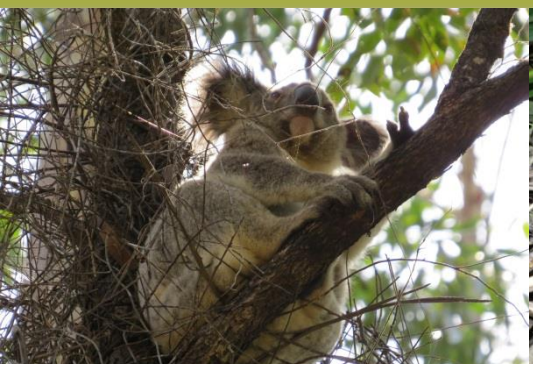
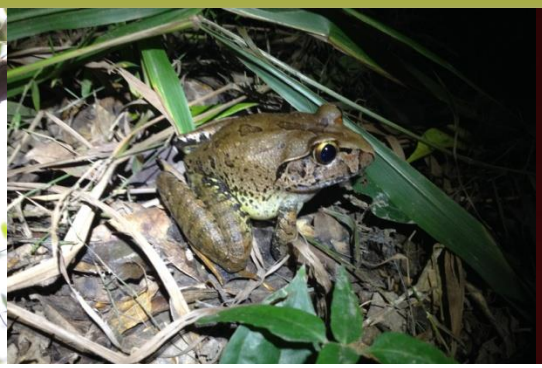
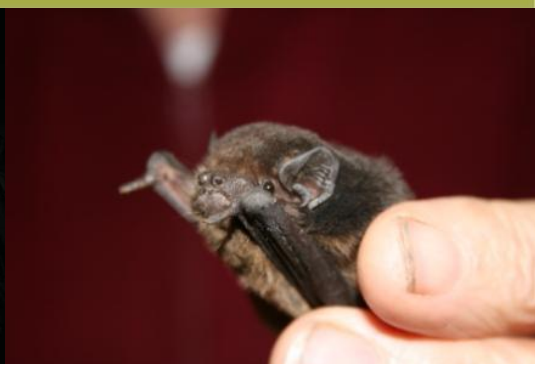
Ecological Monitoring Annual Report (2015)

Warrell Creek to Nambucca Heads Pacific Highway Upgrade

PO Box 119
Lennox Head NSW 2478
T 02 6687 7666

PO Box 1446
Coffs Harbour NSW 2450
T 02 6651 7666

PO Box 1267
Armidale NSW 2350
T 0488 677 666

Unit 10 Warina Walk Arcade
156 Molesworth St
Lismore NSW 2480
T 02 6621 6677

info@geolink.net.au

Prepared for: Roads and Maritime Services

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Table of Contents

Appendices

1. Introduction

1.1 Introduction

The Pacific Highway Upgrade Program is a joint commitment by the Australian and New South Wales governments to improve the standard and safety of the Pacific Highway between Hexham and the Queensland border.

The NSW Minister for Planning approved the Warrell Creek to Urunga (WC2U) Pacific Highway Upgrade Project (the Project) under Part 3A (now repealed) of the Environmental Planning and Assessment Act 1979 (EP&A Act) on 19 July 2011, subject to the Minister's Conditions of Approval (CoA) being met.

The WC2U Project comprises approximately 42 km of dual carriageway road that would bypass the towns of Warrell Creek, Macksville, Nambucca Heads and Urunga on the Mid North Coast of NSW. The Project has been divided into two stages with Stage 1 consisting of approximately 22.5 km from Nambucca Heads to Urunga (NH2U) and Stage 2 consisting of the remaining 19.5 km of dual carriageway between Warrell Creek and Nambucca Heads (WC2NH). This report relates to Stage 2 (WC2NH) as 'the Proposal'.

As part of the WC2NH Pacific Highway Upgrade (WC2NH) an ecological monitoring program has been prepared to satisfy the Ministers Condition of Approval (MCoA) B10, which requires preconstruction, construction and post construction phases (Benchmark, 2014). The monitoring program incorporates all threatened species monitoring developed as part of individual species management plans (refer to the CEMP). This submission provides an annual report of the ecological monitoring program undertaken in 2015 in relation to the following:

- Pre-clearing and Clearing Procedures.
- Flying Fox Population.
- Koala Population.
- Giant Barred Frog (GBF) Population.
- Threatened Microbats.
- Road Kill Monitoring.
- In Situ Threatened Flora.
- Threatened Flora Translocation Area.

The following sections provide a summary of ecological monitoring tasks undertaken in the first year of construction (2015). A further detail of monitoring undertaken is contained within separate monitoring reports appended to this report.

The following non-compliances were raised during 2015 and are discussed further within the relevant sections of the report:

- Omission of the November 2015 monitoring report on translocated threatened flora individuals which is a requirement of the Threatened Flora Management Plan.
- Omission of the Winter Microbat Roost Box monitoring (1st year) which is a requirement of the Micro-chiropteran Management Plan.
- Recent omission of the fortnightly Grey Headed Flying Fox Monitoring frequency as required within the Grey-headed Flying Fox Management Plan.

2. Pre-clearing and Clearing Procedures

The Conditions of Approval and species management plans which form part of the Flora and Fauna Management Plan for the project requires a number of pre-clearing surveys to be undertaken. GeoLINK as the project ecologist has undertaken these surveys as part of clearing activities on the project. A summary of pre-clearing surveys undertaken on the project is provided below. A habitat tree register and register of fauna capture/ relocations is provided in **Appendix A**. A more detailed description of pre-clearing survey results will be provided as part of the post-clearing report upon completion of clearing activities.

2.1 Pre-clearing Surveys

2.1.1 Green-thighed Frog

Pre-clearing surveys targeting the Green-thighed Frog (GTF) were conducted within all areas of nominated GTF habitat on the project. These involved active searches of suitable microhabitat either the night before or immediately prior (within two) hours of clearing operations commencing. Active searches involved turning rocks and logs, raking of debris and peeling of decorticating bark.

No GTFs were recorded within clearing areas during the pre-clearing surveys.

2.1.2 Giant Barred Frog

Nocturnal pre-clearing surveys of all areas of Giant Barred Frog (GBF) habitat have been undertaken after the installation of temporary frog fence. As required these surveys were undertaken over two non-consecutive nights for the northern and southern banks of Upper Warrell Creek where frog fence was installed. Surveys were commenced at dusk and were undertaken for a minimum of 1.5 hours on each bank. Surveys were undertaken within seven days of a rainfall event (> 10mm in 24 hours). Three GBFs have been successfully captured/ relocated from the works area during pre-clearing surveys. All GBFs captured during pre-clearing surveys were relocated at approximately 100 m from the capture location.

In addition to the above, actives searches of all areas of GBF habitat were undertaken either the night prior to or immediately prior (less than two hours) to the commencement of clearing operations. No GBFs were detected during such surveys.

2.1.3 Koala and Spotted-tailed Quoll

Pre-clearing surveys for Koalas were undertaken by GeoLINK ecologists the night prior to clearing any areas of Koala habitat on the project involving spotlighting within areas of suitable habitat on the night prior to clearing operations. Diurnal visual searches were also conducted in areas of suitable habitat immediately prior to commencement of clearing operations to detect any koalas that enter the area overnight. No Koalas or evidence of recent presence were detected during clearing operation in year 1.

Pre-clearing surveys for the Spotted-tailed Quoll (STQ) were conducted immediately prior to commencement of clearing and included searches of potential denning habitat, including large hollow logs and rock piles. No STQs or evidence of recent presence were detected during clearing operation in year 1.

2.1.4 Searches for Fauna Immediately prior to Clearing

A final pre-clearing visual search was undertaken by an ecologist immediately prior (ie. less than two hours) to commencement of clearing operations to ensure that the areas to be cleared are as free of fauna as possible.

This survey was often successful in flushing mobile fauna from the works area including birds, macropods and reptiles before the commencement of clearing

2.2 Clearing Supervision

Following the completion of the pre-clearing surveys described in **Section 2.1**, tree removal was undertaken in a staged manner, with non-habitat trees being removed first, then the potential habitat trees being removed with a swivel head harvester at least 48 hours later to enable resident hollow-dependent fauna time to evacuate the tree prior to felling. A suitably qualified, licensed and experienced ecologist and/ or a suitable licensed and experienced wildlife carer from GeoLINK was present to observe the removal of each potential habitat tree.

A habitat tree register and register of fauna capture/ relocations is provided in **Appendix A**.

