

Healesville-Koo Wee Rup Road - Southern Brown Bandicoot Survey

Project 05-69

Prepared for:

Vicroads



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Summary

Ecology Australia was commissioned by VicRoads (Metropolitan South East Region) to undertake a targeted survey for the Southern Brown Bandicoot (*Isodon obesulus obesulus*) in relation to the future upgrade of the Healesville - Koo Wee Rup Road, between the Pakenham Bypass and the South Gippsland Highway. The Southern Brown Bandicoot is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Therefore, the results of the survey will be used to gain an understanding of the status and distribution of the Southern Brown Bandicoot in areas potentially affected by the road upgrade, assist VicRoads with upgrade alignment, and identify potential implications of road upgrade in the context of the EPBC Act.

The study area falls within the Gippsland Plain Bioregion. The pre-European vegetation which would have occurred in the study area is likely to have been Swampy Woodland, Swamp Scrub and Swampy Riparian Woodland. Draining of the original Koo Wee Rup Swamp, vegetation clearance for agriculture, and channelling of watercourses has resulted in a predominantly pastoral landscape with scattered Swamp Scrub remnants along roadside drains, watercourses and at the Koo Wee Rup 'Swamp Lookout' reserve.

A hair tube survey recorded Southern Brown Bandicoots in two locations in the south of the study area: Boundary Drain Road/Station Street, Koo Wee Rup; and the 'Swamp Lookout'. Fox scats collected from adjacent to the Dandenong-Leongatha Railway Line and Bunyip River in the vicinity of Koo Wee Rup also contained Southern Brown Bandicoot hair samples. As vegetation is contiguous along drainage lines running between Koo Wee Rup township and the 'Swamp Lookout', it is expected that the bandicoot population is continuous in these areas.

No bandicoots were recorded in the north of the study area (between Deep Creek and Hall Road), or at the intersection of the South Gippsland Highway and Rossiter Road in the southeast, where Swamp Scrub remnants appear to be too small and isolated to support bandicoots. With respect to Southern Brown Bandicoots, few constraints appear to apply in the north of the Healesville – Koo Wee Rup Road study area.

Potential impacts to the Southern Brown Bandicoot in relation to the road upgrade are the loss and/or fragmentation of habitat. If the road alignment was designed to avoid areas where bandicoots occur, impacts would be less likely. While there appear to be few issues in the north of the study area (i.e. where no bandicoots were recorded), the extent of the bandicoot population is uncertain. Therefore, once the alignment of the road upgrade is refined, further habitat assessment and survey may be required.

It is recommended that VicRoads prepare an EPBC Act referral with regards to the Southern Brown Bandicoot. The design and future alignment of the road would determine whether or not a significant impact on the Southern Brown Bandicoot is likely and whether or not the works require approval from the Department of Environment and Heritage (DEH).

1 Introduction

Ecology Australia was commissioned by VicRoads (Metropolitan South East Region) to undertake a targeted survey for the Southern Brown Bandicoot (*Isodon obesulus obesulus*) in relation to the future upgrade of the Healesville - Koo Wee Rup Road, between the Pakenham Bypass and the South Gippsland freeway.

The Southern Brown Bandicoot is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is recognised as Near Threatened in Victoria (DSE 2003a). This species was identified as potentially occurring within the environs of the Healesville - Koo Wee Rup Road in a previous flora and fauna desktop review of the roadway conducted by Ecology Australia (Crowfoot et al. 2005).

This document reports on the results of a survey for the Southern Brown Bandicoot along the Healesville - Koo Wee Rup Road and discusses potential impacts from the proposed road upgrade and the EPBC Act implications. The results of this survey will assist VicRoads in determining options for the future upgrading of the road along its current alignment.

1.1 Study Area

The final alignment for the road upgrade has not been decided, but is likely to include road-widening on both sides of the existing Healesville – Koo Wee Rup Road. Thus, for the purposes of this survey, the study area included a 100 m strip either side from the centre of the existing road. From north to south, the study area extended from the area of the proposed Pakenham Bypass to the South Gippsland Highway, Koo Wee Rup (Figure 1). Five areas previously identified as supporting potential Southern Brown Bandicoot habitat (in this case, mostly Swamp Scrub remnants, but also large thickets of the exotic blackberry *Rubus* sp.) were targeted (see Crowfoot et al. 2005):

- A. south of Deep Creek to Hall Road;
- B. Station Street (a continuation of the Healesville - Koo Wee Rup Road which runs into the Koo Wee Rup township) and Boundary Drain Road;
- C. adjacent to the Dandenong – Leongatha Railway line and Bunyip River;
- D. Koo Wee Rup ‘Swamp Lookout’; and
- E. the corner of Rossiter Road and the South Gippsland Highway (see Figure 2).

