when key tree and mistletoe species are flowering in the identified patches within the development footprint, the species may forage here; and
- there is no evidence that Regent Honeyeater utilise the patches of habitat within the study area for roosting or breeding.

Based on the information presented here, Regent Honeyeater preferentially utilises the larger tracts of habitat critical to the survival of the species surrounding the study area rather than smaller and more fragmented patches of habitat, such as those within the study area. It is also noted that only 1.432 percent of Regent Honeyeater habitat within the study area is proposed to be removed.

There is a very small possibility of injury or mortality of the species during clearing of these patches of habitat, although due to the likely limited Regent Honeyeater activity within the area and the smaller size of these patches, this possibility can be removed with the implementation of a Construction Management Plan (CMP), based on the Preliminary Vegetation Management and Fauna Management Plans, that ensures that the species is not present before vegetation is removed or modified.

Regent Honeyeater is principally a tree canopy species (Department of the Environment 2016). The tree canopy within the study area is between approximately 20 and 25 metres in height with the wind turbine Rotor Swept Area (RSA) height between 40 metres and 285 metres above ground level. Regent Honeyeater has not been recorded during extensive carcass searches at operational wind farm sites throughout the species' distribution in southern, eastern and south-eastern Australia (Nature Advisory, unpublished data). It is noted that the species occurs more often in NSW and Victoria than Queensland. As such and in combination with the absence of Regent Honeyeater records within the study area, mortality of this species from wind turbine strike within the study area is unlikely to occur.

#### 7.1.2. Painted Honeyeater

The development footprint contains 19.677 hectares of Painted Honeyeater habitat (0.143 hectares of high quality habitat and 19.534 hectares of potential habitat) that is proposed to be removed (Figure 3). This habitat is not considered habitat critical to the survival of the species and the removal of this habitat

is considered acceptable for reasons summarised below based on the detailed findings in Sections 5 and 6:

- only 2.112 percent of habitat for the species within the study area is proposed to be removed;
- the majority of patches habitat for the species do not contain a significant quantity of mistletoe for Painted Honeyeater;
- the species may occasionally forage in the patches of habitat within the study area at times when mistletoe is fruiting and flowering;
- the species is more common in larger, continuous blocks of remnant woodland than in narrower strips (Department of the Environment 2015b) such as the patches of Painted Honeyeater habitat within the development footprint; and
- the distribution of records in the region demonstrates that the species is found in Protected Areas and larger tracts of remnant vegetation with one record within remnant vegetation in the Millmerran Road corridor and no records of the species within the patches of habitat within the study area.

When mistletoe is fruiting and flowering in the larger tracts of remnant vegetation in the surrounding area (such as Durikai State Forest) Painted Honeyeater would preferentially forage and breed in these areas as well as narrow roadside strips, where and when ample mistletoe fruit and flower is available (Department of the Environment 2015b), rather than within the smaller and more fragmented patches of habitat within the study area.

There is a very small possibility of injury or mortality of the species during clearing of these patches of habitat, although due to the limited Painted Honeyeater activity within the area and the smaller size of these patches, this possibility can be removed with the implementation of a Construction Management Plan (CMP), based on the Preliminary Vegetation Management and Fauna Management Plans, that ensures that the species is not present before vegetation is removed or modified.

Painted Honeyeater is a woodland bird species and is largely found in trees. The tree canopy within the study area is between approximately 20 and 25 metres in height and the wind turbine Rotor Swept Area (RSA) height between 40 metres and 285 metres above ground level. Painted Honeyeater has not been recorded during extensive carcass searches at operational wind farm sites throughout the species' distribution in southern, eastern and south-eastern Australia (Nature Advisory, unpublished data). As such and in combination with the absence of Painted Honeyeater records within the study area, mortality of this species from wind turbine strike within the study area is unlikely to occur.

### **7.1.3. Swift Parrot**

The development footprint contains 12.423 hectares of Swift Parrot habitat (3.121 hectares of high quality habitat and 9.302 hectares of potential habitat) that is proposed to be removed (Figure 4). This habitat is not considered habitat critical to the survival of the species and the removal of this habitat is considered acceptable for the reasons summarised below based on detailed information in Sections 5 and 6:

- the species typically disperses through Victoria and New South Wales, however, smaller numbers are observed in south-east Queensland on a regular basis (Saunders & Tzaros 2011);
- 23 of the 34 records of Swift Parrot within 50 kilometres of the study area are within the Traprock Important Bird Area, all of which are within the Durikai State Forest where the species is foraging and likely roosting; and
- there are no records of the species within the patches of Swift Parrot habitat mapped in the study area. The species exhibits high site fidelity, returning to locations on an irregular cyclic basis (Threatened Species Scientific Committee 2016). The lack of records indicates that these

patches may not produce sufficient levels of lerp and/or nectar to allow the species to forage regularly.

Based on the distribution of records in Figure 7 and the smaller and more fragmented patches of habitat within the study area, the Swift Parrot is likely to be foraging preferentially and likely roosting in habitat within the Durikai State Forest, which covers an area of 12,357 hectares and would contain more extensive high quality and potential habitat compared with the 12.423 hectares of habitat for the species within the development footprint.

There is a very small possibility of injury or mortality of the species during clearing of these patches of habitat, although due to the limited Swift Parrot activity within the area and the smaller size of these patches, this possibility can be removed with the implementation of a Construction Management Plan (CMP), based on the Preliminary Vegetation Management and Fauna Management Plans, that ensures that the species is not present before vegetation is removed or modified.

It has been reported that the construction of wind energy turbines in south-eastern Australia may have implications for the conservation of the Swift Parrot where they are poorly sited (Saunders & Tzaros 2011). While there is limited information on the flight heights of Swift Parrot, flight height data for a variety of parrot species of south-eastern Australia indicates that parrot species fly within RSA at times, although most flight heights are recorded below RSA. While foraging, Swift Parrots generally fly within the tree canopy, although while flying between feeding and roosting locations and on migration, the species may fly higher (Smales 2005). Given the species is expected to fly more often below RSA, mortality of the species from wind turbine strike within the study area is considered unlikely to occur.

#### **7.1.4. White-throated Needletail**

The development footprint does not contain White-throated Needletail roosting habitat, as such no roosting habitat for this species is proposed to be removed. If White-throated Needletail are roosting within the region, it is most likely to be within Sundown National Park (28 kilometres south of the study area) which contains treed remnant vegetation along a mountain range. The airspace over the study area is not of particular significance to the species as there is generally an even distribution of records of the species over the study area as there is within 50 kilometres of the study area.

There is a very small possibility of injury or mortality of the species during clearing within the development footprint, although due to the absence of White-throated Needletail roosting habitat within the study area, this possibility is considered remote. Any residual risk of impacts can be removed with the implementation of a Construction Management Plan (CMP), based on the Preliminary Vegetation Management and Fauna Management Plans, that ensures that the species is not present before vegetation is removed or modified.

White-throated Needletail mortality from collision with overhead wires within Australia is known to occur, although is a low severity threat and affects a small number of birds (Hull et al. 2013). A threshold of mortality of 10 individuals annually can be considered a significant impact on the species (Department of the Environment 2015c). Given there are not extensive records of the species within the study area and that overhead wires affect a small number of individuals, this threshold is not expected to be exceeded with the construction of aboveground power lines for the proposed MacIntyre Wind Farm.