Ecologist clearing supervision was also undertaken for the following areas:

- Mapped Giant Barred Frog habitat.
- In the vicinity of the Flying Fox camp.

No GBFs or GHFF were observed during clearing supervision undertaken in such areas.

3. Flying-fox Population

3.1 Methods

Population monitoring at the flying-fox camp has been undertaken by GeoLINK on at least a monthly basis since July 2013 to confirm flying-fox presence and determine patterns of occupation, species composition, demographic composition, key behaviours, and habitat characteristics. The sampling methodology and timing has been undertaken in accordance with the flying-fox management plan (Gorecki *et al*. 2014).

Population monitoring commenced in the winter of 2013 to provide a baseline of population condition prior to road construction, which will provide a point of comparison to assess the impacts of the road on the population of flying-foxes and monitor the effectiveness of mitigation measures (Gorecki *et al*. 2014). Population monitoring will continue to be undertaken monthly throughout the pre-construction phase, construction phase and first year of the operational phase of the project. The fortnightly field monitoring program would continue through construction of the Project during the period when the flying-foxes are expected to be in the camp (i.e. from 1 August until monitoring confirms camp vacated). The monitoring program would be reviewed regularly and refined if considered appropriate.

The latest monthly monitoring report for January 2016 which incorporates the results of the previous years monitoring is included as **Appendix B**.

3.2 Non-compliances Raised

Omission of the fortnightly Grey Headed Flying Fox Monitoring frequency occurred. Monthly frequency has been adopted by RMS due to no presence of Grey Headed Flying Fox's during the nominated period within the plan. However the frequency adjustment was not approved prior to implementation. The following corrective actions have been adopted:

- Project Environmental Representative endorsement of this frequency change shall be obtained and then a formal request submitted to DP&E to formalise the amended Grey Headed Flying Fox Management Plan.

3.3 Summary of Results

The results of the January 2016 monthly flying-fox monitoring indicate that excluding a brief stopover at the site observed in mid-January 2015, flying-foxes have been absent from the WC2NH site now since mid-April 2014. The nearby Macksville Cemetery camp which was detected in February 2015 and has supported flying-foxes for most months since (excluding three months from July to September 2015), supported large numbers of flying-foxes during the January monitoring event (estimated >40,000). The Macksville Cemetery camp appears to be used as a replacement camp to the site.

4. Koala Population

4.1 Methods

Transect surveys were undertaken by GeoLINK in spring during construction phase (years 1) in order to provide an estimate of Koala numbers and distribution associated with potential habitat associated with the WC2NH project. Transects were established on each side of the Project footprint within the Nambucca State Forest/ Old Coast Road area between chainage 15600 and 19500Both diurnal and nocturnal transect surveys were conducted during each survey period with the addition of spotlighting on tracks and easements across the survey area. Monitoring methods were in accordance with the Koala Management Plan (GeoLINK 2014b).

The results of the spring 2015 population monitoring which incorporates the results of the baseline monitoring undertaken prior to construction are provided in **Appendix C**.

4.2 Summary of Results

The construction stage (year 1) Koala monitoring surveys located one Koala on three occasions during spotlighting surveys and once during diurnal transect surveys. The Koala was located in the northern portion of Nambucca State Forest. This result confirms the dry upper slopes and ridges associated with the northern portion of Nambucca State Forest are utilised by Koalas on occasion. This is in addition to previous baseline monitoring results indicating Koala usage in the moist gullies that occur predominantly in the southern portion of the study site.

The results of the construction stage (year 1) monitoring and baseline monitoring events support the results of previous Koala surveys, undertaken as part of the WC2NH Koala impact assessment and confirm that the southern and northern parts of the Nambucca State forest are subject to low level usage by a small number of Koalas (estimated at one to two animals).

The results of the baseline monitoring do not trigger the need for the provision of GPS/ VHF fitted collaring and pit tagging Koalas or establishing transect survey control sites.

5. Threatened Microbats

The following sections provide a summary of monitoring activities completed for threatened microbats. Microbat monitoring reports covering the first year of construction are provided in **Appendix D**.

5.1.1 Non-compliances Raised

Omission of the Winter Microbat Roost Box monitoring (1st year which is a requirement of the Micro-chiropteran Management Plan (MBMP) occurred. An inconsistency exists between Table 4.4 within the MBMP and the wording within the management plan. Table 4.4 states that roost box monitoring is to commence in Year 2 of construction while the document details that roost box monitoring is to commence in Year 1 of construction. Table 4.4 has been used as a reference to track ecological monitoring requirements. The following corrective actions have been adopted:

- Ecological Monitoring internal tracker has been updated with the correct deliverables
- Quarterly Monitoring of roost boxes is proposed for the next four years in the MBMP which is expected to provide sufficient data to achieve the objectives of this particular monitoring component.

5.1.2 Microbat Habitat (Flyway) Monitoring

Microbat habitat (flyway) monitoring was undertaken by GeoLINK on a monthly basis by conducting inspections of the riparian zone to assess whether flyways have been constricted as part of construction works. On either side of the construction corridor at appropriate flyway (riparian) locations a photo point was be installed and a visual assessment undertaken during each monitoring event to gauge whether the flyway has been maintained or is in need of corrective actions (i.e. vegetation management).

To date no detrimental impacts to flyways off site have been detected although substantial changes have occurred on site due to construction proceeding.

5.1.3 Microbat Roost Box Monitoring

Microbat roost boxes were installed by RMS prior to construction commencing. Roost boxes were inspected quarterly to determine species presence/ absence, an estimate or count of numbers and breeding activity. Information was collected as to the roost identification number, date and time of the inspection. Bat box inspections commenced six months after installation and will finish one year post-construction.

To date the results of monitoring has indicated a low uptake/ usage rate in the first year of construction which would be expected to increase in the second year.

5.1.4 Microbat Persistence and Behaviour Monitoring

The Microbat Management Strategy requires monitoring during construction to examine bat behaviour and roost persistence. This monitoring is to focus on Crouches Creek Bridge during construction to evaluate the response of microbats to a range of construction activities. A methodology for completing this monitoring was prepared by GeoLINK and approved by EPA which involves quarterly monitoring

of this known roost sits until the end of construction. Quarterly surveys are to be undertaken so that variations between summer and winter roost occupancy are captured.

During each monitoring session an ecologist (experienced with microbat survey/ identification) physically inspected Crouches Creek Bridge and recorded the following:

- Evidence of microbats (guano and/or staining).
- Number of microbats present.
- Identification of species.
- Indications of breeding activity.
- Date and time of inspection.
- Location of microbats within the bridge.
- Record of rainfall during monitoring period.

To date monitoring has indicated the ongoing use of the roost site despite construction activities occurring in proximity. Further monitoring will assess longer term impacts on the roost site and seasonal usage of the site by different species.

6. Giant Barred Frog Population

6.1 Methods

Transect surveys were undertaken by GeoLINK in autumn and spring 2015 and summer 2016 during construction phase (year 1) in order to provide an estimate of Giant Barred Frog (GBF) numbers and distribution within known habitat associated with the WC2NH project. Transects were established on each side of the Project footprint along Upper Warrell Creek (UWC) for 500 m either side of the alignment and Butchers Creek, 200 m either side of the alignment. Habitat, abiotic, water quality and tadpole trapping data were collected during the day. GBF population data was collected during nocturnal surveys to record weight, snout to vent length, sex and GPS location of capture, all frogs were microchipped and swabbed for Chytrid fungus. Visual encounters via spotlighting and call playback were employed to detect frogs within the study area. At UWC and Butchers Creek 20 x 50 m monitoring zones were surveyed on both sides of the creek (20 zones at UWC; 8 zones at Butchers Creek). Monitoring methods were in accordance with the WC2NH GBF Management Strategy (Lewis Ecological, 2014).

The results of the annual population monitoring which incorporates the results of the baseline monitoring undertaken prior to construction are provided in **Appendix E**.

6.2 Summary of Results

During year 1 a total of 16 GBFs were recorded during the autumn/ spring/ summer population monitoring, all frogs were captured within the Upper Warrell Creek system. All frogs were classified as adults, no sub adults or juveniles have been recorded during any population monitoring surveys. Six frogs were captured during autumn, three during spring and seven during summer. All GBFs captured appeared to be in good health with no visible signs of disease or illness.

Three frogs were captured during spring surveys which were microchipped for the first time. Two of the seven frogs captured during the summer monitoring were recaptures from spring monitoring. No frogs captured and microchipped during Lewis Ecological surveys have been identified or recaptured during the population survey efforts of 2015/ 2016.