The study area falls within the Gippsland Plain Bioregion. The pre-European Ecological Vegetation Classes (EVCs) which would have occurred within the study area are likely to have been Swampy Woodland, Swamp Scrub and Swampy Riparian Woodland (Oates and Taranto 2001; Crowfoot et al. 2005). Much of the study area and surrounds originally formed part of the Koo Wee Rup Swamp prior to drainage, vegetation clearance and watercourse leveeing. It is now

characterised by a pastoral landscape with remnants of vegetation (e.g. degraded Swamp Scrub remnants in paddocks, along drainage lines, creeks and the Healesville - Koo Wee Rup Road), residential gardens and non-indigenous planted roadside trees (e.g. Southern Mahogany, Spotted Gum). Considerable areas of remnant vegetation occur along the six watercourses draining into Westernport Bay and running to the northwest of the Koo Wee Rup township and through the Swamp Lookout reserve. These watercourses include the Healesville- Koo Wee Rup Road Drain, McDonalds Drain, McDonalds Road Drain west, the Bunyip River, Main Road Drain and Boundary Road Drain.

These watercourses flow into the Western Port Ramsar Wetland Site (ANCA 1996; DSE 2003b). Ramsar wetlands are internationally important wetlands listed under the International Convention on Wetlands (i.e. the Ramsar Convention). These wetlands are important especially in regard to total numbers and/or numbers of species of waterbird, and are also matters of national environmental significance listed under the EPBC Act.

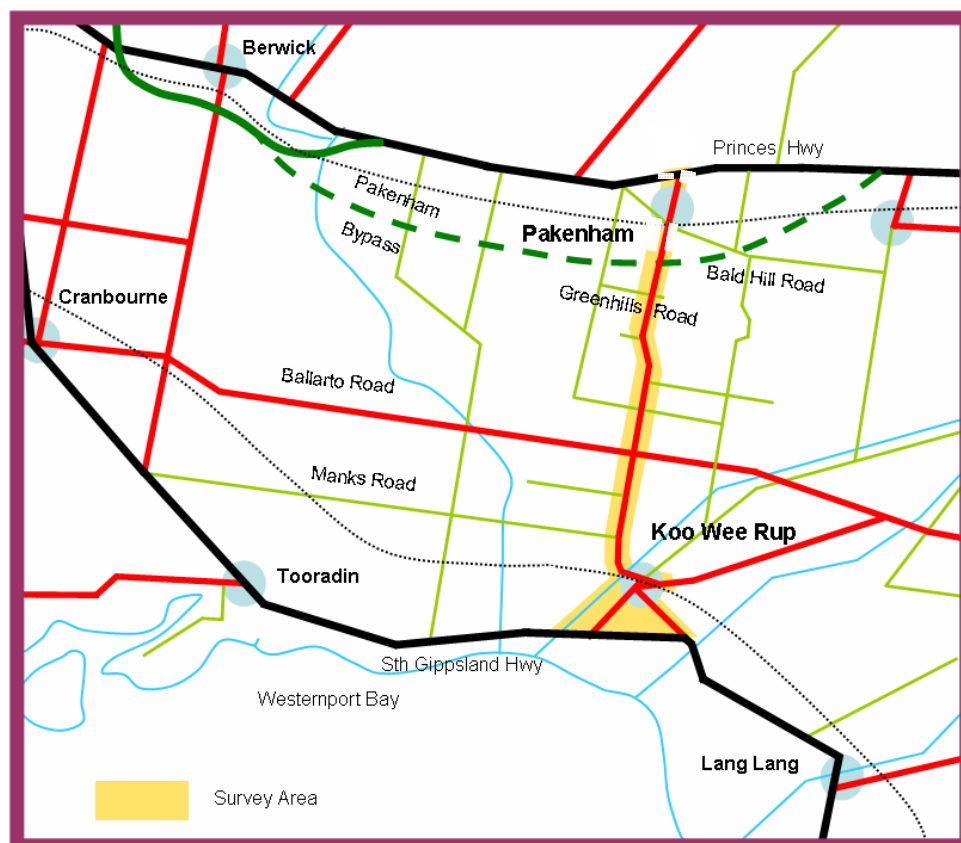


Figure 1 Study area (yellow)

2 Methods

The study area was visited on the 5 and 19 October 2005. Two methods were employed to assess the status of the Southern Brown Bandicoot: hair-funnel sampling and predator scat analysis.

2.1 Hair-tube sampling

Hair-tubes are injection-moulded ‘half-tubes’, with glue-covered plastic wafers placed, and secured, across their ceiling. The funnel is baited with salami. Fauna attracted to the scent of the bait enter the funnel leaving behind hairs that brush against the sticky wafer. Mammals have a unique hair structure and hair samples may be identified to species level (Brunner and Coman 1974; Brunner and Triggs 2002).

Sixty hair-funnels (Faunatech Pty Ltd) were set along eight transect lines (see Figure 2). Funnels were spaced at 10 – 20 m intervals and placed on the ground. All wafers were forwarded to Dr. Hans Brunner (Consulting Scatologist, Frankston) for identification of hair samples.

