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Inland Rail Phase 2 Tottenham to Illabo Technical & Approvals Consultancy Services

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Ecology Report - Victorian Temperate Woodland Bird Survey

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Limitations Statement

The sole purpose of this report and the associated services performed by Kellogg Brown & Root Pty Ltd (KBR) is to undertake targeted survey for swift parrot and Victorian temperate woodland bird community in accordance with the scope of services set out in the contract between KBR and the Australian Rail Track Corporation ('the Client'). That scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

KBR derived the data in this report primarily from visual inspections and examination of records in the public domain made on the dates indicated. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site and subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, KBR has relied upon and presumed accurate certain information (or absence thereof) relative to the site provided by government officials and authorities, the Client and others identified herein. Except as otherwise stated in the report, KBR has not attempted to verify the accuracy or completeness of any such information.

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Revision History

Revision	Date	Comment	Signatures			
			Originated by	Checked by	Technical Approval	Project Approval
A	19/08/19	Preliminary	J. Manders	NA	NA	R. Hunt
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Contents

Summary

The Victorian Temperate Woodland Bird Community (VTWBC) is a *Flora and Fauna Guarantee Act 1998* (FFG) listed threatened ecological community. Targeted surveys for VTWBC described in this report were undertaken by Kellogg Brown & Root Pty Ltd (KBR) as part of a larger assessment of the ecological values of the existing rail reserve between Tottenham (Victoria) and the Murray River at the Victorian/New South Wales border for the Inland Rail project. This larger assessment is detailed in *Tottenham to Albury Biodiversity Assessment Report* (KBR 2020).

The objective of the assessment was to complete targeted surveys in previously identified woodland habitat areas, and determine the presence or absence of listed threatened bird species and the VTWBC.

The VTWBC lists 24 species, including swift parrot (*Lathamus discolor*) and regent honeyeater (*Anthochaera phrygia*) which are listed as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and painted honeyeater (*Grantiella picta*) which is listed as Vulnerable, under the EPBC Act. An ecological assessment identified swift parrot, regent honeyeater and painted honeyeater as having the potential to be present within the Project Areas (KBR 2020).

This report describes the outcomes of the assessment of winter surveys for the VTWBC, following the EPBC Act guidelines for swift parrot survey (DEWHA 2010). Potential impacts for the swift parrot, the regent honeyeater and the painted honeyeater were considered with regards to the significant impact guidelines for matters of national environmental significance (DoE 2013).

The surveys were completed in July 2019, in accordance with the guidelines that surveys on the mainland be conducted between March and July, comprising 20 hours of surveys over eight days (DEWHA 2010). Appropriate weather conditions coincided with the selected survey dates during July 2019.

Swift parrot, regent honeyeater and painted honeyeater were not observed at any of the survey sites during the winter 2019 surveys. Five species from the VTWBC were observed, brown-headed honeyeater (*Melithreptus brevirostris*), fuscous honeyeater (*Lichenostomus fuscus*), jacky winter (*Microeca fascinans*), little lorikeet (*Glossopsitta pusilla*) and western gerygone (*Gerygone fusca*). In absence of a community description specifying the threshold of presence/absence of VTWBC, the presence of these species along with the location and appropriate vegetation type and condition is considered to indicate the presence of VTWBC at the survey sites.

Swift parrots actively seek available foraging resources within south eastern Australia during winter, traversing large distances find large areas of winter-flowering eucalypts located between northern Victoria and southern NSW. The habitat present within the project areas is considered to be a habitat corridor for the species to move through the landscape to important bird areas.

Regent honeyeaters are highly mobile throughout their ranges, with the population moving north from southern Victoria from autumn, and contracting to breeding areas, which include areas of box-ironbark forest in northern Victoria, in late winter. Painted honeyeater exhibits seasonal movements throughout its distribution, arriving in Victoria in October, and departing in March-April, following the fruiting of mistletoes as its primary food source (DSE 2003). Due to the species' movements, neither regent honeyeater nor painted honeyeater were expected to be present at the survey sites during the survey time. Small areas of habitat that is suitable for these species was identified.

Swift parrots, regent honeyeaters or painted honeyeaters are known to concentrate in key foraging and nesting habitats during winter. The species absence from the survey sites, plus the generally narrow and linear corridors, with minimal foraging resources, indicates that the habitat is not important to any of the three species. Therefore, the impact to these species is predicted to be negligible and not considered to be a significant impact in accordance with EPBC Act policy (DoE 2013) or meet Victorian *Environment Effects Act 1978* referral criteria (DSE 2006).

The confirmation of the VTWBC at each site and the predicted impact on the VTWBC may be considered significant in relation to the EES referral criteria. The impact is considered to meet one of the combination criteria for the 'potential loss of a significant area of a listed ecological community'. Impacts to the VTWBC are recommended to be minimised through retaining habitat, where possible, plus reinstatement of habitat in areas not required for permanent operations. Impacts to the FFG Act listed VTWBC will also require a permit under the Act.

1 Introduction

The Victorian Temperate Woodland Bird Community (VTWBC) targeted surveys described in this report were undertaken by Kellogg Brown & Root Pty Ltd (KBR) as part of a larger assessment of the ecological values of the Victorian section of the Inland Rail project.

Inland Rail is a major national project that will enhance Australia's existing national rail network by constructing a high performance and direct interstate freight rail corridor between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland.

1.1 BACKGROUND

Ecological investigations were undertaken by KBR for the Australian Rail Track Corporation (ARTC) in consideration of proposed enhancement works at several sites along the rail and associated road networks to facilitate the project.

Previous ecological surveys and assessments have been completed on various project components of the Tottenham to Albury section of the Inland Rail Project. These include:

- *VIC and NSW Enhancement Works Phase 2 Preparatory Works, Ecological assessment – Tottenham to Albury* (WSP/PB 2016).
- Vegetation Quality Assessments, habitat assessments and targeted surveys for Enhancement Sites, Track Slews and Signal Gantries (KBR 2020)

Early ecological assessments (WSP/PB 2016) identified potential VTWBC habitat at several sites, which were assessed and impacts further reviewed based on the refined project areas, during the ecological investigations (KBR 2020). Recommendations for further targeted survey work to determine the presence or absence of VTWBC, and for individual bird species listed under the *Environment and Biodiversity Conservation Act 1999* (EPBC Act) and the *Flora and Fauna Guarantee Act 1998* (FFG) Acts, was included in the earlier assessment (KBR 2020).

1.2 TARGETED SURVEY

The objectives of the targeted survey were to:

- Determine the presence or absence of VTWBC and EPBC Act and FFG Act listed species in identified woodland habitat areas
- Investigate the use of habitat by species in the FFG Act- listed VTWBC including EPBC Act and FFG Act listed species
- Confirm project impacts to EPBC Act and FFG Act listed species, specifically in relation to :
  - Environment Effects Statement (EES) referral criteria, including significant impacts to matters listed under the FFG Act (DSE 2006)
  - EPBC Act Significant Impact Guidelines (DoE 2013).

The surveys are designed to detect the VTWBC suite of bird species that are associated with Victorian (dry) temperate woodland habitat and EPBC Act-listed species, swift parrot (*Lathamus discolor*), regent honeyeater (*Anthochaera phrygia*) and painted honeyeater (*Grantiella picta*).

Both swift parrot and regent honeyeater are highly mobile species, relocating throughout the year following the availability of their food source of flowering eucalypts. The sites identified for targeted survey include eucalypts that flower at various times of the year. Where there is suitable habitat, any impacts by the project on the availability of food resources or habitat connectivity could potentially be significant.

On the basis of recommendations from KBR (2020), the following five Project Areas are to be surveyed:

- Short Street Overbridge (Broadford)
- Marchbanks Road Overbridge (Broadford)
- Hume Highway Precinct Tallarook (Tallarook)
- Seymour Avenel Road Overbridge (Seymour)
- Hume Highway Seymour Precinct (Seymour).

A detailed description of the survey sites is included in section 1.4.

1.3 VICTORIAN TEMPERATE WOODLAND BIRD COMMUNITY DESCRIPTION

The VTWBC covers a set group of bird species that inhabit woodland habitat, though the distribution of species is variable, and not all species occupy the same range. The species included in the VTWBC are detailed in Table 1 below.

Table 1 Species included in the FFG listed VTWBC

Common Name	Scientific Name	EPBC Act Status	FFG Act Status
Apostlebird	*Struthidea cinerea*		L
Barking owl	*Ninox connivens*		L
Black-chinned honeyeater	*Melithreptus gularis*		
Brown treecreeper	*Climacteris picumnus victoriae*		
Brown-headed honeyeater	*Melithreptus brevirostris*		
Bush stone-curlew	*Burhinus grallarius*		L
Diamond firetail	*Stagonopleura guttata*		L
Fuscous honeyeater	*Lichenostomus fuscus*		
Grey-crowned babbler	*Pomatostomus temporalis*		L
Ground cuckoo-shrike	*Coracina maxima*		
Hooded robin	*Melanodryas cucullata*		L
Jacky winter	*Microeca fascinans*		
Little lorikeet	*Glossopsitta pusilla*		
Painted button-quail	*Turnix varia*		
Painted honeyeater	*Grantiella picta*	VU	L
Red-capped robin	*Melanodryas cucullata*		
Red-tailed black-cockatoo	*Calyptorhynchis banksii graptogyne*	CR	L
Regent honeyeater	*Anthochaera phrygia*	CR	L
Speckled warbler	*Chthonicola sagittata*		L

Common Name	Scientific Name	EPBC Act Status	FFG Act Status
Superb parrot	*Polytelis swainsonii*		
Swift parrot	*Lathamus discolor*	CR	L
Turquoise parrot	*Neophema pulchella*		L
Western gerygone	*Gerygone fusca*		
Yellow-tufted honeyeater	*Lichenostomus melanops meltoni*		

L – Listed as threatened under the FFG Act

VU – Listed as vulnerable under the EPBC Act

CR – Listed as critically endangered under the EPBC Act

Many of the VTWBC bird species are closely associated with northern Victorian drier woodlands, dominated by box (including grey box (*Eucalyptus microcarpa*) and yellow box (*Eucalyptus melliodora*)), red ironbark (*Eucalyptus tricarpa*), yellow gum (*Eucalyptus leucoxylon*), river red gum (*Eucalyptus camaldulensis*), buloke (*Allocasuarina luehmannii*) or cypress-pine (*Callitris* spp.). Many of these woodlands would have originally had an open structure, a light shrubby understory, a grassy ground cover with fallen timber, tree hollows and other nesting sites, and available sources of seeds, nectar and insects (DELWP 2019a).