White-throated Needletail mortality from collision with wind turbines within Australia is known to occur, although is a low severity threat and affects a small number of birds (Hull et al. 2013, Nature Advisory, unpublished data). It is noted the species has been recorded flying at RSA within and adjacent to the study area at times. A threshold of mortality of ten individuals annually can be considered a significant impact to the species (Department of the Environment 2015c). Given there are not extensive records of the species within the study area and that wind turbine strike affects a small number of individuals, this

threshold is not expected to be exceeded with the construction and operation of the proposed MacIntyre Wind Farm. Ongoing Bird Utilisation Surveys will inform a Before-After-Control-Impact (BACI) bird assessment for the proposed MacIntyre Wind Farm to confirm this.

## 7.2. Indirect impacts

The removal of Regent Honeyeater, Painted Honeyeater and Swift Parrot habitat for the proposed MacIntyre Wind Farm will result in the fragmentation of some patches with a clearing of approximately 38 metres wide on average through these patches. This minor level of habitat fragmentation is considered to have minimal impact on each species, given the availability of larger tracts of habitat adjacent to the study area and elsewhere in the region. The removal of the habitat within the development footprint will also result in an inconsequential reduction in habitat connectivity, particularly considering these species are highly mobile. It is noted that this clearing will not completely remove these patches of habitat.

The construction of the proposed MacIntyre Wind Farm may indirectly impact Regent Honeyeater, Painted Honeyeater, Swift Parrot and White-throated Needletail as listed below, although each of these impacts can be sufficiently mitigated through the implementation of a CMP, especially considering that the species are expected to utilise the habitat within the study area very infrequently (if at all):

- Disturbance from increased light, noise and vibration;
- Habitat degradation through increased dust, run-off and sedimentation;
- Introduction and spread of invasive fauna species; and
- Introduction and spread of weed species.

### 7.2.1. *White-throated Needletail*

The loss of forest and woodland habitats may have resulted in the decline of invertebrate prey for White-throated Needletail, which may be contributing to the decline of the species (Threatened Species Scientific Committee 2019). While 209 hectares of treed remnant vegetation may be removed for the proposed MacIntyre Wind Farm, approximately 26,700 hectares of treed remnant vegetation occurs within five kilometres of the study area. This is not considered a significant reduction in treed remnant vegetation that would reduce invertebrate prey to an extent that would impact the capacity for the airspace over the study area to provide foraging habitat for the species.

Given the long-ranging daily movements and flight height range of White-throated Needletail, the construction of the MacIntyre Wind Farm is not considered to create a barrier for the species to access the airspace over or adjacent to the study area.

The use of insecticides, particularly organochlorines, has been identified as a possible cause of decline of White-throated Needletails, either through a decrease in the abundance of invertebrates from wide use of insecticides or from secondary poisoning by insecticides accumulated as sublethal doses in prey (Threatened Species Scientific Committee 2019). The use of insecticides is not expected to increase as a consequence of the proposed wind farm.

### 7.3. Significant impact assessment

#### 7.3.1. Regent Honeyeater

An assessment against the significant impact criteria outlined in the Matters of National Environmental Significance Significant impact guidelines 1.1 (Department of the Environment 2013) is provided for Regent Honeyeater in Table 3 and identifies that the action is likely to significantly impact the species.

**Table 3: Significant impact assessment for Regent Honeyeater**

An action is likely to have a significant impact on a critically endangered species if there is a real chance or possibility that it will:	
Criteria	Likelihood
Lead to a long-term decrease in the size of a population.	<p><b>Unlikely</b></p> <p>The removal of 8.060 hectares of Regent Honeyeater habitat (0.169 hectares of high quality habitat and 7.891 hectares of potential habitat) that is also considered habitat critical to the survival of the species is unlikely to lead to a long-term decrease in the size of the population as:</p> <ul style="list-style-type: none"> <li>▪ only 1.432 percent of Regent Honeyeater habitat within the study area is proposed to be removed;</li> <li>▪ larger tracts of Regent Honeyeater habitat that are also considered habitat critical to the survival of the species (and is habitat where the species has been recorded) are located within Protected Areas and along waterways within close proximity to the study area, including in Durikai State Forest and along MacIntyre Brook and Branch Creek;</li> <li>▪ habitat for the species within the development footprint is restricted to five smaller and more fragmented patches;</li> <li>▪ the species is only found regularly at a few localities in NSW and Victoria where most of the sightings have been recorded (Department of the Environment 2015a; Department of the Environment 2016);</li> <li>▪ the species has not been recorded within the patches of habitat within the development footprint, although when key tree and mistletoe species are flowering in the identified patches within the development footprint, the species may forage here;</li> <li>▪ there is no evidence that Regent Honeyeater utilise the patches of habitat within the study area for roosting or breeding;</li> <li>▪ the species preferentially utilises the larger tracts of habitat critical to the survival of the species surrounding the study area rather than smaller and more fragmented patches of habitat, such as those within the study area; and</li> <li>▪ there is only a very small possibility of injury or mortality of the species during clearing of these patches of habitat, and due to the limited Regent Honeyeater activity within the area and the smaller size of these patches, this possibility can be removed with the implementation of a Construction Management Plan (CMP), based on the Preliminary Vegetation Management and Fauna Management Plans, that ensures that the species is not present before vegetation is removed or modified.</li> </ul> <p>Regent Honeyeater mortality from wind turbine strike within the study area is unlikely to occur as the species is principally found within the tree canopy (Department of the Environment 2016). The tree canopy within the study area is between approximately 20</p>

An action is likely to have a significant impact on a critically endangered species if there is a real chance or possibility that it will:	
Criteria	Likelihood
	and 25 metres in height with the wind turbine Rotor Swept Area (RSA) height between 40 metres and 285 metres above ground level.
Reduce the area of occupancy of the species.	<b>Unlikely</b> The removal of 8.060 hectares of Regent Honeyeater habitat (0.169 hectares of high quality habitat and 7.891 hectares of potential habitat) will not completely remove these patches of habitat. Fragmentation of these patches will occur with a clearing approximately 38 metres wide on average through these patches. This minor level of habitat fragmentation is considered to have minimal impact on Regent Honeyeater, given the availability of larger tracts of habitat adjacent to the study area and elsewhere in the region. The removal of the habitat within the development footprint will also result in an inconsequential reduction in habitat connectivity, particularly considering the species is highly mobile. As the removal of habitat will not completely remove patches of habitat, will result in only minor levels of habitat fragmentation and an inconsequential reduction in habitat connectivity, the area of occupancy of the species is unlikely to be reduced.
Fragment an existing population into two or more populations.	<b>Unlikely</b> The Regent Honeyeater comprises a single population (Garnett et al. 2011) and is not severely fragmented (Department of the Environment 2015a). The removal of only 8.060 hectares of Regent Honeyeater habitat (0.169 hectares of high quality habitat and 7.891 hectares of potential habitat) will not fragment the existing population into two or more populations. The species is highly mobile and only 1.432 percent of Regent Honeyeater habitat within the study area is proposed to be removed.
Adversely affect habitat critical to the survival of a species.	<b>Likely</b> A total of 8.060 hectares of Regent Honeyeater habitat (0.169 hectares of high quality habitat and 7.891 hectares of potential habitat) is proposed to be removed. This habitat is considered to be habitat critical to the survival of the species. The proposed removal of this habitat is considered to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population.	<b>Unlikely</b> Regent Honeyeater breeding events have been recorded in the Cement Mills-Durikai region (Department of the Environment 2016) including adjacent to the study area. The species has not been recorded breeding within the study area and has not been recorded in the study area since 1995 where two individuals were recorded 100 metres in from the southern boundary of the study area (S Debus 2021, pers. comm. 8 February 2021). It is also noted there are no key breeding areas or other breeding areas for the species mapped within Queensland (Department of the Environment 2016). As a result, the action is unlikely to disrupt the breeding cycle of the Regent Honeyeater population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	<b>Unlikely</b> The removal of only 8.060 hectares of Regent Honeyeater habitat (0.169 hectares of high quality habitat and 7.891 hectares of potential habitat) that is also considered habitat critical to the survival of the species is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline as: <ul style="list-style-type: none"><li>▪ only 1.432 percent of Regent Honeyeater habitat within the study area is proposed to be removed;</li><li>▪ larger tracts of Regent Honeyeater habitat that are also considered habitat critical to the survival of the species (and are also where the species has been recorded)</li></ul>