2.2 Predator Scat Analysis

Analysis of predator (Fox, Cat and Dog) scats is also a useful means of detecting mammal (prey) species. Hair samples (and bone fragments) of mammals are teased apart from scats, and identified to species level via their unique hair structure (Brunner and Coman 1974; Brunner and Triggs 2002). Predator scats collected from the study area were forwarded to Dr. Hans Brunner for identification of mammal species. The main limitation with the technique is that carnivores have large home ranges. Subsequently, caution must be exercised when assessing the prey species distribution in an area from such records, as species appearing in predator scats may not necessarily occur where scats are deposited.

3 Results

Of the 60 hair-tubes, 20 (33%) yielded hair, with Southern Brown Bandicoot (SBB) hair identified in seven of those 20 tubes. Southern Brown Bandicoot hair samples were found in two main areas, these included: west of Koo Wee Rup Township – south of Station Street and along Boundary Drain Road (Site B); and at the Koo Wee Rup ‘Swamp Lookout’ on the South Gippsland Highway (Site D).

Several Fox (*Vulpes vulpes*) scats were collected from adjacent to the Dandenong – Leongatha Railway Line and Bunyip River (Site C). Hair in these scats was identified as coming from the Southern Brown Bandicoot and Swamp Rat (*Rattus lutreolus*).

Other species recorded in the hair-funnels were the native Swamp Rat and Bush Rat (*Rattus fuscipes*), and the exotic House Mouse (*Mus musculus*) and Black Rat (*Rattus rattus*).

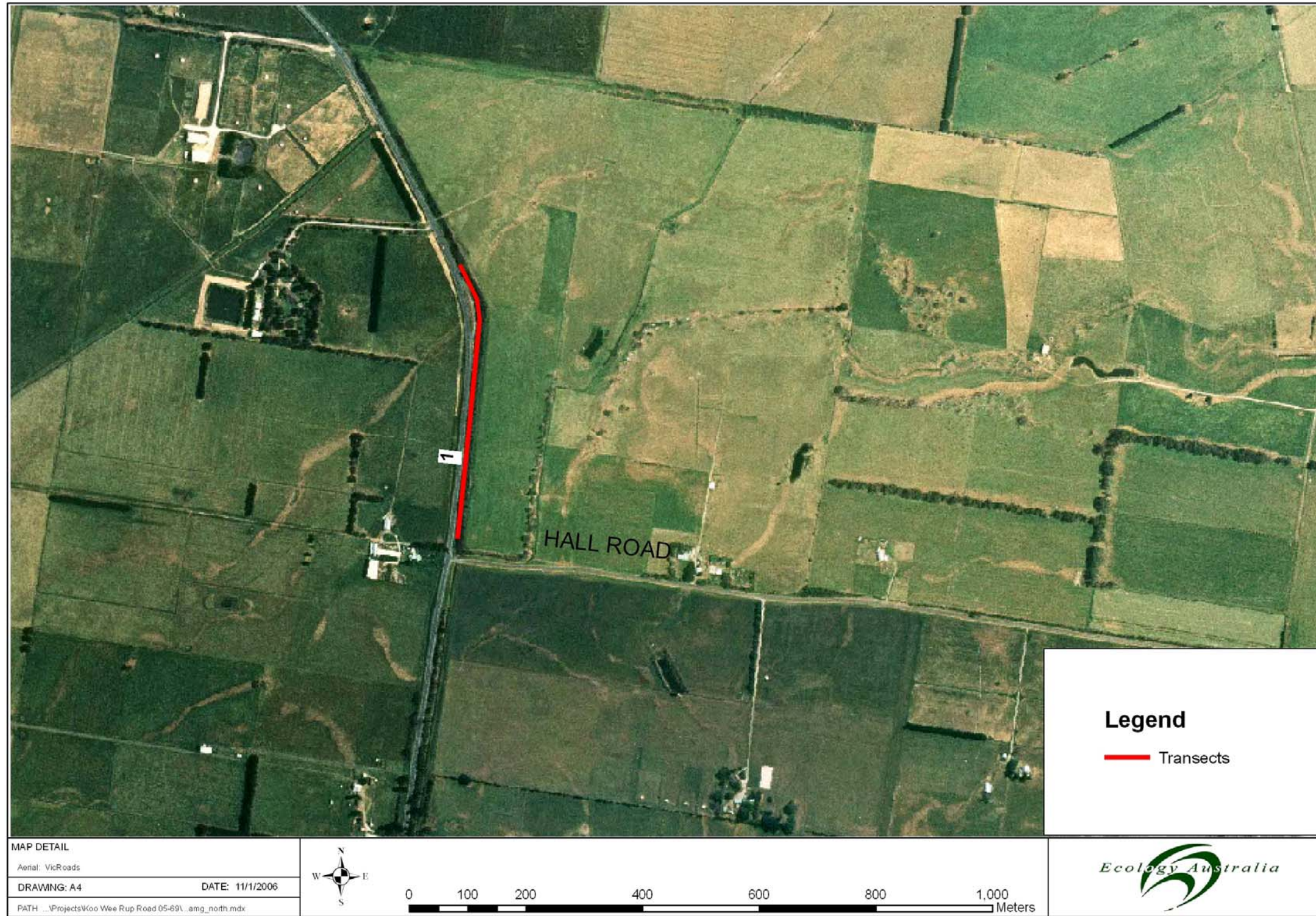


Figure 2 Location of hair-tube transect one.