Some species in the VTWBC have not been identified as having potential habitat in the survey sites, as their range does not extend to the survey area. This includes the EPBC and FFG Act-listed red-tailed black-cockatoo (*Calyptorhynchis banksii graptogyne*).

1.4 SITE LOCATIONS AND CHARACTERISTICS

Maps of the project areas and woodland bird survey areas are provided in Appendix A. A landscape context map has been provided in Appendix B, which indicates the distance between the mapped woodland bird habitat (KBR 2020) and surrounding public reserve that provide potential woodland bird habitat in the landscape.

Larger investigation areas were initially identified for biodiversity assessments based on concept design, which broadly identified the areas required for construction including impact areas, laydown and access (KBR 2020). Project areas have been developed based on the findings of the biodiversity assessments and refined as part of reference design to avoid and minimise impacts to values that have been identified in the environmental assessments (KBR 2020). All vegetation within the project areas have been assumed to be impacted, however further opportunities to avoid and minimise impacts will be explored during detailed design.

The woodland bird surveys have included areas beyond the boundaries of the project areas due to high mobility of target species and in consideration of the vegetation present being part of a wider habitat corridor within the landscape that extends beyond the extents of the project areas.

Below is a description of the survey sites, including vegetation information from vegetation and habitat assessments completed within the project areas (KBR 2020).

1.4.1 Site 1 – Short Street Overbridge (Broadford)

Site 1 - Short Street Overbridge (Broadford) is located at chainage 76.596 km. It is intersected by the rail corridor and is within the township of Broadford. It is bordered by public land to the north and west, and by private residential land along Chloe Drive and Rupert St to the south and Short Street to the east.

Site 1 contains patches of generally low to moderate quality Ecological Vegetation Class (EVC) 55 Plains grassy woodland, which is considered suitable habitat for woodland bird species. The vegetation is

dominated by river red gum, with red box (*Eucalyptus polyanthemos*) and yellow box also present. The understory has low diversity, with a high proportion of weedy species (KBR 2020).

The survey area includes native vegetation that extends for approximately 160 m to the north, which is public land, including Lion's Park and Broadford Bowling Club. To the west of the survey area there is good connectivity to native vegetation along Sunday Creek.

The Victorian Biodiversity Atlas (VBA) contains records of diamond firetail and square-tailed kite within close proximity to the survey area within the last 15 years (DELWP 2019b).

There is a short distance to Site 2 Marchbanks Road Overbridge (Broadford), which is approximately 630 m further north. However, potential habitat between the project areas is greater than 1 km apart, separated by cleared rural residential land.

Of the woodland bird habitat recorded through previous habitat assessments at Site 1 (KBR 2020), 0.675 ha is located within the project area and is predicted to be impacted.

1.4.2 Site 2 – Marchbanks Road Overbridge (Broadford)

Site 2 – Marchbanks Road Overbridge (Broadford) is located at chainage 77.978 km. It is intersected by the rail corridor, Marchbanks Rd/High St and the Broadford-Kilmore Hume Highway Out Ramp. The site is bordered by rural private land to the northwest, the road and rail corridor to the north, Hume Highway to the east and private land to the southeast.

Site 2 contains patches of low to moderate quality EVC 55 Plains grassy woodland that is considered suitable habitat for woodland bird species. The vegetation is dominated by large river red gum with occasional messmate (*Eucalyptus obliqua*) and yellow box towards the south of the site. The understory is sparse, with low diversity, and often dominated by introduced phalaris (*Phalaris aquatica*) (KBR 2020).

Patches of habitat within the wider survey area are bordered by grassy farm paddocks with large scattered trees in each direction except to the east where there is an industrial warehouse. There are large patches of native vegetation within 200 m to the south and 1 km to the north east. The habitat patches are intersected by the rail corridor and Marchbanks Road and are bordered by the Hume Highway to the east, these are all barriers for fauna dispersal (KBR 2020).

The VBA contains records of diamond firetail and square-tailed kite within 5 km of the project area within the last 15 years (DELWP 2019b).

Of the woodland bird habitat recorded through previous habitat assessments at Site 2 (KBR 2020), 1.221 ha is located within the project area and is predicted to be impacted.

1.4.3 Site 3 – Hume Highway Tallarook Precinct (Tallarook)

Site 3 – Hume Highway Tallarook Precinct (Tallarook) is located at chainage 88.498 km. It is intersected by the Hume Highway running northeast to southwest, and the rail corridor. The site is bordered by a Hume Highway off ramp to the south east, and private land to the north. To the southwest is Gairns Lane.

Site 3 contains patches of relatively good quality EVC 55 Plains grassy woodland and EVC 175 Grassy woodland vegetation that is considered suitable habitat for woodland bird species. The vegetation is dominated by red box, with a diverse understory including golden wattle (*Acacia pycnantha*), sifton bush (*Cassinia sifton*), black-anther flax-lily (*Dianella admixta*), wattle mat-rush (*Lomandra filiformis*) and spiny-head mat-rush (*Lomandra longifolia*). The site has good connectivity along the rail corridor and the nearby Dabyminga Creek, and large patches of woodland habitat are located within 500 m of the site (KBR 2020).

The survey area includes habitat within the west side of the rail reserve and adjacent Gairns Lane road reserve, where there is a band of native vegetation which extends to at least 80 m from the rail track.

Beyond this is farmland. Habitat patches on the east side of the rail reserve also have further native vegetation beyond them, before meeting an off ramp of the Hume Highway.

The VBA contains records of hooded robin within 5 km of the project area within the last 15 years (DELWP 2019b).

Of the woodland bird habitat recorded through previous habitat assessments at Site 3 (KBR 2020), 1.898 ha is located within the project area and is predicted to be impacted.

1.4.4 Site 4 – Seymour Avenel Road (Seymour) and Hume Highway Seymour Precinct (Seymour)

Site 4 – Seymour Avenel Road Overbridge (Seymour) and is located at chainage 102.392 km and the Hume Highway Seymour Precinct (Seymour) is located at 103.801 km, with the Project Areas located approximately 550 m apart. The gap between the project areas is connected woodland bird habitat along the rail and road reserve, with agricultural grazing land to either side. Given the proximity of the two sites and connected habitat, Seymour Avenel Road Overbridge and Hume Highway Seymour Precinct are being assessed as a single site and included in a combined survey area.

The Seymour Avenel Road Overbridge Project Area is intersected by Seymour Avenel Rd and Granville Drive. The Hume Highway Precinct Seymour Project Area is intersected by the Hume Highway, which includes an area of road reserve to the east and west of the site.

There is private land to the east and west of Site 4, as well as road reserve along Seymour Avenel Road.

Site 4 contains patches of relatively good quality EVC 61 Box-ironbark forest and EVC 55 Plains grassy woodland vegetation that is considered suitable habitat for woodland bird species (KBR 2020). The habitat patches are intersected by Seymour-Avenel Road, the rail line, and the Hume Highway and are predominantly bordered by farmland (KBR 2020).

The vegetation is dominated by grey box, of which large individuals are present, seven of which contain hollows of varying sizes. The site has a diverse understory including golden wattle, sifton bush, black-anther flax-lily, wattle mat-rush and spiny-head mat-rush, though is limited in available logs. The site has good connectivity along the rail corridor, though is limited in other connections across the landscape (KBR 2020).

To the north east there is a larger area of native vegetation, within the survey area, extending to Four Mile Creek.

The VBA contains records of square-tailed kite and hooded robin within 5 km of the project area within 15 years (DELWP 2019b).

Of the woodland bird habitat recorded through previous habitat assessments at Site 4 (KBR 2020), 3.701 ha is located within the project area and is predicted to be impacted. This consists of 1.707 ha at Seymour – Avenel Road and 1.994 ha at Hume Highway Seymour Precinct (Seymour).

2 Methodology

The methodology was undertaken in accordance with the recommended survey guidelines for detecting swift parrot detailed in the Commonwealth EPBC Act policy statement 6.2 *Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act 1999* (DEWHA 2009) (The guidelines).

The survey method for swift parrot focusses on identifying individuals through visual or audible detection. The sites were surveyed with area searches in the early morning or afternoon, when birds are most active and vocal. The guidelines specify either area searches or transect searches, however area searches were determined to be the most appropriate, due to the small size of the sites, and because of their easy application and flexibility of observer movement. Free movement allowed the surveyors to more thoroughly explore any noises, indicative signs or favoured habitat features, than other more structured searches such as transects and point counts.

2.1 TARGETED SURVEYS

Seymour Avenel Road Overbridge and Hume Highway Seymour Precinct were surveyed as one site. This is due to their proximity and connected habitat, meaning any individual birds would be expected to (and were observed to) occupy the habitat that extends over both sites.

Area surveys were completed on eight days at each site, between the 18 and 31 of July 2019. At least 2.5 hours survey on each of the eight days at each of the four survey sites was completed to meet the guidelines' requirements of 20 hours over eight days (DEWHA 2009). Days with suitable weather conditions were chosen to meet survey guidelines. All days were days with no rain, light winds, clear of fog or mist and with temperatures within seasonal averages. On six of the eight days surveys were conducted in the early morning, and on the remaining two days the surveys were conducted in the afternoon.

The survey times for each day are detailed in Table 2 and cumulative effort in Table 3 below.

Table 2 Dates and times of VTWBC targeted surveys

Site	18/7/19	19/7/19	22/7/19	23/7/19	24/7/19	25/7/19	26/7/19	29/7/19	30/7/19	31/7/19
Site 1 - Short Street Overbridge (Broadford)	7:20-10:05	7:30-10:10	7:10-9:45	7:00-9:40	7:10-9:50		15:00-17:35	14:50-17:25	7:15-9:50	7:20-10:05
Site 2 - Marchbanks Road Overbridge (Broadford)	7:25-10:10	7:30-10:15	7:15-9:55	7:05-9:40	7:15-9:55		15:05-17:50	14:55-17:30	7:20-10:05	7:25-10:10
Site 3 - Hume Highway Tallarook Precinct (Tallarook)	7:30-10:05	7:25-10:15	7:05-9:50	7:00-9:50	7:10-10:05		15:00-17:40	15:00-17:45	7:15-10:25	7:30-10:05
Site 4 - Seymour Avenel Road Overbridge (Seymour) & Hume Highway Seymour Precinct (Seymour)	7:40-10:45		7:30-10:30	7:15-9:45	7:30-10:15	7:00-10:10	13:00-15:32	12:20-14:52	9:15-11:50	7:40-10:45

Table 3 Survey effort of VTWBC targeted survey

Survey site	Total survey time (hours)
Site 1	21.24
Site 2	21.91
Site 3	22.50
Site 4	22.15

Each survey was conducted by the area survey technique undertaken by two suitably qualified and experienced ecologists familiar with the identification of woodland bird species. Searches were completed on foot, following access tracks where available through the mapped habitat.