<b>An action is likely to have a significant impact on a critically endangered species if there is a real chance or possibility that it will:</b>	
<b>Criteria</b>	<b>Likelihood</b>
	<p>are located within Protected Areas and along waterways within close proximity to the study area, including in Durikai State Forest and along MacIntyre Brook and Branch Creek;</p> <ul style="list-style-type: none"> <li>▪ habitat for the species within the development footprint is restricted to five smaller and more fragmented patches;</li> <li>▪ the species is only found regularly at a few localities in NSW and Victoria where most of the sightings have been recorded (Department of the Environment 2015a; Department of the Environment 2016);</li> <li>▪ the species has not been recorded within the patches of habitat within the development footprint, although when key tree and mistletoe species are flowering in the identified patches within the development footprint, the species may forage here;</li> <li>▪ there is no evidence that Regent Honeyeater utilise the patches of habitat within the study area for roosting or breeding; and</li> <li>▪ the species preferentially utilises the larger tracts of habitat critical to the survival of the species surrounding the study area rather than smaller and more fragmented patches of habitat, such as those within the study area.</li> </ul>
Result in invasive species that are harmful to a critically endangered species becoming established in the critically endangered species' habitat.	<p><b>Unlikely</b></p> <p>Invasive weeds and rabbits cause degradation of Regent Honeyeater habitat and have been identified as a threat to the species (Department of the Environment 2015a). Invasive weeds and rabbits have been recorded throughout the study area and the removal of 8.060 hectares of Regent Honeyeater habitat (0.169 hectares of high quality habitat and 7.891 hectares of potential habitat) is not considered to increase the likelihood of invasive species that are harmful to the species becoming established in the species habitat throughout the study area. It is noted that a project-specific Preliminary Vegetation and Fauna Management Plans includes measures to reduce the impact of invasive species on all biota, including on the Regent Honeyeater.</p>
Introduce disease that may cause the species to decline.	<p><b>Unlikely</b></p> <p>Due to the small size of the population, the species is at greater risk from the potential impact of stochastic events including disease (Department of the Environment 2016). The action is not considered likely to introduce disease during construction and operation that may cause Regent Honeyeater to decline.</p>
Interfere with the recovery of the species.	<p><b>Likely</b></p> <p>Strategy 1 of the National Recovery Plan of the Regent Honeyeater is to improve the extent and quality of Regent Honeyeater habitat (Department of the Environment 2016). The removal of 8.060 hectares of Regent Honeyeater habitat (0.169 hectares of high quality habitat and 7.891 hectares of potential habitat) that is also considered habitat critical to the survival of the species will marginally reduce the extent of Regent Honeyeater habitat and marginally interfere with the recovery of the species.</p>

### 7.3.3. *Painted Honeyeater*

An assessment against the significant impact criteria outlined in the Matters of National Environmental Significance Significant impact guidelines 1.1 (Department of the Environment 2013) is provided for Painted Honeyeater in Table 4 and identifies that the action is unlikely to significantly impact the species.

**Table 4: Significant impact assessment for Painted Honeyeater**

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criteria	Likelihood
Lead to a long-term decrease in the size of an important population of a species.	<p><b>Unlikely</b></p> <p>Painted Honeyeater important populations have not been identified in the species' conservation advice (Department of the Environment 2015b). Considering its dispersive habits, the species is considered to have a single population (Garnett et al. 2011).</p> <p>The removal of 19.677 hectares of Painted Honeyeater habitat (0.143 hectares of high quality habitat and 19.534 hectares of potential habitat) is unlikely to lead to a long-term decrease in the size of the population as:</p> <ul style="list-style-type: none"> <li>▪ only 2.112 percent of habitat for the species within the study area is proposed to be removed;</li> <li>▪ the majority of patches habitat for the species do not contain a significant quantity of mistletoe for Painted Honeyeater;</li> <li>▪ the species may occasionally forage in the patches of habitat within the study area at times when mistletoe is fruiting and flowering;</li> <li>▪ the species is more common in larger, continuous blocks of remnant woodland than in narrower strips (Department of the Environment 2015b) such as the patches of Painted Honeyeater habitat within the development footprint;</li> <li>▪ the distribution of records in the region demonstrates that the species is found in Protected Areas and larger tracts of remnant vegetation with one record within remnant vegetation in the Millmerran Road corridor and no records of the species within the patches of habitat within the study area;</li> <li>▪ when mistletoe is fruiting and flowering in the larger tracts of remnant vegetation in the surrounding area (such as Durikai State Forest) Painted Honeyeater would preferentially forage and breed in these areas as well as narrow roadside strips, where and when ample mistletoe fruit and flower is available (Department of the Environment 2015b), rather than within the smaller and more fragmented patches of habitat within the study area;</li> <li>▪ the habitat within the study area is not considered important habitat for the species as the patches are smaller and more fragmented, the species may only occasionally forage in these patches and the majority of patches habitat for the species do not contain a significant quantity of mistletoe for Painted Honeyeater; and</li> <li>▪ there is only a very small possibility of injury or mortality of the species during clearing of these patches of habitat, and due to the limited Painted Honeyeater activity within the area and the smaller size of these patches, this possibility can be removed with the implementation of a Construction Management Plan (CMP), based on the Preliminary Vegetation Management and Fauna Management Plans, that ensures that the species is not present before vegetation is removed or modified.</li> </ul> <p>Painted Honeyeater is a woodland bird species and is largely found in trees. The tree canopy within the study area is between approximately 20 and 25 metres in height and the</p>