Figure 3 Locations of hair-tube transects two to eight, and the occurrence of the Southern Brown Bandicoot (SBB).

Table 1 Hair-tube results from Healesville - Koo Wee Rup Road reserve, October 2005.

Site	Description	Transect Number	Location (start of transect)	Species	Detection Method
A	South of Deep Creek to Hall Road	1	367704 E 5779345 N	Black Rat	Hair -funnel
				House mouse	Hair-funnel
				Swamp Rat	Hair -funnel
B	Boundary Drain Road, Koo Wee Rup	2	366878E 5771200N	Southern Brown Bandicoot	Hair -funnel
				Black Rat	Hair -funnel
	Station Street (south side road reserve), Koo Wee Rup	3	367184E 5771117N	Southern Brown Bandicoot	Hair -funnel
				Bush Rat	Hair -funnel
C	Adjacent to the Dandenong – Leongatha Railway and Bunyip River	4	366619E 5771150N	Southern Brown Bandicoot	Fox Scat Analysis
				Swamp Rat	Fox Scat Analysis
				Bush Rat	Fox Scat Analysis
				Fox	Scat found
		5	366383E 5770810N	Bush Rat	Hair-funnel
D	Koo Wee Rup 'Swamp Lookout'	6	365179 E 5769461 N	Southern Brown Bandicoot	Hair-funnel
				7	364979E 5769456N
E	The corner of Rossiter Road and the South Gippsland Highway	8	365966E 5769684N	Swamp Rat	Hair-funnel
				Bush Rat	Hair-funnel

4 Discussion

4.1 Southern Brown Bandicoot Distribution

Southern Brown Bandicoots were formerly more widespread southeast of Melbourne prior to intensive agricultural or urban development (Menkhorst and Seebeck 1990; Meknhorst 1995; AVW, DSE 2004).

Records presented in earlier Ecology Australia studies and the AVW (DSE 2004) suggest that the Southern Brown Bandicoot is sparsely scattered in areas surrounding the Healseville – Koo Wee Rup Road study area (e.g. Bayles) (see Bedggood and Williams 2002; Williams 2002; DSE 2004; Quin et al. 2004, 2005a,b). Aside from recent records presented in these earlier studies (e.g. Yallock Creek upstream and downstream of Bayles, Bayles Fauna Park), it is known from the Longwarry Road between Nar Nar Goon and Longwarry (Bruce Bell, Bayles Fauna Park, pers. comm.). These include:

- three records from Bayles, c. 9 km northeast of Koo Wee Rup (1976, 1977 and 1979);
- eight records from around Garfield (1967-1991), c. 20 km northeast of Koo Wee Rup;
- five records from around Lang Lang (1970, 1971 and 1995), ranging from 11 - 25 km southeast of Koo Wee Rup;
- one record from Cardinia Creek (1971), c. 1 km west of the Koo Wee Rup Swamp Lookout;
- three records from the South Gippsland Highway 3 km west of the Koo Wee Rup Swamp Lookout (1989, 1990 and 1992);
- five records from around Tooradin (1971 – 2 records, 1979, 1980 and 1985), c. 7 km west of Koo Wee Rup Samp Lookout;
- four records from Warneet (1971 – 3 records, 1974), which is c. 12 km west of the Swamp Lookout;
- one record from McAlpine Road and adjacent to the South Gippsland Railway (2002), c. 10 km west northwest of Koo Wee Rup;
- two records from 6 km southeast of Cranbourne (1971 and 1974), which is c. 12 km west northwest of Koo Wee Rup;
- one record from along Ballarto Road at Dalmore East (1991), c. 4 km west of the study area; and
- numerous records from the Royal Botanic Gardens Annexe at Cranbourne (c. 20 km northwest of Koo Wee Rup) where the species is known to persist.

Hence, the records of Southern Brown Bandicoots obtained during this survey are significant. Given the hair tube survey results and fox scat analysis, which provided records of bandicoots along Station Street, Koo Wee Rup, and the Swamp Lookout to the south, it is most likely that bandicoots are continuously distributed between Koo Wee Rup and the 'Swamp Lookout', along the six drainage lines which support considerable areas of native vegetation. Though narrow and interspersed with the drainage lines, these strips of vegetation run for c. 2.5 km.

Whether the bandicoot occurs to the north of Site B, as these linear strips of habitat continue for some distance to the north, is not known. Furthermore, none were recorded in Swamp Scrub remnants along the Healesville - Koo Wee Rup Road south of Deep Creek to Hall Road, and at the intersection of Rossiter and the South Gippsland Highway, suggesting that these remnants are too small and isolated for bandicoots.