All woodland habitat within the defined project areas and contiguous habitat in the surrounding area (that was publicly accessible) was searched and forms the sites' survey area. The survey area for each site is indicated in Appendix A.

Each Survey Area was searched systematically, while stopping or moving to investigate sightings, calls or signs of presence. Time spent on patches of habitat varied according to the patch size, with at least 20 minutes spent on each patch.

3 Results

3.1 SURVEY RESULTS

Five species included in the VTWBC were observed during the swift parrot winter surveys (Table 4).. None of these species are individually listed under the EPBC or FFG Acts. A full list of species observed at each site is included in Appendix C.

No swift parrots, regent honeyeaters or painted honeyeaters were observed during the winter surveys.

Table 4 VTWBC species observed during Swift parrot winter surveys

Species	Site 1 – SS	Site 2 - MR	Site 3 - HHT	Site 4 – SA/HHS
Brown-headed honeyeater		ü	ü	ü
Fuscous honeyeater				ü
Jacky winter		ü		
Little lorikeet	ü			ü
Western gerygone	ü			

3.2 THREATENED SPECIES HABITAT ASSESSMENT

The habitat for threatened species was generally limited within the sites, particularly for the three EPBC Act listed birds, swift parrot, regent honeyeater and painted honeyeater. Only occasional winter-flowering yellow gums were recorded within Site 4, with sites generally consisting of a dominant overstorey of grey box or river red gum.

The habitat at the survey sites include a number of large trees (as defined under vegetation quality assessments (DELWP 2017)), some of which contain hollows that would be suitable as nest sites for birds and arboreal mammals. The number of large trees, and the area of vegetation that will be impacted are detailed in Table 5 below. The large trees and hollows are recorded on the maps included as Appendix A.

Table 5 Area of habitat and number of large trees impacted at each site

Site	Area of VTWBC habitat (ha)	Area of VTWBC habitat loss (ha)	Number of Large Trees Recorded	Number of Large Trees Impacted
Site 1 - Short Street Overbridge (Broadford)	1.50	0.68	14	2
Site 2 - Marchbanks Road Overbridge (Broadford)	3.25	1.22	36	7
Site 3 - Hume Highway Tallarook Precinct (Tallarook)	4.43	1.90	26	10

Site	Area of VTWBC habitat (ha)	Area of VTWBC habitat loss (ha)	Number of Large Trees Recorded	Number of Large Trees Impacted
Site 4 - Seymour Avenel Road Overbridge (Seymour) & Hume Highway Seymour Precinct (Seymour)	14.66	3.70	63	13

A habitat assessment for each site is provided below.

3.2.1 Site 1 – Short Street Overbridge (Broadford)

The vegetation is dominated by river red gum, with red box and yellow box, which were not flowering at the time of the survey. No winter-flowering eucalypt species were observed, including in adjacent woodland habitat outside of the project area. There are mature individuals of eucalypts present, though no hollows were recorded.

The understory is generally consistent of weedy and native grass, with several areas regularly mown and maintained. Complex understorey with organic litter and logs is scarce and only present as patchy areas of suitable ground and understorey foraging areas with occasional logs is found on the southern side of the rail, west of Short Street. Suitable understorey foraging areas were observed in the habitat patch to the north of the Project Area.

3.2.2 Site 2 – Marchbanks Road Overbridge (Broadford)

The vegetation is dominated by large river red gum with occasional messmate, grey box and yellow box towards the south of the site. None of the eucalypts were flowering at the time of surveying. Two mature eucalypts, one river red gum and one grey box, were observed to contain hollows. The understory is sparse, and often dominated by introduced grass species, which do not provide good foraging or cover.

3.2.3 Site 3 – Hume Highway Precinct Tallarook (Tallarook)

The vegetation is dominated by red box, with additional river red gum and grey box. One grey box was observed to contain hollows. There were no eucalypts in flower at the time of surveying. There is a diverse understory including golden wattle, sifton bush, black-anther flax-lily and spiny-head mat-rush, which provide good cover for foraging and nesting. There are adequate logs and vegetation debris available, which also provide suitable foraging and cover for woodland birds.

3.2.4 Site 4 – Seymour Avenel Road (Seymour) and Hume Highway Seymour Precinct (Seymour)

The vegetation is dominated by grey box, eight of which were observed to contain hollows. There were no eucalypts in flower at the time of surveying. Occasional yellow gums were scattered throughout the survey area, which were in the early phases of flowering.

The vegetation included a complex understory including golden wattle, sifton bush, black-anther flax-lily and spiny-head mat-rush, which provide good foraging and cover for the smaller bird species, which were often observed in this vegetation that occurred immediately adjacent to Seymour Avenel Road that runs adjacent to the majority of the survey area. Numerous small birds, including several honeyeater species and robins were also observed foraging in the open cleared paddocks, with occasional shrubs, immediately adjacent to the woodland habitat. It was noted that the ground layer vegetation throughout was sparse, with minimal logs present, though high levels of leaf litter and other organic material were present.

4 Discussion

4.1 THREATENED SPECIES

The habitat present at the four sites does not represent high quality habitat for the swift parrot, regent honeyeater or painted honeyeater, due to the small size of the vegetation patches, their linear nature, and the small number of winter-flowering eucalypts, particularly at sites 1-3. It is also not critical habitat, which is considered to be areas containing extensive habitat with a high density of preferred winter-flowering foraging species, particularly red ironbark (*Eucalyptus tricarpa*) and yellow gum (Saunders & Tzaros 2011, DSE 2003, DoE 2015).

A review of the landscape found that the closest important or critical habitat area for threatened birds is the Puckapunyal Military Area, Mangalore Conservation Reserve and a further area south of Avenel (Mangalore Ammunition Depot). These sites comprise a listed Important Bird Area (IBA) as they contain a large amount of good quality Box-Ironbark forest (BirdLife 2019). This IBA is recognised as important habitat area for swift parrot. Regent honeyeater, painted honeyeater and several species included in the VTWBC have also been recorded in this IBA.

The location of the IBA in relation to the project areas within the wider landscape is identified in Appendix B. Puckapunyal is located approximately 6.8 km from Site 4 – Seymour Avenel Road Overbridge (Seymour) and Hume Highway Seymour Precinct (Seymour), and Mangalore Nature Conservation Reserve is located approximately 3.8 km from Site 4. The IBA also has good connectivity to the Rushworth Box-Ironbark Region IBA, which is located directly to the north. There are further areas of suitable habitat and dispersal corridor along the Goulburn River. These areas provide a large amount of suitable habitat, which due to their size and connectivity would provide more attractive habitat for swift parrot, regent honeyeater and painted honeyeater than the narrow strips of habitat with limited resources within the project area.

The vegetation along the rail corridor does act as a dispersal corridor for ecologically similar species. Musk lorikeet (*Glossopsitta concinna*) and little lorikeet (*Glossopsitta pusilla*) were recorded utilising the corridor for dispersal at Site 4 – Seymour Avenel Road (Seymour) and Hume Highway Seymour Precinct (Seymour). There are potential habitat linkages to Site 4, particularly for the swift parrot, which is a highly mobile species, to the Puckapunyal Army Barracks, the Mangalore Conservation Reserve and along the Goulburn River. Local Department of Environment, Land, Water and Planning (DELWP) officers commented that they expected the vegetation to be used as a habitat corridor and that the species is known within the landscape (Daniel Pendavingh - DELWP pers comm. 2019).

Connectivity between the sites is likely interrupted by the Hume Highway. To the south of the Hume Highway there are large areas of vegetation including Tallarook State Forest, Toolangi State Forest, Mount Piper Conservation Reserve and Dabyminga Creek Bushland Reserve. A large road like the Hume Highway would be an effective barrier for many of the smaller species of woodland birds, including species of robin, thornbill, wren and small honeyeater species (Taylor & Goldingay 2010). Larger woodland bird species would be less affected by these barriers. The break between Site 1 - Short Street Overbridge (Broadford) and Site 2 - Marchbanks Road Overbridge (Broadford) is small enough that it would likely be traversed by woodland bird species. The gap between the other sites is considerably larger, therefore it is not certain that individual birds would cross these gaps and utilise the habitat at each site.

Large numbers of little lorikeet and musk lorikeet were observed at Site 4 – Seymour Avenel Road Overbridge (Seymour) and Hume Highway Seymour Precinct (Seymour), that were not seen at the other sites, where very limited numbers of these species were recorded. This indicates that the breaks in the vegetation between the sites and across the Hume Highway may be a barrier to dispersal, which many species of woodland bird do not cross.

Notwithstanding the above, swift parrots travel up to 40 km each day from the roosting site to the foraging site, depending on the available resources (DSE 2002) and can traverse several types of habitats, including urban areas. There is potential for swift parrot to use this corridor, including occasional foraging of grey boxes. Grey box usually flowers in autumn when the birds are first arriving in Victoria (DSE 2002). Site 4 – Seymour Avenel Road Overbridge (Seymour) & Hume Highway Seymour Precinct (Seymour) contains a population of grey box, however they were not in flower at the time of survey. It is possible that swift parrot will utilise this site for occasional foraging during dispersal through Victoria in the autumn months.

The vegetation across the four sites does not include significant numbers of winter-flowering Eucalypts, which is the resource that swift parrot seeks out at the time of year when they are present on the mainland (Saunders & Tzaros 2011). It is more likely that the species would utilise larger areas containing extensive foraging tree species, and only sporadically occur within the project areas.