A smaller number of GBFs have been captured during the seasonal population monitoring for the 2015/ 2016 period than was recorded during the baseline population monitoring undertaken in 2013/ 2014 which recorded a total count of 47 frogs including juveniles and sub-adult animals.

Since construction has commenced survey zones 8, 9 and 10 have now been fully or partially impacted by construction works. During baseline population monitoring these zones recorded the highest number of frog captures with 21 records in zones 8 and 9 and 6 in zone 10. During pre-clearing surveys (prior to disturbance to these areas) three frogs were captured and relocated outside of the works footprint. During 2015/2016 surveys frogs were observed within zones 2-13 whereas during population baseline monitoring frogs were recorded to be using the creek system more broadly with records spaning zones 2-20.

After only one year of monitoring it is difficult to draw conclusions regarding the dynamics of the UWC GBF population but this reduction in frog records since the baseline population monitoring may be attributable to several factors such as:

- Non-favourable surveys conditions due to lower than usual rainfall.
- Lower than average monthly rainfall records and smaller than usual flood events.
- Direct impacts to previously populated GBF habitat in zones 8, 9 and 10 at UWC.
- No successful breeding events during the years between monitoring and therefore no recruitment of juveniles.
- Reduced health in the population due to disease, although all frogs captured appeared to be in good health.

7. In Situ Threatened Flora Monitoring

7.1 Methods

In accordance with the Threatened Flora Management Plan (TFMP) for the project, monitoring of threatened flora species being retained in-situ as part of the WC2NH project has been undertaken by GeoLINK.

All in situ threatened flora were located and tagged prior to clearing activities commencing with no-go fencing and signage installed. The location of threatened plants was shown on the project Sensitive Area Plans. Monitoring of the health of in-situ threatened flora was undertaken prior to clearing commencing and six months after this.

A report documenting the first year of monitoring is included as **Appendix F**.

7.2 Summary of Results

Key points arising from the first year of monitoring are as follows:

- The overall number of in-situ threatened flora to be monitored has reduced due to additional translocation of a number of threatened plants occurring on the edge of cleared areas with were deemed by Ecos Environmental to be at increased risk of being impacted by edge effects.
- All Tall Knotweed plants have completely died back since the original monitoring survey undertaken, prior to clearing commencing. A reference population of Tall Knotweed located in the Maclean locality in the far north coast was surveyed at the same times and was also found to have had all plants die back. It is currently assumed that this finding is due to climatic events or the natural lifecycle of this species which is not currently well understood. Monitoring of the reference population at Maclean will continue as part of the in situ threatened flora monitoring in order to understand further observations in the WC2NH population.
- Favourable growing conditions for Maundia were present prior to and during construction in 2015. Large areas of Maundia occur adjacent to the project footprint and have been included in revised sensitive area plans. Areas of Maundia at Crouches Creek and the Nambucca floodplain are currently very healthy and dense.
- In-situ Rusty Plums in the Cockburns Lane locality are generally healthy and in good condition, the one exception to this being NW56. This plant shows some signs of discolouration which may be due to its now exposed position. Remediation measures to protect this plant from edge effects will be initiated if no improvement is recorded in its condition.
- The in-situ Spider Orchid is in a healthy condition with recruitment of an additional individual occurring immediately below this plant on the same tree.
- A number of Slender Marsdenia individuals have recently died back. This finding is not surprising given that this species is known to naturally die back as part of its natural lifecycle. Monitoring undertaken next year would expect to see continued recruitment of juvenile vines associated with dead vines.

8. Threatened Flora Translocation Areas

8.1 Methods

The overall aim of the translocation project is to establish viable populations of the impacted species in habitat adjacent to the highway corridor. To achieve this aim the translocation program has three components:

- Salvage transplanting of impacted individuals from the construction footprint.
- Population enhancement by introduction of additional plants propagated from locally collected seed, to increase the initial population size and promote establishment of a viable long-term population.
- Restoration of good quality habitat in the receival sites where required.

Monitoring of translocation areas was undertaken by Ecos Environmental in 2015 in accordance with the requirements of the Threatened Flora Management Plan in order to evaluate the success of translocations undertaken for threatened flora. A report detailing the first year of translocation area monitoring is included in **Appendix G**.

8.2 Non-compliances Raised

Omission of the November 2015 monitoring report on translocated individuals which is a requirement of the TFMP occurred. Section 4.8.3 Timing/Frequency of the Threatened Flora Management Plan, which forms part of the Flora and Fauna Management Plan details the monitoring frequency periods for the translocated threatened species, which includes four monitoring periods in the first year and six monthly monitoring period in Year 2. In Year 1 only three monitoring events were completed, with no monitoring being undertaken in November 2015. The cause of this non-compliance was the principal botanist contracted to undertake the monitoring was not available during this period and was overseas. It did not become apparent to the Project that the monitoring period had been missed until the Annual Report was prepared by the principal botanist. The following corrective actions have been adopted:

- Proposal from Plan Author to modify the frequency of monitoring to the following:
  - Year 1 – frequency change to 3 monitoring periods
  - Year 2 – frequency change to 3 monitoring period (6th, 9th and 12th months) – this change will also enable the Plan Author to complete monitoring in November 2016 which would coincide with the flowering time of Slender Marsdenia.
- A request to the Environmental Representative has been made for a minor amendment to the CEMP (TFMP, Appendix B of FFMP) under Condition B29 (g) minor change to CEMP.

8.3 Summary of Results

The survival rate of all threatened species was high in the first year. The overall survival rate of Slender Marsdenia, the main species requiring translocation was 90.7% (169 individuals translocated). Plants were transplanted directly to the new sites, watered in and given follow-up watering. No other

treatments were applied such as fertilisers. This survival rate is slightly higher than the equivalent treatment on the NH2U project (87.6% after 12 months). Koala Bells and Spider Orchid flowered in the first year and Koala Bells set seed. A novel approach was used to prepare the receival site for Floyds Grass, which was weed infested, by stripping off the ground layer vegetation and the top 10 cm of soil which contains most of the soil seedbank, creating bare conditions with much lower weed potential for the Floyds Grass to become established. Nearly all Floyds Grass clumps survived and are growing, 30% have sent out runners of more than 1.0 m up to a maximum of 1.6 m long in just over six months.

9. Road Kill Monitoring

9.1 Methods

Daily road kill monitoring has been undertaken by the Pacifico project team during the first year of construction in accordance with the requirements of the Road Kill monitoring strategy prepared for the project (refer to Koala/ Spotted-tailed Quoll Management Plans).

Reports documenting the results of the first year of monitoring are included in **Appendix H**.

9.2 Summary of Results

Thirteen fauna road mortalities have been recorded during the first year of monitoring including one threatened fauna species, namely a Grey- headed Flying-fox (*Pteropus poliocephalus*) which is listed as vulnerable under State and Commonwealth legislation.

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Appendix A

Habitat Tree Register and Fauna Capture/ Relocation Records

Table A1 WC2NH Fauna Register February 2015 to March 2016

Common Name	Scientific Name	Number of Individuals	Date	Fate	Location	Chainage	Comments	Observer
February 2015								
GBF	*Mixophyes iteratus*	2	19/02/2015	Released on non works side of frog fence.	Lower warrel Ck	42500	Observed during gbf monitoring (night time)	DH,FM,JO
March 2015								
Sugar Glider	*Petaurus breviceps*	4	4/03/2015	Released, Unharmed.	State forest off Old Coast Rd	55200	Nest box attached to tree was removed. 4 x sugar gliders occupying nest box. Nest box relocated into bush, reatacched to tree on same chainage outside clearing limits.	JO
Pink Tounged Skink	*Cyclodomorphus gerrardii*	1	16/03/2015	Released, Unharmed.	Cockburns lane	42980	Found within fallen stag, relesed in bush on same chainage outside clearing limits.	DH,FM
Yellow Bellied Glider	*Petaurus australis*	4	16/03/2015	Died in falling stag.	Cockburns lane	42980	Discovered in fallen stag. Three dead on arrival one euthanased by Macksville Vet.	DH,FM
Brushtail Possum	*Trichosurus vulpecula*	5	16/03/2015	Escaped falling stag.	Cockburns lane	42980	Observed escaping fallen stag. Appered to be unharmed.	DH,FM
Ringtail Possum	*Pseudocheirus peregrinus*	2	23/03/2015	Self relocated	NE siding lane	58150	Observed during pre dawn survey.	DH,FM
Red Backed Toadlet	*Pseudophryne coriacea*	1	23/03/2015	Self relocated	NE siding lane	58150	Observed during pre dawn survey.	DH,FM
Sugar Glider	*Petaurus breviceps*	1	25/03/2015	Self relocated	NE siding lane	58150	Observed during pre dawn survey.	DH,FM
Carpet Python	*Morelia spilota*	1	30/03/2015	Died on site, possible machinery strike.	NE siding lane	58150	Observed during site visit.	DH,FM
Faun Footed Melomys	*Melomys cervinipes*	1	30/03/2015	Released, Unharmed.	NE siding lane	58150	Observed Habitat tree removal.	DH,FM

