BILFINGER BERGER

Terrestrial Fauna Monitoring Program

ALBURY-WODONGA NATIONAL HIGHWAY MAINTENANCE PROJECT

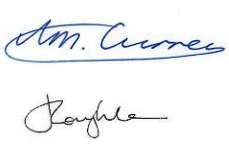
YEAR 1

AUGUST 2009

nghenvironmental

Document Verification

Job title: Terrestrial Monitoring Program, Albury-Wodonga National Hghway Project.

Document Title		Terrestrial Monitoring Program					
File Name		\\Nghwagga\wagga-active\Projects\2009\Bilfinger Berger\Albury Bypass Maintenance\Flora and Fauna Monitoring\Fauna Monitoring\1st Year Trapping Works (Sept 08 and Apr 09)\Reporting					
Revision	Date	Prepared by Amy Currey and Jacqui Coughlan		Checked by Jacqui Coughlan		Approved by Erwin Budde	
Draft	22.7.09	name		name		name	
Final	24.08.09	name		name		name	

nghenvironmental prints all documents on sugar cane paper made from 100% bagasse (a by-product of sugar production).

*102/63-65 johnston st **wagga wagga** nsw 2650 australia **t** 61 2 6971 9696 **f** 61 2 6971 9693*

***web**: www.nghenvironmental.com.au **email**: ngh@nghenvironmental.com.au*

206/410 elizabeth st surry hills
nsw 2010 australia
***t** 61 2 8202 8333 **f** 61 2 9211 1374*

1/216 carp street (po box 470) bega
nsw 2550 australia
***t** 61 2 6492 8333 **f** 61 2 6494 7773*

suite 4/4, 234 naturaliste terrace
dunsborough
wa** 6281 **australia
***t** 61 8 9759 1985 **f** 61 2 6494 7773*

Table of Contents

1 BACKGROUND

1.1 PROJECT BACKGROUND

The new Albury-Wodonga National Highway, which is approximately 14.7 kms in length, was opened to the public on the 6th March 2007, linking the Hume Highway in Wodonga (Victoria) with the Hume Highway at Ettamogah, just north of Albury (New South Wales). The main objective for constructing this new dual carriageway highway was to strengthen the major transport link that connects the two major cities of Sydney and Melbourne, along with improving safety to road users along this section of the freeway.

An Operational Environmental Management Plan (OEMP) for the Albury-Wodonga Hume Freeway Project (AWNHP) was prepared to provide Abigroup Pty Ltd and Bilfinger Berger Services (BBS) a system that establishes and maintains best practice controls to manage potential environmental impacts during the operational phase of the Albury-Wodonga Hume Freeway project.

A total of 27 Ministerial Conditions were associated with the operational phase of this project with the monitoring of threatened terrestrial fauna species required under Condition of Approval (COA) Number 51. This COA requires the preparation of a "*threatened species management procedure addressing requirements for minimising habitat disturbance, remediation of degraded habitat, monitoring procedures and training. All reasonable measures shall be taken to ensure minimal harm and/or risk to threatened species during operation"*.

nghenvironmental have been engaged by Bilfinger Berger (BBS) to undertake the threatened species monitoring to ensure that the above COA is met.

1.2 THREATENED SPECIES IDENTIFICATION

The original EIS (GHD 1995) identified a total of 12 threatened species (listed on the schedules of the *Threatened Species Conservation Act 1995* (NSW) (TSC Act) that could potentially occur in the route corridor. In 1999 legislation changes were made with the introduction of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act) and additional species listed under the TSC Act. Woodland bird species that were identified in the original EIS (1995), occurring along the proposed internal route, where the highway now runs and updated Environmental Review undertaken by the RTA (2003) to accommodate new legislation changes included the Turquoise Parrot (*Neophema pulchella*), Superb Parrot (*Polytelis swainsonii*), Black Chined Honeyeater (*Melithreptus gularis gularis*), Painted Honeyeater (*Grantiella picta*), Regent Honeyeater (*Xanthomyza phrygia*), Brown Treecreeper (*Climacteris picumnus victoriae*), Bush Stone Curlew (*Burhinus grallarius*), Hooded Robin (*Melanodryas cucullata cucullata*), Diamond Firetail (*Stagonopleura guttata*), Speckled Warbler (*Pyrrholaemus saggitatus*), and Barking Owl (*Ninox connivens*), with the AWNHP potentially impacting on the Swift Parrot and Regent Honeyeater.

Since approval in January 1998, additional investigations and design development was undertaken for microchiropteran bats and avifauna species identified above. Additional investigations in regards to the Squirrel Glider (*Petaurus norfolcensis*) were also undertaken. During surveys for the Albury Wodonga Development Corporation (AWDC) threatened species conservation strategy undertaken in 2003 the Black Chinned Honeyeater was found utilising creek line areas and planted revegetation areas near Thurgoona, while the Brown Treecreeper and Barking Owl were also recorded. A pair of

breeding Barking Owls was observed roosting in a large River Red Gum (*Eucalyptus camaldulensis*) approximately 100 m north of the Murray River near the main channel (Taylor 2002). Research on this breeding pair suggests that they have bred at the site for three successive years from 2000 (Taylor, 2002). Barking Owls are listed as Vulnerable on the NSW TSC Act.

It was noted in the original EIS / EES that the Squirrel Glider (*Petaurus norfolcensis*) may potentially occur within the Highway alignment however this species was not expected to be present as it was last recorded in the area in 1954. More recent studies have indicated that the study area contains a viable Squirrel Glider population, particularly between Billy Hughes Bridge and Thurgoona Drive. Similarly, surveys undertaken for the AWDC by Davidson and Datson in 2003 revealed the presence of the Squirrel Glider within the Thurgoona region. Squirrel Gliders are believed to inhabit the creek line areas near Eight Mile Creek, approximately 4 kms north of Thurgoona Drive and near the Thurgoona area.

The Charles Sturt University (CSU) Johnston Centre was engaged in 2003 to undertake additional 7 Part tests for the Squirrel Glider with the assessment concluding that the project would act as a barrier to movement of the Squirrel Gliders along the Murray River and across the Thurgoona region, reducing the home range of some individuals and passages for dispersal. The project was also likely to result in the isolation of suitable Squirrel Glider habitat. Squirrel Gliders are listed as vulnerable on the NSW TSC Act.

1.3 TIMING

This is a five year monitoring program with surveys being conducted bi-annually in spring and autumn commencing in spring (September) 2008 and concluding in autumn 2012. An annual report will be prepared after completion of the autumn survey period each year.

The annual report will be sent to the BBS maintenance contractor (Maintenance Project Manager) for internal review, and then provided onto the NSW Roads and Traffic Authority (RTA). The RTA will then liaise with the NSW Department of Environment and Climate Change (DECC) and the Department of Primary Industries (DPI) and formulate a response on the monitoring project.

This first annual report documents the results of the first year of monitoring encompassing Spring 2008 and Autumn 2009 monitoring events.

2 METHODOLOGY

2.1 MONITORING PROGRAM RATIONALE

The primary objective of the monitoring program is to evaluate the effects of the operation of the new Albury-Wodonga National Highway Project. The terrestrial fauna monitoring program is detailed in the OEMP Version A2 (July 2008) and involves targeted monitoring of key threatened species including the Squirrel Glider (*Petaurus norfolcensis*), Barking Owl (*Ninox connivens*) and threatened woodland birds. The aim of this program is to gauge the on-going effect from the operation of the dual carriageway on these threatened species.

The monitoring program has been designed in consultation with Rodney van der Ree of the Australian Research Centre for Urban Ecology to ensure that the data being collected can be utilised in the analysis of broader Squirrel Glider monitoring programs along the Hume Highway. It has been specifically designed to determine:

- The presence, seasonal use of habitat and possibly movement behaviour of the Squirrel Glider;
- The presence, abundance and stability of bird populations, particularly threatened woodland birds including but not limited to the Brown Treecreeper, Diamond Firetail, Speckled Warbler and Hooded Robin, and their response to disturbance and revegetation of the road corridors;
- The distribution, abundance, reproductive output and long term survival of Squirrel Gliders in relation to the highway; and
- Whether any cross-highway movements are being undertaken by Squirrel Gliders.

