

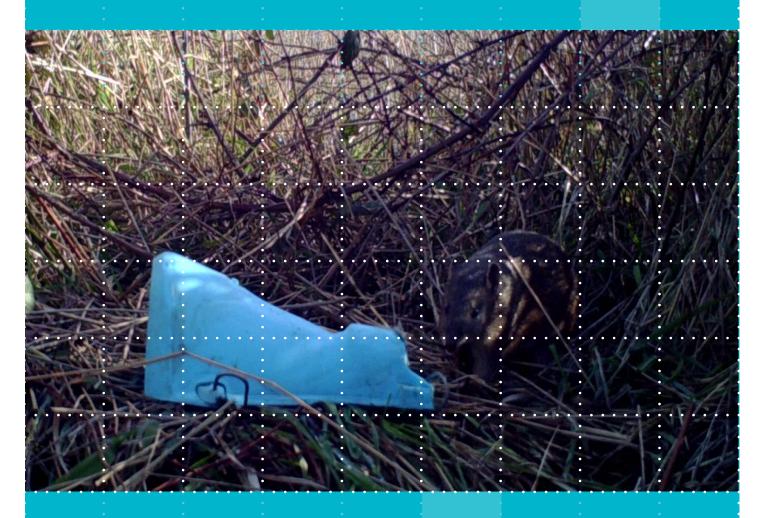
Draft Report

Targeted Surveys for Southern Brown Bandicoot, 21, 75 and 115 Key Lane and 335 McGregor Road, Pakenham, Victoria

Prepared for

Podium 1

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Ecology and Heritage Partners Pty Ltd



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1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was engaged by Podium 1 to undertake Targeted Surveys for Southern Brown Bandicoot *Isoodon obesulus obesulus* at 21, 75 and 115 Key Lane and 335 McGregor Road, Pakenham, Victoria. Ecology and Heritage Partners Pty Ltd completed a detailed flora and fauna assessment within the study area (Ecology and Heritage Partners 2019) and identified suitable habitat for Southern Brown Bandicoot along Toomuc Creek. Targeted surveys were recommended by DELWP in relation to the planning permit application (5000025809) to determine the presence or absence of this species, and where possible to ascertain its distribution and abundance and the extent of the species habitat within the study area.

The following addresses any implications under Commonwealth and provides information on mitigation measures associated with the proposed development should Southern Brown Bandicoot be identified within the study area.

1.2 Objectives

The objectives of the targeted surveys were to:

- Determine the presence/absence of Southern Brown Bandicoot within the study area;
- Provide information in relation to any implications of Commonwealth and State environmental legislation and Government policy associated with the proposed development;
- Determine any potential impacts on Southern Brown Bandicoot, and on Southern Brown Bandicoot habitat at a National and State level associated with the proposed development; and,
- Provide advice on mitigation measures that may be undertaken to avoid and/or mitigate potential adverse impacts on significant ecological values.

1.3 Study Area

The study area is located at 21, 75 and 115 Key Lane and 335 McGregor Road, Pakenham, Victoria, approximately 60 kilometres south-east of Melbourne's CBD (Figure 1). The study area is directly adjacent to, but outside of the Melbourne Strategic Assessment Area. The study area covers approximately 128 hectares and is bound by Key Lane to the north, McGregor Road to the east, and private agricultural land to the south and west. The road reserves of Key Lane and McGregor Road are included in the current assessment, due to being covered by the DPO16.

The land within and surrounding the study area predominantly supports agricultural and recreational activities, in the form of grazing and a motorbike trail. Cattle were present across the study area during the field assessment. The study area contains a gradual slope from north-east to south-west. Eight artificial dams and a drainage line are present within the study area and Toomuc Creek runs through the western end of the study area.





