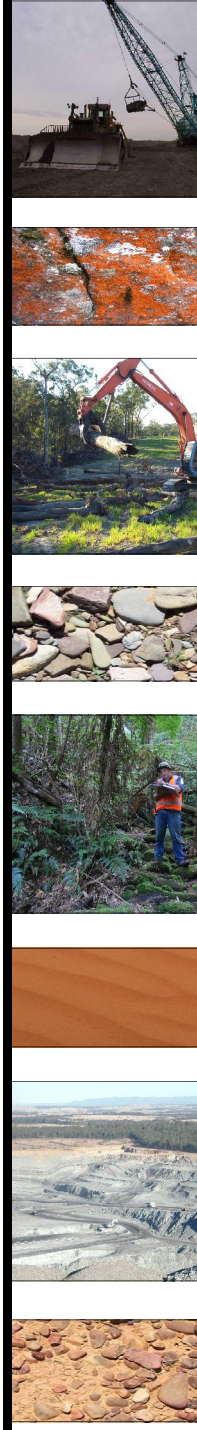
FLORA & FAUNA ASSESSMENT



APPENDIX 5

Flora & Fauna Assessment

For a
Proposed Powerline

At
Centennial Airly Coal
Airly Coal Mine, Capertee

Prepared for
Airly Coal Pty Ltd
Glen Davis Road
Capertee NSW 2846

HARPER SOMERS O'SULLIVAN
PLANNING · SURVEYING · ECOLOGY
A member of RPS Group Plc

Job Reference 25401 - June 2009

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PROJECT: FLORA & FAUNA ASSESSMENT – PROPOSED POWER LINE AT AIRLY COAL MINE	
CLIENT:	AIRLY COAL PTY LTD
OUR REF	25401
DATE:	JUNE 2009
APPROVED BY:	ALLAN RICHARDSON
SIGNATURE:	
CHECKED BY:	TOBY LAMBERT
SIGNATURE:	

EXECUTIVE SUMMARY

INTRODUCTION

RPS Harper Somers O'Sullivan (RPS HSO) was engaged by Airly Coal Pty Ltd (Centennial Airly) to undertake Flora and Fauna and Archaeological Assessment over land holdings at Airly in the Capertee Valley. The purpose of these assessments was to investigate and assess a range of options for a proposed powerline route (and associated infrastructure) to connect the Airly Coal Mine (Airly) to the existing Integral Energy power supply.

The selected proposed powerline route was chosen to minimise potential impacts and will follow a predominantly north-east to southwest axis, with a substation being located at the north-east end of the alignment. The powerline route includes an associated access track following existing farm tracks where possible to further minimise potential impacts. Nevertheless no native vegetation will be removed for the construction of access tracks. This report deals with ecological aspects of onsite assessments over the selected powerline route.

This assessment aims to examine the likelihood of the proposal to have a significant effect on any threatened species, populations or ecological communities listed within the *Threatened Species Conservation Act 1995* (*TSC Act 1995*). The report recognises the relevant requirements of the *Environmental Planning and Assessment Act 1979* (*EP&A Act 1979*) as amended by the *Environmental Planning and Assessment Amendment Act 1997* (*EP&AA Act 1997*). Assessment is also made with regard to those threatened entities listed federally under the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act 1999*).

VEGETATION

Regional mapping - '*The Vegetation of the Western Blue Mountains'* (VWBM), (DEC 2006) maps four vegetation communities within the vicinity of the proposed powerline route, namely:

- MU 20 Capertee Rough-Barked Apple Redgum Yellow Box Grassy Box Woodland;
- MU 21 Capertee-Wolgan Slopes Red Box-Grey Gum-Stringybark Grassy Woodland;
- MU 38 Capertee Grey-Gum-Narrow-Leaved Stringybark-Scribbly Gum-Callitris- Ironbark Shrubby Forest; and
- MU 62 Cleared and Severely Disturbed vegetation.

An area of MU13 Tableland Gully Ribbon Gum Blackwood Apple Box Forest was also observed near the creek crossing via ground-truthing.

Ground-truthing of the proposed powerline route found that the route largely traverses MU 62 Cleared and Severely Disturbed vegetation, avoiding small stands of woodland vegetation and isolated trees. However the proposed route will require the removal of 16 mature trees and one immature tree near the rail line. One of the mature trees is a hollow-bearing tree located near the existing rail line.

Vegetation communities traversed by the proposed powerline route were assessed for their potential to represent locally occurring Endangered Ecological Communities (EECs) vegetation and these communities were not found to constitute EEC vegetation.

Significant Flora

A number of threatened flora species were targeted during flora investigations, due to the presence of existing records from the wider locality. These species or their potential habitat were not found to occur within the proposed powerline route or its vicinity.

HABITAT

Generally the powerline route traverses open grassy habitat, which has limited potential to support native fauna species apart from common native open country birds and mammals. However, where woodland habitats occur in close proximity to grassy powerline route areas there are foraging opportunities for threatened grassland species such as *Stagonopleura guttata* (Diamond Firetail).

Due to a lack of habitat diversity, structural complexity and therefore habitat opportunities it is considered that there is limited opportunity for locally occurring threatened fauna species within the proposed powerline route. Where habitat opportunities currently exist for threatened species within the route, such as is the case with the Diamond Firetail, such opportunities will not be diminished during the process of construction and will remain in a similar state after the powerline is completed.

CORRIDORS AND HABITAT LINKAGES

The proposed powerline route crosses wooded habitat on the western extremity of the southwest ridge. The removal of some trees is not expected to represent a break in vegetation sufficient to hinder the movements of native fauna as currently exist within the site.

FAUNA

Mammals noted within the site were limited to common macropods and introduced species. No threatened native mammals were observed within the site and woodland habitats contain relatively sparse densities of hollow-bearing trees, which might provide shelter opportunities for arboreal mammals.

Three threatened bird species were observed in the vicinity of the proposed powerline route, namely Diamond Firetail, Brown Treecreeper and Gang-Gang Cockatoo. However, the proposal is not likely to diminish those opportunities that currently exist for these species within or adjacent to the proposed powerline route.

Only two species of frog and no species of reptiles were observed during four visits to the site, although cool weather is likely to have affected the mobility of such species.

ENVIRONMENTAL LEGISLATION ASSESSMENT

The proposal is to be assessed under Part 3A of the *EP&A Act 1979*. Due recognition and consideration of the *TSC Act 1995* has been made throughout this assessment.

***Key Threatening Processes** (KTPs)*
KTP's are listed in Schedule 3 of the *TSC Act 1995*. Four KTP's have the potential to affect the site as a consequence of the proposed powerline route, being:

- Clearing of Native Vegetation;
- Loss of hollow-bearing trees;
- Infection of native plants by *Phytophthora cinnamomi* ;and
- Invasion of native plant communities by exotic perennial grasses.

No other KTP's are believed to be likely as a consequence of the proposed powerline route. It is not expected that any of these KTP's are likely to be exacerbated by the proposal to any significant degree due to the minor alteration of existing habitats required by the proposal.

SEPP 44 'Koala Habitat Protection'
No tree species listed in Schedule 2 of SEPP No. 44 – 'Koala Habitat Protection' occur within the proposed powerline route.

Therefore, the site is not considered to constitute 'Potential Koala Habitat' as defined by SEPP 44.

EPBC Act 1999
A total of 20 threatened species and one EEC, which are listed under the *EPBC Act 1999* have been recorded within the proximate region of the site. None of the State-listed threatened bird species observed during the survey are listed under the *EPBC Act 1999*.

The potential for the proposal to significantly impact on individuals or local populations for the above species has been assessed under the provisions of the *EPBC Act 1999*. This assessment concluded that there will not be any significant impact upon any Commonwealth listed threatened species during the proposed powerline construction. Due to the absence of potential adverse impacts upon these species, it will not be necessary to refer the matter to the Department of the Environment, Water, Heritage and the Arts (DEWHA).

CONCLUSIONS AND RECOMMENDATIONS

A number of routes were assessed for significant ecological attributes, the proposed route being selected due to it representing the least potential impact upon local flora and fauna. To further minimise impacts within the site, access for the proposed powerline construction and maintenance will utilise existing farm access tracks.

Five locally common vegetation communities were identified as occurring within the proposed powerline route. The proposed powerline route largely traverses MU 62 Cleared and Severely Disturbed vegetation.

The route was selected to avoid removal of mature trees with only sixteen mature trees and one immature tree requiring removal and remaining vegetation clearance limited to regrowth saplings in the vicinity of Airly Creek.