Common Name	Scientific Name	Number of Individuals	Date	Fate	Location	Chainage	Comments	Observer
Southern Dwarf, Crowned Snake	*Cacophis krefftii*	1	27/03/2015	Released outside of clearing limits.	NE siding lane	58150	Observed Habitat tree removal.	DH,FM
GBF	*Mixophyes iteratus*	3	11/03/2015	Released on non works side of frog fence.	Lower warrel Ck	42500	Observed during GBF monitoring (night time)	DH,FM,JH
April 2015								
Sugar Glider	*Petaurus breviceps*	1	1/04/2015	Released outside of clearing limits.	Above quarry on Pacific Hwy.	47750	Observed in HBT held during the day then released after dark.	DH,FM
Sugar Glider	*Petaurus breviceps*	3	8/04/2015	Self relocated	Old coast rd	59300	Found in habitat tree when dropped	FM
Sugar Glider	*Petaurus breviceps*	1	8/04/2015	Wires	Old coast rd	59300	Found in habitat tree when dropped	FM
Blind snake	*Ramphtyphlops nigrescens*	1	9/04/2015		Bald hill rd	49300	Found in habitat tree when dropped	FM
Green Tree Snake	*Dendrelaphis punctulata*	1	15/04/2015	Relocated outside of project area	Bald hill rd	48500	Salvaged from debris afetr habitat tree felliing	FM, GJM
Carpet python	*Morelia spilota*	1	23/04/2015	Relocated outside of project area	Lower warrel ck	48100	Collected from the south side of lower warrel ck.	DH, EW
May 2015								
White headed pigeon	*Columba leucomela*	1	4/05/2015	Taken to Macksville vet	Nth Bald Hill	49300		
Carpet python	*Morelia spilota*	1	14/05/2015	wires	Cockburns lane	42800		
Carpet python	*Morelia spilota*	1	15/05/2015	Relocated outside of project area	Butchers Ck	43200		
Pacific black duck	*Anas superciliosa*	15	29/05/2015	Relocated outside of project area	Dam wall	44500	Mother duck plus 14 ducklings, shooed from dam wall into neighbouring water body(outside of allignment).	
Carpet python	*Morelia spilota*	1	29/05/2015	Relocated outside of project area	South of Butchers creek	42700		

Common Name	Scientific Name	Number of Individuals	Date	Fate	Location	Chainage	Comments	Observer
June 2015								
Swamp wallaby	*Wallabia bicolor*	1+1	5/06/2015	Mother hit by car, joey survived	Intersection of scotts head rd	48100	Wires carer to rehabilitate	FM,EW
Lace monitor	*Varanus varius*	1	11/06/2015	Rellocated to nearby bush land, unharmed.	North of Sheathers driveway.	56200		FM
Carpet Python	*Morelia spilota*	1	11/06/2015	Rellocated to nearby bush land, unharmed.	North of Sheathers driveway.	56200		FM
Feather tailed glider	*Acrobates pygmaeus*	2	16/06/2015	Rellocated to nearby bush land ,unharmed.	Adjacent Jacks ridge	57000	Placed in nest box with dry leafy material.	DH,FM
Little Forest Bat	*Vespadelus sp*	4	16/06/2015	3 deceased, 1 rellocated after sun down.	Adjacent Jacks ridge	57000		DH,FM
Eastern water dragon	*Physignathus lesueurii*	6	16/06/2015	5 Relocated outside of project area, 1 Euthanased	Culvert, near quarry access	47500		DH,FM
Sugar Glider	*Petaurus breviceps*	1	18/06/2015	Rellocated to nearby bush land, unharmed.	Jacks Ridge	57050		FM
Southern Dwarf, Crowned Snake	*Cacophis krefftii*	1	22/06/2015	Self relocated	South Bald Hil	48900		DH
Carpet python	*Morelia spilota*	1	23/06/2015	Rellocated to nearby bush land, unharmed.	Poplar trail, OCR			FM
Red Belly black snake	*Pseudechis porphyriacus*	1	24/06/2015	Rellocated to nearby bush land, unharmed.	Old Mill, Sheathers			FM
Echidna	*Tachyglossus aculeatus*	1	25/06/2015	Rellocated to nearby bush land, unharmed.	Poplar trail, OCR			FM,JO,JL
kookaburra	*Dacelo novaeguineae*	1	25/06/2015	Died after being struck by stick in mulcher	Poplar trail, OCR			DH
July 2015								
Brush tailed possum	*Trichosurus vulpecula*	1	1/07/2015	rellocated outside of project boundary	Old Coast rd		possibly with young	FM

Common Name	Scientific Name	Number of Individuals	Date	Fate	Location	Chainage	Comments	Observer
Eastern small eyed snake	*Cryptophis nigrescens*	1	8/07/2015	rellocated outside of project boundary	Old Coast rd			FM
Lace monitor	*Varanus varius*	1	15/07/2015	Injured in clearing and grubbing, taken to macksville vet	Old Coast rd		Currently being rehabilitated	FM
Eastern water dragon	*Physignathus lesueurii*	1	15/07/2015	rellocated outside of project boundary	Old Coast rd and pacific hwy		Found in rubbish pile	FM
Blind snake	*Ramphtyphlops nigrescens*	1	15/07/2015	rellocated outside of project boundary	Old Coast rd			FM
Echidna	*Tachyglossus aculeatus*	1	16/07/2015	rellocated outside of project boundary	Stoney creek			FM
Sugar glider	*Petaurus breviceps*	2	17/07/2015	Found in nest box that required moving outside of clearing limits	Old Coast rd			FM
Blue tongue lizard	*Tiliqua sp.*	1	21/07/2015	found during top soil stripping, rellocated unharmed.	North of southern compound			FM
Swamp wallaby	*Wallabia bicolour*	2	24/07/2015	Hit by vehicle (OCR) Mother died at scene, joey un injured being cared for by wires.				FM
Feather tailed glider	*Acrobates pygmaeus*	1	27/07/2015	found in HBT whilst clearing, rellocated to nearby bush land, unharmed.	Gate 18, Old Coast rd			FM
August 2015								
No Records for August								
September 2015								
Great Barred Frog	Mixophyes faciolatus	2	7/09/2015	Moved off site, found during GBF pre clearing survey	Butchers ck	43300		DH

Common Name	Scientific Name	Number of Individuals	Date	Fate	Location	Chainage	Comments	Observer
Striped Rocket Frog	Litoria nasuta	2	9/09/2015	Moved off site, found during GBF pre clearing survey	Butchers ck	43300		FM
Red Backed Toadlet	Pseudophryne coriacea	1	9/09/2015	Moved off site, found during GBF pre clearing survey	Butchers ck	43300		FM
Eastern Dwarf Frog	Litoria fallax	1	10/09/2015	Moved off site, found during GBF pre clearing survey	Butchers ck	43300		FM
Dwarf Crowned Snake	Cacophis krefftii	1	11/09/2015	Moved off site, found during GBF pre clearing survey	Butchers ck	43300		FM
Great Barred Frog	Mixophyes faciolatus	1	17/09/2015	Moved off site, found during GBF pre clearing survey	Butchers ck	43300		DH
Blind Snake	*Ramphtyphlops nigrescens*	1	24/09/2015	Unharmed rellocated off site	OC15	59200		
October 2015								
Marsh Snake	*Hemiapsis signata*	1	2/10/2015	relocated outside of project boundary	Gate OC14 Nambucca State Forest	59000	Identified by work crew	JO
Brown Snake	*Pseudonaja textilis*	1	6/10/2015	relocated outside of project boundary	Albert Drive interchange	46150	Identified by work crew	JO
Carpet Python	*Morelia spilota*	1	8/10/2015	taken to the vet for medical attention, now in care with WIRES	122 Old Coast Road house demolition, pre-demo survey was undertaken however the snake was not detected	54100	Identified during house demolition by work crew	JO
Eastern Rosella	*Platycercus eximius*	1	15/10/2015	taken to care for WIRES	Fill 12 south of Lower Warrell Creek	48000		JO