According to the Department of Environment, Land, Water and Planning (DELWP) Native Vegetation Information Management (NVIM) Tool (DELWP 2019a), the study area occurs within the Gippsland Plain bioregion. It is located within the jurisdiction of the Port Phillip and Western Port Catchment Management Authority (CMA) and the Cardinia Shire Council municipality. Section 4.4.1 discusses zoning and overlays relevant to the study area.



2 SOUTHERN BROWN BANDICOOT

EPBC Act Conservation Status: Endangered

FFG Act Conservation Status: Listed

DELWP Advisory List: Near Threatened

National Action Plan for Australian Marsupials and Monotremes: Near Threatened

The Southern Brown Bandicoot is a marsupial with coarse brindled dark grey to yellow-brown fur on its back, with creamy white feet and underbelly (Plate 1). The ears are short and rounded, barely extending



Plate 1. Southern Brown Bandicoot. Source: Ecology and Heritage Partners

above the head. Individuals tend to be 28-35 centimetres in length (head-body), with an 8-13 centimetre long tail. Females weigh 400-1000 grams, whilst males weigh 500-1500 grams (Menkhorst and Knight, 2011).

The diet is omnivorous consisting largely of soil invertebrates, seeds and underground (hypogeal) fungi. In the Royal Botanic Gardens, Cranbourne the species' diet is dominated by green jewel beetles and population numbers have been reported to crash when beetle numbers decline (Coates and Wright 2003). Breeding is usually seasonal, with most births occurring between July and December. Young remain in the pouch for two months, and become sexually mature at seven months, with females able to give birth to over eight young per year. The death rate of juveniles is usually high, while adults may live up to 3.5 years (Strahan 1995).

In Victoria, the species' remaining distribution is divided into five major groups, or loose sub-populations, centred around Portland-Mount Gambier, Grampians National Park, Otway Ranges, South-central (Port Phillip-Westernport-Wilson's Promontory) and East Gippsland (Coates and Wright 2003). The species is absent from Victorian Islands even though some such as French, Phillip, Snake and Sunday Islands have large areas of apparently suitable woodland habitat (Menkhorst and Knight, 2011).

The species has dramatically declined in recent decades (Coates *et al.* 2008). Threats to the species include habitat loss and fragmentation, habitat modification, predation by introduced carnivores including foxes, cats and domestic dogs, disease, increasing urbanisation and road mortality (DoEE 2016).



3 METHODS

3.1 Desktop Assessment

Relevant literature, online-resources and numerous databases were reviewed to assess the occupancy of Southern Brown Bandicoot within the study area. The following information sources were reviewed:

- The Victorian Department of Environment, Land, Water and Planning (DELWP) Native Vegetation Information Management (NVIM) Tool (DELWP 2019);
- The Victorian Biodiversity Atlas (VBA) (DELWP 2018);
- The DoEE Protected Matters Search Tool (PMST) (DoEE 2019); and,
- Aerial photography of the study area.

3.2 Targeted Surveys

Southern Brown Bandicoot monitoring within the study area was undertaken using remote cameras and accordance with the Survey Guidelines for Australia's Threatened Species (DSEWPaC 2013) and the SPRAT advice for Southern Brown Bandicoot (DoEE 2019). Fauna surveys were conducted under the Ecology and Heritage Partners Pty Ltd research permit (#10008283) issued by DELWP under the *Wildlife Act 1975* and *Flora and Fauna Guarantee Act 1988*.

Targeted Southern Brown Bandicoot surveys were completed between 12 July and 25 September, when twelve cameras were deployed, nine within the study area and three further south along corridors of habitat connectivity to the study area. All cameras (Reconyx®) were baited and fastened to trees, fence posts or metal pickets and orientated towards an open area approximately two metres in front of the camera. Cameras were set to record an image each time the motion sensor was triggered, both day and night. The remote camera locations are illustrated in Figure 2. Two survey events were undertaken, each of 14 days in duration, and with at least one month between survey events. Surveys were conducted after rainfall events (i.e. cameras placed out a day after rain). Images from the cameras were uploaded to a computer and a qualified zoologist examined all images individually to record the fauna species present.