Regent honeyeater is a highly mobile species, occurring throughout Victoria in spring when Eucalypts are flowering, and migrating to areas north of the Great Dividing Range, in northern Victoria, New South Wales and Queensland during winter (DEWHA 2010). In winter, the species is more likely to inhabit important foraging areas of box-ironbark forest that contain their preferred feed trees. The only key feed species for regent honeyeater observed were occasional yellow box trees. As the species was not observed during the survey, and due to the small number of yellow box trees present within the survey areas, it is likely that the area is not an important habitat or foraging site. Additionally, local DELWP officers considered the presence of regent honeyeater unlikely in the region around the project areas (D. Pendavingh - DELWP pers comm. 2019). The significant impact assessment for critically endangered species is included in Table 6 below.

Painted honeyeater follows a similar migration pattern to the regent honeyeater, occurring throughout Victoria in the spring and summer, when mistletoe fruits are available, before moving north of the Great Dividing Range over the winter months, mostly to arid areas of Victoria, New South Wales, Queensland and the Northern Territory over the winter months (DoE 2015). As for the regent honeyeater, the painted honeyeater is likely to only occupy important foraging areas, with extensive forest and woodland patches that contain high concentrations of mistletoe, which are a key foraging resource. There were also only small and scattered infestations of mistletoe observed throughout the habitat, which is not likely to support populations of the species. As the species was not observed during the survey, and due to the low density of key feed resources (mistletoe), it is likely that the habitat is not an important area for the species.

Key habitat areas for the species are considered to be locations that have high fidelity, or the ability to draw large flocks of birds (Saunders & Tzaros 2011), not habitats that are, or potentially are, used opportunistically by these mobile and nomadic species in seeking out resources in the landscape. Habitat within the project area is considered to be suitable to support opportunistic use in seeking foraging resources over the landscape and is therefore not considered to be significant or critical habitat for any of the three species.

4.2 VICTORIAN TEMPERATE WOODLAND BIRD COMMUNITY

Five species in the VTWBC were recorded across the four surveyed sites. It is reasonable to conclude that as five of the 24 species in the cohort were recorded, and that the vegetation and location align with the community description, that the community is present at the sites.

Additionally, local DELWP officers know of eight other species listed under the VTWBC that are also likely to occur in the surrounding landscape, including swift parrot (D. Pendavingh - DELWP pers comm. 2019).

However, there are no published guidelines detailing a threshold for presence/absence of the VTWBC and no known listing advice available (D. Pendavingh - DELWP pers comm. 2019).

The amount of habitat that will be lost is predicted to be 7.501 ha across the five project areas. The loss of vegetation is not considered to comprise a high portion of remaining community throughout the State and is not considered significant to EPBC Act or FFG Act listed species, as breeding, foraging and movement through the landscape is not likely to affect individual species or local populations of species (see landscape context map in Appendix B). However, the impact to the VTWBC may still be considered significant due to:

- The combined area of predicted impact (totalling 7.501 ha)
- The ongoing reduction of the community across Victoria
- The loss of a number of large trees (32 in total over the project areas), which provide key habitat features
- The loss of complex understory for ground-foraging species is also known to affect populations of these species.

The potentially significant impact is taken into account when considering whether the project should be referred under the EE Act, as part of a combination criteria for the 'potential loss of a significant area of a listed ecological community' (DSE 2006). Based on the predicted loss of 7.501 ha and the habitat features being lost within the project area, this referral criteria is considered to be met for the VTWBC. It should be noted that EE Act referral criteria are not considered met for individual FFG Act listed species.

Habitat loss is thought to be the main threat to the VTWBC and has contributed to the continuing decline in the numbers of these birds, particularly those species that nest in hollows or forage on the ground. As several of these sites, particularly Hume Freeway, Tallarook, Seymour Avenel Road and Hume Freeway, Seymour, contain suitable ground layers for foraging and mature, hollow-bearing trees, the loss of this vegetation may be significant for individuals of hollow-dependent and ground-foraging species that rely on these resources within the landscape. Of particular note is the increase of gaps in the vegetation which will result from the project works. Small species of bird may be restricted by the increased gaps by being unable to cross between the newly created patches (Taylor & Goldingay 2010). The loss of understory, logs and debris will also decrease the cover, foraging and roosting resources used by many small woodland bird species.

The impacts across the sites contribute to the cumulative ongoing loss of habitat for the VTWBC across Victoria. The landscape map included in Appendix B displays the habitat impacts in a wider context. This map indicates the proportional loss of woodland bird habitat is unlikely to cause significant impacts to woodland bird species in the landscape, due to the amount of remaining habitat as the areas of loss are discrete and small. However, as the community is in decline within Victoria (Ingerswen and Tzaros 2011), the combined area of 7.501 ha and cumulative effect of the losses may be significant.

4.3 SIGNIFICANT IMPACTS FOR THE SWIFT PARROT

In completing the assessment of significant impacts for critically endangered and endangered species, consideration needs to be given to the term 'population'. The policy provides guidance on the definition (DoE 2013):

> *A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:*
>
> - *a geographically distinct regional population, or collection of local populations, or*
> - *a population, or collection of local populations, that occurs within a particular bioregion.*

Swift parrots are highly variable in their distribution, with both breeding and foraging locations fluctuating with the seasonal availability of resources (Webb 2008), but as a whole the species migrates between

breeding habitat in Tasmania and foraging habitat on the mainland. The swift parrot population has therefore been interpreted as a single population, as it is not possible to separate individuals into separate populations based on location. It is unknown if individual swift parrots return to the same breeding location each year, though they have not been recorded as necessarily using the same hollow each year (DPIPWE 2010).

Of the threatening processes listed under the EPBC Act, clearing native vegetation and fauna habitat fragmentation are the most likely processes to be generated by the impacts of the project, as well as potential spread of pathogens. *The National Recovery Plan for the Swift Parrot Lathamus discolor* specifically mentions that the clearance of nesting, roosting or foraging habitat may have a significant impact on the population, especially when the vegetation lost is adjacent to or consists of critical habitat (Saunders & Tzaros 2011).

Critical habitat for the swift parrot contains large trees, which flower more heavily and reliably than younger trees. The National Recovery Plan lists Local/Regional/State Parks, National Parks, State Forests and Nature Conservation Reserves that are considered priority habitat for the species. They are considered priority due to their use:

- for nesting
- by large proportions of the swift parrot population
- repeatedly between seasons (site fidelity)
- for prolonged periods of time (site persistence).

Of the 40 sites of priority foraging habitat for the species identified within Victoria, four are located in the wider landscape to the north of Site 4 (Saunders & Tzaros 2011). Crosbie Nature Conservation Reserve is located approximately 46 km north west of Site 4, Costerfield Nature Conservation Reserve is located approximately 34 km north west of Site 4, Spring Plains Nature Conservation Reserve is located approximately 35 km north west of Site 4, and Rushworth State Forest is the closest to the project, located approximately 33 km to the north of Site 4. These sites are considered priority habitat for conservation management as they are used by large proportions of the swift parrot population, or exhibit high site fidelity or site persistence. They are therefore important for the recovery of the species, rather than those areas that are used opportunistically.

The vegetation within the project areas contains a number of large trees. Site 4 contains a population of mature grey box, which are a noted food source for swift parrot. Given the linear nature of the patches and the limited width, the number of flowering grey box trees would be insufficient to support more than a few individuals or small family groups of swift parrot, which may utilise the resources as a foraging point during dispersal to larger areas.

4.4 SIGNIFICANT IMPACTS FOR THE REGENT HONEYEATER

Regent honeyeater is highly mobile and migrates through its range over the year. The species' movement consists of the population extending into parts of northern NSW and south-east Queensland during autumn, and the corresponding movement out of southern Victoria and high country of south-east Australia from late autumn to early spring, while contracting to core breeding areas on inland slopes of the Great Divide in north-west, central-west and south-west NSW and north-east Victoria in late winter (DEWHA 2010). The only known breeding sites in Victoria are located north of the project areas, in box-ironbark forest in the Lurg-Benalla District and Chiltern Mt Pilot National Park (DOE 2016). The species comprises a single population, with some exchange of individuals between regularly used areas (Garnett *et al.* 2011).

Regent honeyeaters are able to travel considerable distances between foraging, roosting and breeding sites. Areas used by large aggressive honeyeater species, such as noisy miner (*Manorina melancephala*) are less likely to be used by regent honeyeater.

The National Recovery Plan lists a number of areas known to support regent honeyeater foraging and breeding, however none of these are in the vicinity of the project area. These areas generally consist of large areas of high-quality box-ironbark forest habitat (DoE 2016).

The significant impact guidelines included in the *National Recovery Plan for the Regent Honeyeater Anthochaera phrygia* (DoE 2016) do not specify thresholds for what constitutes a significant impact. It does recommend the highest level of protection be applied to any areas of critical habitat. Critical habitat for regent honeyeater is any breeding or foraging areas where the species is likely to occur (DoE 2016).Yellow box are a known foraging resource (DoE 2016), and a small number were recorded within the survey sites, though they occur only sporadically and are not a dominant species.

As there are so few key foraging species present, it is considered unlikely that the vegetation would be used by regent honeyeater for foraging. The vegetation present is also unlikely to be used as roosting sites, as the vegetation does not have the dense foliage that the species requires.

Discussions with DELWP officers, indicated that the species the presence of regent honeyeater is unlikely in the region around the project area (D. Pendavingh - DELWP pers comm. 2019). It is possible that the vegetation would be used as a dispersal corridor for vagrant individuals moving through the landscape. Noisy Miner was also recorded at Site 4, which may further reduce the likelihood of individuals utilising the habitat.

Table 6 Significant impact assessment for critically endangered species

Significant impact criteria	Swift parrot	Regent honeyeater
Lead to a long-term decrease in the size of a population	The population is highly mobile, utilising available resources where they are available. The project area is not considered to contain critical foraging habitat and any impact to these areas would be unlikely to lead to a decrease in the population.	The population is highly mobile, utilising available resources where they are available. The project area is not considered to contain critical foraging habitat and any impact to these areas would be unlikely to lead to a decrease in the population.
Reduce the area of occupancy of the species	The patches of habitat are small and do not represent areas of occupancy. For the species in Victoria an 'area of occupancy' is considered to be critical foraging habitat, particularly adjacent to roosting sites. At most the areas represent a dispersal corridor, and occasional foraging habitat at Seymour-Avenel Road and Hume Freeway, Seymour. Project impacts at these sites are not predicted to impact the species, as it is unlikely to inhibit dispersal and foraging.	Regent honeyeater are reliant on a specific array of flora species to produce nectar. Of these, only yellow box is present at the study sites, and then in very low numbers (17 individuals recorded across the four areas). The habitat does not therefore represent a significant food source. The vegetation is also not high-quality roost habitat for the species, as they require thick foliage, and favour larger patches of vegetation. Project impacts at these sites are not predicted to impact the species, as it will only impact four yellow box individuals, and is unlikely to inhibit dispersal and foraging.
Fragment an existing population into two or more populations	Impacts at the four sites would not fragment the population as there are no fixed areas in the project area that the species relies on.	Impacts at the four sites would not fragment the population as there are no fixed areas in the project area that the species relies on. The species is generally considered unlikely to be present in the region (D. Pendavingh - DELWP pers comm. 2019), with only potential use by vagrant individuals.