2.2 SITE DESCRIPTION AND SITE SELECTION PROCESS

The terrestrial monitoring program has incorporated three study sites across the Albury region to undertake surveys for the duration of the monitoring program, targeting the threatened Squirrel Glider.

Squirrel Gliders are believed to make use of vegetated areas and travel in an east-west direction using linear strips of woodland along creek line areas and roadsides. The 2003 study also revealed that parts of the highway alignment provide ideal movement corridors that are important for gene flow, recolonisation and bolstering of small populations. As such, an assessment of significance undertaken by CSU in 2003 for the Squirrel Glider assumed that in addition to the known Thurgoona population, a viable population of Squirrel Glider also occurred along the Murray River area and that all hollow bearing trees along the highway alignment are potentially used by the species. The AWDC also stated that the species may inhabit areas of Eight Mile Creek as large hollow bearing trees are present and the creek line runs east to west.

Based on the above information, the OEMP vA2 identified three sites that encompass such attributes including Oddies Creek in the South, Thurgoona Drive and Eight Mile Creek in the North. The number of traps varied at each of the three sites depending on the shape and extent of suitable habitat, access issues and safety (**Table 2-2**). Survey works focus on threatened species habitat along both sides of the highway at each of the three sites. The following table provides details on each survey site.

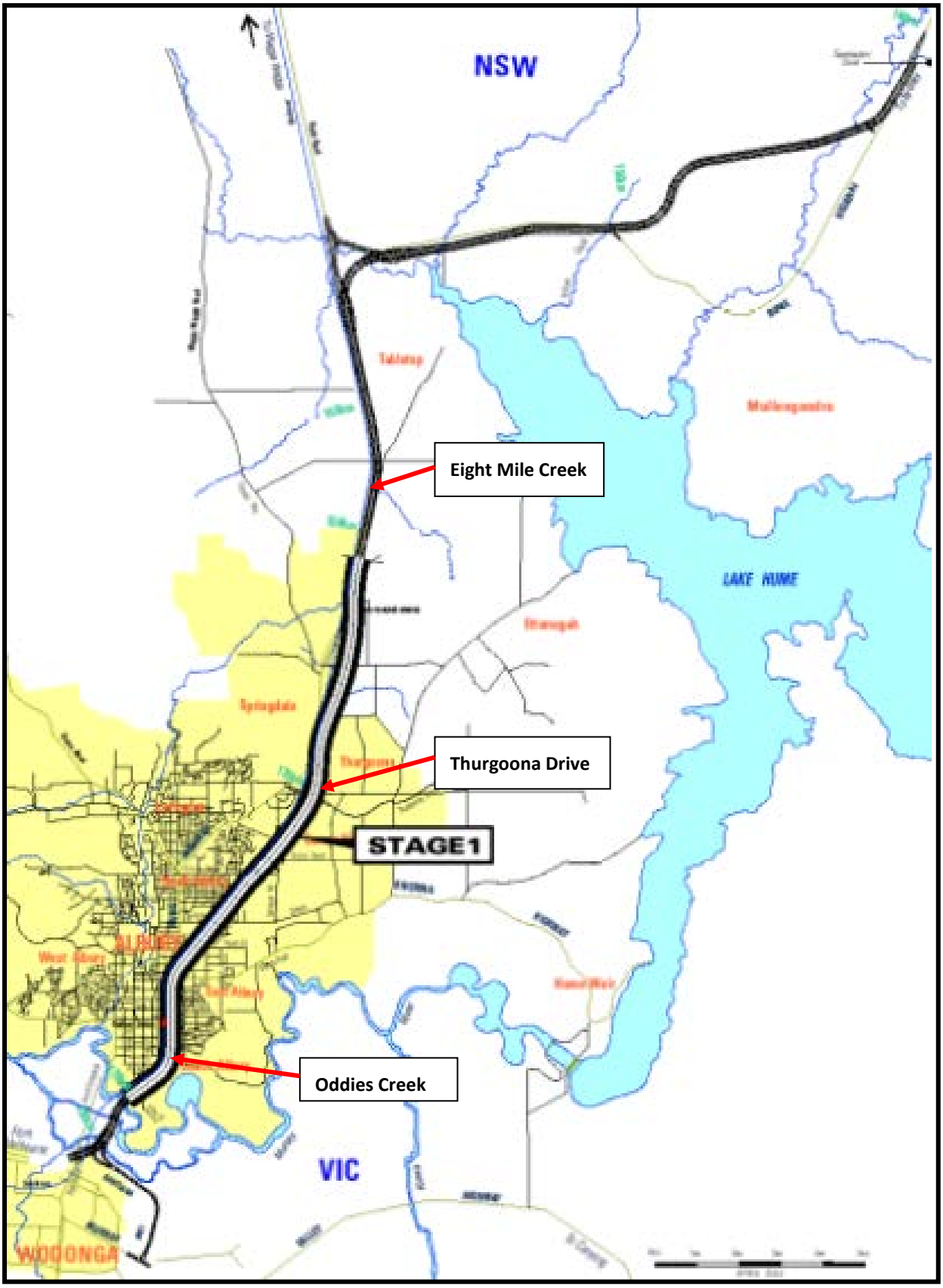


Figure 2-1: Map of Study Sites (Source: AWNHP Environmental Review, 2003)

Table 2-1: Site Locations

Location	Description	Aerial View	Landscape View
Oddies Creek	Located south of Albury township, approximately 270 m north-east of the Murray River.		
Thurgoona Drive	Located just north-east of Lavington, Thurgoona Drive traverses over the Albury-Wodonga Highway.		
Eight Mile Creek	Located approximately 5 kms north of Thurgoona Drive, is near Norske Skog.		

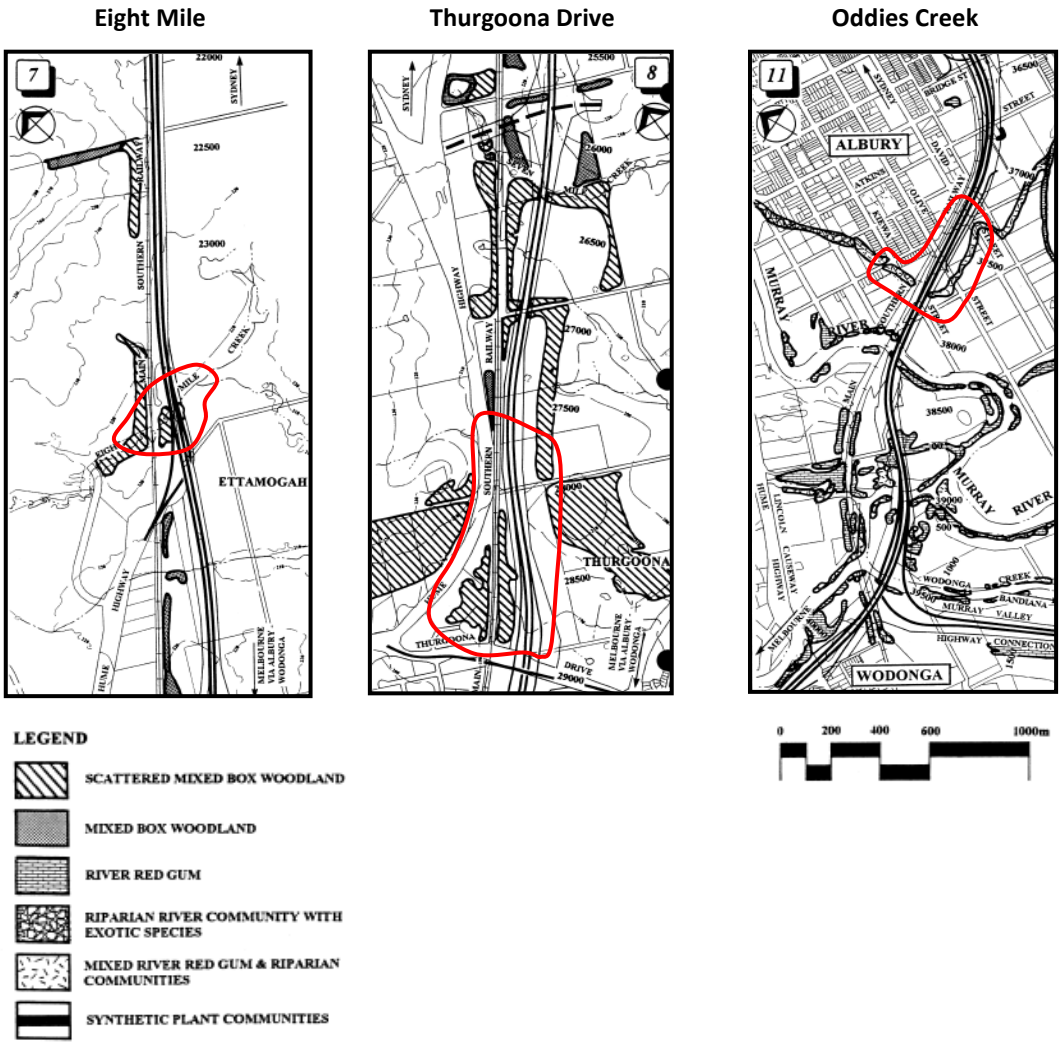


Figure 2-2: Vegetation Communities identified in original EIS (Source: Gunninah Consultants, 1995).