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criteria	Likelihood
	wind turbine Rotor Swept Area (RSA) height between 40 metres and 285 metres above ground level. Given this, mortality of this species from wind turbine strike within the study area is unlikely to occur.
Reduce the area of occupancy of an important population.	<b>Unlikely</b> The removal of 19.677 hectares of Painted Honeyeater habitat (0.143 hectares of high quality habitat and 19.534 hectares of potential habitat) will not completely remove these patches of habitat. Fragmentation of these patches will occur with a clearing of approximately 38 metres wide on average through these patches. This minor level of habitat fragmentation is considered to have minimal impact on Painted Honeyeater, given the availability of larger tracts of habitat adjacent to the study area and elsewhere in the region. The removal of the habitat within the development footprint will also result in an inconsequential reduction in habitat connectivity, particularly considering the species is highly mobile. As the removal of habitat will not completely remove patches of habitat, will result in only minor levels of habitat fragmentation and an inconsequential reduction in habitat connectivity, the area of occupancy of the species is unlikely to be reduced.
Fragment an existing important population into two or more populations.	<b>Unlikely</b> The Painted Honeyeater is considered to have a single population (Garnett et al. 2011) and is not severely fragmented (Department of the Environment 2015a). The removal of only 19.677 hectares of Painted Honeyeater habitat (0.143 hectares of high quality habitat and 19.534 hectares of potential habitat) will not fragment the existing population into two or more populations. The species is highly mobile and only 2.112 percent of Painted Honeyeater habitat within the study area is proposed to be removed.
Adversely affect habitat critical to the survival of a species.	<b>Unlikely</b> A total of 19.677 hectares of Painted Honeyeater habitat (0.143 hectares of high quality habitat and 19.534 hectares of potential habitat) is proposed to be removed. This habitat is not considered to be habitat critical to the survival of the species and subsequently, the proposed removal of this habitat is not considered to adversely affect habitat critical to the survival of the species.  Habitat critical to the survival of Painted Honeyeater refers to areas that are necessary (Department of the Environment 2013): <ul style="list-style-type: none"><li>▪ for activities such as foraging, breeding, roosting or dispersal;</li><li>▪ for the long-term maintenance of the species (including the maintenance of species essential to the survival of the species, such as pollinators);</li><li>▪ to maintain genetic diversity and long term evolutionary development; or</li><li>▪ for the reintroduction of populations or recovery of the species.</li></ul> Areas that are considered necessary for the processes outlined immediately above to function in a region contain the following characteristics: <ul style="list-style-type: none"><li>▪ large, continuous blocks of remnant woodland (Department of the Environment 2015b);</li><li>▪ contains a significant quantity of mistletoe for Painted Honeyeater; and/or</li><li>▪ records of the species within or adjacent to the habitat.</li></ul> Examples of areas that meet the characteristics outlined immediately above are the larger tracts of remnant vegetation in the region (such as Durikai State Forest where the species has been recorded) with fruiting and flowering mistletoe. Painted Honeyeater

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criteria	Likelihood
	<p>preferentially forage and breed in these areas where and when ample mistletoe fruit and flower is available (Department of the Environment 2015b).</p> <p>The Painted Honeyeater habitat mapped within the study area is not considered necessary for the processes outlined above to function in the region as:</p> <ul style="list-style-type: none"> <li>▪ the patches of Painted Honeyeater habitat that occur within the study area are small and fragmented rather than large, continuous blocks of remnant woodland;</li> <li>▪ the majority of habitat within the study area does not contain a significant quantity of mistletoe for Painted Honeyeater; and</li> <li>▪ the species has not been recorded within the study area.</li> </ul> <p>As a result, Painted Honeyeater habitat within the study area is not considered habitat critical to the survival of the species and the proposed removal of this habitat is not considered to adversely affect habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of an important population.	<p><b>Unlikely</b></p> <p>The species exhibits seasonal north-south movements governed principally by the fruiting of mistletoe, with which its breeding season is closely matched (Department of the Environment 2015b). It is likely that numbers of Painted Honeyeaters breeding in southern and central Queensland are extremely low (Department of the Environment 2015b).</p> <p>Painted Honeyeater would preferentially breed in the larger tracts of remnant vegetation in the surrounding area (such as Durikai State Forest) when mistletoe is fruiting and flowering these areas (Department of the Environment 2015b) rather than within the smaller and more fragmented patches of Painted Honeyeater potential habitat within the study area. As a result, the action is unlikely to disrupt the breeding cycle of the Painted Honeyeater population.</p>
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	<p><b>Unlikely</b></p> <p>The removal of only 19.677 hectares of Painted Honeyeater habitat (0.143 hectares of high quality habitat and 19.534 hectares of potential habitat) is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline as:</p> <ul style="list-style-type: none"> <li>▪ only 2.112 percent of habitat for the species within the study area is proposed to be removed;</li> <li>▪ the majority of patches habitat for the species do not contain a significant quantity of mistletoe for Painted Honeyeater;</li> <li>▪ the species may occasionally forage in the patches of habitat within the study area at times when mistletoe is fruiting and flowering;</li> <li>▪ the species is more common in larger, continuous blocks of remnant woodland than in narrower strips (Department of the Environment 2015b) such as the patches of Painted Honeyeater habitat within the development footprint;</li> <li>▪ the distribution of records in the region demonstrates that the species is found in Protected Areas and larger tracts of remnant vegetation with one record within remnant vegetation in the Millmerran Road corridor and no records of the species within the patches of habitat within the study area;</li> <li>▪ when mistletoe is fruiting and flowering in the larger tracts of remnant vegetation in the surrounding area (such as Durikai State Forest) Painted Honeyeater would preferentially forage and breed in these areas as well as narrow roadside strips,</li> </ul>

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criteria	Likelihood
	<p>where and when ample mistletoe fruit and flower is available (Department of the Environment 2015b), rather than within the smaller and more fragmented patches of habitat within the study area; and</p> <ul style="list-style-type: none"> <li>▪ the habitat within the study area is not considered important habitat for the species as the patches are smaller and more fragmented, the species may only occasionally forage in these patches and the majority of patches habitat for the species do not contain a significant quantity of mistletoe for Painted Honeyeater.</li> </ul>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	<p><b>Unlikely</b></p> <p>Painted Honeyeater predation by invasive species (e.g. black rat <i>Rattus rattus</i>) has been identified as a threat to the species. Grazing from rabbits results in an uneven age structure of mistletoe host trees and promotion of future collapse of mistletoe resources and has also been identified as a threat to the species (Department of the Environment 2015b). Rabbits have been recorded throughout the study area and the removal of 19.677 hectares of Painted Honeyeater habitat (0.143 hectares of high quality habitat and 19.534 hectares of potential habitat) is not considered to increase the likelihood of invasive species that are harmful to the species becoming established or further established in the species habitat throughout the study area. It is noted that a project-specific Preliminary Vegetation and Fauna Management Plans includes measures to reduce the impact of invasive species on all biota, including on the Painted Honeyeater.</p>
Introduce disease that may cause the species to decline.	<p><b>Unlikely</b></p> <p>Disease is not identified as a threat to Painted Honeyeater (Department of the Environment 2015b). The action is not considered likely to introduce disease during construction and operation that may cause Painted Honeyeater to decline, particularly given the species has not been recorded within the study area and is preferentially foraging in habitat within Durikai State Forest. It is noted that a project-specific Preliminary Vegetation and Fauna Management Plans include measures that will reduce the likelihood of disease introduction.</p>
Interfere substantially with the recovery of the species.	<p><b>Unlikely</b></p> <p>The removal of only 19.677 hectares of Painted Honeyeater habitat (0.143 hectares of high quality habitat and 19.534 hectares of potential habitat) is unlikely to interfere substantially with the recovery of the species as:</p> <ul style="list-style-type: none"> <li>▪ only 2.112 percent of habitat for the species within the study area is proposed to be removed;</li> <li>▪ the majority of patches habitat for the species do not contain a significant quantity of mistletoe for Painted Honeyeater;</li> <li>▪ the species may occasionally forage in the patches of habitat within the study area at times when mistletoe is fruiting and flowering;</li> <li>▪ the species is more common in larger, continuous blocks of remnant woodland than in narrower strips (Department of the Environment 2015b) such as the patches of Painted Honeyeater habitat within the development footprint;</li> <li>▪ the distribution of records in the region demonstrates that the species is found in Protected Areas and larger tracts of remnant vegetation with one record within remnant vegetation in the Millmerran Road corridor and no records of the species within the patches of habitat within the study area;</li> <li>▪ when mistletoe is fruiting and flowering in the larger tracts of remnant vegetation in the surrounding area (such as Durikai State Forest) Painted Honeyeater would</li> </ul>