Three threatened fauna species were recorded within the vicinity of the proposed powerline route, being Diamond Firetail, Brown Treecreeper and Gang-Gang Cockatoo. No suitable habitat for the treecreeper and no significant habitat for the cockatoo occur within the proposed powerline route and Diamond Firetail habitat occurring within the powerline route will not be diminished during construction and commissioning phases of the powerline route and associated infrastructure. Otherwise it is expected that more mobile threatened species such as locally occurring birds and bats may traverse the site on at least an intermittent basis. Larval feed plants for the Bathurst Copper Butterfly occur within the locality, but the proposed powerline route avoids these areas.

Due to their generally open nature, the minimal removal of vegetation associated with the proposed works is considered highly unlikely to result in adverse impacts upon locally occurring threatened species or communities provided the recommendations contained below are considered.

Recommendations

The following recommendations have been outlined to provide ecological guidelines and site management strategies that may prevent any ongoing deleterious impacts upon habitat surrounding the proposed powerline route.

- It is recommended that precautions be implemented to avoid impacts upon waterways and associated vegetation to prevent the movement of sediments or contaminated waters / liquids into onsite drainage lines, particularly Airly Creek.

- It is recommended that appropriate measures be employed to ensure that machinery working within the site does not bring materials (soils etc.) onto the sites that may infect onsite vegetation with *Phytophthora cinnamomi*;

- It is recommended that ongoing weed monitoring be instituted and potential weed infestations be appropriately managed to ensure surrounding communities are protected from invasive species particularly where the proposed powerline route crosses the southwest ridge line.

- It is also recommended that measures be implemented to prevent the erosion of soil on the southwest ridgeline particularly where vegetation will be removed and that any planting required for substrate stability employ locally occurring native species where practical.

- During the construction phase, for any tree removal, and in particular where a hollow-bearing tree may be removed, all works should be supervised by an appropriately qualified person to recover any native fauna that are potentially displaced.

- Centennial Airly has commenced discussions with the Hawkesbury Nepean CMA to undertake voluntary revegetation works within Airly Creek in the vicinity of the creek crossing. These works will include staged revegetation works to remove weeds such as Weeping Willows to ensure bank stabilisation, and planting of native vegetation. Revegetation will involve planting of native vegetation to improve the connectivity between the two current disjunct vegetation assemblages to the east and west of the existing access track. It is recommended that these works be undertaken.

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1 INTRODUCTION

RPS Harper Somers O'Sullivan (RPS HSO) was engaged by Airly Coal Pty Ltd (Centennial Airly) to undertake Flora and Fauna and Archaeological Assessment over land holdings at Airly in the Capertee Valley. The purpose of these assessments was to investigate and assess a range of options for a proposed powerline route (and associated infrastructure) to connect the Airly Coal Mine (Airly) to the existing Integral Energy power supply.

The selected proposed powerline route was chosen to minimise potential impacts and will follow a predominantly north-east to southwest axis, with a substation being located at the north-east end of the alignment. The powerline route includes an associated access track, following existing farm tracks where possible to further minimise potential impacts. This report deals with ecological aspects of onsite assessments over the selected powerline route.

This assessment aims to examine the likelihood of the proposal to have a significant effect on any threatened species, populations or ecological communities listed within the *Threatened Species Conservation Act 1995* (*TSC Act 1995*). The report recognises the relevant requirements of the *Environmental Planning and Assessment Act 1979* (*EP&A Act 1979*) as amended by the *Environmental Planning and Assessment Amendment Act 1997* (*EP&AA Act 1997*). Assessment is also made with regard to those threatened entities listed federally under the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act 1999*).

1.1 Site Particulars

Locality – Airly, Capertee NSW

LGA – Lithgow

Area – The easement for the proposed powerline route has a footprint of approximately 3.8 km x 15m, which represents about 6 ha in total. To ensure that an adequate area is assessed, an assumed 40m wide easement has been assessed.

Boundaries – The proposed powerline route is to be constructed almost entirely within the land holdings of Centennial. The one exception to this is where the powerline route traverses an unformed Crown road which is under Enclosure Permit 50283 held by Centennial. The proposed powerline route is largely encompassed by open pasture lands apart from where it crosses a wooded ridge in the southwest of the site. Lands adjoining the Airly site are a mosaic of natural vegetation communities and open pastoral properties.

Current Land Use – Most of the land is currently disused pasture land, although the proposed powerline route traverses some areas that are still used for grazing purposes.

Topography – The topography of the site is largely undulating hills with a relatively steep forested ridge in the southwest of the site. Drainage lines within the site are ephemeral or reduced to ponds due to their location in the top of the Airly Creek watershed.

Vegetation – The proposed powerline route largely traverse open grassy pasture dotted with isolated trees or small patches of woodland vegetation. The proposed powerline route crosses a narrow area of sparse woodland associated with the south-western ridge.

1.2 Description of the Proposal

The proposal encompasses a powerline route to provide power to the Airly pit top area. The approximate study area is shown in Figure 1-1.

The proposed alignment was determined after deliberation of a number of different routes. The proposed powerline route crosses cleared land up to the western extremity of the southwest ridgeline and crosses in the vicinity of an existing access road. The powerline route continues on to skirt the northern extremity of the ridge and then traverses open pasture land to the already approved 66kV substation. This option was chosen as the best option for several reasons, including:

- Minimal loss of trees (only 16 mature and 1 immature tree);
- Avoidance of understorey vegetation including patches of *Bursaria spinosa*, which is the preferred larval feed plant of *Paralucia spinifera* (Bathurst Copper Butterfly);
- Minimised erosional problems associated with vegetation loss; and
- Minimal loss of habitat for other local fauna species such as Wedge-tailed Eagle and Gang-Gang Cockatoo.

The proposed powerline route is shown on Figure 1-2.

The proposed powerline route will be owned and maintained by Centennial Airly and will include the following:

- Establishment of an easement 15 m wide for the full length (approximately 3.85 km) of the proposed powerline route;
- Construction of 66kV powerline within the easement including:
    - Installation of poles in timber, steel or concrete and stays, insulators and fittings;
    - Installation of overhead conductors (involving minor lopping of overhanging branches and removal of saplings directly in line with overhead lines);
    - Construction of barriers at road crossings (involving ground disturbance for excavation of concrete footings);
    - Circuit metering yard; and
    - Connection to the Integral take-off point.
- Construction of farm style access track within the easement, utilising existing tracks where possible. Nevertheless no native vegetation will be removed for the construction of access tracks. Where the route crosses Airly Creek construction of a vehicle crossing is not required as an existing bridge will be used, located immediately downstream of the proposed powerline crossing.

WARNING
No part of this plan should be used for critical design dimensions. Confirmation of critical positions should be obtained from Harper Somers O'Sullivan Pty Ltd.

APPROXIMATE STUDY AREA

CAPERTEE

BATHURST

LITHGOW

TITLE:
Figure 1-1 Locality Map

CLIENT: Centennial Coal

SCALE: 1: 235,000 at A3 Size
DRAWN: S. Corry
APPROVED: A. Richardson
DATUM: MGA Zone 55 (GDA 94)
DATE: 1/10/2008
LAYOUT REF: J:\JOBS\25K\25401 - Capertee\Drafting\MapInfo Figure 1-1 Locality Map 260908
CONTOUR INTERVAL: N/A
JOB REF: 25401