Active searching was undertaken to record signs of activity, including tracks, scats, nests and conical foraging holes during the deployment and collection of cameras on site. While in the field, staff actively searched for indirect evidence of the target species', including scats, characteristic diggings (Southern Brown Bandicoot) and den sites (Red Fox *Vulpes vulpes*).

3.3 Assessment Qualifications and Limitations

Data and information held within the ecological databases and mapping programs reviewed as part of the desktop assessment are unlikely to represent all observations of the target species that have occurred within, and surrounding, the study area. Further, the primary limitation of using remote sensing cameras for monitoring populations is that they provide data on the presence of a species, as opposed to the absence, or any details on population size. Absence can only be inferred through the lack of Southern Brown Bandicoot images collected during the limited window of monitoring. Considering these points, absence of Southern





Brown Bandicoots can only be suggested, with the strength of inference based on current local records, and monitoring results.

Despite the above, the survey results are accurate and relevant in determining the likely presence and importance of the study area for Southern Brown Bandicoot.



4 RESULTS

4.1 Desktop Assessment

The VBA (DELWP 2018) contains several Southern Brown Bandicoot records within 10 kilometres of the study area (Figure 3). There are multiple Southern Brown Bandicoot records within the local area, particularly along creek and drainage lines throughout the broader landscape.

4.2 Targeted Survey Results

The efforts of the targeted surveys identified Southern Brown Bandicoot individuals between 1-1.8 kilometres south of the study area. Southern Brown Bandicoot were recorded on three occasions, two records along Toomuc Creek adjacent to Wenn Road (Plate 2; Plate 3), and one record at the junction of Toomuc Creek and Watson Road. All records were within areas of exotic vegetation, within a linear patch of Blackberry *Rubus* sp. and a patch of Toowoomba Canary-grass *Phalaris aquatica*.

No individuals were recorded within the study area, however, based on the habitat present within the study area, close proximity of records from the current survey to the south and connectivity along Toomuc Creek, Southern Brown Bandicoot are considered likely to occur within the study area along the Toomuc Creek corridor. Additionally, cows present in the study area disturbed a number of cameras, knocking over three in the first survey event, and two in the second survey event.



Plate 2. Southern Brown Bandicoot recorded along Toomuc Creek, south of the study area (Ecology and Heritage Partners Pty Ltd 20/07/2019).



Plate 3. Southern Brown Bandicoot recorded along Toomuc Creek, south of the study area (Ecology and Heritage Partners Pty Ltd 30/07/2019).

In addition to Southern Brown Bandicoot, a number of exotic fauna species were recorded. Commonly encountered species included the introduced species Black Rat *Rattus rattus*, European Rabbit *Oryctolagus cuniculus*, and House Mouse *Mus musculus*. A low number of Red Fox were recorded.

4.2.1 Suitability of Habitat for Southern Brown Bandicoot

The habitat preferences of Southern Brown Bandicoot are relatively broad, with the species known to occur in a variety of habitats, including seemingly disturbed areas dominated by exotic species (e.g. Blackberry *Rubus* spp.) (Maclagan *et al.* 2018). The vegetation surrounding Toomuc Creek within and adjacent to the study area is considered to contain suitable habitat features for Southern Brown Bandicoot. This vegetation includes both native and exotic vegetation, with the understory primarily dominated by exotic shrubs, such



as Gorse *Ulex europaeus* and Blackberry (Plate 4; Plate 5). Native vegetation patches present include small linear patches of Swampy Riparian Woodland (EVC 83), which were present in a low-quality state along the banks of Toomuc Creek.

The vegetation within the majority of the study area, where the main facilities are proposed to be developed, are not considered to contain suitable habitat features for Southern Brown Bandicoot. The vegetation within this area is either exotic pasture paddocks or a wetland area and does not contain a structural shrub layer preferred by Southern Brown Bandicoot.