2.3 THREATENED OWLS AND WOODLAND BIRDS

Owls were monitored at Oddies Creek during both the spring 2008 and autumn 2009 survey periods. Call playback and spotlighting were conducted at the Oddies Creek site over two nights during both spring and autumn for the threatened Barking Owl and Powerful Owl. Each call was played for approximately 4 – 5 minutes and then stopped to indentify of any species were calling back. Spotlighting was undertaken within in suitable habitat along the creek line areas near Oddies Creek which comprised of a mixture of River Red Gum species and Salix sp. to identify any eye shine from species perching near nests or foraging. Spotlighting and call playback surveys were undertaken by two field staff over two nights at Oddies Creek during both the spring 2008 and autumn 2009 survey periods.

Areas supporting suitable habitat for threatened woodland birds were identified in previous studies and these sites were incorporated into the monitoring program.

Twenty minute transect surveys were undertaken at each of the three sites within woodland areas. At Oddies Creek survey efforts were focused on traversing the creek line area, while at Thurgoona Drive areas on both the west and east of the highway were surveyed and at Eight Mile Creek areas of the creek line were surveyed within the road reserve.

2.4 SQUIRREL GLIDERS

Surveys for Squirrel Gliders were undertaken as part of a process to monitor the size and distribution of a population (if present) during the operation of the highway over a five year period to assess the ongoing impacts of the operation of the AWNHP. Trap locations for the long term monitoring of this threatened species were selected within the three previously identified sites along the Highway based on the following criteria:

- Sites that contained woodland of low to medium habitat quality (i.e. areas supporting trees including large diameter trees, trees with hollows and potentially some shrubby understorey).
- Sites that is large enough to position traps at least 100 m apart, to increase potential capture rates.

The monitoring program is designed so that all trapping methods implemented are consistent across sites; however during the first year of survey works, due to access issues at Eight Mile Creek and stolen traps at Oddies Creek a number of traps could not be set. Consequently the number of trap nights has differed at each site in spring and autumn during the first year of the monitoring program.

During the first round of surveys undertaken in spring 2008, Bell's TSR was also set up for trapping and used as a control site. This site is known to have Squirrel Gliders present from Rodney van der Ree's ongoing work for the RTA and was utilised to ensure our trapping methods were succeeding if the species was not present at the other three identified survey sites.

Live trapping using specially designed cage traps was used to survey for Squirrel Gliders at each of the three sites. This method was considered more effective than spotlighting or hair-tube analysis as information regarding sex, reproduction, distribution and abundance was required for the monitoring program. In addition, differentiation of hairs from Squirrel Gliders and Sugar Gliders is problematic (Lobert *et al*. 2001), while spotlighting can repeatedly fail to detect the presence of Squirrel Gliders due to their small stature, poor reflective eye shine and quiet behaviour (Van Der Ree 2003) (unlike Sugar Gliders, Squirrel Gliders rarely vocalise – calling rates may only be one per night, and not all nights (*Goldingay pers. comm.*).

Specially designed wire cage traps (30 in total) (refer to Appendix E for diagram of traps) were positioned across the three sites using an aluminium extension ladder to nail each trap onto selected tree trunks at a height of 3-5 m off the ground. Traps were placed approximately 100 m apart to maximise the area covered and to accommodate for home ranges and territories of Squirrel Gliders.

Refer to Figures **Figure 2-3**, **Figure 2-4** and **Figure 2-5** for trap locations at each of the three survey sites during the spring and autumn survey periods. The yellow markers indicate trap locations for the autumn period, while the blue markers indicate extra traps that were set up in spring, however were not set up in autumn die to access, and safety.

Each cage trap was baited with a mixture of honey, rolled oats and peanut butter to attract the Squirrel Glider, while a trail of diluted honey water was sprayed above the trap to a height of 5 – 10 m. The location of each tree trap was marked with a GPS unit to identify locations during each survey

period and to identify movement locations and distances of recaptured Squirrel Gliders. The following table represents how many cage traps were set up at each of the three sites during the spring 2008 and autumn 2009 survey periods.

Table 2-2: Number of traps at each site (* Three traps were stolen over survey period.**)**

Survey Period	Oddies Creek	Thurgoona Drive East	Thurgoona Drive West	Eight Mile Creek	Bell's TSR (control)	Total
Spring 2008	7 to 4 traps*	6 traps	7 traps	4 traps	7 traps	28
Autumn 2009	6 traps	7 traps	7 traps	3 traps	N/A	23

A total of six trap nights were undertaken during each survey period with all traps being set at dusk and checked from dawn the following morning. All captured animals (including other mammals caught, however mostly comprising of Brush tail possums were processed at the point of capture and released after processing.

Each captured Squirrel Glider was fitted with a microchip with a unique numerical code and given an ear tattoo comprising of an alphabetical digit and a numerical digit such as A9 to easily identify each individual in the field without the aid of a micro-chip scanner. Males were tattooed in the left ear, while females were tattooed in the right ear as this helps in easily identifying sex during capture. Two tissue samples of the ear were also taken using a toe punch device and then put in ethanol to preserve to assist in subsequent genetic analysis to determine population structure in the future. Tissue samples will be sent to Rod van der Ree to be analysed with other samples undertaken by his team to aid in research for this threatened species within the Albury region.

Processing involved recording the following information for each individual:

- Species identification.
- Weight.
- Sex.
- Tattoo Identification.
- Upper Incisor wear (Squirrel Glider)
- Micro-chip Implant number
- Tissues sampling details.
- Reproductive condition.

The unique combination of the three identification methods assists in future identification of any recaptured animals.

The trap data sheet and Appendix B for the processing sheet are provided in Appendix A.

A combination of traits was used to estimate the age of Squirrel Gliders. Body weight and incisor wear are the most ideal characteristics to use when estimating the age class (Quinn 1995). Age estimates for juvenile individuals less than 18 months in age could be reliably made using these parameters, however after the 18 month age; estimates were less reliable due to the overlap between differing characteristics. The following table shows characteristics used to estimate age classes of the Squirrel Glider.

Table 2-3 – Parameters to estimate age class of Squirrel Glider (Derived from Van der Ree 2002)

Trait	< 1 year	1 – 2 years	2 – 3 years	> 3 years
Weight of male (g)	< 200g	> 220 g	> 220 g	> 220 g
Weight of female (g)	< 180 g	> 200 g	> 200 g	> 200 g

Wear of upper incisors	None to slight (1 – 1.5)	Slight to moderate (2 – 2.5)	Moderate to heavy (3 – 3.5)	Moderate to very heavy, both are brown/rotting colour. Worn to gum line. (3.5 – 4)
Wear of lower incisors	White, no cracks	Slight, discoloured, lateral cracks slight	Orange discolouration, lateral cracks obvious, often chipped teeth in older animals	
Pouch condition	Small and shallow with fine white hairs, teats < 1 mm long	Carrying pouch young or pouch larger and deeper than in females that had not bred. Yellow/rusty coloured hairs, black scale often present. Teats > 1 mm long		
Frontal gland condition	Not developed	Partially to well developed		
Patagium colour	White	Cream / yellow / lemon		

To estimate the female reproductive condition each female caught was allocated a one – six reproductive category (Quinn, 1995). The following table best represents these categories.