PLANNING SURVEYING ECOLOGY

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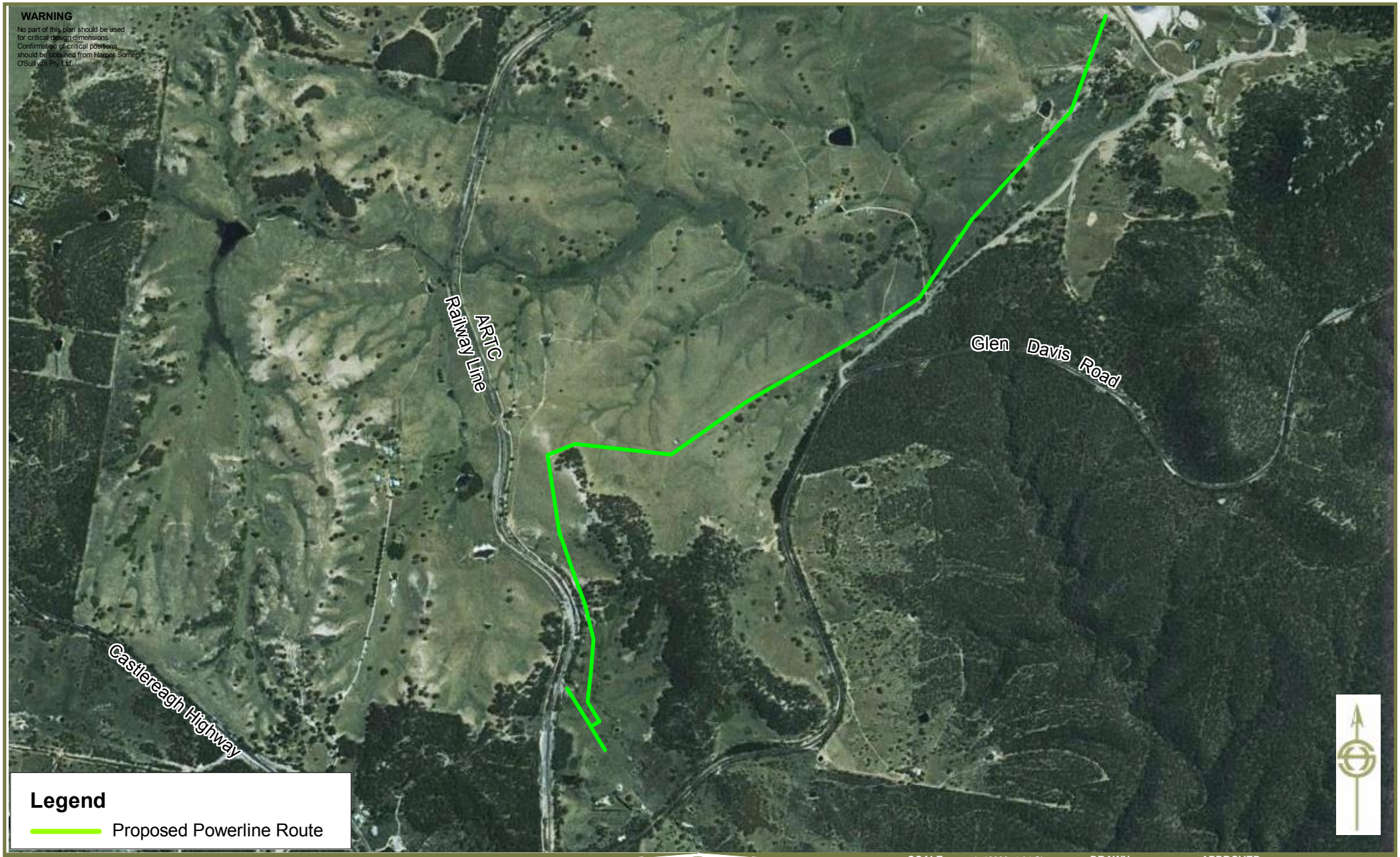

TITLE:
Figure 1-2 Proposed Easement Route

CLIENT: Centennial Coal

SCALE: 1: 18000 at A4 Size **DRAWN:** S. Corry **APPROVED:** A. Richardson

DATUM: MGA Zone 56 (GDA 94) **DATE:** 26/9/2008

LAYOUT REF: J:\JOBS\25K\25401 - Capertee\Drafting\MapInfo Figure 1-2 Easement Options 260908

CONTOUR INTERVAL: N/A

JOB REF: 25401

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1.3 Scope of the Study

The scope of this Flora and Fauna Assessment is to:

- Identify vascular plant species found on the site;
- Identify and map existing vegetation communities;
- Assess the status of identified plant species and vegetation communities under relevant legislation;
- Identify existing habitat types on the site and assess the habitat potential for threatened species, populations, or ecological communities known from the proximate area;
- Through preliminary research identify threatened fauna potentially using the site;
- Employ targeted survey techniques to identify fauna, in particular threatened species using the site; and
- Assess the potential of the proposed powerline route to have a significant impact on any threatened species, populations or ecological communities identified during field surveys or as having potential habitat on the site.

Whilst survey work has been undertaken wholly within the bounds of the site, consideration has been afforded to areas off the site in order to appreciate the environmental context of the site.

The purpose of this report is to:

- Ensure planning, management and development decisions are based on sound scientific information and advice by documenting the presence of any biodiversity components or potential significant impacts that may exist on the site;
- Provide information to enable compliance with applicable assessment requirements contained within the *TSC Act 1995, EP&A Act 1979*, the Commonwealth *EPBC Act 1999*, and any other relevant state, regional and local environmental planning instruments; and
- Enable the provision and analysis of ecological data that is comparable with data for other sites within the region to ensure continuity and consistency for survey and results.

1.4 Qualifications and Licensing

Qualifications

This report was written by Allan Richardson BEnvSc (Hons) and Shaun Corry Dip Cons & Lnd Mgt and reviewed by Toby Lambert BEnvSc of RPS Harper Somers O'Sullivan Pty Ltd. The academic qualifications and professional experience of all RPS HSO consultants involved in the project are documented in Appendix A.

Licensing

Research was conducted under the following licences:

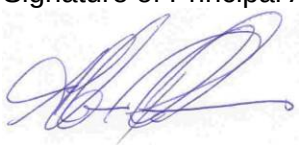
- NSW National Parks and Wildlife Service Scientific Investigation Licence S10300 (Valid 30 November 2009);
- Animal Research Authority (Trim File No: 01/1142) issued by NSW Agriculture (Valid 12 March 2010);
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 01/1142) issued by NSW Agriculture (Valid 12 March 2010); and
- Certificate of Accreditation of a Corporation as an Animal Research Establishment (Trim File No: 01/1522 & Ref No: AW2001/014) issued by NSW Agriculture (Valid 26 May 2009).

1.5 Certification

As the principal author, I, Allan Richardson BEnvSc (Hons) make the following certification:

- The results presented in the report are, in the opinion of the principal author and certifier, a true and accurate account of the species recorded, or considered likely to occur within the site;
- Commonwealth, state and local government policies and guidelines formed the basis of project surveying methodology, or where the survey work has been undertaken with specified departures from industry standard guidelines, details of which are discussed and justified in Section 2; and
- All research workers have complied with relevant laws and codes relating to the conduct of flora and fauna research, including the *Animal Research Act 1995, National Parks and Wildlife Act 1974* and the *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes*.

Signature of Principal Author and Certifier:



Allan Richardson
Ecologist
RPS Harper Somers O'Sullivan Pty Ltd

2 METHODOLOGY

A variety of field survey techniques were employed over the course of fieldwork for this assessment to record the full suite of flora species and fauna guilds across the site.

RPS HSO has undertaken numerous assessments of this nature within the region and wider NSW. Considerable local knowledge and experience supports an excellent understanding of the key ecological issues for this locality, and in particular the management strategies required to appropriately address and accommodate these issues in accordance with the requirements of determining authorities. Our extensive portfolio coupled with Commonwealth, State and Local Government policies and guidelines form the basis for our adopted project methodology.

It should be noted that due to the low-level nature of impacts associated with this proposal that survey effort has been reduced accordingly from what may be typically required under relevant guidelines. The low-level impact has resulted from investigations of a number of route options, with the option having the least level of impact being chosen. This has been overcome by flora surveys and habitat assessments being undertaken within the impact zone. Trapping surveys, spotlighting surveys and other labour-intensive survey types were not conducted within the site as they were not considered necessary. Habitat assessment and targeted searches in conjunction with local records (Atlas of NSW Wildlife 2009; any previous reporting / anecdotal evidence) were conducted in lieu of trapping surveys to determine the potential for threatened fauna to occur within the site.

2.1 Flora Survey

2.1.1 Vegetation Mapping

Flora surveys and vegetation mapping carried out on the site has been undertaken as follows.

- DEC (2006) *The Vegetation of the Western Blue Mountains.* Unpublished report funded by the Hawkesbury – Nepean Catchment Management Authority. Department of Environment and Conservation, Hurstville.

- Confirmation of the community type(s) present (dominant species) via undertaking flora surveys and identification.

- Consideration was given to the potential for the derived vegetation communities to constitute 'Endangered Ecological Communities' (EEC) as listed within the *TSC Act 1995*.

- Flora surveys were carried out across the site, with an emphasis on potentially significant species, as outlined below. The general flora survey also included the casual consideration of the site in line with methodology such as the "Random Meander Technique" described by Cropper (1993).

- Map the type and general extent of the community(s) present into definable map units where appropriate.

2.1.2 Survey Limitations

Timing limitations are often encountered during ecological surveys due to the seasonality of activity and detectability for a number of flora and fauna species being studied. There is a range of common albeit cryptic plant species that have a brief flowering period and hence small 'window' of effective detectability. In addition, the seasonality of surveys also places limits on the number of flora species identified in the site. Therefore, some threatened species not detected cannot be discounted off-hand due to seasonality and other factors, and are therefore addressed in terms of their potential for occurrence within the site based on ecological factors. As such, the precautionary principle is applied and for some species, where appropriate, assumed presence is made for assessment purposes.

2.1.3 Significant Flora Survey

A list of potentially occurring significant flora species from the locality (10km radius) was compiled, which included threatened species (Endangered or Vulnerable) and EEC's listed under the *TSC Act 1995*, those species listed under the *EPBC Act 1999,* Rare or Threatened Australian Plants (RoTAP) listed flora species (Briggs and Leigh 1996), as well as any other species deemed to be of local importance.