Hence, contemporary records suggest that, within a 25 km radius of the study area, the Southern Brown Bandicoot persists at:

- Koo Wee Rup, between Koo Wee Rup and the Swamp Lookout;
- Bayles;
- Longwarry Road between Nar Nar Goon and Longwarry;
- Along the South Gippsland Railway e.g. adjacent to McAlpine Road; and
- Cranbourne.

The species was formerly known from the Unimin Quarry at Lang Lang (c. 20 km southeast of Bayles), though a survey by Ecology Australia did not confirm recent reported sightings of this species at the Quarry (Moysey et al. 2005).

Remnant vegetation suitable for Southern Brown Bandicoots at these locations is isolated by vast areas of open pastoral land (e.g. see Quin et al. 2005a and Figure 4). Thus, these populations are probably small and effectively isolated from one another.

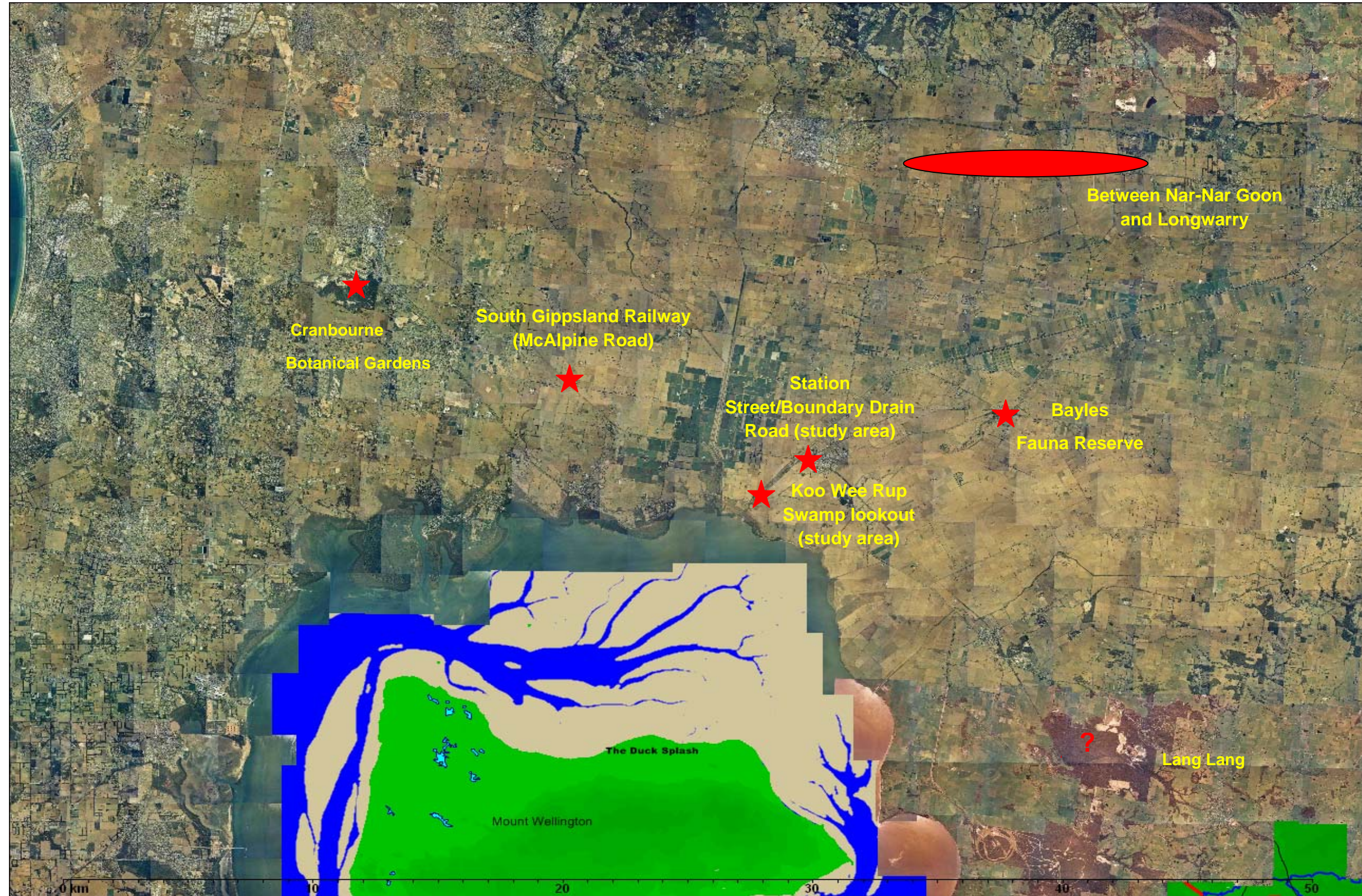





Figure 4   Known populations of Southern Brown Bandicoots in the South-east of the greater Melbourne region.
 Southern Brown Bandicoots previously recorded (latest record 1995), moderate likelihood of occurring.