Table 2-4 – Reproductive Categories for Squirrel Gliders.

Category	Description
1 – Juvenile Virgin	Pouch is small, tight and undeveloped. Hairs white and teats < 1 mm.
2 – Pregnant Females	Pouch lining thicker with the pouch wall glandular, muscular and richly vascularised, may or may not have previously bred.
3 – Female carrying pouch young	Female carrying pouch young should be able to see pouch young.
4 – Lactating females	Females with a loose pouch and one or two lactating teats present.
5 – Females recently bred	Pouch and teats are large but are not lactating.
6 – Adult female non breeding	Pouch is larger and deeper than virgin females, but reproductive activity not apparent. Hairs are brown to yellow with teats > 1 mm.

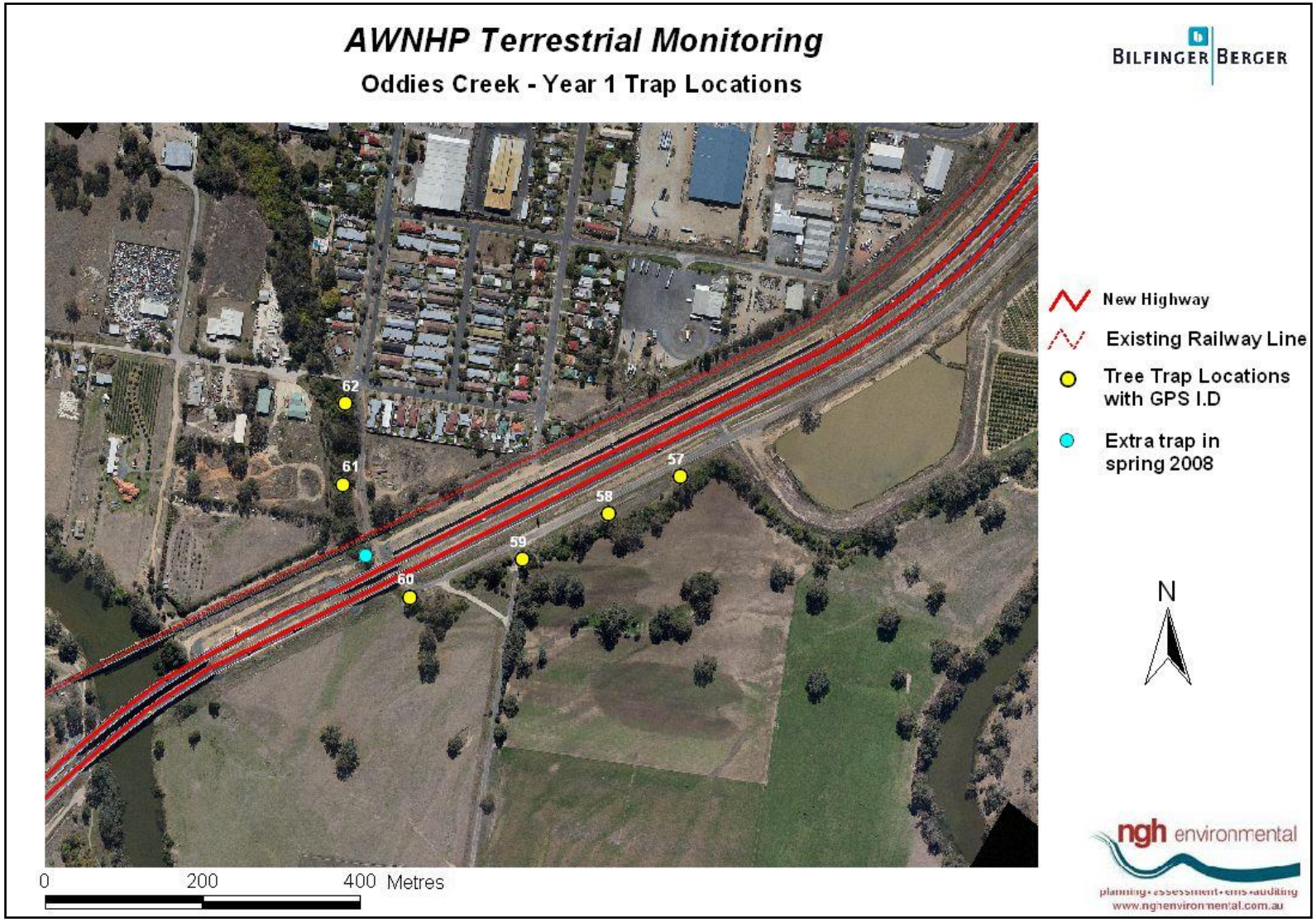


Figure 2-3 – Oddies Creek Trap Locations

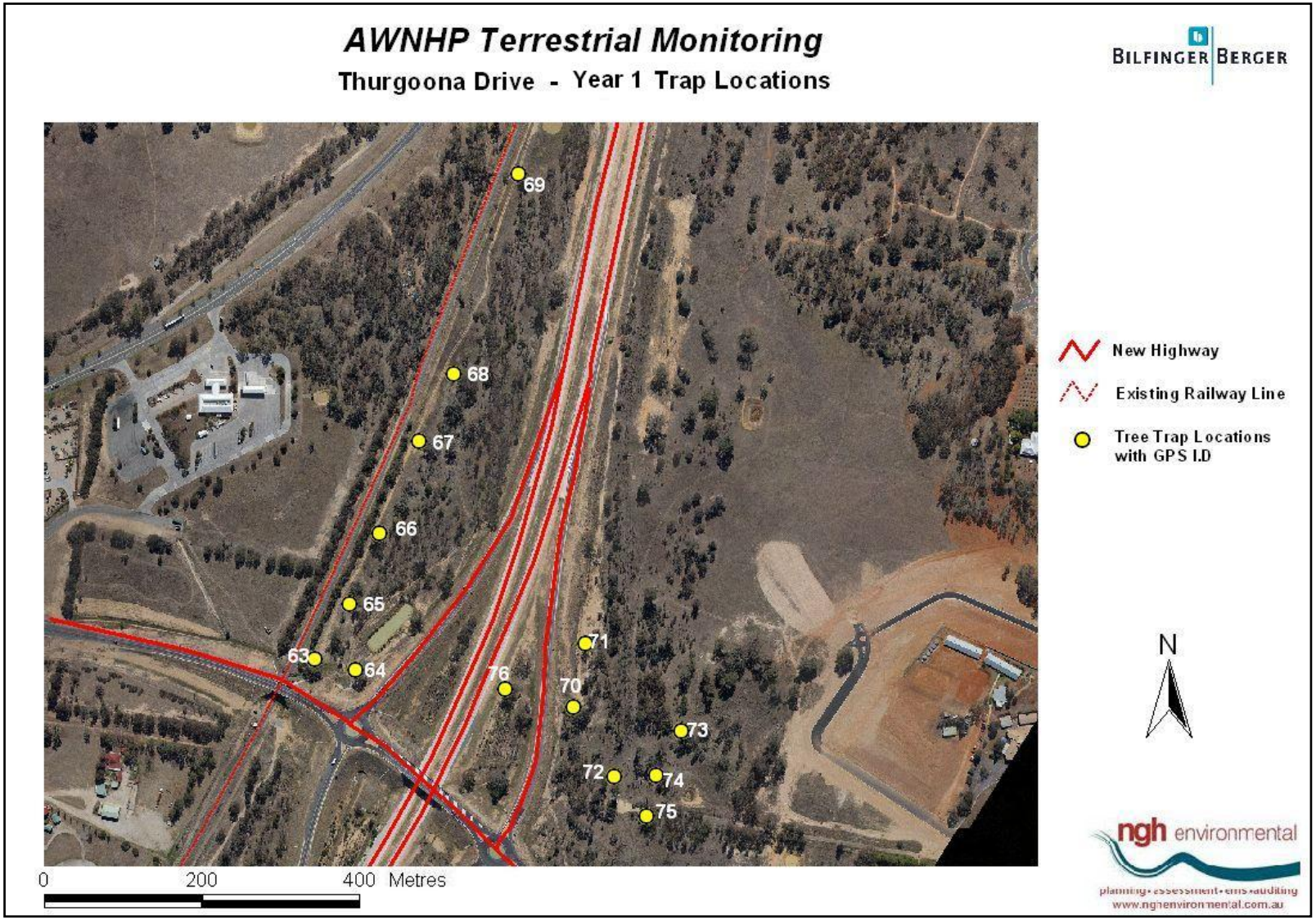


Figure 2-4 – Thurgoona Drive Trap Locations

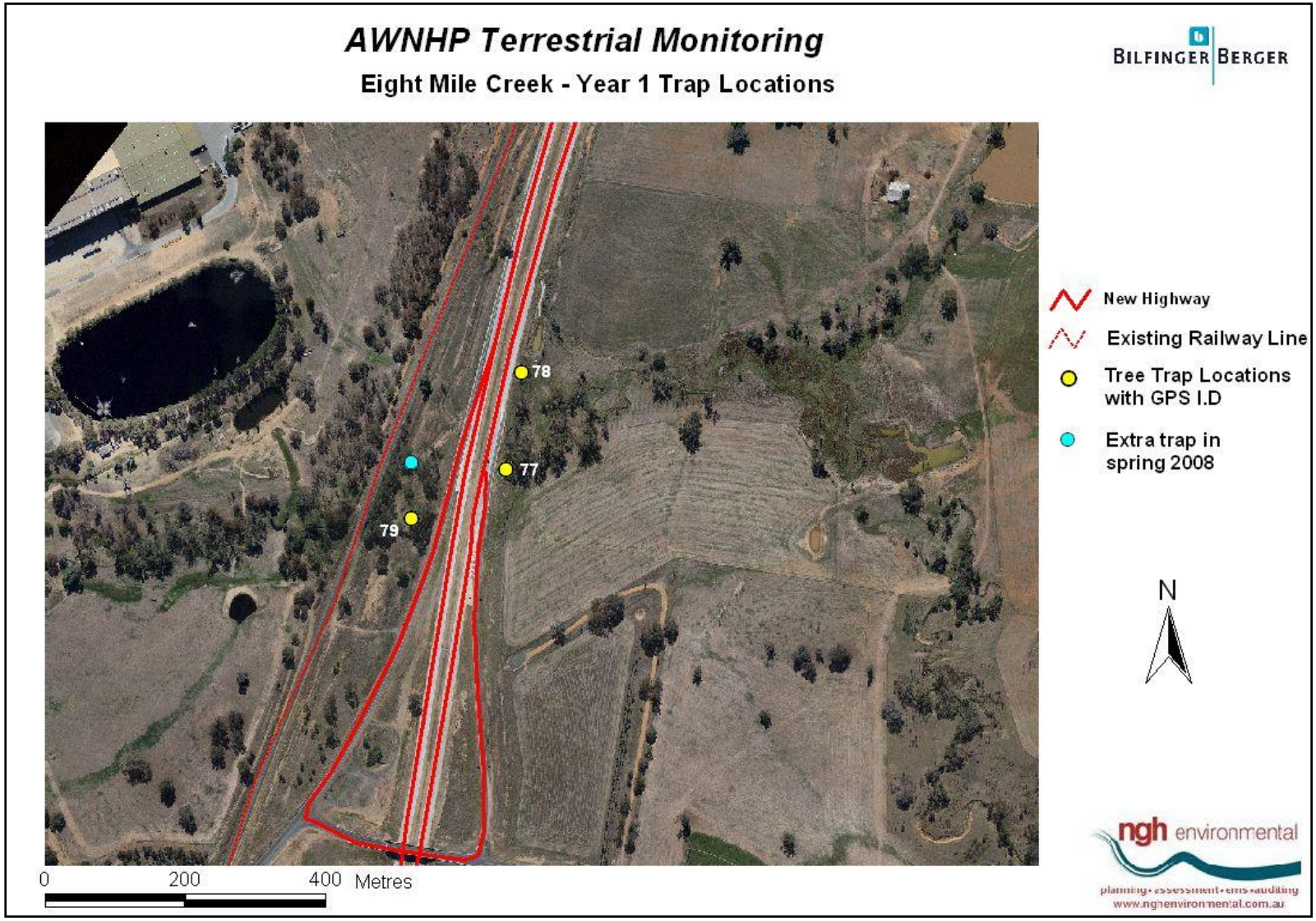


Figure 2-5 – Eight Mile Creek Trap Locations

3 RESULTS

3.1 THREATENED OWLS AND WOODLAND BIRDS

No threatened owls were recorded or observed during call play back and spot lighting surveys at Oddies Creek in September 2008 or April 2009. Given the snapshot nature of the survey and traffic noise from the highway and surrounding neighbours it is expected that these species could still occupy areas of Oddies Creek within the survey site area and possibly near other areas within the locality including the Murray River, which does not form part of the survey area. Both the Barking Owl and Powerful Owl have large home ranges and can traverse vast amounts of land for foraging, roosting and breeding habitat, all of which is ample along the Murray River, approximately 150 m from Oddies Creek.

A total of 20 bird species were recorded across all three survey sites during the spring survey period, while a total of 35 bird species were recorded during the autumn survey period across all three sites. Bird survey results are provided in Appendix C. No threatened species listed under the TSC Act or EPBC Act was identified during the avifauna surveys. Thurgoona Drive provided the most suitable potential habitat for threatened woodland bird species with a higher density of vegetation present, revegetation of shrubs and ground cover species, presence of hollow bearing trees and nest boxes.

The majority of species recorded across Oddies Creek, Thurgoona Drive and Eight Mile Creek are commonly found in woodland areas and road side vegetation. Two introduced bird species were recorded over the two survey periods; the Common Blackbird (*Turdus merula*) and the Common Starling (*Sturnus vulgaris*).