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criteria	Likelihood
	<p>preferentially forage and breed in these areas as well as narrow roadside strips, where and when ample mistletoe fruit and flower is available (Department of the Environment 2015b), rather than within the smaller and more fragmented patches of habitat within the study area;</p> <ul style="list-style-type: none"> <li>▪ the habitat within the study area is not considered important habitat for the species as the patches are smaller and more fragmented, the species may only occasionally forage in these patches and the majority of patches habitat for the species do not contain a significant quantity of mistletoe for Painted Honeyeater; and</li> <li>▪ there is only a very small possibility of injury or mortality of the species during clearing of these patches of habitat, and due to the limited Painted Honeyeater activity within the area and the smaller size of these patches, this possibility can be removed with the implementation of a Construction Environmental Management Plan (CMP), based on Preliminary Vegetation and Fauna Management Plans, that ensures that the species is not present before vegetation is removed or modified.</li> </ul> <p>Painted Honeyeater is a woodland bird species and is largely found in trees. The tree canopy within the study area is between approximately 20 and 25 metres in height and the wind turbine Rotor Swept Area (RSA) height between 40 metres and 285 metres above ground level. Given this and considering the absence of Painted Honeyeater records within the study area, mortality of this species from wind turbine strike within the study area is unlikely to occur.</p>

### 7.3.4. Swift Parrot

An assessment against the significant impact criteria outlined in the Matters of National Environmental Significance Significant impact guidelines 1.1 (Department of the Environment 2013) is provided for Swift Parrot in Table 5 and identifies that the action is unlikely to significantly impact the species.

**Table 5: Significant impact assessment for Swift Parrot**

An action is likely to have a significant impact on a critically endangered species if there is a real chance or possibility that it will:	
Criteria	Likelihood
Lead to a long-term decrease in the size of a population.	<p><b>Unlikely</b></p> <p>The removal of only 12.423 hectares of Swift Parrot habitat (3.121 hectares of high quality habitat and 9.302 hectares of potential habitat) is unlikely to lead to a long-term decrease in the size of the population as:</p> <ul style="list-style-type: none"> <li>▪ only 2.350 percent of Swift Parrot habitat within the study area is proposed to be removed;</li> <li>▪ the species typically disperses through Victoria and New South Wales, with smaller numbers observed in south-east Queensland on a regular basis (Saunders &amp; Tzaros 2011);</li> <li>▪ 23 of the 34 records of Swift Parrot within 50 kilometres of the study area are within the Traprock Important Bird Area, all of which are within the Durikai State Forest where the species is preferentially foraging and likely roosting in important habitat for the species;</li> <li>▪ there are no records of the species within the patches of Swift Parrot habitat mapped in the study area. The species exhibits high site fidelity, returning to locations on an irregular cyclic basis (Threatened Species Scientific Committee 2016). The lack of records indicates that the habitat patches within the study area may not produce sufficient levels of lerp and/or nectar to allow the species to forage regularly;</li> <li>▪ the patches of Swift Parrot habitat within the study area are not considered important habitat for the species as the patches may not produce sufficient levels of lerp and/or nectar to allow the species to forage regularly, are smaller and more fragmented and do not contain records of the species;</li> <li>▪ the species does not breed on mainland Australia (Saunders &amp; Tzaros 2011); and</li> <li>▪ there is only a very small possibility of injury or mortality of the species during clearing of these patches of habitat, and due to the limited Swift Parrot activity within the area and the smaller size of these patches, this possibility can be removed with the implementation of a Construction Management Plan (CMP) that ensures that the species is not present before vegetation is removed or modified.</li> </ul> <p>It has been reported that the construction of wind energy turbines in south-eastern Australia may have implications for the conservation of the Swift Parrot where they are poorly sited (Saunders &amp; Tzaros 2011). While foraging, Swift Parrots generally fly within the tree canopy, although while flying between feeding and roosting locations and on migration, the species may fly higher (Smales 2005). Given the species is expected to fly more often below RSA (i.e. longer-distance movements are less frequent than routine foraging flights within the tree canopy), mortality of the species from wind turbine strike within the study area is considered unlikely to occur.</p>
Reduce the area of occupancy of the species.	<p><b>Unlikely</b></p> <p>The removal of only 12.423 hectares of Swift Parrot habitat (3.121 hectares of high quality habitat and 9.302 hectares of potential habitat) will not completely remove these</p>

An action is likely to have a significant impact on a critically endangered species if there is a real chance or possibility that it will:	
Criteria	Likelihood
	<p>patches of habitat. Fragmentation of these patches will occur with a clearing of approximately 38 metres wide on average through these patches. This minor level of habitat fragmentation is considered to have minimal impact on Swift Parrot, given the availability of larger tracts of habitat adjacent to the study area and elsewhere in the region. The removal of the habitat within the development footprint will also result in an inconsequential reduction in habitat connectivity, particularly considering the species is highly mobile. As the removal of habitat will not completely remove patches of habitat, will result in only minor levels of habitat fragmentation and an inconsequential reduction in habitat connectivity, the area of occupancy of the species is unlikely to be reduced.</p>
Fragment an existing population into two or more populations.	<p><b>Unlikely</b></p> <p>The Swift Parrot comprises a single population (Garnett et al. 2011). The removal of only 12.423 hectares of Swift Parrot habitat (3.121 hectares of high quality habitat and 9.302 hectares of potential habitat) will not fragment the existing population into two or more populations. The species is highly mobile and only 2.350 percent of Swift Parrot habitat within the study area is proposed to be removed.</p>
Adversely affect habitat critical to the survival of a species.	<p><b>Unlikely</b></p> <p>A total of 12.423 hectares of Swift Parrot habitat (3.121 hectares of high quality habitat and 9.302 hectares of potential habitat) is proposed to be removed. This habitat is not considered to be habitat critical to the survival of the species.</p> <p>Habitat critical to the survival of the Swift Parrot includes (Saunders &amp; Tzaros 2011):</p> <ul style="list-style-type: none"> <li>▪ those areas of priority habitat for which the Swift Parrot has a level of site fidelity or possess phenological characteristics likely to be of importance to the Swift Parrot; or</li> <li>▪ are otherwise identified by the recovery team.</li> </ul> <p>Priority habitat for Swift Parrot are areas of particular importance for conservation management which are used (Saunders &amp; Tzaros 2011):</p> <ul style="list-style-type: none"> <li>▪ for nesting;</li> <li>▪ by large proportions of the Swift Parrot population;</li> <li>▪ repeatedly between seasons (site fidelity); or</li> <li>▪ for prolonged periods of time (site persistence).</li> </ul> <p>The Swift Parrot habitat within the study area is not considered priority habitat for the species as the patches of Swift Parrot habitat within the study area are:</p> <ul style="list-style-type: none"> <li>▪ not used for nesting with nesting occurring in Tasmania (Saunders &amp; Tzaros 2011);</li> <li>▪ not used by large proportions of the Swift Parrot population with no records of the species within the study area from WildNet, Birdata and Atlas of Living Australia databases and following targeted surveys for the species as well as following Bird Utilisation Surveys and fauna surveys throughout the study area (GHD 2020b, Nature Advisory 2020b). It is noted there are some Swift Parrot records within the adjacent Durikai State Forest (as shown in Figure 7 and detailed in Section 6.3);</li> <li>▪ not repeatedly used between seasons (lack of site fidelity) with no records of the species within the study area. It is noted there are some Swift Parrot records within the adjacent Durikai State Forest with records from July 2017 to September 2017, from May 2018 to September 2018 and in June 2021; and</li> </ul>