Common Name	Scientific Name	Number of Individuals	Date	Fate	Location	Chainage	Comments	Observer
November 2015								
Great Barred Frog	Mixophyes faciolatus	1	19/11/2015	during frog surveys, rellocated offsite, butchers ck	Butchers Creek	43300		FM/JO
Pink Tongued Skink	*Cyclodomorphus gerrardii*	1	19/11/2015	during frog surveys, rellocated offsite, Butchers ck	Butchers Creek	43300		FM/JO
Brown falcon	Falco berigora	1	28/11/2015	taken to vet, found under plant in the morning, cut 10	Cut 10	47700	Identified by work crew	
Koala	Phascolarctos cinereus	1	24/11/2015	Found during Koala surveys	Near Tip Rd > 70m west of the project alignment			FM/GMcL
December 2015								
Juvenile Brown Snake	*Pseudonaja textilis*	1	8/12/2016	relocated outside of project boundary	OC6 drainage excavation	55200	Identified by work crew	JO
January 2016								
Striped Marsh Frog	*Limnodynates peronii*	1	14/01/2016	relocated outside of Project alignment to the east	Fill 19 near South Mattick Road	54400	Identified by work crew	JO
Red Bellied Black Snake	*Pseudechis porphyriacus*	1	20/01/2016	Euthanised at vet missing tail above the cloaca	Rosewood Creek	44900		JO
Eastern Long Neck Turtle	*Chelodina longicollis*	1	22/01/2016	relocated outside of Project alignment to the east	Fill 19 near South Mattick Road in sediment trap	54400	Identified by work crew	JO
Kookaburra	*Dacelo novaeguineae*	1	27/01/2016	Hit by traffic on Old Coast Road - Euthanised at vet	Old Coast Road		PV brought in to Ecologists	FM
February 2016								
Grey Headed Flying Fox	Pteropus poliocephalus	1	16/02/2016	found in structure pile casing, taken to vet then given to experienced WIRES carer	Nambucca River Bridge - Gumma Rd	52050	Structures staff called ecologist to capture the animal	FM/JO

Common Name	Scientific Name	Number of Individuals	Date	Fate	Location	Chainage	Comments	Observer
Yellow Bellied Gliders	Ptaurus australis	3	18/02/2016	Observed on HBT at OC18 - additional monitoring and supervision of tree felling. No YBGs in the habitat tree while felling	OC18 HBT	60950	Observed on HBT at OC18 1 animal observed 2 additional animals heard calling with 100m of the HBT	JO
Sugar Gliders	Ptaurus	2	29/02/2016	found within hollows of the OC18 HBT - safely released at night	OC18 HBT	60950	captured during supervised felling of the HBT	DH/FM/JO
March 2016								
Swamp Wallaby	*Wallabia bicolour*	1	2/03/2016	Found attacked by dogs - taken to vet for treatment in care with WIRES	Cut24 OC14	58800	attacked by 2 dogs captured by forman and given to Ecologists	JO
Twany Frogmouth	*Podargus strigoides*	1	7/03/2016	Collision with delivery truck on route to PCY - Eunthanised due to missing wing	PCY	54100	Delivery driver called Enviros	JO
Perons Tree Frog	*Litoria peronii*	1	8/03/2016	Captured during HBT felling - relocated offsite	Stoney Creek	45500	Ecologist capture/relocate	FM

Table A2 WC2NH Hollow Bearing Tree Register March 2015 to March 2016

Reference	Co-ordinates (GDA 1994)		Location	Species	Surrounding Vegetation	Habitat Type	Dead or Alive	DBH (cm)	Tree Height (m)	Date Felled	Position and Size of Hollows						Fissures/ Base Hollows			
	Easting	Northing									Trunk - Small (<5cm)	Trunk - Medium (5-15 cm)	Trunk - Large (>15cm)	Limb - Small (<5cm)	Limb - Medium (5-15cm)	Limb - Large (>15cm)	Medium Fissure	Large Fissure	Medium Hollow	Large Hollow
G81	490852	6596754	Stoney Ck	Blue gum	Cleared creek line	Potential hollow-bearing tree	Alive	90	18	8/03/2016	0	0	0	0	0	0	0	0	0	0
G80	497520	6610273	Top of OCR	Stag	Open Forest-Blackbutt	Potential hollow-bearing tree	Dead	50	12	29/03/2016	0	0	0	0	0	0	0	0	0	0
G79	497465	6610258	Top of OCR	Stag	Open Forest-Blackbutt	Hollow-bearing tree	Dead	45	12	29/03/2016	0	0	0	0	0	0	0	0	0	0
G78	497453	6610261	Top of OCR	Blood wood	Open Forest-Blackbutt	Hollow-bearing tree	Alive	70	22	29/03/2016	0	0	0	0	0	0	0	0	0	0
G77	497167	6610233	OcC18	Stag	Open Forest-Blackbutt	Potential hollow-bearing tree	Dead	80	16	18/02/2016	0	0	0	0	0	0	0	0	0	0
G76	497275	6610275	OC19	Blackbutt	Open Forest-Blackbutt	Potential hollow-bearing tree	Alive	140	25	18/02/2016	0	0	0	0	0	0	0	0	0	0
G75	497271	6610278	OC19	Blackbutt	Open Forest-Blackbutt	Potential hollow-bearing tree	Alive	105	20	18/02/2016	0	0	0	0	0	0	0	0	0	0
G74	492086	6598490	Cut 10	Ficus sp.	Paddock, Quarry	Potential hollow-bearing tree	Alive	250	12	28/10/2015	0	0	0	0	0	0	0	0	0	0
G73	497119	6610042	Oc17	Blackbutt	Open Forest-Blackbutt	Potential hollow-bearing tree	Alive	120	20	7/10/2015	0	0	0	0	0	0	0	0	0	0
G72	494282	6603654	53250 - 54300	Stag	Moist Open Forest-White Mahogany	Hollow-bearing tree	Dead	135	20	5/08/2015	0	1	0	0	0	0	0	0	0	0
G71	494282	6603665	53250 - 54300	Blackbutt	Moist Open Forest-White Mahogany	Hollow-bearing tree	Alive	55	18	5/08/2015	0	1	0	1	0	0	0	0	0	0
G70	494270	6603667	53250 - 54300	Blackbutt	Moist Open Forest-White Mahogany	Hollow-bearing tree	Alive	120	22	5/08/2015	0	1	0	0	0	0	0	0	0	0
G69	494272	6603655	53250 - 54300	Stag	Moist Open Forest-White Mahogany	Hollow-bearing tree	Dead	155	18	5/08/2015	0	0	0	1	0	0	0	0	0	0
G68	494375	6604033	53250 - 54300	Blackbutt	Moist Open Forest-White Mahogany	Hollow-bearing tree	Alive	120	22	5/08/2015	0	1	0	0	0	0	0	0	0	0
G67	494370	6604038	53250 - 54300	Blackbutt	Moist Open Forest-White Mahogany	Hollow-bearing tree	Alive	100	18	5/08/2015	0	0	0	1	0	0	0	0	0	0
G66	497367	6610376	60950 - 61280	Blackbutt	Open Forest-Blackbutt	Hollow-bearing tree	Alive	60	12	23/07/2015	0	0	0	2	0	0	0	0	0	0
G65	497388	6610414	60951 - 61280	Blackbutt	Open Forest-Blackbutt	Hollow-bearing tree	Alive	120	25	23/07/2015	0	0	0	2	2	0	0	0	0	0
H16	490697	6596192	Rose wood Ck	Flooded gum	Camphor Laurel Forest	Hollow-bearing tree	Alive	90	25	3/08/2015	2	0	0	0	2	0	0	0	0	0
G64	490673	6596062	Rose wood Ck	Ficus sp.	Paddock	Hollow-bearing tree	Alive	20	12	3/08/2015	2	0	0	0	1	0	0	0	0	0
H95	497154	6610100	North OCR	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	90	18	28/07/2015	0	0	1	1	0	0	0	0	0	0
H98	497279	6610216	North OCR	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	50	12	28/07/2015	0	1	0	1	0	0	0	0	0	0
H97	497274	6610215	North OCR	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	45	12	28/07/2015	0	1	0	1	0	0	0	0	0	0
H99	497264	6610227	North OCR	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	70	22	28/07/2015	0	1	0	1	0	0	0	0	0	0