4.2 Southern Brown Bandicoot Habitat and Habitat Availability

In Victoria, the Southern Brown Bandicoot occupies heathy forest and woodland, coastal heathland, Swamp Scrub (*Malaleuca ericifolia*), sedgy woodland along drainage lines and grassy areas bordering dense vegetation (e.g. thickets of blackberry, sedges and tussocks) (Stoddart and Braithwaite 1979; Menkhorst and Seebeck 1990; Menkhorst 1995; Ecology Australia, unpublished data). For example, at Bayles in a similar environment to that at Koo Wee Rup, potential sheltering habitat was identified as Swamp Scrub and Swampy Woodland of Bayles Fauna Park, patches of Swamp Scrub along Yallock Creek, degraded Swamp Scrub and other vegetation along road reserves, Boxthorn bushes and Common Reed beds (*Phragmites australis*) adjacent to the bridge over Yallock Creek. Feeding habitat included grassy/sedgy areas of the Fauna Park and open grassy areas bordering dense vegetation, such as the Yallock Creek floodplain, pasture and road reserves (Williams 2002; Quin et al. 2004, 2005a).

Habitat within the Study Area

The areas supporting potential Southern Brown Bandicoot habitat which were targeted during the surveys mostly included Swamp Scrub remnants, but also large thickets of exotic Blackberry (**Rubus* sp.). Generally, Swamp Scrub habitat is dominated by: Swamp Paperbark, Wattles (*Acacia* spp.), Common Reed, Blackberry, Broom (**Genista* sp.) and exotic grasses. Swamp Scrub remnants within the study area are significantly reduced in size and heavily disturbed by grazing and weed invasion, particularly Blackberry.

Patches of remnant Swamp Scrub along the Healesville – Koo Wee Rup road reserve in the north are narrow, small and isolated from other remnant vegetation. Surveys in this area (i.e. between Deep Creek and Hall Road) failed to detect bandicoots. While the habitat appears suitable, it is likely that bandicoots do not occur as the habitat is too small and isolated.

Patches further south (i.e. Station Street, Boundary Drain Road running east, perpendicular to Healesville-Koo Wee Rup Road and vegetation adjacent to McDonalds Drain and Bunyip River) are degraded and heavily infested with Blackberry. However, these patches provide good habitat for bandicoots, as the dense thickets provide shelter and nesting opportunities, a food source from the Blackberry fruits and protection from predators (e.g. foxes). These patches extend south-west to the Koo Wee Rup ‘Swamp Lookout’ where bandicoots were detected during this survey.

Good habitat also occurs at the Koo Wee Rup ‘Swamp Lookout’. This habitat has a canopy of Swamp Paperbark and a sedgy understorey dominated by Spiny-headed Mat-rush (*Lomandra longifolia*), *Gahnia* sp. and tall grass tussocks. Many conical diggings (typical of bandicoots) were found here and five of the eight hair-tubes had bandicoot hair.

4.3 Potential Impacts

The greatest threat to the Southern Brown Bandicoot in relation to the Healesville - Koo Wee Rup Road upgrade is the loss and/or fragmentation of habitat. Ideally, the design would avoid areas where bandicoots occur (see above and Figure 3). These areas include the Swamp Scrub remnants along Station Street, Boundary Drain Road (runs eastwards, perpendicular to the Healesville-Koo Wee Rup Road), the six drainage lines (i.e. Healesville - Koo Wee Rup Road Drain, McDonalds Drain, McDonalds Road Drain west, Bunyip River, Main Road Drain and Boundary Road Drain) and at the Koo Wee Rup 'Swamp Lookout'. If the alignment was designed to avoid these areas, impacts to bandicoots would probably not occur.

There appear to be few issues in the north of the study area (i.e. where no bandicoots were recorded). However, the extent of the bandicoot population (or suitable habitat) along the drainage lines to the north of Station Street is uncertain. Therefore, once the alignment of the road upgrade is refined, further habitat assessment and survey may be required.

4.4 EPBC Act Implications

The *Environment Protection and Biodiversity Conservation Act 1999* pertains to matters of national environmental significance, for example Ramsar Wetlands and listed threatened species (e.g. Southern Brown Bandicoot). The proponent is obliged to refer matters to the Commonwealth Environment Minister if such values, such as an 'important population' of a threatened species, may be affected by a proposed action. The Department of Environment and Heritage (DEH) decides whether there will be a significant impact and if it needs to be a 'controlled action'.

In the case of the proposed works associated with the Healesville-Koo Wee Rup Road upgrade, it is recommended that VicRoads prepare an EPBC Act referral with regards to the Southern Brown Bandicoot. The design and future alignment of the road would determine whether or not a significant impact on the Southern Brown Bandicoot is likely, and therefore whether it should be referred as a 'controlled' or 'non-controlled' action.