Given the timing and snapshot nature of the surveys it is expected that a range of other species, particularly bird species and including threatened species, could occur across all three survey sites at other times of the year.

3.2 SQUIRREL GLIDERS

In spring 2008 a total of 21 cage traps were set up across the three survey sites, with 7 additional traps set up in Bell's TSR to determine the presence of the Squirrel Glider in the study locality. Survey works undertaken in autumn 2009 did not implement a control site, as the presence of Squirrel Gliders were detected at Thurgoona Drive and the main aim of the project was to monitor the three sites along the highway. **Figure 2-3**, **Figure 2-4** and **Figure 2-5** illustrates the number of traps put up at each site during the first year of trapping works.

3.2.1 Spring 2008

A total of four Squirrel Gliders were captured during the spring 2008 survey period with two captures at Thurgoona West and two captures at Bell's TSR. Both individuals caught at Bell's TSR were re-captures from previous survey efforts undertaken by Rodney van der Ree. The two individual Squirrel Gliders caught at Thurgoona West comprised of one male approximately 265 g in weight with an upper incisor wear of three, suggesting it may be around 2 – 3 years of age and one female approximately 245 g in weight also with an upper incisor wear of three and it was carrying pouch young. These two

individuals were caught on the 4th and 5th trap nights in different tree traps approximately 280 m apart (refer to **Figure 3-1**).

Table 3-1 – Capture Rates for Spring 2008

Individual	Capture Date	Sex	Location	Recapture	Date of recapture	Location of recapture	Distance
SQH2M	12.09.08	Male	67	No	N/A	N/A	N/A
SQH0F	15.09.08	Female	63	Yes	18.04.09	66	165 m
SQ2AF	11.09.08	Female	Bell's TSR	Yes	One of Rod van der Ree's captures.		
SQ4AF	12.09.08	Female	Bell's TSR	Yes	One of Rod van der Ree's captures.		

A total of four Common Brushtail Possums were captured during the survey period with two individuals caught at Thurgoona East, one captured at Thurgoona West and one caught at Oddies Creek (**Figure 3-2** and **Figure 3-3**). Refer to Appendix D for a detailed database of species captures.

To conclude on capture rates for the first round of monitoring works undertaken in spring 2008, no species were caught at traps location at Eight Mile Creek, one brushtail possum was captured at the Oddies Creek site, while two brushtail possums were captured at Thurgoona Drive, one on the western side and one on the eastern. Two squirrel gliders were also caught at the Thurgoona Drive site, both on the western side of the highway. Also two squirrel gliders were caught at the control site within Bell's TSR, both recaptures from Rod van der Ree's work.