Reference	Co-ordinates (GDA 1994)		Location	Species	Surrounding Vegetation	Habitat Type	Dead or Alive	DBH (cm)	Tree Height (m)	Date Felled	Position and Size of Hollows						Fissures/ Base Hollows			
	Easting	Northing									Trunk - Small (<5cm)	Trunk - Medium (5-15 cm)	Trunk - Large (>15cm)	Limb - Small (<5cm)	Limb - Medium (5-15cm)	Limb - Large (>15cm)	Medium Fissure	Large Fissure	Medium Hollow	Large Hollow
H100	497311	6610242	North OCR	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	80	16	28/07/2015	0	1	0	1	0	0	0	0	0	0
H104	497501	6610514	60900 - 61250	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	140	25	27/07/2015	0	2	0	0	0	0	0	0	0	0
H103	497460	6610464	60900 - 61250	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	100	18	27/07/2015	2	1	0	1	0	0	0	0	0	0
G63	497456	6610607	60900 - 61250	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	80	22	27/07/2015	1	0	0	2	0	0	0	0	0	0
G62	497052	6610585	60900 - 61250	casurina	Blackbutt dry open forest	Hollow-bearing tree	Alive	155	18	27/07/2015	1	0	0	1	0	0	0	0	0	0
G61	497396	6610456	60900 - 61250	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	120	22	27/07/2015	1	0	0	0	0	0	0	0	0	0
G60	497382	6610405	60900 - 61250	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	100	18	27/07/2015	1	0	1	1	0	0	0	0	0	0
G59	497190	6610030	60400 - 60600	Stag	Blackbutt dry open forest	Hollow-bearing tree	Alive	120	22	20/07/2015	0	0	0	2	0	0	0	0	0	0
H93	497002	6610010	60400 - 60600	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	140	25	20/07/2015	0	0	0	2	0	0	0	0	0	0
H92	497002	6610010	60300 - 60950	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	105	20	16/07/2015	2	0	0	0	1	2	0	0	0	0
H89	497091	6609977	60300 - 60950	White mahogany	Blackbutt dry open forest	Hollow-bearing tree	Alive	250	12	16/07/2015	2	0	0	0	1	0	0	0	0	0
H91	497082	6609969	60300 - 60950	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	120	26	16/07/2015	1	0	0	0	1	0	0	0	0	0
H90	497128	6609976	60300 - 60950	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	120	26	16/07/2015	2	0	0	0	1	0	0	0	0	0
H86	496954	6609900	60300 - 60950	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	100	26	16/07/2015	1	0	0	0	2	0	0	0	0	0
H79	496664	6609613	59650 - 60200	Blackbutt	Moist Open Forest-Flooded Gum	Potential hollow-bearing tree	Alive	120	28	15/07/2015	0	0	0	0	0	0	0	0	0	0
H76	496740	6609603	59650 - 60200	Blackbutt	Moist Open Forest-Flooded Gum	Potential hollow-bearing tree	Alive	85	24	15/07/2015	0	0	0	0	0	0	0	0	0	0
H77	496709	6609634	59650 - 60200	Blackbutt	Moist Open Forest-Flooded Gum	Potential hollow-bearing tree	Alive	100	26	15/07/2015	0	0	0	0	0	0	0	0	0	0
H75	496647	6609457	496646-6609457	Flooded gum	Moist Open Forest-Flooded Gum	Hollow-bearing tree	Alive	12	20	13/07/2015	3	0	0	0	0	0	0	0	0	0
H74	496668	6609455	496668-6609455	Flooded gum	Moist Open Forest-Flooded Gum	Hollow-bearing tree	Alive	120	26	5/01/1900	0	0	0	3	0	0	0	0	0	0
H102	497447	6610424	60900 -61250	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	110	26	3/07/2015	0	0	0	2	0	0	0	0	0	0
H105	497364	6610342	60900 -61250	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	105	20	3/07/2015	0	2	0	0	0	0	0	0	0	0
G58	496524	6609105	59000 - 59450	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	100	18	10/07/2015	2	0	0	0	0	0	0	0	0	0
G57	496521	6609077	59000 - 59450	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	60	12	10/07/2015	1	2	0	1	0	0	0	0	0	0
G56	496523	6609033	59000 - 59450	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	120	25	10/07/2015	1	0	0	1	0	0	0	0	0	0
H66	496543	6608949	59000 - 59450	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	120	26	10/07/2015	1	0	0	1	0	0	0	0	0	0
H67	496540	6608909	59000 - 59450	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	120	28	10/07/2015	1	0	0	1	0	0	0	0	0	0

Reference	Co-ordinates (GDA 1994)		Location	Species	Surrounding Vegetation	Habitat Type	Dead or Alive	DBH (cm)	Tree Height (m)	Date Felled	Position and Size of Hollows						Fissures/ Base Hollows			
	Easting	Northing									Trunk - Small (<5cm)	Trunk - Medium (5-15 cm)	Trunk - Large (>15cm)	Limb - Small (<5cm)	Limb - Medium (5-15cm)	Limb - Large (>15cm)	Medium Fissure	Large Fissure	Medium Hollow	Large Hollow
G55	496325	6608435	58600 - 58900	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	90	18	1/07/2015	1	2	0	0	0	0	0	0	0	0
G54	496310	6608403	58600 - 58900	Mahogany	Blackbutt dry open forest	Hollow-bearing tree	Alive	50	12	1/07/2015	1	0	0	0	0	0	0	0	0	0
G53	496259	6608375	58600 - 58900	Mahogany	Blackbutt dry open forest	Hollow-bearing tree	Alive	45	12	1/07/2015	1	0	0	0	1	0	0	0	0	1
G52	496234	6608375	58600 - 58900	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	70	22	1/07/2015	1	0	0	0	1	0	0	0	0	0
G51	496216	6608375	58600 - 58900	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	80	16	1/07/2015	0	0	0	3	1	0	0	0	0	0
G50	496296	6608415	58400 - 58800	Mahogany	Blackbutt dry open forest	Hollow-bearing tree	Alive	140	25	2/07/2015	0	2	0	0	0	0	0	0	0	0
H63	496195	6608316	58400 - 58800	Stag	Blackbutt dry open forest	Hollow-bearing tree	Alive	100	12	2/07/2015	0	1	0	3	0	0	0	0	0	0
G49	496182	6608280	57900 - 58500	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	120	25	29/06/2015	3	0	0	0	0	0	0	0	0	0
G48	496540	6608909	58700-59450	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	90	25	29/06/2015	2	1	0	3	0	0	0	0	0	0
H62	496179	6608282	57900-58700	Brushbox	Blackbutt dry open forest	Hollow-bearing tree	Alive	40	16	26/06/2015	0	0	0	0	0	0	0	0	0	0
G47	495614	6607505	57450-57800	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	95	20	22/06/2015	0	2	0	4	0	0	0	0	0	0
H57	495600	6607465	57100-57500	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	110	20	18/06/2015	1	0	0	3	1	2	2	0	0	0
H58	495614	6607505	57100-57500	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	80	14	18/06/2015	1	1	0	2	0	0	0	0	0	0
G46	495560	6607360	57100-57500	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	60	15	18/06/2015	0	2	0	3	0	0	0	0	0	0
H56	495395	6607106	57100-57500	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	110	22	18/06/2015	0	0	1	3	1	0	0	0	0	0
H55	495392	6607100	57100-57500	Blackbutt	Blackbutt dry open forest	Potential hollow-bearing tree	Alive	85	22	18/06/2015	0	0	0	0	0	0	0	0	0	0
H36	495401	6607034	56980-57900	White mahogany	Blackbutt dry open forest	Hollow-bearing tree	Alive	100	16	16/06/2015	2	2	0	2	2	2	0	0	0	0
H38	492470	6599294	56980-57900	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	115	22	16/06/2015	2	0	0	0	0	0	0	0	0	0
H39	492508	6599449	56980-57900	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	135	20	16/06/2015	4	0	1	1	0	1	0	0	0	0
H43	495410	6607049	56980-57900	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	40	14	16/06/2015	2	0	0	1	0	0	0	0	0	0
H40	492420	6600018	56980-57900	Flooded gum	Blackbutt dry open forest	Hollow-bearing tree	Alive	50	2	16/06/2015	4	0	0	1	0	0	0	0	0	0
H42	492348	6600079	56980-57900	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	150	8	16/06/2015	2	0	0	0	0	0	0	0	0	0
H44	495406	6607054	56980-57900	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	200	19	16/06/2015	3	0	1	2	0	1	0	0	0	0
H45	495410	6607049	56980-57900	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	60	17	16/06/2015	2	0	0	0	0	0	0	0	0	0
H46	495388	6607014	56980-57900	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	110	18	16/06/2015	2	0	0	0	0	0	0	0	0	0
G45	495074	6606525	56980-57900	Blood wood	Blackbutt dry open forest	Hollow-bearing tree	Alive	90	17	16/06/2015	3	0	0	3	0	0	0	0	0	0
G44	495058	6606488	56980-57900	Turpentine	Blackbutt dry open forest	Hollow-bearing tree	Alive	50	10	16/06/2015	2	0	0	0	0	0	0	0	0	0
G43	495031	6606453	56980-57900	Paperbark	Blackbutt dry open forest	Hollow-bearing tree	Alive	45	12	16/06/2015	0	0	0	0	0	0	0	0	0	0