Significant impact criteria	Swift parrot	Regent honeyeater
Adversely affect habitat critical to the survival of a species	The species is highly mobile and utilises habitat opportunistically based on available resources. None of the project sites contain critical habitat, as there are minimal winter flowering eucalypts at all sites. The grey box at Seymour being the exception, which flowers during autumn when the species first migrates to the mainland. The vegetation is more likely to be opportunistically utilised by small groups as they disperse through the landscape to larger habitat areas with more resources available. Use of the project sites as a dispersal corridor is more likely, as the species could use it to move through the landscape to foraging sites.	The species is highly mobile and utilises habitat opportunistically based on available resources. None of the project sites contain critical habitat, as there are minimal key foraging eucalypt species present. At most the species may use the habitat as a dispersal corridor while moving through the landscape to access foraging and roosting sites.
Disrupt the breeding cycle of a population	The species migrates to breed in Tasmania. This would not be impacted by any works in the project area.	The species' only recorded breeding site in Victoria is in the Chiltern area (DoE 2016). This would not be affected by any works in the project area.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The species is highly mobile and utilises habitat opportunistically based on available resources. The limited number of winter-flowering eucalypts are not likely support more than nomadic visitations from a few individuals or small groups. It is likely that these resources would be utilised opportunistically by individuals dispersing through the landscape. Project impacts are unlikely to inhibit dispersal or foraging that would result in the species declining.	The species is highly mobile and utilises habitat opportunistically based on available resources. The small number of key flora species present across the survey sites do not represent habitat that would cause the species to decline if it were impacted. Project works across the four sites are expected to impact four yellow box individuals. This is not expected to impact the species, as it is unlikely to inhibit dispersal or foraging.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The surrounding areas are modified with weeds and invasive fauna species, particularly in the residential areas in Broadford. It is unlikely that the works will result in an increase in weeds within the habitat. However, weed hygiene controls should be employed during works.	The surrounding areas are modified with weeds and invasive fauna species, particularly in the residential areas in Broadford. It is unlikely that the works will result in an increase in weeds within the habitat. However, weed hygiene controls should be employed during works.
Introduce disease that may cause the species to decline	Hygiene controls should be employed to mitigate this potential impact, however this impact is unlikely.	Hygiene controls should be employed to mitigate this potential impact, however this impact is unlikely.
Interfere with the recovery of the species.	This impact is unlikely	This impact is unlikely

4.5 SIGNIFICANT IMPACTS FOR THE PAINTED HONEYEATER

Painted honeyeater is a highly specialised species, feeding primarily on berries from mistletoe, as well as some nectar from mistletoes, eucalypts and possibly banksias (DoE 2015). The species' distribution tends

to follow fruiting mistletoe, particularly drooping mistletoe (*Amyema pendula*) and box mistletoe (*Amyema miquelli*) in Victoria (DSE 2003). Box mistletoe is one of the most widespread of Australian mistletoes, and flowers from December – June (VicFlora 2019). Very few mistletoes were noted at any of the survey sites, and none were in flower.

The Conservation Advice for painted honeyeater specifies habitat loss as a key threat to this species, due to clearing of forests containing mistletoe, and clearing of regrowth forest where mistletoe is often more abundant due to past disturbance (DoE 2015). Painted honeyeater is more common in wider blocks of remnant woodland than in narrower strips (DoE 2015) and is currently considered to be unlikely to occur in the surrounding region (D. Pendavingh - DELWP pers comm. 2019).

The threatening processes noted in the Conservation Advice (DoE 2015) have been used to inform the significant impact assessment, which is detailed in Table 7 below.

Competition with noisy miners and nest predation by large over abundant species including pied currawong (*Strepera graculina*), and ravens (*Corvus* spp.) are also known threats to painted honeyeater. All three of these species were recorded at the survey sites.

Table 7 Significant impact assessment for Painted Honeyeater

Significant Impact Criteria for Vulnerable Species	Assessment for Painted honeyeater
Lead to a long-term decrease in the size of an important population of a species	The lack of mistletoe at the survey sites and reported unlikely occurrence in the surrounding region (D. Pendavingh - DELWP pers comm. 2019) indicates that the area is not a critical habitat for painted honeyeater.
Reduce the area of occupancy of an important population	Painted honeyeater is unlikely to occupy the site, given the lack of mistletoe, the restricted size of the vegetation area and the linear nature of the corridor. At most it would act as a dispersal corridor allowing the species to move between other habitat areas.
Fragment an existing important population into two or more populations	The whole population of painted honeyeater is considered a single population. Small, discrete losses in narrow corridors will not contribute to fragmenting the dispersal of the species within its range.
Adversely affect habitat critical to the survival of a species	The area is not critical habitat for painted honeyeater, given the lack of mistletoe, the restricted size of the vegetation area and the linear nature of the corridor This impact is not likely.
Disrupt the breeding cycle of an important population	The area is not suitable for painted honeyeater breeding, given the lack of mistletoe. This impact is not likely.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Painted honeyeater is unlikely to occupy the site, given the lack of mistletoe, the restricted size of the vegetation area and the linear nature of the corridor. At most it would act as a dispersal corridor allowing the species to move between other habitat areas. The project would not impact the species to the extent that it would have any effect on the population size.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Hygiene controls should be employed to mitigate this potential impact. This impact is unlikely. Competitive fauna species including noisy minor and raven species are already established in the area.

Significant Impact Criteria for Vulnerable Species	Assessment for Painted honeyeater
Introduce disease that may cause the species to decline	Hygiene controls should be employed to mitigate this potential impact. This impact is unlikely.
Interfere substantially with the recovery of the species	This impact is unlikely

5 Conclusion

No swift parrots, regent honeyeaters or painted honeyeaters were observed during the survey period. All three species are known to concentrate in key foraging and nesting habitats during winter, including known important sites in the region, including critical box-ironbark forest habitats in Puckapunyal Military Area, Chiltern Mt Pilot National Park, Spring Plains Nature Conservation Reserve and Rushworth State Forest (BirdLife 2019, DOE 2016).

Key habitats are considered to be areas that provide sufficient foraging resources that result in the species regularly visiting the location or can draw large flocks of birds (Saunders & Tzaros 2011). Habitats that are, or potentially are, used opportunistically in seeking out resources in the landscape are not considered critical habitat. The species absence from the survey areas, plus the generally narrow and linear corridors, with minimal foraging tree species and mistletoe, indicates that the habitat is not important to any of the three species.

The vegetation at Site 4 - Seymour Avenel Road (Seymour) and Hume Highway Seymour Precinct (Seymour) includes grey box, which generally flowers in autumn, and would be a food source if the flowering corresponds with the swift parrot's migratory patterns. The amount of grey box present at Site 4 would limit the number of swift parrot that could be supported by the vegetation to a few individuals or small family groups moving through the landscape.

As the project areas are generally linear habitats along road and rail reserve, and were observed as a dispersal corridor for other similar species, particularly north of Seymour, it is likely that swift parrots would use the vegetation along the rail reserve as a dispersal corridor (D. Pendavingh - DELWP pers comm. 2019). Regent honeyeater and painted honeyeater may also potentially use the rail reserve as a dispersal corridor, although less likely than swift parrot (D. Pendavingh - DELWP pers comm. 2019).

Overall the loss of a small portion of dispersal corridor and foraging habitat within the project areas is unlikely to result in a significant impact to swift parrot, regent honeyeater or painted honeyeater, as other corridors are available for the species to disperse through the landscape. The project impacts will also not fragment any of the populations, as the species are all considered to have a single population and the proposed project impact is not considered to restrict or alter dispersal for any of the species.

All four sites surveyed contain suitable habitat for the FFG listed VTWBC. This has been indicated by the recorded presence of five species included in the VTWBC suite of birds. The loss of woodland habitat in northern Victoria is known to impact upon woodland bird species, particularly the loss of large trees and their associated hollows, and loss of diversity and understory foraging habitat. Due to the total amount of habitat to be impacted (7.5 ha) and the habitat features being lost, a referral under the EE Act is recommended due to the referral (combination) criteria for the 'potential loss of a significant area of a listed ecological community' and potential clearing of 10 ha or more of native vegetation. Impacts should be minimised where possible by:

- minimising vegetation removal as much as possible where a substantial gap will be created, as this will decrease the ability for woodland bird species to disperse.
- engaging a fauna expert to check hollows and nests and relocate fauna prior to vegetation removal
- revegetating construction areas (not required for permanent operations or maintenance) once construction has concluded

- maintaining weed and pathogen hygiene during construction.

Any removal of vegetation considered habitat for the VTWBC will require an FFG Act permit. The Victorian Department of Environment, Land, Water and Planning may also require authorisations under the *Wildlife Act 1974* for handling of fauna.