2.2 Habitat Survey

An assessment of the relative value of the habitat present on site was carried out. This assessment focused primarily on the identification of specific habitat types and resources on the site favoured by known threatened species from the region. The assessment also considered the potential value of the site (and surrounds) for all major guilds of native flora and fauna.

Habitat assessment was based on the specific habitat requirements of each threatened fauna species in regards to home range, feeding, roosting, breeding, movement patterns and corridor requirements. Consideration was given to contributing factors including topography, soil, light and hydrology for threatened flora and assemblages.

2.3 Fauna Survey

The fauna survey methodology initially consisted of the production of an Expected Fauna Species List for the area (Appendix B) and an assessment of the potential use of the site by threatened fauna species (as listed under the *TSC Act 1995*) identified from the vicinity of the site. This was achieved by undertaking literature and database reviews followed by confirmation through field surveys and any additional species observed were noted on the list.

2.3.2 Avifauna Survey

The presence of avifauna on the site was carried out via targeted diurnal and opportunistic observations during site fieldwork visit. Birds were identified by direct observation or by recognition of calls or distinctive features such as nests, feathers, and owl regurgitation pellets etc. The potential for threatened avifauna to use the site was also assessed by habitat attributes occurring within the site and their capacity to support threatened species that are known to occur in the wider locality. Assessment of the site's potential to provide opportunities for Forest Owl species was based upon the known habitat requirements of these species.

2.3.3 Spotlighting Surveys

Spotlighting surveys were not conducted within the site, although the potential for threatened nocturnal species to occur within the site was assessed by assessing the potential for onsite habitat to support these species. The precautionary principle has been taken into account where potential impacts may occur upon these species.

2.3.4 Herpetofauna Survey

Opportunistic amphibian and reptile searches were conducted during the fauna survey. Known occurrences of threatened herpetofauna species from the region were taken into account during assessment of onsite habitat, to determine the potential for the site to support such species.

2.3.5 Secondary Indications and Incidental Observations

Opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of resident fauna were noted. Such indicators included:

- Distinctive scats and scents left by mammals.
- Nests made by various guilds of birds;
- Potential whitewash, regurgitation pellets and prey remains from Owls;
- Skeletal material of vertebrate fauna;
- The calls of fauna; and
- Footprints left by mammals.

Any other incidental observations of fauna were recorded during all phases of fieldwork.

3 RESULTS

The prevailing weather conditions during the survey period are presented in Table 3-1 below.

Table 3-1: Prevailing Weather Conditions

		DATE			
		03/09/2008	**04/09/2008**	**11/09/2008**	**12/09/2008**
Temperature		*3-12^{o}*	*6-9^{o}*	*0-18^{o}*	*3-21^{o}*
Wind		*Moderate*	*Moderate*	*Low*	*Low*
Cloud		*100%*	*100%*	*25%*	*25%*
Rain (24 hrs to 9:00am)		*0*	*5.6mm*	*0*	*0*
Sun	*Rise*	*06:15*	*06:13*	*06:04*	*06:03*
	Set	*17:44*	*17:44*	*17:49*	*17:50*
Moon	*Rise*	*07:41*	*08:11*	*13:38*	*14:40*
	Set	*21:13*	*22:12*	*03:26*	*04:03*

3.1 Flora Survey

3.1.1 Vegetation Community Mapping

Regional mapping – '*The Vegetation of the Western Blue Mountains'* (VWBM), (DEC 2006) maps four vegetation communities within the vicinity of the proposed powerline route, namely:

- MU 20 Capertee Rough-Barked Apple- Redgum- Yellow Box Grassy Box Woodland;
- MU 21 Capertee-Wolgan Slopes Red Box-Grey Gum-Stringybark Grassy Woodland;
- MU 38 Capertee Grey-Gum-Narrow-Leaved Stringybark-Scribbly Gum-Callitris- Ironbark Shrubby Forest; and
- MU 62 Cleared and Severely Disturbed vegetation.

Ground-truthing of the proposed powerline route found that the route largely traverses MU 62 avoiding small stands of woodland vegetation and isolated trees.

An area of MU13 Tableland Gully Ribbon Gum Blackwood Apple Box Forest was also observed near the creek crossing via ground-truthing.

A vegetation community map showing areas of groundtruthed vegetation communities is provided in Figure 3-1 and all flora species recorded are listed in Appendix C. This map differs from the VWBM mapping primarily in that the area of MU13 has been mapped in the vicinity of the creek crossing. This is explained in more detail below.

Vegetation traversed over the southwest ridge (Plates 1 & 2) was confirmed as MU 21 due to the dominant presence of *Eucalyptus sparsifolia* (Narrow-leaved Stringybark), *E. punctata* (Grey Gum) and *E. polyanthemos* (Red Box) in the canopy. Understorey vegetation is almost non-existent where the proposed powerline route traverses this vegetation and a considerable extent of the woodland traversed is represented by an unformed road (Plates 1 and 2).

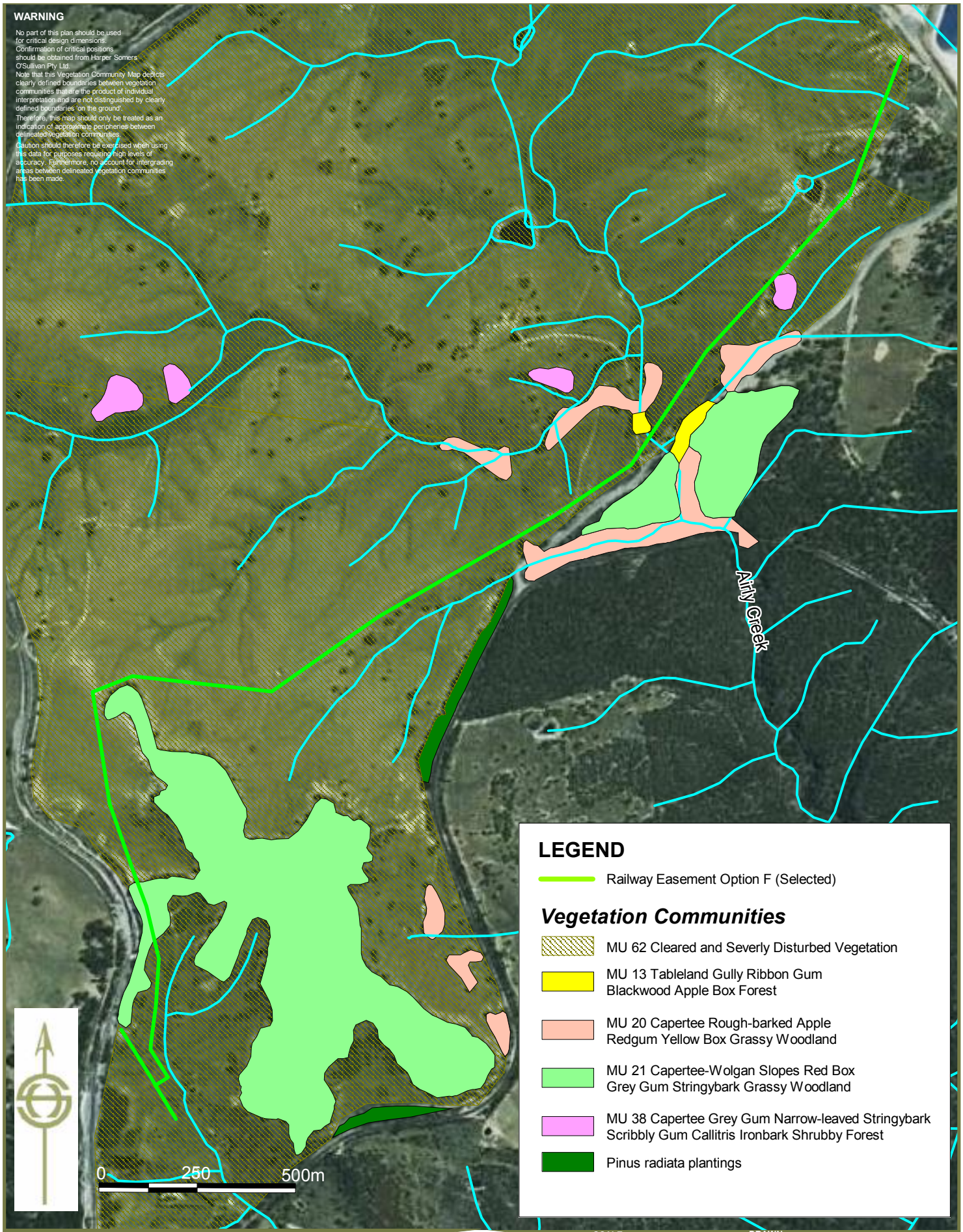
Plate 1: Showing the southwest ridge line crossing north

Plate 2: Showing the southwest ridge line crossing south

Vegetation closely associated with the Airly Creek crossing is dominated by *E. bridgesiana* (Apple Box) and was identified as MU 13 Tableland Gully Ribbon Gum – Blackwood Apple Box Forest and not MU 20 as mapped within the VWBM, although the gully is relatively narrow and MU 38 occurs on the associated slopes to the south and east of the crossing in close association with this community.