Reference	Co-ordinates (GDA 1994)		Location	Species	Surrounding Vegetation	Habitat Type	Dead or Alive	DBH (cm)	Tree Height (m)	Date Felled	Position and Size of Hollows						Fissures/ Base Hollows			
	Easting	Northing									Trunk - Small (<5cm)	Trunk - Medium (5-15 cm)	Trunk - Large (>15cm)	Limb - Small (<5cm)	Limb - Medium (5-15cm)	Limb - Large (>15cm)	Medium Fissure	Large Fissure	Medium Hollow	Large Hollow
G42	495007	6606437	56100-56400	Blood wood	Blackbutt dry open forest	Hollow-bearing tree	Alive	60	12	11/06/2015	0	0	0	0	0	0	0	0	0	0
G41	495000	6606430	56100-56400	Blood wood	Blackbutt dry open forest	Hollow-bearing tree	Alive	80	16	11/06/2015	0	0	3	4	1	0	0	0	0	1
G40	494994	6606408	56100-56400	Paperbark	Blackbutt dry open forest	Hollow-bearing tree	Alive	140	25	11/06/2015	0	0	0	0	1	0	0	0	0	0
G39	494964	6606382	56100-56400	Blackbutt	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	100	18	11/06/2015	0	0	0	0	2	0	0	0	0	0
G38	494952	6606346	56100-56400	Blood wood	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	90	18	11/06/2015	0	0	0	0	3	0	0	0	0	0
G37	494945	6606330	56100-56400	Blackbutt	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	50	12	11/06/2015	0	0	0	0	2	0	0	0	0	0
G36	494924	6603662	56100-56400	Tallow wood	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	45	12	11/06/2015	0	0	0	0	4	0	0	0	0	0
G35	494892	6606332	56100-56400	Blood wood	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	70	22	10/06/2015	0	0	0	0	2	0	0	0	0	0
G34	494908	6606308	56100-56400	Blood wood	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	65	18	10/06/2015	0	0	0	1	2	0	0	0	0	1
G33	494901	6606330	55900-56400	Blood wood	Moist Open Forest- Flooded Gum	bird habitat	Alive	15	40	3/06/2015	0	0	0	0	0	0	0	0	0	0
H531	494424	6605254	54550-55400	Blackbutt	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	90	18	29/05/2015	0	5	0	0	0	0	0	0	0	0
G32	490152	6595348	43350-45300	Tallow wood	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	15	30	20/05/2015	0	0	0	2	0	0	0	0	0	0
G31	490130	6595312	43350-45300	Turpentine	Moist Open Forest- Flooded Gum	bird habitat	Alive	12	30	13/05/2015	0	0	0	0	0	0	0	0	0	0
H80	496730	6609731	60080	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	130	24	14/05/2015	0	0	3	0	2	0	0	0	0	0
G75	489570	6594557	42750-42850	flooded gum	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	65	12	12/05/2015	0	0	0	0	2	0	0	0	0	0
G30	489961	6595160	43350-45300	Stag	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Dead	70	22	13/05/2015	0	3	0	4	5	0	0	0	0	0
H74	496647	6609457	59750-60050	Flooded gum	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	80	16	11/05/2015	0	0	0	0	3	0	0	0	0	0
H73	496600	6609419	59750-60050	Red mahogany	Moist Open Forest- Flooded Gum	Potential hollow-bearing tree	Alive	120	22	8/05/2015	0	0	0	0	0	0	0	0	0	0
H33	496182	6608280	56600-57000	Blood wood	Blackbutt dry open forest	Potential hollow-bearing tree	Alive	80	22	8/05/2015	0	0	0	0	0	0	0	0	0	0
H46	495388	6607014	57000-59500	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	110	18	6/05/2016	0	0	0	0	3	0	0	0	0	0
G29	497190	6610030	60300-60600	Blackbutt	Blackbutt dry open forest	Potential hollow-bearing tree	Alive	80	16	29/04/2015	0	0	0	0	0	0	0	0	0	0
H89	497091	6609977	60400-60500	White mahogany	Blackbutt dry open forest	Hollow-bearing tree	Alive	40	16	27/04/2015	0	1	1	0	2	0	0	0	0	0

Reference	Co-ordinates (GDA 1994)		Location	Species	Surrounding Vegetation	Habitat Type	Dead or Alive	DBH (cm)	Tree Height (m)	Date Felled	Position and Size of Hollows						Fissures/ Base Hollows			
	Easting	Northing									Trunk - Small (<5cm)	Trunk - Medium (5-15 cm)	Trunk - Large (>15cm)	Limb - Small (<5cm)	Limb - Medium (5-15cm)	Limb - Large (>15cm)	Medium Fissure	Large Fissure	Medium Hollow	Large Hollow
H90	497128	6609976	60400-60500	Blackbutt	Blackbutt dry open forest	Potential hollow-bearing tree	Alive	120	26	24/04/2015	0	0	0	0	0	0	0	0	0	0
H91	497082	6609969	60400-60500	Blackbutt	Blackbutt dry open forest	Potential hollow-bearing tree	Alive	115	28	25/04/2015	0	0	0	0	0	0	0	0	0	0
H92	497010	6610018	60400-60500	Blackbutt	Blackbutt dry open forest	Potential hollow-bearing tree	Alive	90	4	26/04/2015	0	0	0	0	0	0	0	0	0	0
H93	497002	6610010	60400-60500	Blackbutt	Blackbutt dry open forest	Potential hollow-bearing tree	Alive	70	20	27/04/2015	0	0	0	0	0	0	0	0	0	0
G28	489468	6594427	42700-42750	Blackbutt	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	70	15	23/04/2015	0	0	0	0	2	0	0	0	0	0
H2	489482	6594420	42700-42750	Stag	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	130	10	23/04/2015	0	0	0	0	2	0	0	0	0	0
H36	492309	6599063	48280-47000	Mahogany	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	100	18	17/04/2015	4	0	0	5	7	0	0	0	0	0
H35	492302	6599044	48280-47000	Tallow wood	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	60	17	17/04/2015	0	0	0	0	0	0	0	0	0	0
H34	492320	6599039	48280-47000	Tallow wood	Moist Open Forest- Flooded Gum	Hollow-bearing tree	Alive	95	16	17/04/2015	0	0	0	0	0	0	0	0	0	0
G27a	497213	6610163	60900-60600	Tallow wood	Blackbutt dry open forest	Hollow-bearing tree	Alive	80	16	17/04/2015	0	0	0	0	0	0	0	0	0	0
G27	497194	6610135	60900-60600	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	72	14	17/04/2015	0	0	2	5	4	0	0	0	0	0
H37	492462	6599311	48280-49000	Grey Ironbark	Moist Open Forest- White mahogany /Grey Gum	Hollow-bearing tree	Alive	75	14	16/04/2015	0	0	2	2	0	0	0	0	0	0
H88	496954	6609900	48280-49000	Blackbutt	Moist Open Forest- White mahogany /Grey Gum	Hollow-bearing tree	Alive	120	26	15/04/2015	0	0	1	3	0	0	0	0	0	0
G26	492402	6599173	48280-49000	Tallow wood	Moist Open Forest- White mahogany /Grey Gum	Hollow-bearing tree	Alive	80	18	14/04/2015	2	0	1	4	0	0	0	0	0	0
G25	492404	6599119	48280-49000	Tallow wood	Moist Open Forest- White mahogany /Grey Gum	Hollow-bearing tree	Alive	60	16	14/04/2015	0	0	0	0	0	0	0	0	0	0
H24	492347	6600078	49300	Blackbutt	Paddock trees, farmland	Hollow-bearing tree	Alive	70	20	9/04/2015	6	0	2	2	0	0	0	0	0	0
G24	492351	6600069	49300	Grey gum	Paddock trees, farmland	Hollow-bearing tree	Alive	230	30	9/04/2015	0	0	1	2	0	0	0	0	0	0
H40	492419	6600018	49300	Flooded gum	Paddock trees, farmland	Hollow-bearing tree	Alive	55	22	9/04/2015	0	0	3	3	0	0	0	0	0	0
H41	492429	6600010	49300	Flooded gum	Paddock trees, farmland	Hollow-bearing tree	Alive	80	18	9/04/2015	0	0	4	1	0	0	0	0	0	0
G23	492400	6600025	49300	Tallow wood	Paddock trees, farmland	Hollow-bearing tree	Alive	130	22	9/04/2015	0	0	5	4	0	0	0	0	0	0
G22	496185	6608513	58950-59100	White mahog	Blackbutt dry open forest	Hollow-bearing tree	Alive	50	10	11/04/2015	0	0	2	1	3	6	0	0	0	0
G21	496393	6608612	58950-59100	Tallow wood	Blackbutt dry open forest	Hollow-bearing tree	Alive	80	12	11/04/2015	0	0	0	0	0	0	0	0	0	0