5 References

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6 Acknowledgments

We would like to thank the following people for assistance with the production of this report:

- Bruce Bell (Bayles Fauna Park);
- Dr. Hans Brunner (Consulting Scatologist, Frankston);
- Lisa Crowfoot and Lawrie Conole (Ecology Australia);
- Tony Hillman and Terry Dexter (VicRoads); and
- Aaron Organ (Ecology Partners).

Appendix 1 VicRoads Assignment Task Brief

3.02.1 Purpose

Ecology Australia will undertake flora and fauna surveys along the Healesville - Koo Wee Rup Road reservation and immediate surrounds. The primary purpose of the surveys will be to determine the presence/absence of rare plants (particularly River Swamp Wallaby-grass) and of the Southern Brown Bandicoot.

3.02.2 Background

A planning study is being undertaken to determine options for the future upgrading of the Healesville - Koo Wee Rup Road (refer Figure 1). It is expected that the development of Healesville - Koo Wee Rup Road will consist of the duplication of the existing road between the Pakenham Bypass and McDonalds Drain. At the southern end it is proposed to construct a bypass of Koo Wee Rup on a new alignment to the west of the township between McDonalds Drain and the South Gippsland Highway.

A flora and fauna desktop review has been undertaken for the route by Ecology Australia. The findings of this review are contained in a report dated July 2005.

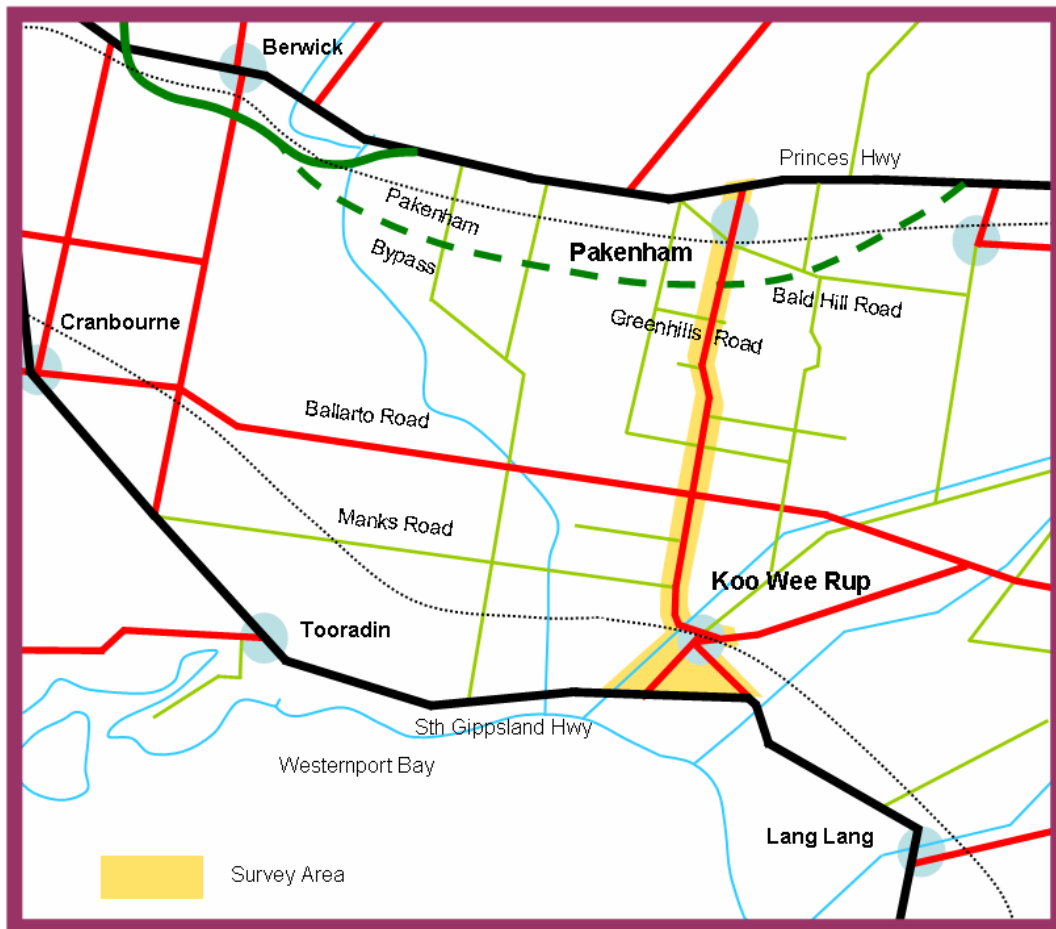


Figure 1 :

Healesville – Koo Wee Rup Road, Princes Highway to South Gippsland Highway

3.02.03 Services to be Provided by the Consultant

Standard Requirements

- a) VicRoads’ Environment Strategy

The VicRoads’ Environment Strategy sets the environment policy framework within which VicRoads operates and consultants should be familiar with the Strategy.