The upstream flats to the north of the Airly Creek crossing are dominated by *Eucalyptus blakelyi* (Blakely's Red Gum) and to a lesser extent *E. melliodora* (Yellow Box). As such, vegetation was confirmed as MU 20, although individuals of *E. bridgesiana* represent a buffer between this vegetation and the powerline route. Regenerating saplings (Plate 3) associated with the Airly Creek crossing are *E. bridgesiana* with a relatively low diversity of native understorey plants as occurs within MU 62 elsewhere along the powerline route.

Plate 3: Regeneration area contain *E. bridgesiana* saplings



TITLE:
Figure 3-1 Groundtruthed Vegetation Community Map

CLIENT: Centennial Coal

SCALE: 1: 7500 at A4 Size

DRAWN: S. Corry APPROVED: A. Richardson

DATUM: MGA Zone 56 (GDA 94) DATE: 26/9/2008

LAYOUT REF: J:\JOBS\25K\25401 - Capertee\Drafting\MapInfo Figure 2-1 Vegetation Map 260908

CONTOUR INTERVAL: N/A

JOB REF: 25401

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3.1.2 Significant Flora

A list of potentially occurring significant flora species from the locality (10km radius) and those that were deemed to have potential to occur within the site due to habitat attributes, was compiled, which included threatened species (Endangered or Vulnerable) and EEC's listed under the *TSC Act 1995*, those species listed on the *EPBC Act 1999,* Rare or Threatened Australian Plants (RoTAP) listed flora species (Briggs and Leigh 1996), as well as any other species deemed to be of local importance. Where suitable habitat for potentially occurring significant flora species was found on site, targeted surveys were conducted across the site during the field survey.

Table 3-2: RoTAP Plant Species in the Western Blue Mountains

Scientific Name RoTAP Known Species	RoTAP	Habitat	Total Known Distribution	Likely Distribution Within Locality
Acacia asparagoides	2R	Dry sclerophyll forest and heath on sandstone	Newnes Junction to Lawson	Newnes Junction area
Acacia matthewii	3RC	3RCShrubby open forest of grey gum, slaty gum, ironbark and Callitris	Rylstone – Capertee to Dharug NP	Capertee Valley, esp. Glen Davis, mainly near Sir Johns Point
Atkinsonia ligustrina	2RCa	Shrubby Sydney peppermint - silvertop ash forest	Wallerawang and east through Wollemi NP	Newnes Plateau
Dillwynia stipulifera	3RCa	Swamp heath on sandstone	Lithgow district and Budawang ranges	Newnes Plateau
Discaria pubescens	3RCa	Grassy to shrubby woodlands and forests, often on enriched soils	Victoria to Queensland	Capertee Valley, Cox's Valley, Jenolan area
Epacris muelleri	3RC-	Skeletal soils on damp rock faces	Blue Mountains and Wollemi NPs	Sandstone scarps in Newnes and eastern Capertee
Eucalyptus gregsoniana	3RCa	Heath communities on sandstone	Newnes Plateau	Newnes Plateau
Geranium graniticola	3RC-	Montane woodland	Oberon to Kanangra- Boyd NP	Throughout Gurnang section

Scientific Name RoTAP Known Species	RoTAP	Habitat	Total Known Distribution	Likely Distribution Within Locality
Gonocarpus longifolius	3RC	Shrub communities on sandstone and near streams	Armidale to the Blue Mountains	Throughout
Leucochrysum graminifolium	2R	Rocky sandstone heaths and pagodas	Western Newnes Plateau to Mount Airly	Pagoda rock communities
Lomandra fluviatilis	3RCa	Streamside communities	Royal NP to Colo River	Capertee and Wolgan Rivers
Notochloe microdon	2RC-	Wet heaths and swamps	Elevated parts of the Blue Mountains	Newnes Plateau
Olearia quercifolia	3RC-	Wetter areas and soaks over sandstone	Blue Mountains	Newnes Plateau
Persoonia recedens	2R	Dry sclerophyll forest	Newnes to Gurnang	Newnes mapping area and Gurnang Mapping area
Philotheca obovalis	3RCa	Heath	Higher Blue Mountains	Newnes Plateau
Prostanthera hindii	2KC-	Shrubland and woodland	Rylstone, Wollemi, Capertee and Newnes	Sandstone areas of Capertee and Newnes plateau
Pseudanthus divaricatissimus	3RCa	Heath and rocky sites	Far northern NSW toVictoria, at higher altitudes	Rocky heaths through-out thearea, mainly on sandstone

3.2 Habitat Survey

Habitat within the study area was assessed for its potential to support native flora and fauna species including threatened fauna for which records occur within the wider locality. The greatest majority of the proposed powerline route are characterised by open pasture land, but there are isolated trees and small patches of resilient woodland habitat in the open pasture areas. The southwest ridge is covered with an open woodland community and there are some wetland plant species growing along Airly Creek with Blackberry stands.

Flora Habitat

Woodland occurring on the southwest ridge where the proposed powerline route traverses has very little understorey vegetation and is characterised by exposed skeletal soils. There is very little opportunity for significant flora species to occur due

to the degraded nature of this section of the woodland area particularly on the northern side of the ridge (see Plate 1). Furthermore, there is little opportunity for threatened flora species on the southern side of the ridge. Elsewhere the powerline route traverses open pasture land dominated by native and exotic grasses and exotic herbaceous weeds. Within the pasture land there are isolated individuals and stands of woodland trees, but the powerline route alignment has been directed around this vegetation to minimise the loss of canopy vegetation within the site. There are very sparse and isolated occurrences of native shrubs and herbs along the powerline route apart from areas adjacent to its crossing of Airly Creek where there are plantings of *Eucalyptus bridgesiana* saplings (see Plate 3). The maintenance of the powerline route would require that some of these saplings be removed so that they do not mature in proximity to associated high voltage lines.

Fauna Habitat

Generally the powerline route traverses open grassy habitats, which have limited potential to support native fauna species apart from common native open country birds and mammals. Where woodland habitats occur in close proximity to grassy powerline route areas there are grassland foraging opportunities for threatened grassland species such as *Stagonopleura guttata* (Diamond Firetail). There is some limited habitat for wetland bird species in vegetation associated with ephemeral pools along Airly Creek. Impacts upon habitat proximate to Airly Creek are considered unlikely, due to the set back of power poles some 40m from either side of the creek and minimal disturbance during the slinging of cable. Woodland habitat traversed by the powerline route across the site's southwest ridge has been selected for its degraded nature, but elsewhere woodland occurring on the ridgeline provides opportunities for canopy frequenting bird species. There is a relatively low occurrence of hollow-bearing trees within the woodland suggesting that arboreal mammal populations may be sparse. Understorey strata do not exhibit a high degree of complexity and as such it is likely that terrestrial mammals would be uncommon as was the case with small woodland bird species and reptiles.

Woodland within the sites was found to be devoid of *Allocasuarina* tree species favoured by the Glossy Black-Cockatoo, but surrounding woodlands provide abundant foraging resources for the Gang-Gang Cockatoo.

Woodland habitat within the study area provides some habitat for threatened woodland bird species favouring more open grassy woodland and open forest habitats, although this type of habitat is very marginal in the limited areas it occurs along the powerline route. The site may represent part of the foraging range for Square-tailed Kites during seasonal southern dispersals of this species.

There are seasonal foraging resources for nectivorous bird species, but winter flowering resources for winter dispersing species such as the Swift Parrot are not present within the proposed powerline route. The site is not considered to provide suitable foraging habitat for threatened nectivorous species such as the Regent Honeyeater and Black-chinned Honeyeater, due to the lack of habitat containing Box-Ironbark associations. Furthermore, these species are often associated with vegetation occurring on riparian flats where canopy densities and nectar resources are higher. There are significant occurrences of mistletoe within surrounding habitat that might be suited to the foraging habits of the Painted Honeyeater, although this species prefers mistletoes associated with *Acacia pendula*, which occur in more western regions.

Surrounding wooded habitats provide abundant foraging resources for locally occurring Microchiropteran bats including threatened species and there are some roosting opportunities for hollow-dwelling and cave-dwelling species on the site and the locality.

There are no preferred Koala feed tree species occurring within the proposed powerline route.

The favoured food plant of the Bathurst Copper Butterfly larvae, *Bursaria spinosa*, occurs in the locality of the proposed powerline route so there are potential habitat opportunities for this species on the site outside of the area of potential impact.