While the study area is not optimal habitat for Southern Brown Bandicoot, the vegetation along Toomuc Creek is considered likely to provide a habitat corridor within the broader landscape, particularly considering the high number of records to the south (Figure 3).

4.2.2 Habitat Connectivity

The study area is connected to the broader landscape by vegetation corridors along Toomuc Creek. The lack of residential development to the south, along with the two occurrences of Southern Brown Bandicoot along Toomuc Creek in the current survey efforts, indicate that the species is likely to use the creek as a dispersal corridor.

However, areas of suitable habitat for the species should be appropriately managed within the study area (e.g. predator control along with rehabilitation/revegetation activities) to enhance and augment existing areas supporting suitable habitat, in order to provide for the long-term conservation of Southern Brown Bandicoot within the broader Cardinia Shire area.



Plate 4. Exotic vegetation dominates the banks of Toomuc Creek within the study area (Ecology and Heritage Partners Pty Ltd 01/11/2018).



Plate 5. Large patches of Gorse and Blackberry provide suitable habitat for Southern Brown Bandicoot within the study area (Ecology and Heritage Partners Pty Ltd o1/11/2018).



5 IMPACTS AND MITIGATION MEASURES

A berm wall is proposed to be constructed at a distance between 50-150 meters from the eastern bank of Toomuc Creek, with the area between the berm wall and creek containing suitable habitat for Southern Brown Bandicoot. A larger development is proposed to the east of the berm wall, where a motor park is proposed, however this area did not contain suitable habitat features for Southern Brown Bandicoot.

The area between the berm wall and Toomuc Creek is not intended to be impacted, however, due to the high weed cover, it is proposed to be rehabilitated with native vegetation. A small area of the Gorse patch will be impacted by the construction of the berm wall, which was identified as suitable habitat for Southern Brown Bandicoot. Despite this loss, the vegetation within the overall area will be improved, with a focus on vegetation that provides suitable habitat for Southern Brown Bandicoot.

It is recommended that the berm wall be constructed prior to the development of the motor park, to restrict access to the area of habitat, and aid in the prevention of fauna entering into the construction site. Where appropriate, fencing should be installed to further prevent access into the construction site, however temporary escape routes may be required to prevent fauna becoming trapped within the construction area.

A Construction Management Plan/Fauna Management Plan is recommended which details management of significant fauna.



6 LEGISLATIVE AND POLICY IMPLICATIONS

This section identifies biodiversity policy and legislation relevant to the proposed development. Please refer to the detailed biodiversity report (Ecology and Heritage Partners 2019) for a complete summary of legislative requirements for the proposed development.

6.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The EPBC Act establishes a Commonwealth process for the assessment of proposed actions (i.e. project, development, undertaking, activity, or series of activities) that are likely to have a significant impact on matters of national environmental significance (NES), or on Commonwealth land. An action, unless otherwise exempt, requires approval from the Commonwealth Environment Minister if it is considered likely to have an impact on any matters of NES.

The draft referral guidelines for the endangered southern brown bandicoot (DSE 2011) include a flow chart to aid decision making in whether a referral should be submitted. Based on the current proposed action, there is uncertainty as to whether the proposed action will have a significant impact on southern brown bandicoot, as the level of impact is minimal, and mitigation measures will be put in place to aid in the rehabilitation of the effected area.

Section 7 of the draft referral guidelines (DSE 2011) highlights general guidance on when a referral may be required, based on certain impacts to the species. These recommendations are not comprehensive, and consideration should be given to all potential impacts to the species from a proposed action.

The proposed action occurs in an area mapped as 'known to occur' based on Map 4 of the referral guidelines (DSE 2011), and the species was recorded to the south of the study area during the current camera survey efforts. The key threats to southern brown bandicoot within the study area include predation via foxes, nearby land use (as a proposed future clay-target shooting range and recreational motorsport track) and inappropriate vegetation rehabilitation.