3.2.2 Autumn 2009

The second round of trapping was undertaken from the 15th April 2009 to the 20th April 2009. A total of 23 traps were set up over six trap nights totalling 138 trap nights. One Brushtail possum was captured at Oddies Creek twice during this survey period in the same trap on the 3rd and 5th nights (**Figure 3-3**). Processing of this individual could not take place due to its aggressive behaviour.

Again no species were caught at Eight Mile Creek; however only three traps could be set up due to access limitations to the site. This issue will be fixed for the next round of survey works to be undertaken in September 2009. Future surveys plan to access areas outside the road reserve to increase potential trap nights at this site.

This round of surveying saw an increase in capture rates at Thurgoona compared to spring 2008. The first round of surveys saw only two individuals of Squirrel Gliders and two brush tail possums captured. This survey round a total of nine species caught, five on the western side of the highway and four on the eastern side of the highway (**Figure 3-1** and **Figure 3-2**).

Table 3-2 – Capture Rates for Autumn 2009

Individual	Capture Date	Sex	Location	Recapture	Date of recapture	Location of recapture	Distance
SQA6M	17.04.09	Male	67	No	N/A	N/A	N/A
SQA5M	20.04.09	Male	66	No	N/A	N/A	N/A
SQA7F	17.04.09	Female	65	No	N/A	N/A	N/A

SQF3F	20.04.09	Female	73	Yes	One of Rod van der Ree's captures, awaiting original data.		
SQA9M	15.04.09	Male	73	Yes	17th & 20th .04.09	75 & 76	320 m
SQA8F	16.04.09	Female	73	Yes	18.04.09	76	210 m

A total of two Common Brushtail Possums were captured during the autumn survey period with one recapture (BTH9F) caught on the western side in the same trap. While on the eastern side another recapture (BTH3M) from the previous survey effort was caught in the same trap four consecutive nights in a row (**Figure 3-2**).

3.2.3 Capture Rates

Since the first round of surveying in spring 2008 a total of four recaptures have occurred, one of which was a recapture from the first survey in spring on the western side of Thurgoona(SQHOF), while another is a recapture from surveys undertaken by Rod van der Ree(SQF3F) which was captured in the eastern side of Thurgoona. Its original capture location is unknown at this stage, but consultation with Rod van der Ree and his staff at the Australian research Centre for Urban Ecology (ARCUE) will identify this species original capture location.

Two new captures (SQA9M and SQA8F) were made at Thurgoona east in the same tree trap on the 1st and 2nd nights of surveying. SQA9M was again captured twice on the 3rd and 5th nights in different tree traps'; covering a distance of over 300 m. SQA8F was again recaptured on the 4th night at trap 76 which is located across the off ramp. Refer to **Figure 3-4** for a map of recapture rates of the three Squirrel Gliders recaptured during the first year of monitoring. Note that SQF3F has not been mapped yet as we are awaiting original data from Rod van der Ree.

From **Figure 3-4** it can be seen that SQHOF was captured on the western side of the highway in trap 63. This was in spring 2008, while it was again recaptured the following round of surveys in autumn 2009 at trap 66, a total of 165 m from its original location.

SQA9M was first captured in autumn 2009 on the first night of surveying in trap 73. This individual was again captured on the third night of trapping works in trap 75, a total distance of 100 m from the original capture site. Again this species was recaptured on the sixth night across the off ramp road in trap 76, a total of 220 m from the second recapture site. During the autumn survey period this species was captured a total of three times and covered a distance of approximately 320 m from each tree trap.

SQA8F was first captured in autumn 2009 on the 2nd night in trap 73, while it was again recaptured during this survey period on the 4th night in trap 76, located across the off ramp, approximately 210 m from its original capture location.

From the map it is evident that SQA9M and SQA8F were occupying the same den trees on two occasions, suggesting that they two individuals may be a breeding pair. Based on the locations of marking and recaptures there were no movements across the dual highway area, however two movements were made across the off ramp section which is approximately 10 m wide, however from tree to tree is approximately 45 m in width.

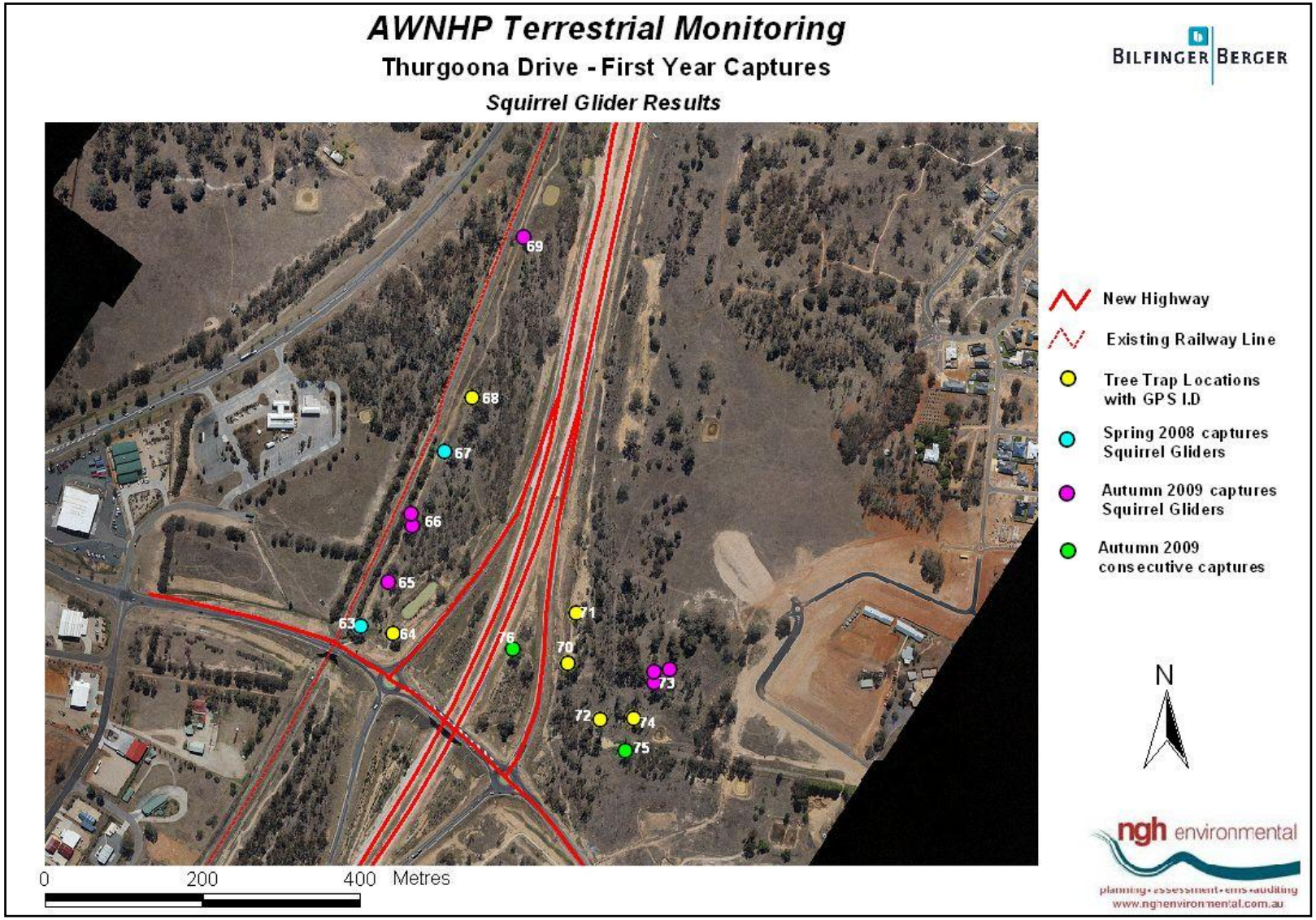

AWNHP Terrestrial Monitoring
Thurgoona Drive - First Year Captures
Squirrel Glider Results
BILFINGER BERGER
New Highway
Existing Railway Line
Tree Trap Locations with GPS I.D
Spring 2008 captures Squirrel Gliders
Autumn 2009 captures Squirrel Gliders
Autumn 2009 consecutive captures
N
63
64
65
66
67
68
69
70
71
72
73
74
75
76
0
200
400 Metres
ngh environmental
planning • assessment • ems • auditing
www.nghenvironmental.com.au