CORRIDORS AND HABITAT LINKAGES

The proposed powerline route crosses wooded habitat on the western extremity of the southwest ridge. The removal of some trees is not expected to represent a break in vegetation sufficient to hinder the movements of native fauna as currently exist within the site as a much greater break in vegetation is represented by the ARTC easement immediately to the west of the proposed ridge line crossing.

3.3 Fauna Survey

The fauna survey methodology initially consisted of the production of an Expected Fauna Species List for the area (Appendix B) and an assessment of the potential use of the site by threatened fauna species (as listed under the *TSC Act 1995*) identified from the vicinity of the site. This was achieved by undertaking literature and database reviews followed by confirmation through field surveys where additional species observed were noted on the list.

3.3.1 Mammal Species

Common native terrestrial mammal species such as Eastern Grey Kangaroo and Red-necked Wallaby were observed within the site as were introduced species including Rabbit, Feral Goat and cattle.

The potential for threatened mammal species to occur within the site is limited by the predominantly fragmented nature of on-site habitats and the limited structural complexity of onsite vegetation communities. Understorey complexity is highly depauperate where the powerline route crosses the southwest ridge with little litter and no shrubs to provide shelter for small terrestrial mammal species.

There are limited opportunities for arboreal mammals on the proposed powerline route due to the very low incidence of hollow-bearing trees; however the few associated canopy trees may represent part of the foraging range of locally occurring species. Koalas are unlikely to use resources within the proposed powerline route due to the lack of feed tree species.

3.3.2 Avifauna Survey

Bird species recorded within the vicinity of the proposed powerline route were largely limited to common woodland and open country species, although Gang-Gang Cockatoos were observed elsewhere in the locality in better quality habitat to that within the vicinity of the proposed impact area containing a small number of trees. Habitat suited to the gumnut foraging habits of this species are widespread within

surrounding forest in the locality and it is expected that Gang-Gang Cockatoos would occur widely in local woodlands and forests. No *Allocasuarina* tree species favoured by Glossy Black-Cockatoos were present within vegetation communities in the vicinity of the proposed powerline route.

Two other threatened bird species were observed within the vicinity of the powerline route site, being Diamond Firetail and Brown Treecreeper. Both these species were associated with woodland in the vicinity of Airly Creek. Diamond Firetails were observed foraging in grassland to the west of Airly Creek and Brown Treecreepers were heard calling from woodland trees either side of the proposed powerline route on the western bank of Airly Creek. Gang-Gang Cockatoos were also heard in adjacent woodland to the south of the Airly Creek crossing (Figure 3-2). The Diamond Firetail, Brown Treecreeper and Gang-Gang Cockatoo are listed as Vulnerable under the *TSC Act 1995*.

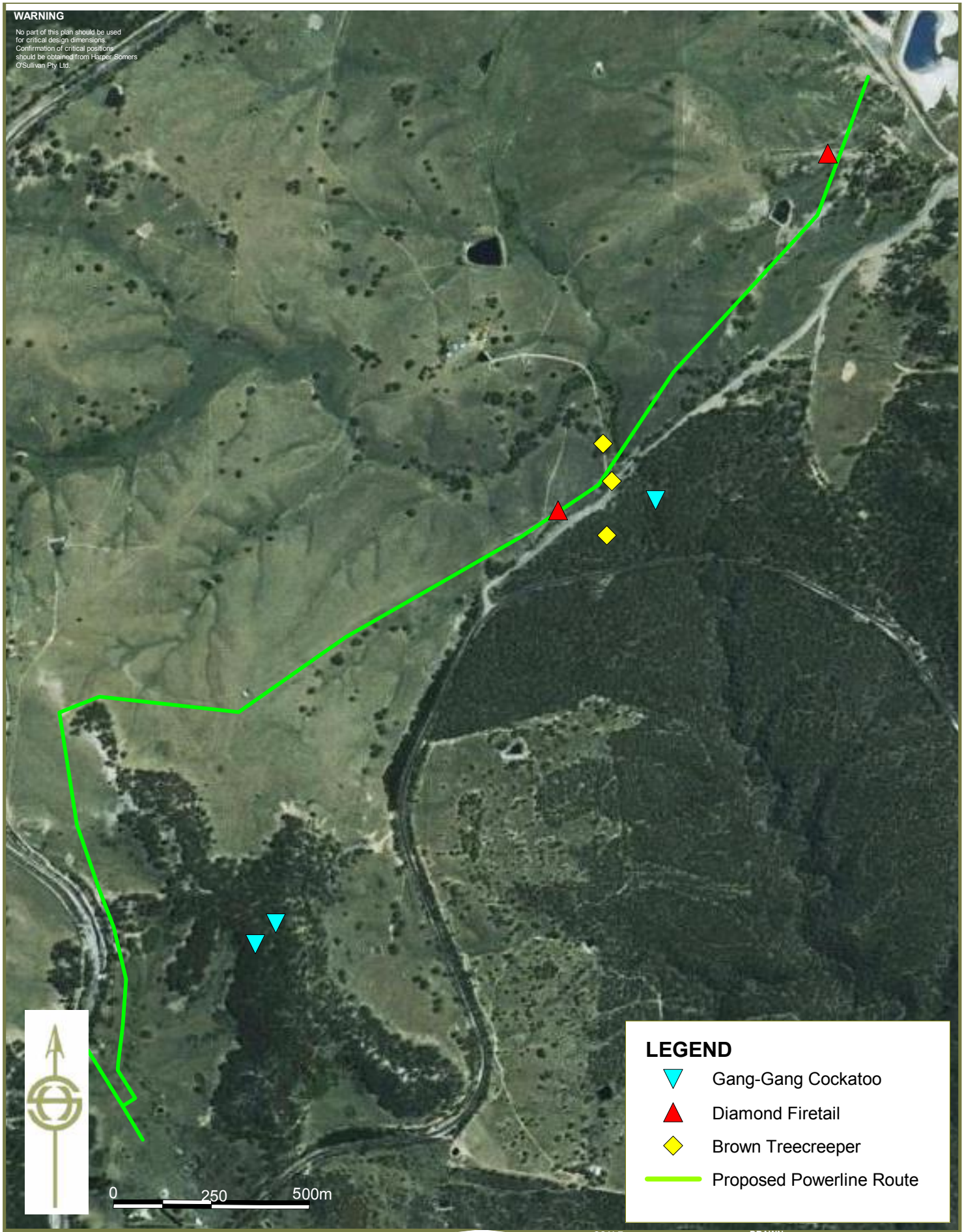
A secretive water land species, the Lewin's Rail, was observed in riparian vegetation along Airly Creek to the north of the proposed powerline route crossing of Airly Creek.

A currently disused Wedge-tailed Eagle's nest occurs on the ridgeline more than 300m from the proposed powerline route. This species was not noted over the site during field surveys although at least two pairs were seen elsewhere in the Capertee Valley during the time of fauna surveys.

3.3.3 Herpetofauna Survey

Incidental surveys were conducted for reptiles within the proposed powerline route, but no species were noted. Habitat occurring along the proposed powerline route exhibited little cover for reptile species due to a lack of woodland debris, leaf litter or exfoliating rock.

Apart from where the proposed powerline route crosses Airly Creek, no wet or damp areas occur within the powerline route alignment that might provide breeding opportunities for threatened frog species. Two common frog species were noted calling from small dams located elsewhere in the site, including *Crinia signifera* (Common Eastern Froglet) and *Lymnodynastes tasmaniensis* (Spotted Marsh Frog). No habitat for threatened frog species was noted within the site.



TITLE:
Figure 3-2 Threatened Species Map

CLIENT: Centennial Coal

SCALE: 1: 30689.35 at A4 Size
DRAWN: S. Corry
APPROVED: A. Richardson
DATUM: MGA Zone 56 (GDA 94)
DATE: 26/9/2008
LAYOUT REF: J:\JOBS\25K\25401 - Capertee\Drafting\Mapinfo Figure 3-5 Threatened Species Map
CONTOUR INTERVAL: N/A
JOB REF: 25401

PLANNING SURVEYING ECOLOGY

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3.3.4 Insect Searches

Opportunistic observations were made for the Bathurst Copper Butterfly, but this species or its preferred larval feed plant species, being *Bursaria spinosa*, was not observed on site despite occurrence elsewhere within the locality. The proposed powerline route occurs a considerable distance to the east of this species known range, and although suitable habitat appears to occur within the site its local occurrence could not be confirmed during field surveys.

3.3.5 Spotlighting

No nocturnal bird species were recorded during nocturnal surveys, although it is likely that common species such as Southern Boobook, Owlet Nightjar and Tawny Frogmouth would occur within woodland remnants on the site. No forest owl species were noted within the site although the general lack of hollows and understorey complexity is likely to compromise the site's potential to represent foraging and breeding opportunities for these species.