For the current development, a berm wall is proposed to be constructed along the eastern edge of an area containing suitable habitat for southern brown bandicoot. A small area (<0.1 ha) of a larger gorse patch will be impacted during the construction of the berm wall. No other impacts to areas identified as southern brown bandicoot habitat will occur, and the area between the berm wall and Toomuc Creek will be gradually rehabilitated with structurally suitable native plants which are appropriate for the EVC present along the creek. In addition, the area directly adjacent to the suitable habitat, on the opposite side of the berm wall, will be used as a clay-target shooting range. There is the potential that indirect impacts will occur to southern brown bandicoot through the noise generated by this proposed use.

If appropriate mitigation measures are instated prior to, during and post construction of the proposed action, there is likely to be a low likelihood of a significant impact to Southern Brown Bandicoot. A referral may be submitted to the Commonwealth Environment Minister for assessment under the EPBC Act for certainty regarding impacts to the species.



7 FURTHER REQUIREMENTS

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided in Table 1.

Table 1. Summary of legislative requirements.

Relevant Legislation	Implications	Further Action	
Environment Protection and Biodiversity Conservation Act 1999	Southern Brown Bandicoot were recorded between 1 – 1.8 kilometres south of the study area and are considered likely to use the vegetation along Toomuc Creek, which transects the western boundary of the study area, as a habitat corridor. Despite the presence of the species, the proposed action is considered unlikely to have a significant impact on Southern Brown Bandicoot if appropriate mitigation measures are taken to reduce impacts to the species. It is recommended to prepare a Fauna Management Plan specific to Southern Brown Bandicoot which demonstrates mitigation measures prior to, during and post construction.	Prepare a detailed Fauna Management Plan that includes mitigation measures to reduce risk of impact to Southern Brown Bandicoot from the proposed action.	
Flora and Fauna Guarantee Act 1988	Southern Brown Bandicoot are listed as threatened under the FFG Act, however a permit for impacts to FFG Act listed fauna is not required.	No further action required.	
Wildlife Act 1975	Any persons engaged to conduct salvage and translocation or general handling of terrestrial fauna species must hold a current Management Authorisation.	Ensure wildlife specialists hold a current Management Authorisation.	