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Appendix A

SITE LOCATION MAPS

We Deliver

SUNDAY CREEK

Short Street
Overbridge (Broadford)

MIA MIA CREEK

Tottenhan TO Albury

Woodland Bird Habitat Map - Site 1

MAP 1 OF 4

0 50 100 m

Coordinate System: GDA 1994 MGA Zone 55

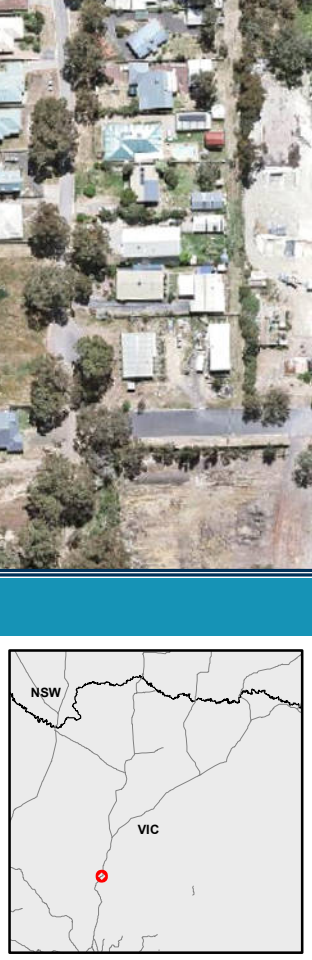
Date: 17-Feb-20
Author: MG
Paper: A3
Scale: 1:3,000

Data Sources: ARTC, VicMap, DataVIC

- Survey Area
- Enhancement Site Project Area
- VicTrack Reserve
- Watercourses

Habitat Tree

- Large Tree
- Woodland Bird Habitat



INLAND RAIL

ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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SUNDAY CREEK

Marchbanks Road Overbridge (Broadford)

Short Street Overbridge (Broadford)

Tottenhan TO Albury

Woodland Bird Habitat Map - Site 2

MAP 2 OF 4

0 75 150 m

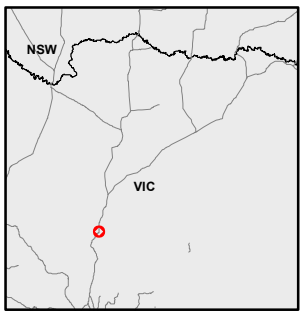
Coordinate System: GDA 1994 MGA Zone 55

Date: 17-Feb-20 Paper: A3
Author: MG Scale: 1:4,000
Data Sources: ARTC, VicMap, DataVIC

- Survey Area
- Enhancement Site Project Area
- VicTrack Reserve
- Watercourses

Habitat Tree

- Large Tree
- Large Tree, Hollow-Bearing
- Woodland Bird Habitat



INLAND RAIL ARTC

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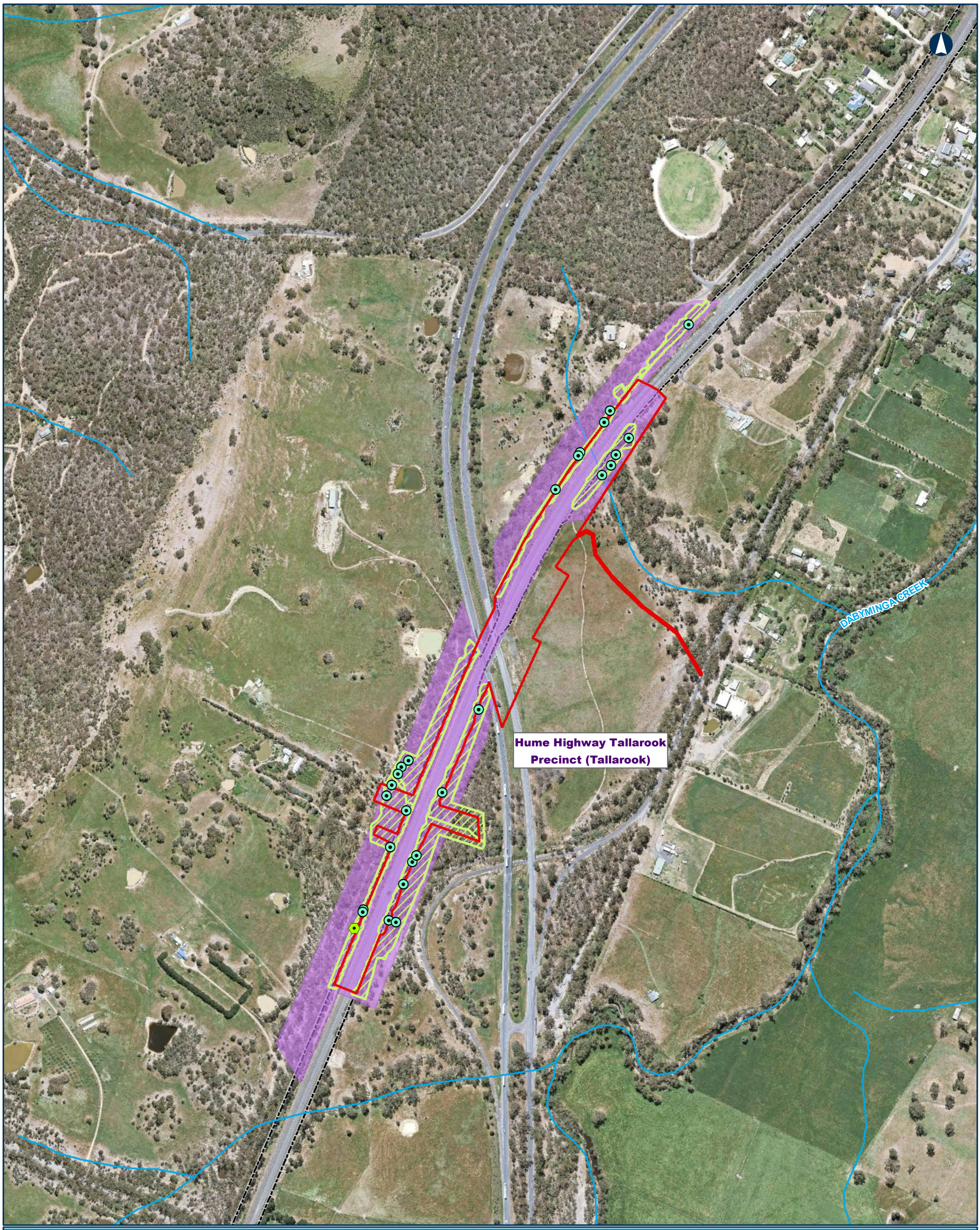


Tottenhan TO Albury

Woodland Bird Habitat Map - Site 3

MAP 3 OF 4

0 110 220 m

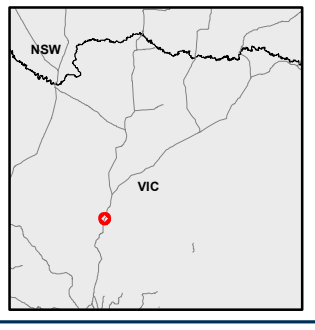
Coordinate System: GDA 1994 MGA Zone 55

Date: 17-Feb-20 Paper: A3
Author: MG Scale: 1:6,000
Data Sources: ARTC, VicMap, DataVIC

- Survey Area
- Enhancement Site Project Area
- VicTrack Reserve
- Watercourses

Habitat Tree

- Large Tree
- Large Tree, Hollow-Bearing
- Woodland Bird Habitat



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Hume Highway Seymour Precinct (Seymour)

Seymour Avenel Road Overbridge (Seymour)

Tottenhan TO Albury

Woodland Bird Habitat Map - Site 4

MAP 4 OF 4

0 175 350 m

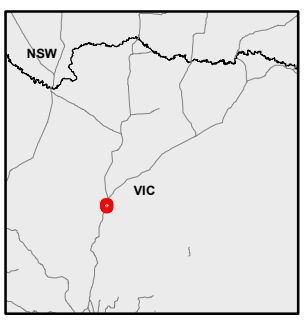
Coordinate System: GDA 1994 MGA Zone 55

Date: 17-Feb-20 Paper: A3
Author: MG Scale: 1:9,000
Data Sources: ARTC, VicMap, DataVIC

- Survey Area
- Enhancement Site Project Area
- VicTrack Reserve
- Watercourses

Habitat Tree

- Large Tree
- Large Tree, Hollow-Bearing
- Woodland Bird Habitat



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Appendix B

LANDSCAPE CONTEXT MAPS

We Deliver

Northwood Hill Bushland Reserve
Goulburn River Water Frontage
Mangalore Ammunition Depot (Important Bird Area)
Mangalore Nature Conservation Reserve (Important Bird Area)
Puckapunyal Commonwealth Area (Important Bird Area)
Northwood Public Recreation Reserve 9/2268
Hume Highway Seymour Precinct (Seymour)
Seymour Avenel Road Overbridge (Seymour)
Stony Creek Water Frontage
Seymour Police Paddock Reserve Goulburn River Water Frontage
Back Creek Water Frontage
Puckapunyal Streamside Reserve
Seymour Cemetery Reserve
Gardiner Creek Water Frontage
Whiteheads Creek Water Frontage
Sugarloaf Creek Water Frontage
Tallarook Cemetery
Bylands Creek Water Frontage
Sugarloaf Creek - Smoky Creek Water Frontage
Tallarook Bushland Reserve
Tallarook Cemetery Reserve
Hume Highway Tallarook Precinct (Tallarook)
Molison Creek Streamside Reserve
Traawool Reservoir
Mill Creek Water Frontage
Lowry Bushland Reserve
Sunday Creek Water Frontage
Mollison Creek Water Frontage
Ferris Creek Water Frontage
Dabyminga Creek Water Frontage
Kurkuruc Creek Streamside Reserve
Falls Creek Water Frontage
Dabyminga Creek Bushland Reserve
Kurkuruc Creek Water Frontage
Hamiltons Creek Streamside Reserve
Tallarook State Forest
Marchbanks Road Overbridge (Broadford)
Moranding I100 Bushland Reserve
Broadford G110 Bushland Reserve
Dry Creek Water Frontage
Moranding I102 Bushland Reserve
Kilmore Creek - Kurkuruc Creek Water Frontage
Moranding I101 Bushland Reserve
Mount Piper Nature Conservation Reserve
Short Street Overbridge (Broadford)
Kilmore Creek Water Frontage
Moranding I23 Bushland Reserve
Broadford 2 Reservoir
Tyaak Cemetery Reserve

Tottenhan TO Albury

FFG Community Map

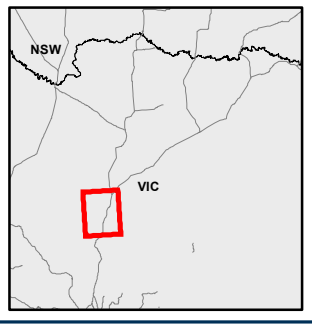
0 1,500 3,000 m

Coordinate System: GDA 1994 MGA Zone 55

Date: 11/27/2019 Paper: A3
Author: MG Scale: 1:100,000
Data Sources: ARTC, VicMap, DataVIC

Enhancement Site Project Area

Parks and Reserves (DELWP 2019)