<b>An action is likely to have a significant impact on a critically endangered species if there is a real chance or possibility that it will:</b>	
<b>Criteria</b>	<b>Likelihood</b>
	<ul style="list-style-type: none"> <li>▪ not used for prolonged periods of time (lack of site persistence) with no records of the species within the study area.</li> </ul> <p>The Swift Parrot habitat within the study area is also not identified by the recovery team as priority habitat for the species (Saunders &amp; Tzaros 2011). It is noted that the WildNet, BirdData and Atlas of Living Australia records for the species in the adjacent Durikai State Forest indicate a level of Swift Parrot site fidelity with records from July 2017 to September 2017, from May 2018 to September 2018 and in June 2021, and as a result these areas within Durikai State Forest are considered priority habitat and habitat critical to the survival of the species.</p> <p>It is noted that the Swift Parrot habitat within the study area may possess phenological characteristics that may support Swift Parrot foraging if sufficient levels of lerp and nectar are available in winter flowering eucalypt species, however, there are no Swift Parrot records within any of these patches (noting that heavy flowering of the winter flowering species White Box was observed in one patch within the study area and outside the development footprint) and high quantities of lerp was not observed in these patches. This indicates that these patches may not produce sufficient levels of lerp and/or nectar to allow the species to forage and are therefore not considered likely to be of importance to the Swift Parrot. If one or more of the patches of Swift Parrot habitat within the study area (or within the adjacent proposed Karara Wind Farm or proposed MacIntyre Wind Farm transmission line corridor) contained one or more records of Swift Parrot and/or high quantities of lerp or very heavy flowering in winter flowering eucalypt species had been observed within these patches, the Swift Parrot habitat within the study area would be considered to possess phenological characteristics likely to be of importance to the Swift Parrot and therefore habitat critical to the survival of the species.</p> <p>As a result of the above, Swift Parrot habitat mapped within the study area is not considered habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of a population.	<b>Unlikely</b> <p>The Swift Parrot breeds in Tasmania in summer and the entire population migrates north and leaves the island for the winter. While on mainland Australia, the Swift Parrot typically disperses through Victoria and New South Wales, however, smaller numbers are observed in south-east Queensland on a regular basis (Saunders &amp; Tzaros 2011). As the species does not breed on mainland Australia, the action will not disrupt the breeding cycle of the Swift Parrot population.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	<b>Unlikely</b> <p>The removal of only 12.423 hectares of Swift Parrot habitat (3.121 hectares of high quality habitat and 9.302 hectares of potential habitat) is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline as:</p> <ul style="list-style-type: none"> <li>▪ only 2.350 percent of Swift Parrot habitat within the study area is proposed to be removed;</li> <li>▪ the species typically disperses through Victoria and New South Wales, with smaller numbers observed in south-east Queensland on a regular basis (Saunders &amp; Tzaros 2011);</li> <li>▪ 23 of the 34 records of Swift Parrot within 50 kilometres of the study area are within the Traprock Important Bird Area, all of which are within the Durikai State Forest where the species is preferentially foraging and likely roosting in important habitat for the species;</li> </ul>

An action is likely to have a significant impact on a critically endangered species if there is a real chance or possibility that it will:	
Criteria	Likelihood
	<ul style="list-style-type: none"> <li>▪ there are no records of the species within the patches of Swift Parrot habitat mapped in the study area. The species exhibits high site fidelity, returning to locations on an irregular cyclic basis (Threatened Species Scientific Committee 2016). The lack of records indicates that the habitat patches within the study area may not produce sufficient levels of lerp and/or nectar to allow the species to forage regularly;</li> <li>▪ the patches of Swift Parrot habitat within the study area are not considered important habitat for the species as the patches may not produce sufficient levels of lerp and/or nectar to allow the species to forage regularly, are smaller and more fragmented and do not contain records of the species; and</li> <li>▪ the species does not breed on mainland Australia (Saunders &amp; Tzaros 2011).</li> </ul>
Result in invasive species that are harmful to a critically endangered species becoming established in the critically endangered species' habitat.	<p><b>Unlikely</b></p> <p>Resource competition with the introduced European Honeybee (<i>Apis mellifera</i>) is likely to pose a threat to the Swift Parrot and the potential introduction of the invasive Large Earth Bumblebee (<i>Bombus terrestris</i>) to mainland Australia also poses a threat to over-wintering foraging habitat for Swift Parrot (Saunders &amp; Tzaros 2011). The action is not considered to increase the likelihood of European Honeybee and Large Earth Bumblebee becoming established in the Swift Parrot habitat throughout the study area. It is noted that project-specific Preliminary Vegetation and Fauna Management Plans includes measures to reduce the impact of invasive species on all biota, including on the Swift Parrot.</p>
Introduce disease that may cause the species to decline.	<p><b>Unlikely</b></p> <p>Psittacine Beak and Feather Disease (PBFD) is a common and potentially deadly disease of parrots (Saunders &amp; Tzaros 2011) and is known to occur in Swift Parrots (Sarker et al. 2013). This disease could potentially have serious implications for the Swift Parrot population should the general health of these birds be reduced from stress associated with competition for food resources (Saunders &amp; Tzaros 2011). The proposed removal of only 12.423 hectares of Swift Parrot habitat (3.121 hectares of high quality habitat and 9.302 hectares of potential habitat) within the study area is not considered to increase the stress associated with the competition for food resources, particularly given the species has not been recorded within the study area and is preferentially foraging in habitat within Durikai State Forest.</p> <p>Considering the way in which the project will be implemented, it is unlikely that this disease will be introduced or spread by the project.</p>
Interfere with the recovery of the species.	<p><b>Unlikely</b></p> <p>The removal of only 12.423 hectares of Swift Parrot habitat (3.121 hectares of high quality habitat and 9.302 hectares of potential habitat) that is not considered habitat critical to the survival of the species will not interfere with the recovery of the species as:</p> <ul style="list-style-type: none"> <li>▪ only 2.350 percent of Swift Parrot habitat within the study area is proposed to be removed;</li> <li>▪ the species typically disperses through Victoria and New South Wales, with smaller numbers observed in south-east Queensland on a regular basis (Saunders &amp; Tzaros 2011);</li> <li>▪ 23 of the 34 records of Swift Parrot within 50 kilometres of the study area are within the Traprock Important Bird Area, all of which are within the Durikai State</li> </ul>