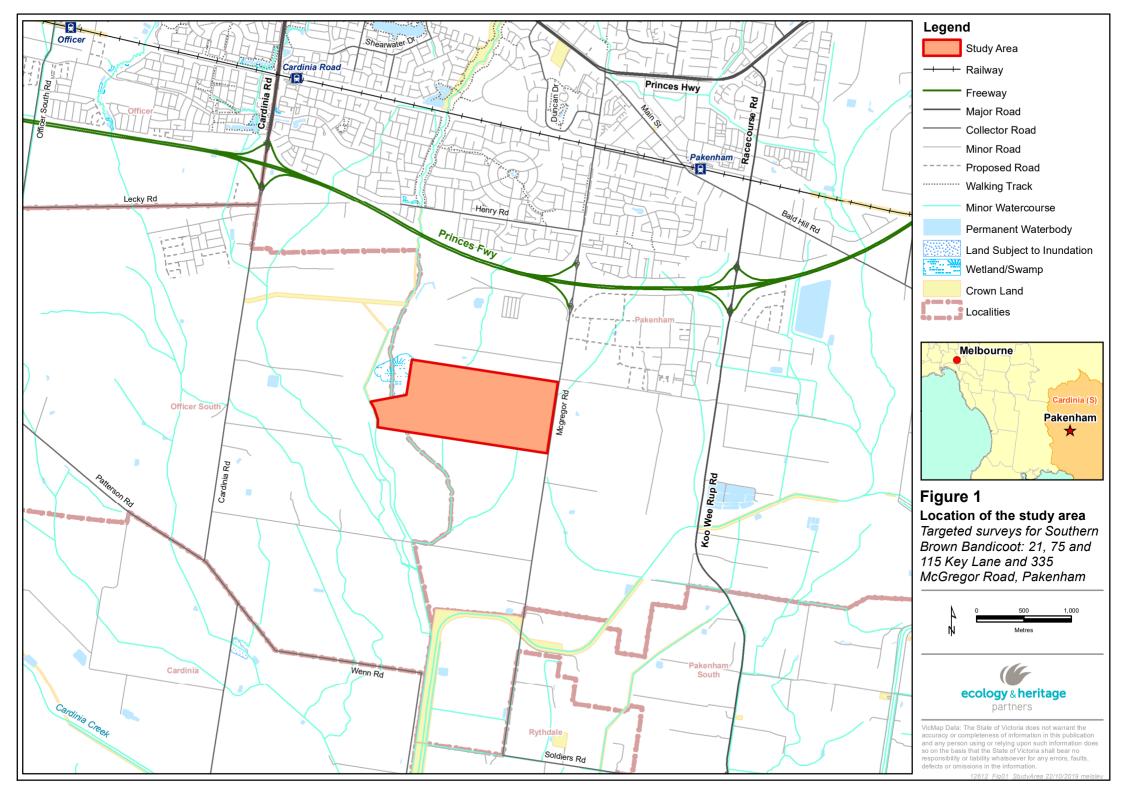
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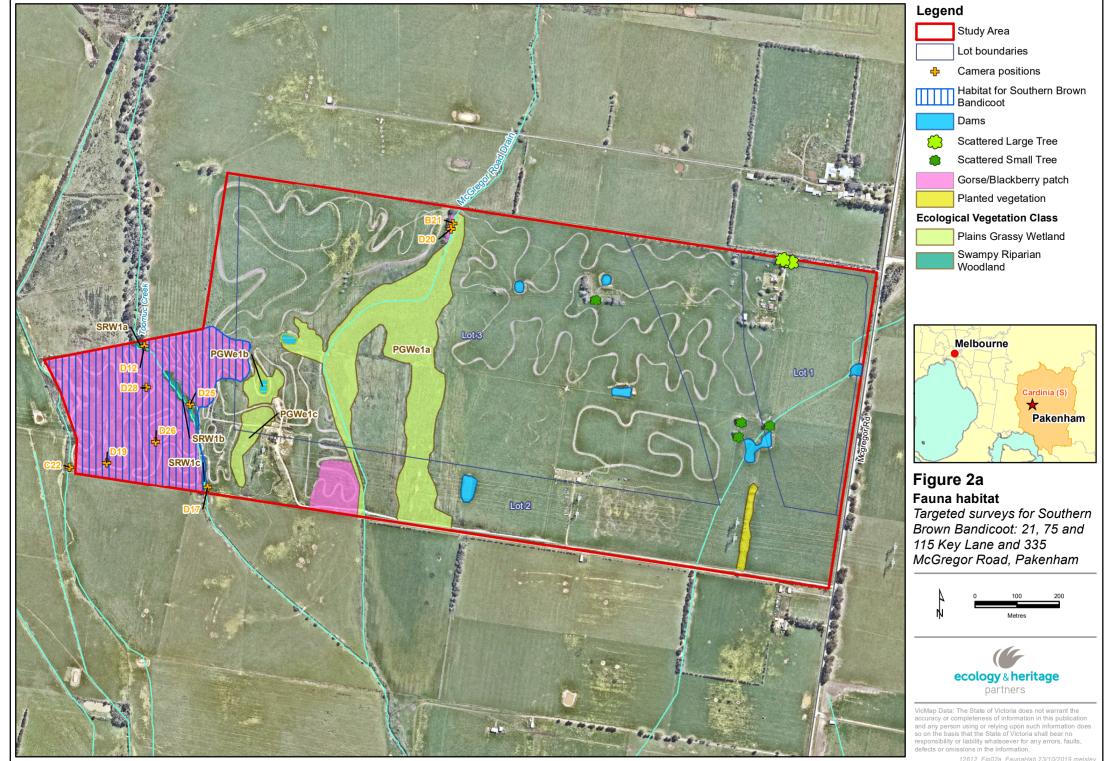