INLAND RAIL ARTC

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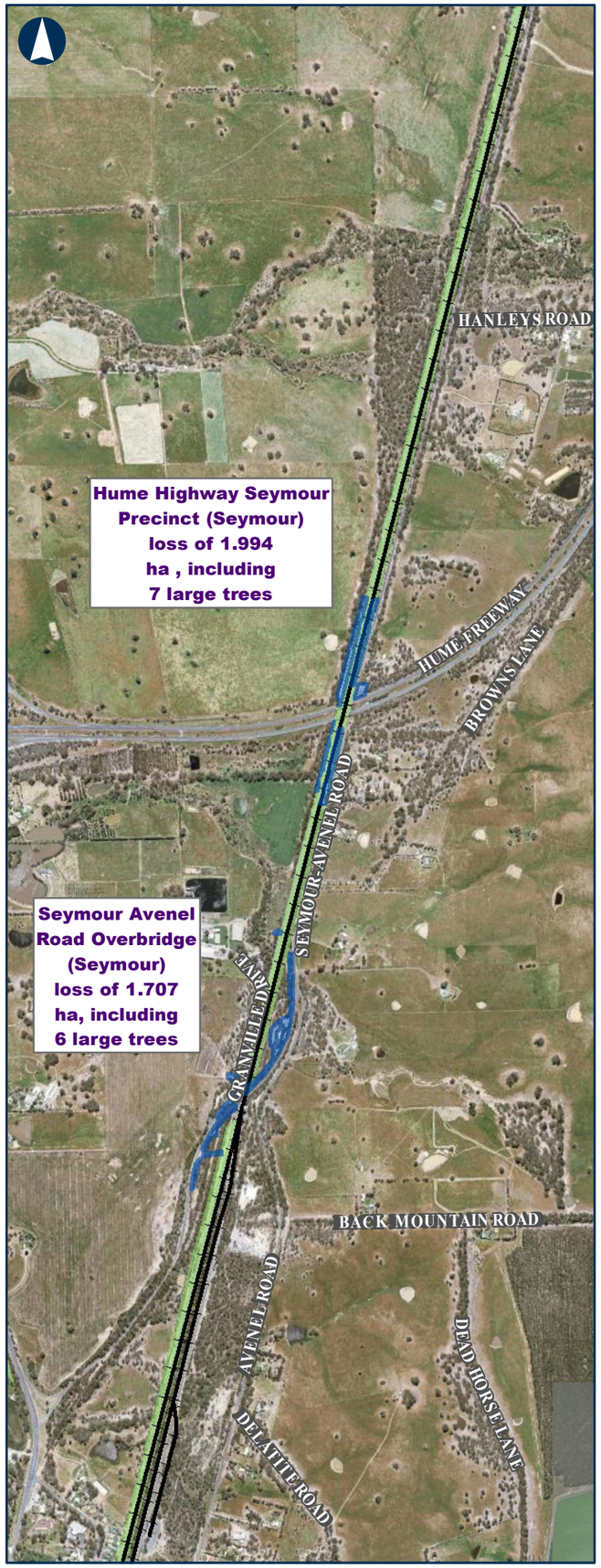
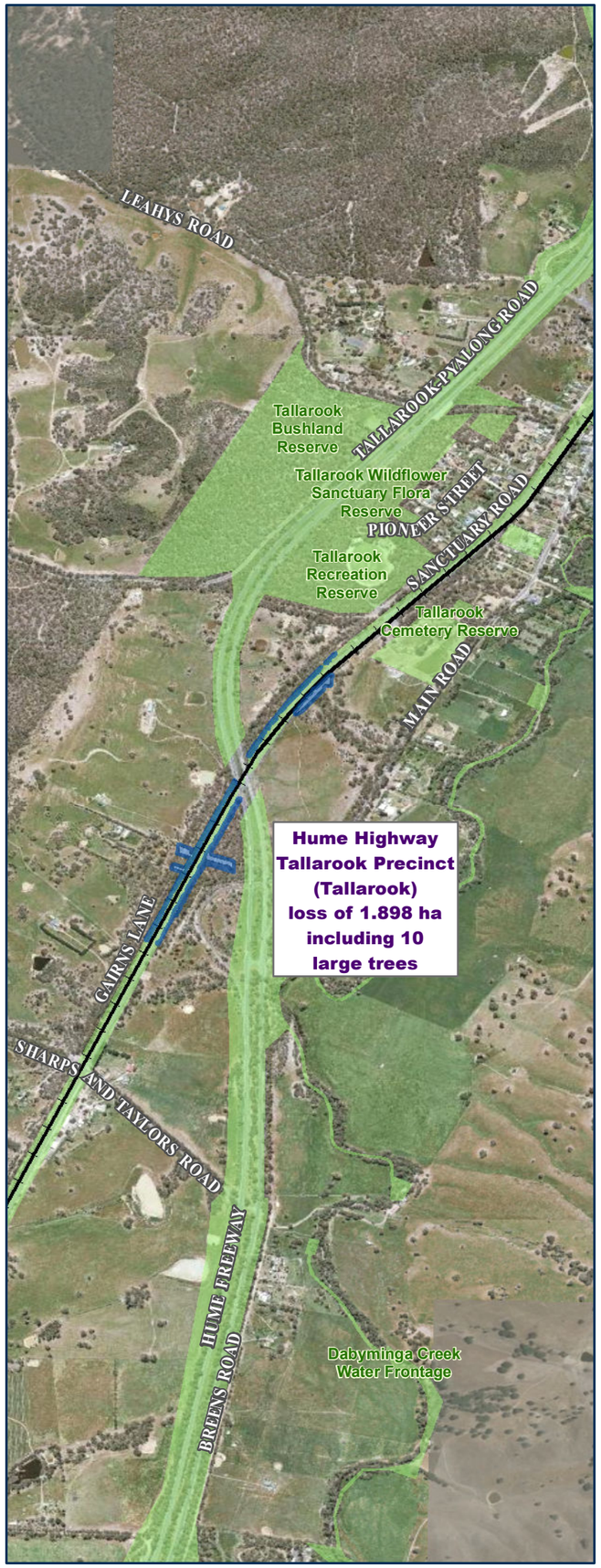
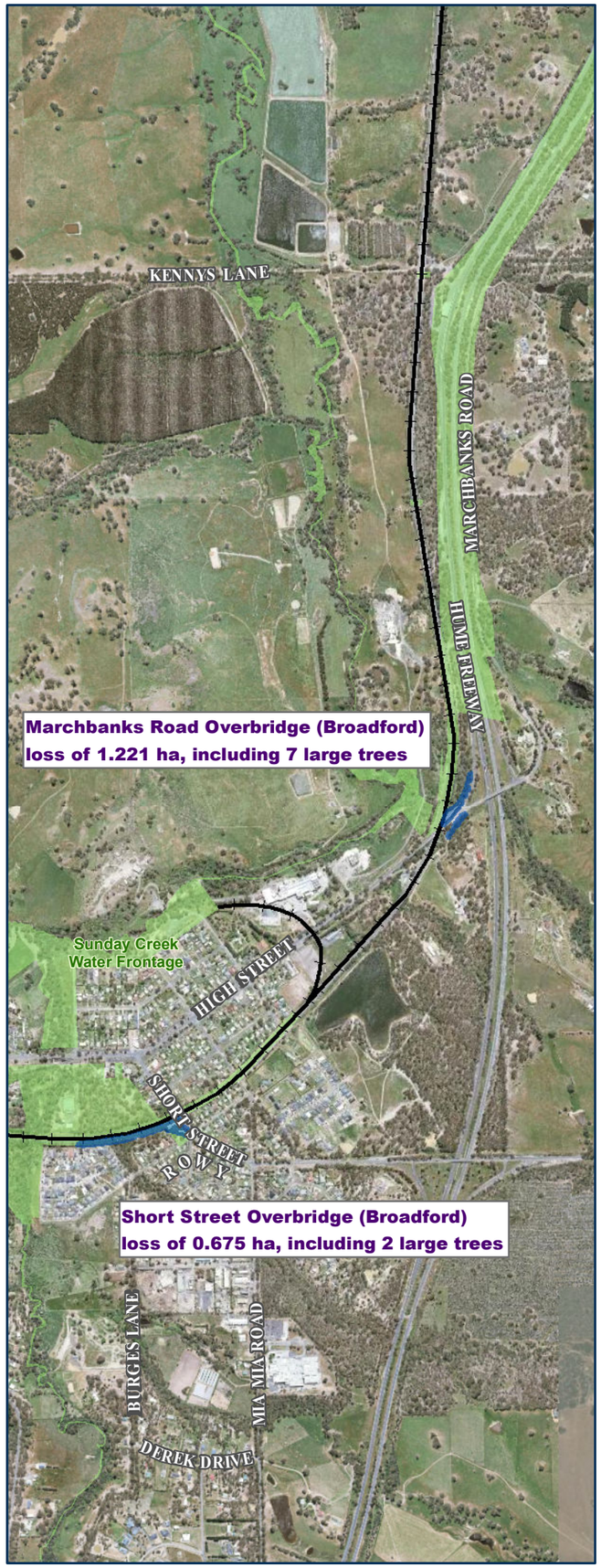






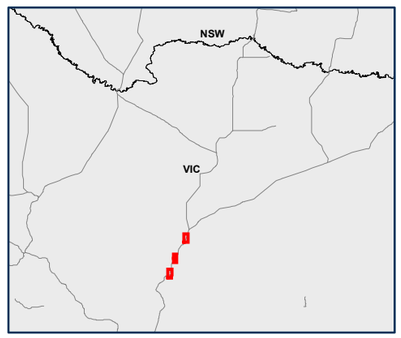
INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

Tottenhan TO Albury

Victorian Temperate Woodland Bird Community Map

- Rail Line
- Victorian Temperate Woodland Bird Community Impacted
- Parks and Reserves (DELWP 2019)



0 400 800 Meters

Coordinate System: GDA 1994 MGA Zone 55

Date: 10-Oct-19 Paper: A3
Author: MG Scale: 1:20,000
Data Sources: ARTC, VicMap, DataVIC, ESRI