- b) Permits

The Consultant shall ensure that they have all necessary permits for undertaking the investigations and that all work be carried out in accordance with these permits.

Survey Tasks

Field work, collation of data and reporting as set out in the Proposal.

The rare plant survey would be undertaken in October/November. The main species in question is River Swamp Wallaby grass, which is best surveyed at this time.

The Southern Brown Bandicoot work would entail a hair tube survey of Swamp Scrub remnants along the existing road and top banks of the watercourses/drains at Koo Wee Rup where considerable remnant vegetation is present, and at the intersection of Rossiter Road and the South Gippsland Highway. This work would involve two zoologists placing the hair tubes in the field over two days, leaving the tubes in place for two weeks, collecting them, and sending the hair tube wafers with hair samples to Dr. Hans Brunner for identification of the hair. This would be undertaken in early to mid-spring (September and/or October) to avoid hotter months when the by-catch of reptiles is higher.

The study area for the survey shall include:

- The existing road reservation for Healesville-Koo Wee Rup Road between the Pakenham Bypass and McDonald's Drain, and a 100 m wide strip each side of the reservation boundary.
- The area bounded by McDonalds Drain (Bunyip River), South Gippsland Highway and Sybella Avenue plus a 100m wide strip along the north-west edge of McDonalds Drain (Bunyip River).

3.02.04 Information to be Supplied by Corporation to Consultant

VicRoads will provide copies of all previous reports and other relevant information.

VicRoads will provide available aerial photos (if required) and plans showing the corridors.

Whilst not expected to be required, VicRoads will arrange, as far as possible, access to private property or will inform the consultant where access is not available or of any known special requirements for access. The Consultant will be fully responsible for contacting all owners prior to entering their property.

VicRoads will co-ordinate liaison with other specialist consultants as required.

3.02.05 Information to be Provided by the Consultant to the Corporation

The consultant shall supply VicRoads with a report for each survey, as set out in 3.02.08, Deliverables.

HP It is anticipated that the Southern Brown Bandicoot survey will be completed within two (2) weeks of the commencement of the contract. A draft report will be presented to VicRoads within two (2) weeks. VicRoads will review the report and within two (2) weeks accept, reject or suggest amendments to it for inclusion into the final report. A final report shall then be submitted within two (2) weeks from the date of receipt of VicRoads response to the draft report.

It is anticipated that the Rare Plant (River Swamp Wallaby grass) survey and draft report will be completed within eight (8) weeks of the commencement of the contract. VicRoads will review the report and within two (2) weeks accept, reject or suggest amendments to it for inclusion into the final report. A final report shall then be submitted within two (2) weeks from the date of receipt of VicRoads response to the draft report.

3.02.06 Methodology

a) General

The Consultant shall conduct the Assignment in accordance with the methodology submitted to and approved by VicRoads, prior to the commencement of the survey.

b) Liaison with VicRoads

On all contractual matters, the Consultant shall liaise only with the Superintendent or the Superintendent's Representative.

The VicRoads Superintendent's Representative for the assignment will be Mr Tony Hillman. The contact details are as follows:

Phone: (03) 9881 8078
Email: tony.hillman@roads.vic.gov.au

3.02.07 Reporting

The Consultant shall notify VicRoads immediately on the commencement and completion of any field work or discovery of any significant issues which arise as a result of the investigations and notify VicRoads immediately of any other issues that VicRoads should be made aware of.

3.02.08 Deliverables

Draft and Final Reports

- One bound copy and one unbound copy of the Draft Report should be presented to VicRoads for comment and review.
- Three bound and one unbound copy of the Final Report should be presented to VicRoads including colour plans as deemed required.
- An electronic copy of the Final Report should be provided to VicRoads on a disc in Microsoft Word format and in Adobe Portable Document File (pdf) format.
- All reports shall contain an executive summary
- All reports shall contain a copy of the Consultant Task Brief as an Appendix (i.e. Section 3.02 of this contract)
- All reports shall conform to the following requirements:-
 - Binding margin : 25mm
 - Open margin : 10mm

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- In practical terms, provide the 25mm margin on both sides of each page so that VicRoads can produce double-sided documents.
 - Top margin : 10mm
 - Bottom margin : 10mm
 - Start each section on the right hand page.
 - Have fonts generally no smaller than 12 point.
 - Start Chapter 1 on the right hand page. Start all other chapters as they occur.
 - First page of Chapter 1 is Page 1.
 - All preceding pages to be in Roman numerals.
 - Odd numbered pages to be right hand pages.
 - Be consistent with style. Use Commonwealth Style manual or similar.
 - Minimise use of colour figures and photographs. Colour figures should be capable of being reproduced in black and white.
 - Supply clean artwork (not photography)
 - Supply unfolded plans if greater than A4 size.
 - Supply loose photographic prints.
 - Where continuous alignment drawings are broken down to A3 size drawings, all annotation and text shown on the continuous alignment drawings must be self contained within each A3 drawing.