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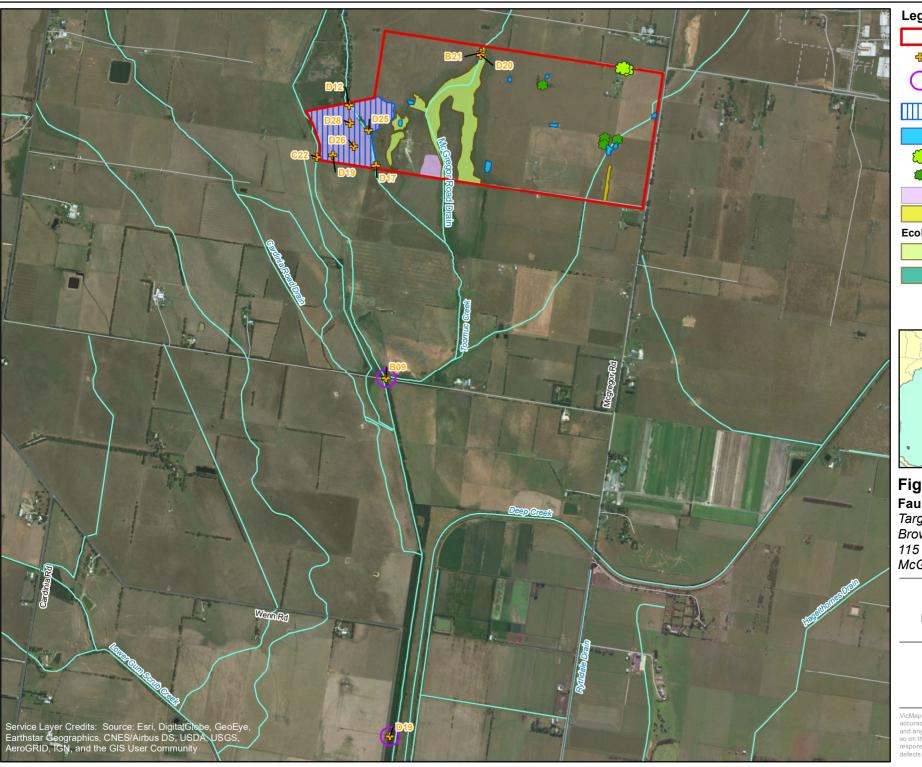