<b>An action is likely to have a significant impact on a critically endangered species if there is a real chance or possibility that it will:</b>	
<i>Criteria</i>	<i>Likelihood</i>
	<p>Forest where the species is preferentially foraging and likely roosting in important habitat for the species;</p> <ul style="list-style-type: none"> <li>▪ there are no records of the species within the patches of Swift Parrot habitat mapped in the study area. The species exhibits high site fidelity, returning to locations on an irregular cyclic basis (Threatened Species Scientific Committee 2016). The lack of records indicates that the habitat patches within the study area may not produce sufficient levels of lerp and/or nectar to allow the species to forage regularly;</li> <li>▪ the patches of Swift Parrot habitat within the study area are not considered important habitat for the species as the patches may not produce sufficient levels of lerp and/or nectar to allow the species to forage regularly, are smaller and more fragmented and do not contain records of the species;</li> <li>▪ the species does not breed on mainland Australia (Saunders &amp; Tzaros 2011); and</li> <li>▪ there is only a very small possibility of injury or mortality of the species during clearing of these patches of habitat, and due to the likely limited Swift Parrot activity within the area and the smaller size of these patches, this possibility can be removed with the implementation of a Construction Management Plan (CMP) , based on project-specific Preliminary Vegetation and Fauna Management Plans, that ensures that the species is not present before vegetation is removed or modified.</li> </ul> <p>It has been reported that the construction of wind energy turbines in south-eastern Australia may have implications for the conservation of the Swift Parrot where they are poorly sited (Saunders &amp; Tzaros 2011). While foraging, Swift Parrots generally fly within the tree canopy, although while flying between feeding and roosting locations and on migration, the species may fly higher (Smales 2005). Given the species is expected to fly more often below RSA (i.e. longer-distance movements are less frequent than routine foraging flights within the tree canopy), mortality of the species from wind turbine strike within the study area is considered unlikely to occur.</p>

### 7.3.5. *White-throated Needletail*

An assessment against the significant impact criteria outlined in the Matters of National Environmental Significance Significant impact guidelines 1.1 (Department of the Environment 2013) is provided for White-throated Needletail in Table 6 and identifies that the action is unlikely to significantly impact the species.

**Table 6: Significant impact assessment for White-throated Needletail**

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criteria	Likelihood
Lead to a long-term decrease in the size of an important population of a species.	<p><b>Unlikely</b></p> <p>White-throated Needletail important populations have not been identified in the species' conservation advice (Threatened Species Scientific Committee 2019). Though the two subspecies of White-throated Needletails breed in separate populations in the Northern Hemisphere, only one occurs in Australia, where they do not occur as smaller populations (Department of Agriculture, Water and the Environment 2021). As a result, the White-throated Needletail subspecies that occurs in Australia is considered a single population.</p> <p>The action is unlikely to lead to a long-term decrease in the size of the population as:</p> <ul style="list-style-type: none"> <li>▪ No roosting habitat for White-throated Needletail is present within the study area and no White-throated Needletail habitat is proposed to be removed;</li> <li>▪ The airspace over the study area is not of particular significance to the species as there is generally an even distribution of records of the species over the study area as there is within 50 kilometres of the study area;</li> <li>▪ There is a very small possibility of injury or mortality of the species during clearing within the development footprint, although due to the absence of White-throated Needletail roosting habitat within the study area, this possibility is considered remote. Any residual risk of impacts can be removed with the implementation of a Construction Management Plan (CMP), based on Preliminary Vegetation and Fauna Management Plans, that ensures that the species is not present before vegetation is removed or modified;</li> <li>▪ White-throated Needletail mortality from collision with overhead wires within Australia is known to occur, although is a low severity threat and affects a small number of birds (Hull et al. 2013). A threshold of mortality of 10 individuals annually can be considered a significant impact on the species (Department of the Environment 2015c). Given there are not extensive records of the species within the study area and that overhead wires affect a small number of individuals, this threshold is not expected to be exceeded with the construction of above ground power lines for the action;</li> <li>▪ White-throated Needletail mortality from collision with wind turbines within Australia is known to occur, although is a low severity threat and affects a small number of birds (Hull et al. 2013, Nature Advisory). It is noted the species has been recorded flying at RSA within and adjacent to the study area at times. A threshold of mortality of ten individuals annually (i.e. 0.1% or more of the flyway population) can be considered a significant impact to the species (Department of the Environment 2015c). Given there are not extensive records of the species within the study area and that wind turbine strike affects a small number of individuals, this threshold is not expected to be exceeded with the construction and operation of the proposed MacIntyre Wind Farm. Ongoing Bird Utilisation Surveys will inform a Before-After-Control-Impact (BACI) bird assessment for the proposed MacIntyre Wind Farm to confirm this.</li> </ul>

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criteria	Likelihood
	<ul style="list-style-type: none"> <li>▪ The loss of forest and woodland habitats may have resulted in the decline of invertebrate prey for White-throated Needletail, which may be contributing to the decline of the species (Threatened Species Scientific Committee 2019). While 209 hectares of treed remnant vegetation may be removed for the action, approximately 26,700 hectares of treed remnant vegetation occurs within five kilometres of the study area. This is not considered a significant reduction in treed remnant vegetation that would reduce invertebrate prey to an extent that would impact the capacity for the airspace over the study area to provide foraging habitat for the species.</li> <li>▪ The use of insecticides, particularly organochlorines, has been identified as a possible cause of decline of White-throated Needletails, either through a decrease in the abundance of invertebrates from wide use of insecticides or from secondary poisoning by insecticides accumulated as sublethal doses in prey (Threatened Species Scientific Committee 2019). The project will not lead to an increase in the use of these chemicals on the project site so impacts on insect abundance are not anticipated.</li> </ul>
Reduce the area of occupancy of an important population.	<p><b>Unlikely</b></p> <p>The action is unlikely to reduce the area of occupancy of the White-throated Needletail population as:</p> <ul style="list-style-type: none"> <li>▪ the action is not considered to create a barrier for the species to access the airspace over or adjacent to the study area given the long-ranging daily movements and flight height range of White-throated Needletail; and</li> <li>▪ no roosting habitat for White-throated Needletail is present within the study area and no White-throated Needletail habitat is proposed to be removed.</li> </ul>
Fragment an existing important population into two or more populations.	<p><b>Unlikely</b></p> <p>The action is unlikely fragment the White-throated Needletail population into two or more populations as:</p> <ul style="list-style-type: none"> <li>▪ the action is not considered to create a barrier for the species to access the airspace over or adjacent to the study area given the long-ranging daily movements and flight height range of White-throated Needletail; and</li> <li>▪ no roosting habitat for White-throated Needletail is present within the study area and no White-throated Needletail habitat is proposed to be removed.</li> </ul>
Adversely affect habitat critical to the survival of a species.	<p><b>Unlikely</b></p> <p>Habitat critical to the survival of the species is not considered to be present within or above the study area, as such the action is unlikely to adversely affect habitat critical to the survival of the species.</p> <p>Habitat critical to the survival of White-throated Needletail refers to areas that are necessary (Department of the Environment 2013):</p> <ul style="list-style-type: none"> <li>▪ for activities such as foraging, breeding, roosting, or dispersal;</li> <li>▪ for the long-term maintenance of the species (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);</li> <li>▪ to maintain genetic diversity and long term evolutionary development; or</li> <li>▪ for the reintroduction of populations or recovery of the species.</li> </ul>