3.3.6 Secondary Indications and Incidental Observations

Several opportunistic sightings of secondary indications (scratches, scats, skeletal remains, diggings, tracks etc.) suggested the presence of a number of other mammal species within the study area. Wombat burrows occur around the base of the southwest ridge-line and Echidna excavations were noted in ant's nests on top of the ridge. Fox scent was noted near Airly Creek.

4 THREATENED SPECIES AND COMMUNITIES ASSESSMENT

Identification of Subject Species and Communities

Threatened flora and fauna species (listed under the *TSC Act 1995* and/or the *EPBC Act 1999*) that have been gazetted and recorded within a 10 km radius of the site have been considered within this assessment. EEC's known from the broader area have also been addressed. Each species / community is considered for its potential to occur on the site and the likely level of impact as a result of the proposal. This assessment deals with each species / community separately and identifies the ecological parameters of significance associated with the proposal.

This assessment deals with the following heads of consideration in tabulated form (refer to Table 4-1 overleaf):

'Species / Community'/ Population – Lists each threatened species / EEC's known from the vicinity. The status of each threatened species under the *TSC Act 1995* and the Commonwealth *EPBC Act 1999* are also provided.

'Habitat Description' – Provides a brief account of the species / community / population and the preferred habitat attributes required for the existence / survival of each species / community.

'Chance of Occurrence on Site' – Assesses the likelihood of each species / community to occur along or within the immediate vicinity of the site in terms of the aforementioned habitat description and taking into account local habitat preferences, results of current field investigations, data gained from various sources (such as Atlas of NSW Wildlife records etc) and previously gained knowledge via fieldwork undertaken within other ecological assessments in the locality.

'Likely Level of Impacts from Proposal' – Assesses the likely level / significance of impacts to each species / community / population that would result from the proposed development, taking into account both short and long-term impacts. This assessment is largely based on the chance of occurrence of each species / community on site with due recognition to other parameters such as home range, habitat utilisation, connectivity etc. It also considers the scope of the proposal, including the likely extent of disturbance, duration of construction works etc. The 'subject species / communities' are identified within this part of the assessment process and have been recommended where necessary for additional more detailed assessment and discussion within Section 5 of this report.

Table 4-1: Threatened Species and Communities Considered and Assessment of Potential Impacts

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Plants			
Derwentia blakelyi (V)	Occurring in small numbers, often in moister areas of Eucalypt forest, this species flowers in summer and is known from fewer than 20 locations. It is known to occur in the Western Blue Mountains near Clarence, near Mt Horrible, Nullo Mountain and in the Coricudgy Range.	**Low** The proposed powerline route does not contain suitable montane habitat for this species and there are no records within the vicinity of the proposed powerline route.	**Low** Due to the lack of individuals or the potential for this species to occur on the proposed powerline route, this species is unlikely to be affected by the proposal.
Eucalyptus cannonii Capertee Stringybark (V,V*)	The altitude range of *Eucalyptus cannonii* is from about 460 m to 1040 m. Within the range, the species appears to tolerate most situations except the valley floors. Recorded from Tablelands Grassy Woodland Complex communities and Talus Slope Woodland, and in Winburndale Nature Reserve within woodland dominated by Red Stringybark (*Eucalyptus macrorhyncha*) and Long-leaved Box (*Eucalyptus goniocalyx*). Produces white flowers from January to April. The seed is spread by wind or gravity, generally in close proximity (within 30 m) to the parent plant; no dormancy mechanism. Associated species are similarly diverse: *Eucalyptus viminalis, Eucalyptus mannifera, Eucalyptus polyanthemos, Eucalyptus rossii, Eucalyptus blakelyi, Eucalyptus oblonga, Eucalyptus sparsifolia, Eucalyptus bridgesiana, Eucalyptus dalrympleana, Eucalyptus melliodora, Eucalyptus dives* and *Angophora floribunda*.	**Low – Moderate** This species was not observed within the proposed powerline route or woodland occurring within the vicinity of the proposed powerline route, however vegetation communities within which this species is known to occur are present within the proposed powerline route and as such the presence of this species within the proposed powerline route cannot be discounted.	**Low** Due to the lack of individuals within the proposed powerline route, this species is unlikely to be affected by the proposal.
Eucalyptus pulverulenta Silver-leafed Gum (V,V*)	Grows in shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum (*Eucalyptus mannifera*), Red Stringybark (*E. macrorhyncha*), Broad-leafed Peppermint (*E. dives*), Silvertop Ash (*E. sieberi*) and Apple Box (*E. bridgesiana*). Often occurs on granite substrates.	**Low – Moderate** Unlikely to occur within the proposed powerline route due to the lack of suitable granite habitat.	**Low** Due to the lack of individuals within the proposed powerline route, this species is unlikely to be affected by the proposal.
Eucalyptus robertsonii subsp. hemisphaerica Robertson's Peppermint (V,V*)	Locally frequent in grassy or dry sclerophyll woodland or forest, on lighter soils and often on granite. Usually found in closed grassy woodlands in locally sheltered sites. Habitats include quartzite ridges, upper slopes and a slight rise of shallow clay over volcanics. Associated vegetation includes variously mixed woodlands of *Eucalyptus piperita, E. goniocalyx, E. dalrympleana, E. dives, E. mannifera* and *E. rossii*.	**Low** There are no peppermint vegetation communities within the proposed powerline route and the proposed powerline route occurs well to the north of this species known range. Therefore its presence within the proposed powerline route is unlikely.	**Low** Due to the lack of individuals within the proposed powerline route, this species is unlikely to be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Euphrasia scabra Rough Eyebright (V, V*)	Occurs in or at the margins of swampy grassland or in sphagnum bogs, often in wet, peaty soil. An annual species. Most flowering collections of the species have been made between January and April. Appears to be self-fertilising but seed production is variable, perhaps depending on season. Although parasitic, the species does not appear to be host-specific.	**Low** The proposed powerline route occurs well to the north of this species known range. Therefore its presence within the proposed powerline route is unlikely.	**Low** Due to the lack of individuals and preferred habitat this species is unlikely to be affected by the proposal.
Grevillea divaricata (E)	Grows in dry open forest. Specimen notes describe the plant as occurring frequently in dry open forest lands and as possibly growing on rocky river margins. Flowers recorded in April, but the species probably also flowers in the spring months.	**Low** The proposed powerline route occurs to the north of this species known range and there are no records for this species within the locality of the proposed powerline route. Therefore its presence within the proposed powerline route is unlikely.	**Low** Due to the lack of individuals and preferred habitat this species is unlikely to be affected by the proposal.
Grevillea obtusiflora subsp. fecunda (E,E*)	Subspecies *obtusiflora* occurs as scattered groups in the understorey of low open eucalypt forest at an altitude of 730 metres above sea level. Subspecies *fecunda* occurs in clusters within low, open scrub beneath open, dry sclerophyll forest, on orange, sandy loam soils with sandstone boulders, at an altitude of 570 metres. Species growing in association with subspecies *obtusiflora* include *Eucalyptus crebra, E. dealbata, E. tenella, Callistemon linearis, Acacia buxifolia, Acacia elongata, Leucopogon sp., Caustis flexuosa, Dianella sp.* and *Patersonia sp*. Species growing in association with subspecies *fecunda* include *Eucalyptus tenella, E. fibrosa, E. macrorhyncha, E. punctata, Callitris endlicheri, Acacia buxifolia, Leptospermum continentale, Monotoca elliptica, Persoonia linearis, Indigofera sp.* and *Pomax umbellata*.	**Low – Moderate** Was not recorded within the proposed powerline route and is unlikely to occur due to the unsuitability of onsite habitat.	**Low** Due to the lack of individuals and preferred habitat this species is unlikely to be affected by the proposal.
Grevillea parviflora Small-flower Grevillea (V,V*)	Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Often occurs in open, slightly disturbed sites such as along tracks. Plants are capable of suckering from a rootstock and most populations demonstrate a degree of vegetative spread, particularly after disturbance such as fire. Flowering has been recorded between July to December as well as April-May. Flowers are insect-pollinated and seed dispersal is limited. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. Grows in sandy or light clay soils usually over thin shales.	**Low** Was not recorded within the proposed powerline route and access road. No records occur within the locality of the proposed powerline route and it is unlikely to occur due to the unsuitability of on proposed powerline route habitat.	**Low** Due to the lack of individuals and preferred habitat this species is unlikely to be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Lepidium hyssopifolium Aromatic Peppercress (E,E*)	The species occurs in a variety of habitats including woodland with a grassy understorey and grassland.	**Low – Moderate** This species was not recorded proposed powerline route during flora surveys and there are no records for this species within the vicinity of the proposed powerline route.	**Low** Due to the lack of individuals and preferred habitat this species is unlikely to be affected by the proposal.
Persoonia marginata Clandulla Geebung (V,V*)	Grows in dry sclerophyll forest and woodland communities on sandstone. Recorded flowering period varies and includes December and Winter. Records occur elsewhere in the region at Ben Bullen.	**Low – Moderate** A woodland species with conspicuous foliage his species was not recorded within the proposed powerline route during flora surveys and there are no records for this species within the vicinity of the proposed powerline route.	**Low** Due to the lack of individuals and preferred habitat this species is unlikely to be affected by the proposal.
Phebalium bifidum (E)	Occurs in Ironbark shrubby woodland or heath on structured loam soil.	**Low** The preferred shrubby Ironbark woodland in which this species is known to occur is absent from the proposed powerline route and no records for this species are known from the proposed powerline route's locality.	**Low** Due to the lack of individuals and preferred habitat this species is unlikely to be affected by the proposal.
Philotheca ericifolia (V, V*)	Grows chiefly in dry sclerophyll forest and heath on damp sandy flats and gullies. It has been collected from a variety of habitats including heath, open woodland, dry sandy creek beds, and rocky ridge and cliff tops. Associated species include *Melaleuca uncinata, Eucalyptus crebra, E. rossii, E. punctata, Corymbia trachyphloia, Acacia triptera, A. burrowii, Beyeria viscosa, Philotheca australis, Leucopogon muticus* and *Calytrix tetragona*.	**Low** The preferred vegetation associations in which this species is known to occur is absent from the proposed powerline route and no records for this species are known from the proposed powerline route's locality.	**Low** Due to the lack of individuals and preferred habitat this species is unlikely to be affected by the proposal.
Pultenaea sp. Genowlan Point (E, CE*)	Likely to be fire sensitive, with recruitment occurring from a persistent soil stored seed bank following fire. Occurs on well drained stony soil near a cliff edge.	**Low** This species is known only from a discrete population on Genowlan Point and no records for this species are known from the proposed powerline route's locality. This species was not recorded from within the proposed powerline route during flora surveys.	**Low** Due to the lack of individuals and preferred habitat this species is unlikely to be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Swainsona sericea *Silky* Swainson-pea (V)	Found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro also found in Box-Gum Woodland in the Southern Tablelands and Southwest Slopes. Sometimes found in association with cypress-pines *Callitris* spp. Habitat on plains unknown.	**Low** The preferred vegetation communities in which this species is known to occur are absent from the proposed powerline route and no records for this species are known from the proposed powerline route's locality.	**Low** Due to the lack of individuals and preferred habitat this species is unlikely to be affected by the proposal.
Thesium austral Austral Toadflax (V, V*)	Occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass (*Themeda australis*). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	**Low** Marginal habitat for this species is considered to occur within the proposed powerline route, however it was not recorded within flora surveys and it is not known to occur on the Central Tablelands.	**Low** Due to the lack of individuals and regional records this species is unlikely to be affected by the proposal.
Herpetofauna			
Hoplocephalus bungaroides Broad-headed Snake (E, V*)	Largely confined to Triassic sandstones, including the Hawkesbury, Narellan and Shoalhaven formations, within the coast and ranges. Nocturnal, sheltering by day in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. In summer it is known to become semi-arboreal in its search for prey including geckos and skinks, and will shelter in hollows in large trees within 200 m of rocky escarpments. The Broad-headed Snake is regarded as potentially dangerous, although it has not been attributed to any human fatalities. Destruction of habitat, particularly the removal of sandstone slabs has lead to a decline in numbers.	**Low** The preferred exfoliating sandstone habitat of this species does not occur with the proposed powerline route and no records occur within the vicinity of the proposed powerline route.	**Low** Due to the lack of suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.
Varanus rosenbergi Rosenberg's Goanna (V)	Found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in; termite mounds are a critical habitat component. Individuals require large areas of habitat.	**Low** The fragmented and isolated nature of marginal habitat within the proposed powerline route is unlikely to represent the preferred habitat of this species and it was not observed during fauna surveys.	**Low** Due to the lack of suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Litoria booroolongensis Booroolong Frog (E,E*)	Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins. Shelter under rocks or amongst vegetation near the ground on the stream edge. Sometimes bask in the sun on exposed rocks near flowing water during summer. Breeding occurs in spring and early summer and tadpoles metamorphose in late summer to early autumn. Eggs are laid in submerged rock crevices and tadpoles grow in slow-flowing connected or isolated pools.	**Low** The preferred permanent stream habitat of this species does not occur within the proposed powerline route and the ephemeral grassy edged dams and pools occurring within the watershed of Airly Creek on proposed powerline route are not considered suitable to the habitat requirements of this species. This species was not recorded within the proposed powerline route.	**Low** Due to the lack of suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.
Insect			
Paralucia spinifera Bathurst Copper Butterfly (E, V*)	A small sized butterfly with a wingspan of 20-30mm, occurring on the Central Tablelands of NSW in an area approximately bounded by Oberon, Hartley and Bathurst. This species is known at 35 locations, all within the Greater Lithgow, Bathurst Regional and Oberon local government areas. It favours sites with a southwest to north-west aspect, usually where direct sunlight reaches the habitat, and with extremes of cold such as regular winter snowfalls or heavy frosts.	**Low – Moderate** This species was not observed within the proposed powerline route and known populations of this species are known from a small area to the south and east of Bathurst. The preferred larval feed plant of this, *Bursaria spinosa* (Native Blackthorn), occurs widely on the southwest ridge to the east of the proposed powerline route. Despite the presence of *B. spinosa* within the vicinity of the proposed powerline route it is considered unlikely that this species occurs locally, due to the known range occurring well to the south of the Capertee Valley. However, due to the mobility of butterflies its local occurrence cannot be entirely discounted.	**Low** Due to the lack of *B. Spinosa* within the proposed powerline route this species is unlikely to be affected by the proposal.
Avifauna			
Callocephalon fimbriatum Gang-Gang Cockatoo (V)	Found in the summer months in tall mountain forests and woodlands, and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open Eucalypt forests and woodlands, and often found in urban areas in some districts.	**High** This species was recorded within two separate woodland areas adjacent to the proposed powerline route during fauna surveys within the proposed powerline route. Woodland habitat occurring within the proposed powerline route on the southwest ridge is not considered to be high quality habitat for this species, due to the degraded condition of the vegetation. No canopy tree species which might represent potential habitat for this species occur elsewhere within the proposed powerline route.	**Low** The small amount of degraded woodland habitat to be removed for the proposed powerline route on the southwest ridge is not considered likely to represent a significant loss of potential habitat for this species considering the abundance of higher quality habitat within the vicinity of the proposed powerline route and its wider locality. *Nevertheless as this species was recorded in the vicinity of the proposed powerline route it has been accorded further assessment in Section 5 of this report.*