Figure 3-1 – Thurgoona Drive Squirrel Glider Captures

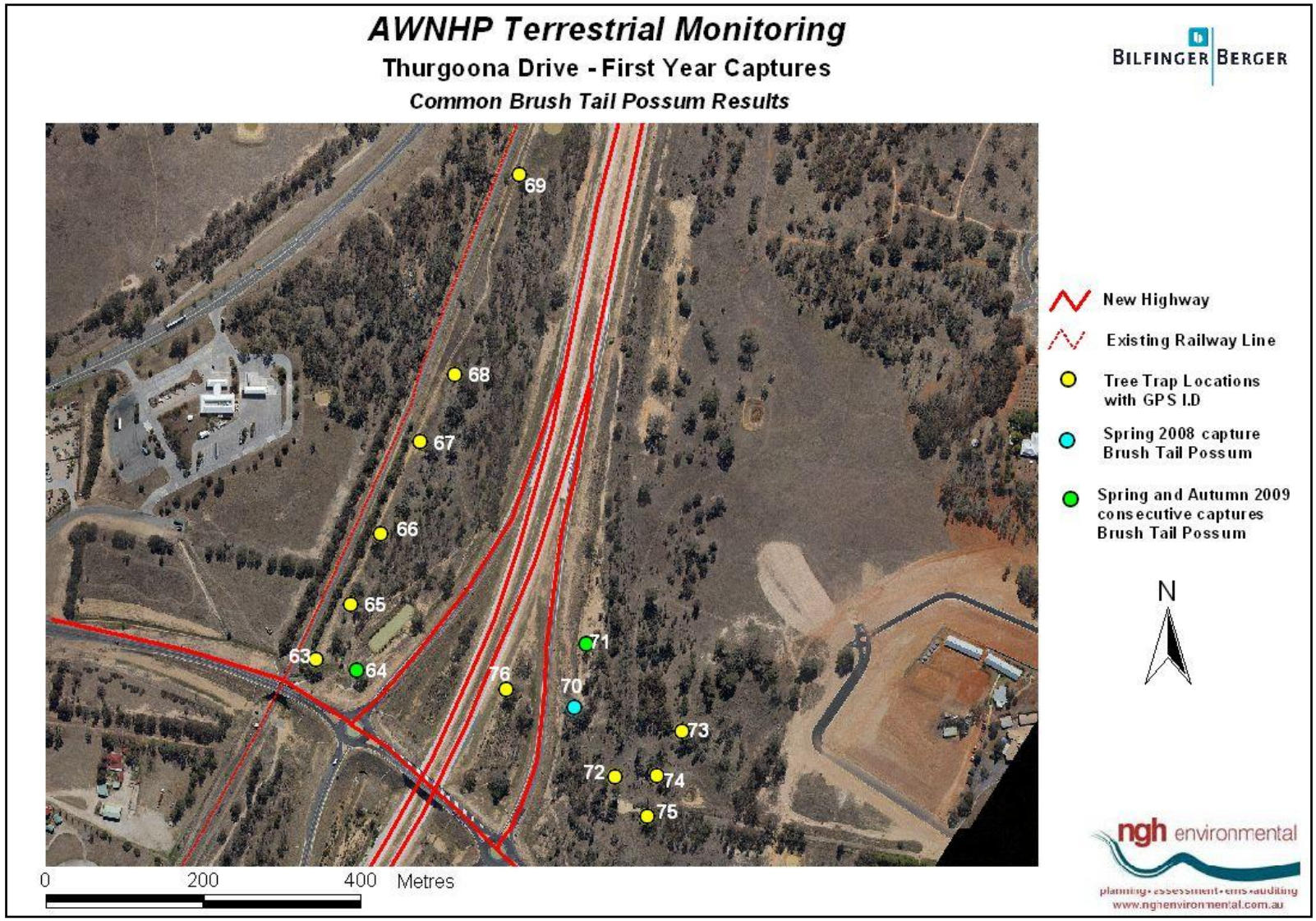


Figure 3-2 – Thurgoona Drive Common Brush Tail Possum Captures

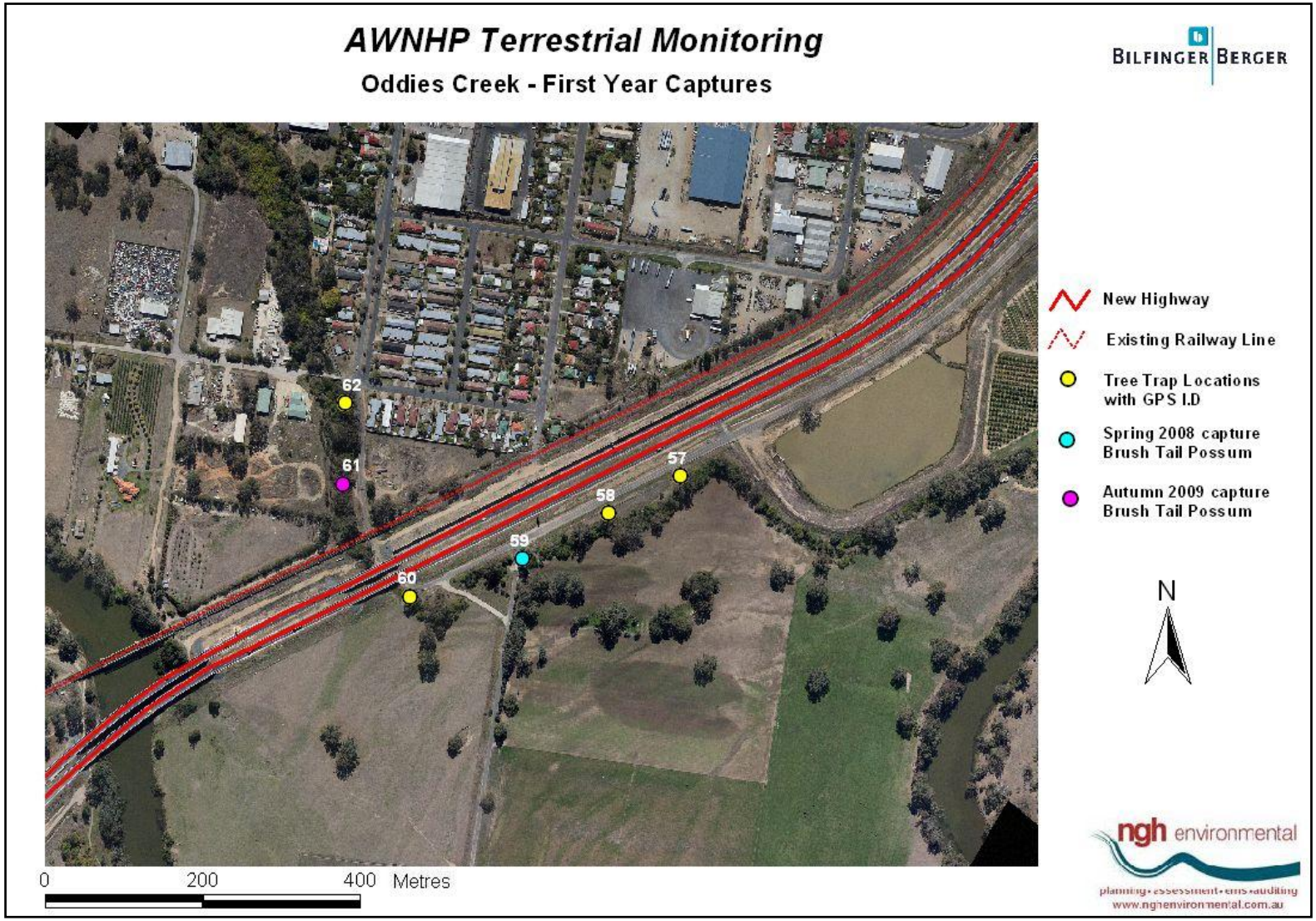


Figure 3-3 – Oddies Creek Common Brush Tail Possum Captures

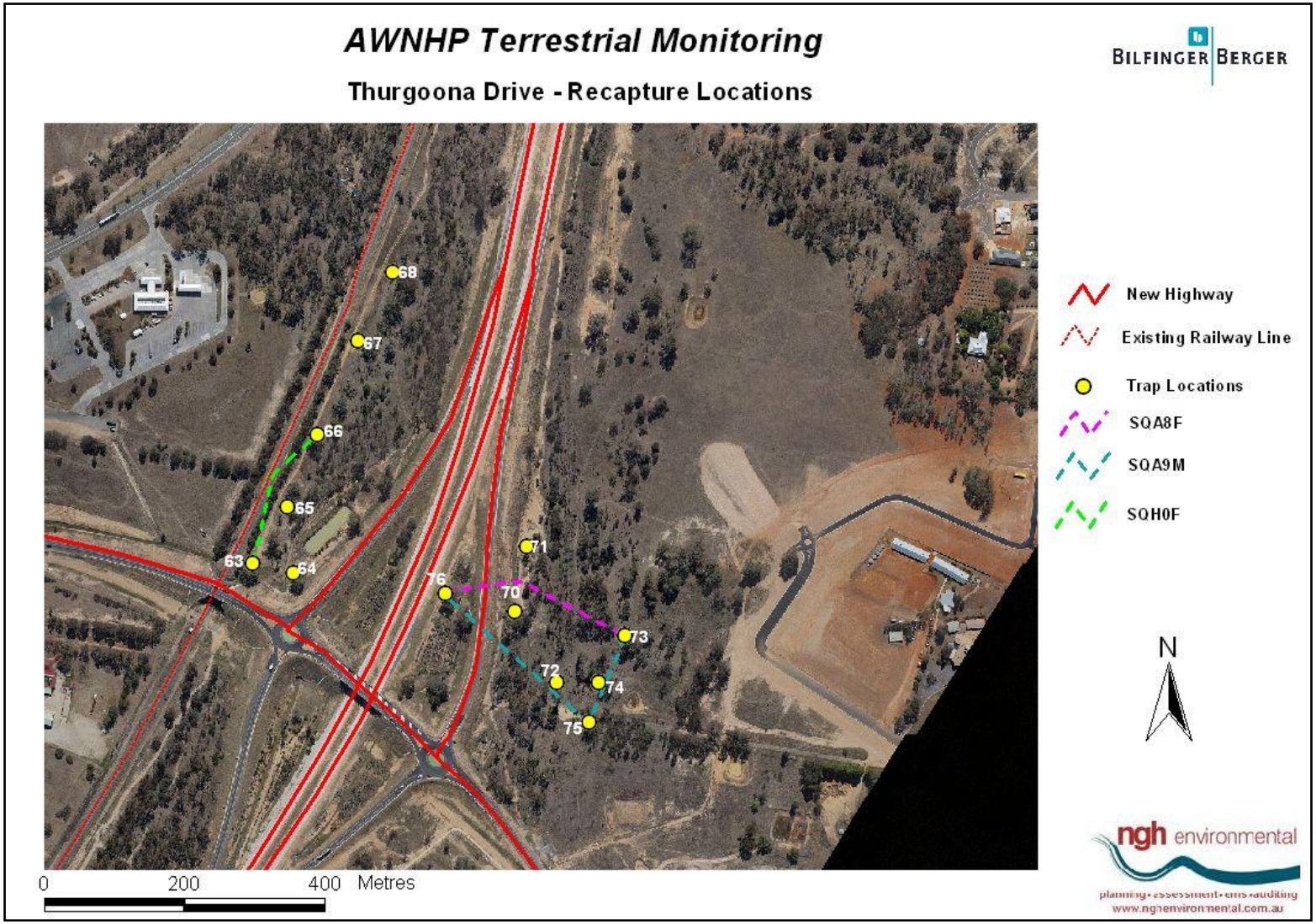


Figure 3-4 – Recapture locations for first year of monitoring

3.2.4 Sex ratio and Reproductive Output

Overall the sex ratio of captured and recaptured Squirrel Gliders was roughly similar with a total of five females captured and four males captured. At Thurgoona West a total of three males were captured and one female. This female was first captured in spring 2008, carrying pouch young; it was again recaptured in autumn 2009, approximately 160 m from its original capture location.

No Squirrel Gliders were detected during the first survey period in spring 2008 on the eastern side of the highway, however two females were captured during the autumn survey period, one of which was a recapture from Rod Van der Ree's work in the area and one a new capture. The new female and male captures were both caught in the same tree at site 73 and again at site 76 suggesting they may be a breeding pair, however the female display a virgin reproductive output.

3.2.5 Conclusion of Results

No Squirrel Gliders were captured at Eight Mile Creek or Oddies Creek during both the spring 2008 and autumn 2009 survey periods. At Thurgoona Drive a total of eight individual Squirrel Gliders were captured during the first year (spring 2008 and autumn 2009) of the monitoring program. Two captures on the west side in spring 2008, while in autumn a total of seven individuals were captured, four on the western side, one of which was a recapture (SQHOF) from spring 2008, and three on the eastern side, one of which was a recapture (SQF3F) from Rod van der Ree's work.

4 DISCUSSION

At this stage, due to the limited duration of monitoring, no conclusive results can be identified. Some features of the results to date include:

- No threatened woodland birds have been recorded;
- No threatened owl species have been recorded;
- Squirrel Gliders have been recorded on both sides of the new Highway at Thurgoona Drive;
- 2 individual Squirrel Gliders were recorded in the retained triangle of vegetation between the southbound off-ramp and the Highway during the autumn survey period;
- No individual Squirrel Glider has been captured on both sides of the road;
- No Squirrel Gliders have been recorded at Oddies Creek or Eight mile Creek.

5 CONCLUSION AND RECOMMENDATIONS