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criteria	Likelihood
	While the airspace above the study area provides an area for White-throated Needletail to forage and disperse; will assist with the long-term maintenance of the species; will help to maintain genetic diversity and long-term evolutionary development; and provides habitat for the recovery of the species; the airspace above the study area is not considered necessary for these processes to occur. The species also breeds in the Northern Hemisphere and roosting habitat is not considered to be present within the study area. As a result, habitat critical to the survival of the species is not considered to be present within or above the study area.
Disrupt the breeding cycle of an important population.	<b>Unlikely</b> The White-throated Needletail subspecies that occurs in Australia is <i>Hirundapus caudacutus caudacutus</i> . This subspecies is a trans-equatorial migrant that breeds in the Northern Hemisphere summer and migrates south for the Southern Hemisphere summer (Threatened Species Scientific Committee 2019). As the species does not breed in Australia, the action will not disrupt the breeding cycle of the species' population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	<b>Unlikely</b> The action is unlikely to lead to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline as: <ul style="list-style-type: none"> <li>▪ no roosting habitat for White-throated Needletail is present within the study area and no White-throated Needletail habitat is proposed to be removed;</li> <li>▪ the airspace over the study area is not of particular significance to the species as there is generally an even distribution of records of the species over the study area as there is within 50 kilometres of the study area;</li> <li>▪ the loss of forest and woodland habitats may have resulted in the decline of invertebrate prey for White-throated Needletail, which may be contributing to the decline of the species (Threatened Species Scientific Committee 2019). While 209 hectares of treed remnant vegetation may be removed for the action, approximately 26,700 hectares of treed remnant vegetation occurs within five kilometres of the study area. This is not considered a significant reduction in treed remnant vegetation that would reduce invertebrate prey to an extent that would impact the capacity for the airspace over the study area to provide foraging habitat for the species.</li> <li>▪ the use of insecticides, particularly organochlorines, has been identified as a possible cause of decline of White-throated Needletails, either through a decrease in the abundance of invertebrates from wide use of insecticides or from secondary poisoning by insecticides accumulated as sublethal doses in prey (Threatened Species Scientific Committee 2019). The project will not lead to an increase in the use of these chemicals on the project site so impacts on insect abundance are not anticipated.</li> </ul>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	<b>Unlikely</b> Invasive species have not been identified as a threat to White-throated Needletail (Threatened Species Scientific Committee 2019). The action is unlikely to result in invasive species that are harmful to the species becoming established in the species' habitat. It is noted that a project-specific Preliminary Vegetation and Fauna Management Plans have been prepared to reduce the impact of invasive species on habitats in the project site.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criteria	Likelihood
Introduce disease that may cause the species to decline.	<p><b>Unlikely</b></p> <p>Disease is not identified as a threat to White-throated Needletail. The action is not considered likely to introduce disease during construction and operation that may cause White-throated Needletail to decline, particularly given the species is mostly aerial in Australia (Threatened Species Scientific Committee 2019). The execution of the project combined with the way the species uses the landscape will not create opportunities for disease to spread.</p>
Interfere substantially with the recovery of the species.	<p><b>Unlikely</b></p> <p>The action is unlikely to interfere substantially with the recovery of the species as:</p> <ul style="list-style-type: none"> <li>▪ No roosting habitat for White-throated Needletail is present within the study area and no White-throated Needletail habitat is proposed to be removed;</li> <li>▪ The airspace over the study area is not of particular significance to the species as there is generally an even distribution of records of the species over the study area as there is within 50 kilometres of the study area.</li> <li>▪ There is a very small possibility of injury or mortality of the species during clearing within the development footprint, although due to the absence of White-throated Needletail roosting habitat within the study area, this possibility is considered remote. Any residual risk of impacts can be removed with the implementation of a Construction Management Plan (CMP), based on Preliminary Vegetation and Fauna Management Plans, that ensures that the species is not present before vegetation is removed or modified.</li> <li>▪ White-throated Needletail mortality from collision with overhead wires within Australia is known to occur, although is a low severity threat and affects a small number of birds (Hull et al. 2013). A threshold of mortality of 10 individuals annually can be considered a significant impact on the species (Department of the Environment 2015c). Given there are not extensive records of the species within the study area and that overhead wires affect a small number of individuals, this threshold is not expected to be exceeded with the construction of aboveground power lines for the action.</li> <li>▪ White-throated Needletail mortality from collision with wind turbines within Australia is known to occur, although is a low severity threat and affects a small number of birds (Hull et al. 2013, Nature Advisory, unpublished data). It is noted the species has been recorded flying at RSA within and adjacent to the study area at times. A threshold of mortality of ten individuals annually (0.1% of the flyway population) can be considered a significant impact to the species (Department of the Environment 2015c). Given there are not extensive records of the species within the study area and that wind turbine strike affects a small number of individuals, this threshold is not expected to be exceeded with the construction and operation of the proposed MacIntyre Wind Farm. Ongoing Bird Utilisation Surveys will inform a Before-After-Control-Impact (BACI) bird assessment for the proposed MacIntyre Wind Farm to confirm this.</li> <li>▪ The loss of forest and woodland habitats may have resulted in the decline of invertebrate prey for White-throated Needletail, which may be contributing to the decline of the species (Threatened Species Scientific Committee 2019). While 209 hectares of treed remnant vegetation may be removed for the action, approximately 26,700 hectares of treed remnant vegetation occurs within five kilometres of the study area. This is not considered a significant reduction in treed remnant vegetation that would reduce invertebrate prey to an extent that</li> </ul>

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
Criteria	Likelihood
	<p>would impact the capacity for the airspace over the study area to provide foraging habitat for the species.</p> <ul style="list-style-type: none"><li>▪ The use of insecticides, particularly organochlorines, has been identified as a possible cause of decline of White-throated Needletails, either through a decrease in the abundance of invertebrates from wide use of insecticides or from secondary poisoning by insecticides accumulated as sublethal doses in prey (Threatened Species Scientific Committee 2019). The project will not lead to any change in the use of these chemicals on the project site so impacts on the insect food supply of this species are not anticipated.</li></ul>

## 8. Conclusions

This investigation provides detailed information on habitat for the Regent Honeyeater, Painted Honeyeater, Swift Parrot and White-throated Needletail within the study area and refines the original predicted habitat mapping (based on field-verified Regional Ecosystem mapping) presented for these species in the Ecological assessment report of the MacIntyre Wind Farm (GHD 2020a).

Regent Honeyeater habitat (8.060 hectares, which is also considered habitat critical to the survival of the species), Painted Honeyeater habitat (19.677 hectares) and Swift Parrot habitat (12.423 hectares) within the development footprint represent relatively small areas compared with the study area, which totals 31,910 hectares and the total development footprint, which totals 1,207 hectares. The removal of this habitat is considered acceptable as these species are understood to utilise the habitat adjacent to the study area and within the wider region rather than being dependent on the habitat within the study area. It is noted that no White-throated Needletail roosting habitat is present within development footprint or study area. Regent Honeyeater, Painted Honeyeater and Swift Parrot were also not recorded during targeted surveys, bird utilisation surveys or incidentally during bird and fauna surveys since 2018.

Mortality and indirect impacts to Regent Honeyeater, Painted Honeyeater and Swift Parrot during construction and operation of the proposed MacIntyre Wind Farm are considered unlikely. A Construction Management Plan, based on Preliminary Vegetation and Fauna Management Plans, will be implemented to reduce this very low residual risk of an impact further. Small numbers of White-throated Needletail may collide occasionally with operational wind turbines but the population consequences are unlikely to be significant.

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