FIGURES





Aerial source: Nearmap 2018



Legend

Study Area

Camera positions

Southern Brown Bandicoot recorded

Habitat for Southern Brown Bandicoot

Dams

Scattered Large Tree

Scattered Small Tree

Gorse/Blackberry patch Planted vegetation

Ecological Vegetation Class

Plains Grassy Wetland

Swampy Riparian Woodland



Figure 2b

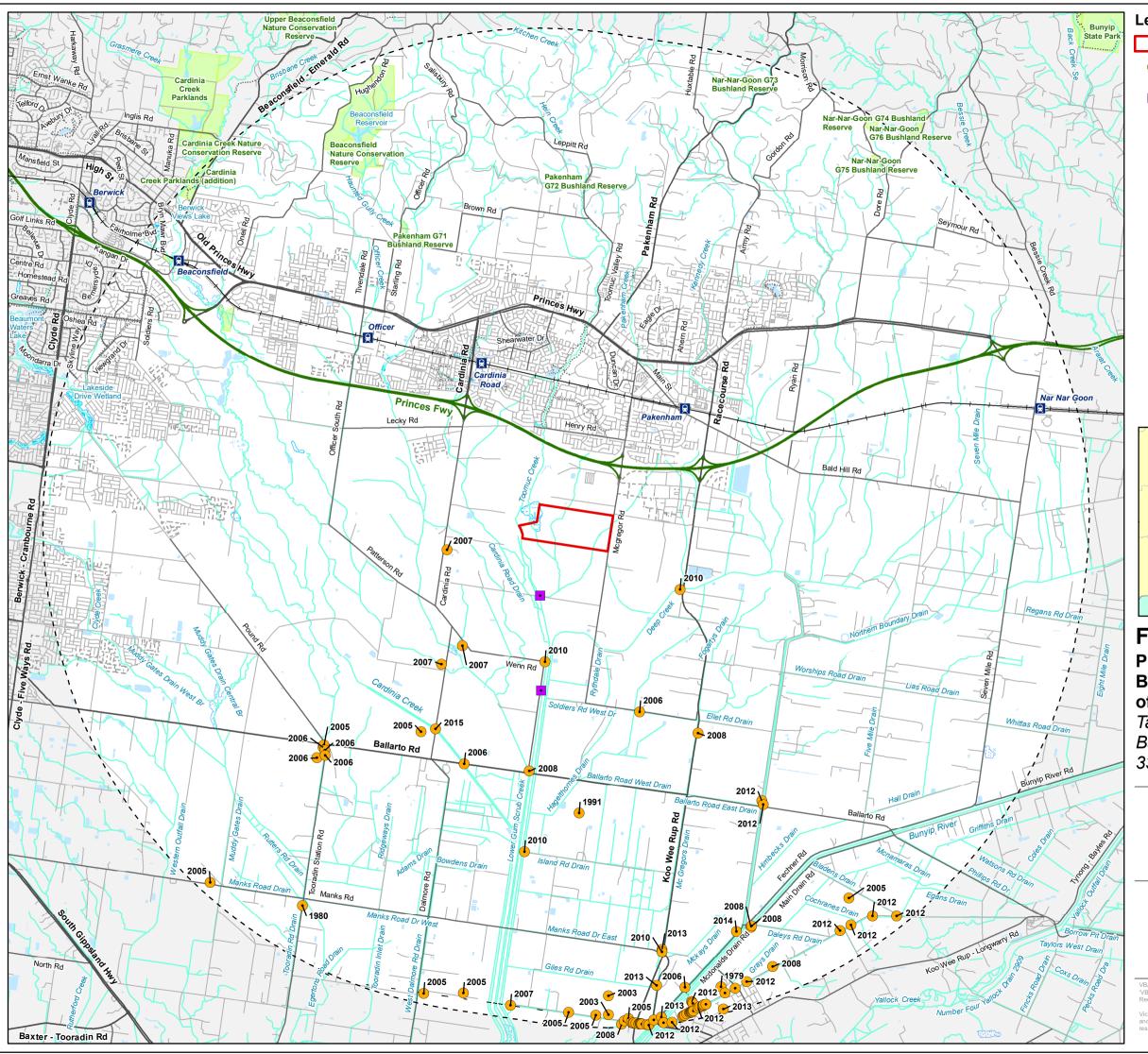
Fauna habitat

Targeted surveys for Southern Brown Bandicoot: 21, 75 and 115 Key Lane and 335 McGregor Road, Pakenham





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Legend

- Study Area
- Southern Brown Bandicoot (VBA 2018)
- Southern Brown Bandicoot (Ecology and Heritage Partners 2019)



Figure 3

Previously documented Southern Brown Bandicoot records within 10km of the study area

Targeted surveys for Southern Brown Bandicoot: 21, 75 and 115 Key Lane and 335 McGregor Road, Pakenham





/BA 2018. Victorian Biodiversity Atlas // Sourced from: "VBA_FLORA25', "VBA_FLORA100', "VBA_FAUNA25' and VBA_FAUNA100', January 2018 © The State of Victoria, Department of Environment, Land, Water and Planning. Records prior to 1949 not shown.

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