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Appendix C

SURVEY RESULTS – SPECIES LIST

We Deliver

Site 1 – Short Street Overbridge (Broadford) survey species list

Note – species highlighted in blue are included in the VTWBC

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
Australian Magpie	1	13	6	8	7	7	12	14	22	20	7	3	5	16	8	8
Bell Miner							1									
Blackbird						1	2	2		1	1					
Black-shouldered Kite								1								
Brown Thornbill		17		21		10	22	18	16	5		1	4		2	
Buff-rumped Thornbill		2				6										
Crested Pigeon		4		1						7		2		22	1	2
Crimson Rosella		6	1	9	1	6	8	10	8	8	3	11	1	6	9	3
Eastern Rosella													3			
Eastern Spinebill				1												1
Galah			1	8	4	8	5	7	3	12	15		4	3	6	4
Grey Butcherbird															1	
Grey Currawong							1	1	4	3			5			
Grey Fantail												1				
Grey Shrike-thrush									1							
Indian Myna		4	3		3	8	1	1		7	5	4	8	12	6	2
King Parrot							2	2		1			1	4		1
Kookaburra		1	2	3	3		1	1	4	3		4	1	1	1	
Little Corella		4		15	2	2	2	3							1	

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
Little Lorikeet							2	3								
Little Raven	1	20	4	8	11	4	7	9	5	19	5	6	3	15	14	19
Little Wattlebird		2	1													
Masked Lapwing										2						
Mudlark							1	1								
Musk Lorikeet						2										
Pacific Black Duck																3
Pied Currawong	1	4	2	3	5		3	3	4	5	6		8	3	9	5
Rainbow Lorikeet	1	2		7	3	2	2	1			3			4	7	
Red Wattlebird	1	1	6	4	8	4		2	2	6	10	2	14	2	6	5
Red-browed Finch							8	9								
Rock Pigeon		1														
Rufous Whistler (female)						1										
Silvereye				10												
Spotted Pardalote									1	2	2				2	
Striated Pardalote		1		1					1	2						
Sulphur-crested Cockatoo	1	1	1	6	7	5	17	12	15	9	5	2	6	7	8	9
Superb Fairy Wren						1	2	2	5	7	1	1			5	1
Unknown Honeyeater								3		2						
Weebill									14	13	4	6	3	8		8
Welcome Swallow																2
Western Gerygone	1		1										1	2		
White-browed Scrub-wren		3		2	3	3	12	10	7	5			9	3		
White-eared Honeyeater													1	2		
White-faced Heron				2			2	2	2	2						

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
White-plumed Honeyeater		1						3					2			
Wood Duck		4	1	11	2	2	4	9		3					3	3
Yellow-tailed Black Cockatoo					2											

Site 2 – Marchbanks Road Overbridge (Broadford) survey species list

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
Australian Magpie	6	8	8	13	5	3	9	2	1	7		2	5	7	9	9
Blackbird			1	1			1			1		1				3
Brown Thornbill					10	13		6		2		11			2	13
Brown-headed Honeyeater		1														
Buff-rumped Thornbill										1		2				20
Chicken					1	1										
Crimson Rosella			6	10	10	31	1	19		20		8		7	1	4
Eastern Yellow-robin						1										
European Goldfinch										1						
European Starling																1
Galah	1	2	2	3	4	5	2	6		3	2	4	2	2		8
Grey Currawong					1	1										
Grey Fantail	1	1			1	1							3			
Grey Shrike-thrush			1		5	5		1	3				1			3
Indian Myna	1	3	6	22	3	3	2	45		2	1		2			21
Jacky Winter	2	3														
King Parrot		1														
Kookaburra							1		1	1		1	1			
Little Corella	2		4	6			2	2								
Little Raven	3	3	4	3	3	5	4	5	2	3	3	3	7	6	6	13
Long-billed Corella										1						
Masked Lapwing															1	

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
Mudlark	3	3			1	1	1		1	1			2	2	5	
Musk Lorikeet					4	4										
Pied Currawong	1	1	1	1			1				1	1	4		2	2
Red Wattlebird					1	5	1			1	2	1	7		2	1
Red-browed Finch										5						
Red-rumped Parrot					3	5										
Restless Flycatcher					1	1										
Scarlet Robin																2
Spotted Pardalote	1	1	1	2	2	4		3	1	2			3			7
Spotted Turtle-dove										2						
Striated Pardalote				1	1	4	2		1	1		2				1
Striated Thornbill				1	1	1				17		1		5		
Sulphur-crested Cockatoo	1	1	2	1	6	7	4	3	1	9	3	7	7	5	3	5
Superb Fairy-wren	3	4	3	5	6	7	5		2	6	2	4	6	6	10	9
Varied Sittella					5	9										
Wedge-tailed Eagle				2				1						1		
Weebill					8	16		5	4	8		1				
Welcome Swallow								1				1				2
Whistling Kite				1				1		3				3		4
White-browed Scrub-wren	16	28	17	7	9	16	7		2			1			1	1
White-eared Honeyeater		1				1		1		3				2		
White-faced Heron					1	1				1						
White-plumed Honeyeater		1		2		5		3		3						4
White-winged Chough		3														
Willie Wagtail													1	1		

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
Wood Duck						1										
Yellow-billed Spoonbill				1												
Yellow-rumped Thornbill										1		2				12

Site 3 – Hume Highway Tallarook Precinct (Tallarook) survey species list

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
Australian Magpie	4	2	5	6	7	7	6	13	8	10	7	6	3	9	13	3
Australian Raven							2							7		
Blackbird											1					
Black-faced Cuckoo-shrike										5						
Brown Thornbill	6			5	9	6	1	13	7	10			1	11	10	9
Brown-headed Honeyeater	1	7		7				10		16		2				
Buff-Rumped Thornbill	2	30	1	6	3	2		17	5	13					1	1
Crimson Rosella	4	4	1	9		16	2	15	3	8	3	8	1	5	6	15
Eastern Rosella				4		2			2	2	1	2			2	2
Galah				1	3		1	2								
Golden Whistler					1	2		1								
Grey Currawong											1	1			4	2
Grey Shrike-thrush			1			1	2	3	4	2	4	2			6	
Indian Myna									1							
King Parrot			1	4		1					1	1				
Laughing Kookaburra											1	1				1
Little Corella		7	2	18		1			8	6	1					6
Little Raven	7	2	3	3	8	1	11	10	14	10	5	6	2	2	13	3
Long-billed Corella								25								
Mudlark					1								1		2	1
Musk Lorikeet										1						
Pied Currawong			1				1		2	2		1	1		5	1

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
Rainbow Lorikeet											1	2		2		
Red Wattlebird					1		3				6	3	3	5	6	
Rose Robin				1												
Rufous Whistler	2		1				1									
Scarlet Robin		1		4		1		1		3	1	1		2	3	4
Silvereye							5									
Spotted Pardalote		11		1	2		2	3		3					1	3
Straw-necked Ibis								60								
Striated Pardalote	2	10									1	1				
Striated Thornbill				7				1				1		8	3	4
Sulphur-crested Cockatoo	3			1	2		2				4	1	2	1	8	11
Superb Fairy-wren	1			1	1		3	1	2	2	7		6	1	10	15
Unknown cuckoo-like call										2						
Unknown Honeyeater										5		1			1	1
Varied Sittella				5				2				1				
Wedge-tailed Eagle																1
Weebill						1		2	1	2	12	8		2	12	14
White-browed Scrub-wren										1	12	2			3	1
White-eared Honeyeater				3				2		1						
White-naped Honeyeater															1	1
White-plumed Honeyeater		4		2	1	2		3		2	3	2				3
White-winged Chough					1	10		5						13	2	4
Willie Wagtail	2															
Wood Duck						1										
Yellow Spoonbill										1						

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
Yellow-rumped Thornbill				1			5	10		8						
Yellow-tailed Black-cockatoo											6	18				

Site 4 – Seymour Avenel Road Overbridge (Seymour) and Hume Highway Seymour Precinct (Seymour) survey species list

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
Australian Magpie		7	1	7	2		2	2		7	8	4	1	11	8	17
Black-faced Cuckoo Shrike				1												
Brown Thornbill		25	1	33		5		1		9				7		1
Brown-headed Honeyeater				8		1		6		2		6		1		4
Buff-rumped Thornbill				1		12		3		7		3		9		10
Crested Pigeon										1						
Crimson Rosella		3	7	11		2		8		3	1	11	1	4	1	7
Eastern Rosella		1		3		9		6		3		3		2		
Flame Robin						1		3				9				4
Fuscous Honeyeater		5								2						
Galah		8	2	3				2		4	4			4		30
Golden Whistler		2				1		1						1		
Grey Fantail		4		2		2		1		2				4		
Grey Shrike Thrush	2			2	2	2		1	1		1	1		2	1	
Kookaburra	1				1	1				1	1					1
Little Corella	32								1		6	4				
Little Eagle						1		1		1						1
Little Lorikeet		29		46		20	2	15		15		28		13		22
Little Pied Cormorant														1		1
Little Raven		8	1	10		3	1	5*		14	6	18*		5	6	20
Masked Lapwing							2				1					
Mudlark	4				2	2					3		1		4	

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
Musk Lorikeet		80	10	8		34	9	76		37	1	45	5	47	2	43
New Holland Honeyeater			1													
Noisy Miner		3	2		2	4				13				4		
Pied Currawong		3	1			1	1	2	1		2				3	1
Purple-crowned Lorikeet?					1											
Rainbow Lorikeet														2		2
Red Wattlebird	7			10		9	11	13	1		7	2	3	2	4	6
Red-browed Firetail		10														
Red-rumped Parrot		11			6			6		8	1	2		2		
Rufous Whistler										1						
Scarlet Robin		4		2						1		2		2		
Striated Thornbill				1		4		1				8		5		1
Sulphur-crested Cockatoo				1	2	2	1		1		2			1	2	
Superb Fairy-wren		4				2		2		1		2		11	3	9
Varied Sittella												2		1		
Weebill				1												
Welcome Swallow										19		2		6		2
Whistling Kite											1		1		1	
White Ibis								10						1		
White-bellied Cuckoo Shrike		1														
White-eared Honeyeater												2		2		
White-faced Heron				1	1		1									
White-plumed Honeyeater		6*		4		1				1						
White-winged Chough		6*	1					0*	4		2*				6	8*
White-winged Triller	1															

	18-Jul		19-Jul		22-Jul		24-Jul		25-Jul		29-Jul		30-Jul		31-Jul	
	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen	Heard	Seen
Willie Wagtail		1						1			2	2			1	2
Wood Duck		4	2			4		8		2				11		2*
Yellow-rumped Thornbill		1		2				2				6				1