Reference	Co-ordinates (GDA 1994)		Location	Species	Surrounding Vegetation	Habitat Type	Dead or Alive	DBH (cm)	Tree Height (m)	Date Felled	Position and Size of Hollows						Fissures/ Base Hollows			
	Easting	Northing									Trunk - Small (<5cm)	Trunk - Medium (5-15 cm)	Trunk - Large (>15cm)	Limb - Small (<5cm)	Limb - Medium (5-15cm)	Limb - Large (>15cm)	Medium Fissure	Large Fissure	Medium Hollow	Large Hollow
G20	496429	6608592	58950-59100	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	120	24	11/04/2015	0	0	0	0	0	0	0	0	0	0
G19	492427	6599830	49100	Red ash	Moist Open Forest- White mahogany /Grey Gum	Bird habitat	Alive	40	15	13/04/2015	0	0	0	0	0	0	0	0	0	0
H101	497405	6610271	60890	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	115	24	15/04/2015	0	0	0	3	1	0	0	0	0	0
G18	496181	6608281	58570-58700	Tupentine	Blackbutt dry open forest	Hollow-bearing tree	Alive	50	12	9/04/2015	0	2	0	4	0	0	0	1	0	0
H62	496179	6608282	58570-58700	Brushbox	Blackbutt dry open forest	Hollow-bearing tree	Alive	40	16	9/04/2015	0	0	0	0	0	0	0	0	0	0
H63	496195	6608316	58570-58700	Stag	Blackbutt dry open forest	Hollow-bearing tree	Alive	100	16	9/04/2015	0	0	0	0	0	0	0	0	0	0
H66	496543	6608949	59300	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	120	28	8/04/2015	0	4	0	6	2	0	0	0	0	0
H67	496540	6608909	59300	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	125	28	8/04/2015	0	0	0	0	0	0	0	0	0	0
G17	496056	6608091	58300-58000	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	80	14	30/03/2015	4	3	2	0	3	0	0	0	0	0
G16	496044	6608102	58300-58000	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	40	10	30/03/2015	0	0	0	0	0	0	0	0	0	0
G15	495961	6607980	58300-58000	Tallow wood	Blackbutt dry open forest	Hollow-bearing tree	Alive	80	14	27/03/2015	0	1	4	2	3	1	0	0	1	1
G14	495987	6608094	58300-58000	White mahog	Blackbutt dry open forest	Hollow-bearing tree	Alive	80	14	27/03/2015	0	0	0	2	0	0	0	0	0	0
G13	495995	6608026	58300-58000	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	110	16	27/03/2015	0	0	0	0	0	0	0	0	0	0
G12	495955	6608064	58300-58000	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	110	15	27/03/2015	0	0	0	3	0	0	0	0	0	0
G11	495997	6608097	58300-58000	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	80	14	27/03/2015	0	0	0	0	0	0	0	0	0	0
G10	495998	6608055	58300-58000	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	90	16	26/03/2015	0	1	0	2	0	0	0	0	0	0
G9	495939	6607980	58300-58000	Stag	Blackbutt dry open forest	Potential hollow-bearing tree	Dead	130	18	26/03/2015	0	0	0	0	0	0	0	0	0	0
G8	495919	6607947	58300-58000	Tallow wood	Blackbutt dry open forest	Potential hollow-bearing tree	Alive	50	12	25/06/2015	0	0	0	0	0	0	0	0	0	0
G7	495890	6607913	58300-58000	Blackbutt	Blackbutt dry open forest	Hollow-bearing tree	Alive	80	18	25/03/2015	0	1	0	0	0	0	0	1	0	0
G6	492085	6598703	47800	Stag	Moist Open Forest- White mahogany /Grey Gum	Hollow-bearing tree	Dead	50	14	7/04/2015	0	2	0	4	0	0	0	0	0	0
G5	491620	6598053	47050	Paperbark	Moist Open Forest- White mahogany /Grey Gum	Hollow-bearing tree	Alive	110	15	30/03/2015	0	0	4	0	0	0	0	0	0	0
H32	492100	6598598	48150-47050	White mahogany	Moist Open Forest- White mahogany /Grey Gum	Hollow-bearing tree	Alive	60	12	1/04/2015	0	0	0	2	4	0	0	0	0	0
H58	495614	6607505	57600-57900	Stag	Blackbutt dry open forest	Hollow-bearing tree	Alive	80	14	24/03/2015	0	0	0	0	0	0	3	0	0	0
H27	491163	6597337	46150	Tallow wood	Paddock trees, farmland	Hollow-bearing tree	Alive	90	22	19/03/2015	0	0	1	0	0	0	0	0	0	0

Reference	Co-ordinates (GDA 1994)		Location	Species	Surrounding Vegetation	Habitat Type	Dead or Alive	DBH (cm)	Tree Height (m)	Date Felled	Position and Size of Hollows						Fissures/ Base Hollows			
	Easting	Northing									Trunk - Small (<5cm)	Trunk - Medium (5-15 cm)	Trunk - Large (>15cm)	Limb - Small (<5cm)	Limb - Medium (5-15cm)	Limb - Large (>15cm)	Medium Fissure	Large Fissure	Medium Hollow	Large Hollow
H26	491160	6597334	46000-46880	White mahogany	Paddock trees, farmland	Hollow-bearing tree	Alive	70	18	24/03/2015	0	1	0	0	0	0	0	0	0	0
H3	489589	6594531	43150-42850	Stag	Hardwood platation	Hollow-bearing tree	Dead	230	30	16/03/2015	0	10	0	0	0	0	0	0	0	0
G4	495059	6606380	56550-56350	Blackbutt	Paddock trees, farmland	Hollow-bearing tree	Alive	90	18	19/03/2015	2	0	0	0	0	0	0	0	0	0
G3	495067	6606410	56550-56350	Blackbutt	Paddock trees, farmland	Hollow-bearing tree	Alive	130	25	19/03/2015	0	0	0	0	0	0	0	0	0	0
G2	495126	6606610	57000-57500	Mahogany	Blackbutt dry open forest	Hollow-bearing tree	Alive	50	10	13/03/2015	2	0	0	0	1	0	0	0	0	0
G1	491173	6597334	60750-60800	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	80	14	9/03/2015	0	0	2	0	0	0	0	0	0	0
H96	497230	6610193	60750-60800	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	120	28	9/03/2015	0	0	0	0	0	0	0	0	0	0
H533	494431	6605290	55500	Stag	Blackbutt dry open forest	Hollow-bearing tree	Dead	70	16	2/03/2015	1	0	0	3	0	0	0	0	0	0
Totals											**87**	**62**	**48**	**138**	**84**	**15**	**5**	**2**	**1**	**4**

Appendix B

Flying Fox Monthly Report (January 2016)

Appendix C

Koala Monitoring Report (Construction Stage – Year 1)

Appendix D

Threatened Microbat Monitoring Reports (Construction Stage – Year 1)

Appendix E

Giant Barred Frog Monitoring Report

(Construction Stage – Year 1)

Appendix F

In Situ Threatened Flora Monitoring Report (Construction Stage - Year 1)

Appendix G

Threatened Flora Translocation Area Monitoring Report (Construction Stage- Year 1)

Appendix H

Road Kill Monitoring Reports (Construction Stage – Year 1)