After the first year of monitoring works no threatened owl species or woodland birds have been recorded at the three survey sites. A total of eight Squirrel Gliders were captured in traps over the year, five on the western side and three on the eastern side.

The following recommendations are made for the next round of surveying to be undertaken in September 2009.

- Increase number of trapping locations at Eight Mile Creek once access limitations have been resolved;
- Check nest boxes that have been put up at Thurgoona Drive and monitor their success and condition; and
- Record and document the density of hollow bearing trees at each of the three sites to gain information on habitat suitability for the Squirrel Glider, which will later assist in analysing differences between each of the three sites.

6 REFERENCES

Davidson, I. and Datson, G (2003). *Draft Thurgoona Threatened Species Conservation Strategy*, Prepared for AWDC, July 2003.

Gutteridge Haskins and Davey (1995). *Albury Wodonga Potential National Highway Routes EIS/EES,* October 1995, Sydney, NSW.

Gunninah Consultants (1995). *Flora and Fauna Assessment for the Albury Wodonga Potential National Highway Routes EIS/EES*, as part of the EIS undertaken by GHD, 1995.

Lobert, B., Lumsden, L., Brunner, H., Triggs, B. (2001). *An assessment of the accuracy and reliability of hair identification of south-east Australian mammals*, Wildlife Research, 28: 637-641.

Quinn, D.G. (1995), *Population ecology of the Squirrel Glider (Petaurus norfolcensis) and the sugar glider (P. breviceps) at Limeburners Creek, on the central north coast of New South Wales,* Wildlife Research, 22: 471-505.

RTA, (2003). *Albury Wodonga National Highway Project (AWNHP), Environmental Review*, Roads and Traffic Authority (RTA), South West Region, RTA Environmental Technology Branch.

Taylor, I.R (2002). *Status of the Barking Owl in relation to the proposed Albury Wodonga Internal Freeway Alignment*: Report of Research 1999-2002, Charles Sturt University, Albury, NSW.

Van der Ree, R., and Bennett, A. F. (2001). *Woodland remnants along roadsides – A reflection of pre European structure in temperate woodlands*, Ecological management and restoration, 2: 226-228.

Van der Ree, R (2002). *The population ecology of the Squirrel Glider within a network of remnant linear habitats,* Wildlife Research, 2002, 29: 329-340.

Van der Ree, R (2003). *Home Range of the Squirrel Glider (Petaurus norfolcensis) in a network of linear habitats,* Journal of Zoology, 259:327-336 (London).

Appendix A

Trap Data Sheet

Appendix B

Processing Data Sheet

Appendix C

Bird Census Records (Year 1)

Appendix D

Terrestrial Monitoring Trapping Database (Year 1)

Appendix E

Diagram and Photograph of Traps used in Monitoring Program