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Calyptorhynchus lathami Glossy Black-Cockatoo (V)	Occurs in forests and woodlands where it forages predominantly on *Allocasuarina* cones, particularly those of *A. littoralis*, *A. torulosa* and at time *A. distyla*. Requires large Eucalypt tree hollows for nesting. Local records occur on the Newnes Plateau (Atlas of NSW Wildlife Data 2009).	**Low** This species was not observed within the proposed powerline route during fauna surveys. This species requires forest habitats containing *Allocasuarina* species (*A. littoralis*, *A. torulosa* and/or *A. distyla*) for foraging purposes and Eucalypts of sufficient size to develop hollows large enough for breeding sites. No *Allocasuarina* sp. were observed on proposed powerline route and there are no hollows of sufficient size to represent breeding opportunities for this species. Therefore the proposed powerline route is unlikely to represent suitable habitat for this species.	**Low** Due to the lack of suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.
Climacteris picumnus Brown Treecreeper (V)	Frequents drier forests and woodlands, particularly open woodland lacking a dense understorey. Also found in grasslands in proximity to wooded areas where there are sufficient logs, stumps and dead trees nearby. Feeds on invertebrate larvae and small insects, particularly ants. Utilises hollows for roosting/nesting. Appears not to persist in remnants less than 200ha. A number of records exist on the Newnes Plateau to the northwest of the sites (Atlas of NSW Wildlife Data 2009).	**High** This species was observed within woodland adjacent to the proposed powerline route crossing of Airly Creek. However there is no suitable habitat for this species within the footprint of the proposed powerline route adjacent to where this species was recorded. This species was not observed in woodland habitat on the southwest ridge despite the occurrence of potential habitat.	**Low** The proposed powerline route will not remove any suitable habitat for this species due to the lack of trees in the area where this species was recorded. Therefore it the proposal is unlikely to affect this species. *Nevertheless as this species was recorded in the vicinity of the proposed powerline route it has been accorded further assessment in Section 5 of this report.*
Lathamus discolor Swift Parrot (E, E*)	On the mainland this species frequents Eucalypt forests and woodlands with large trees having high nectar production during winter. Mainland winter foraging sites often vary from year to year. Swift Parrots are dependent on habitats that provide winter foraging resources such as nectar and lerps (sugary exudates from leaf insects). Within these habitats, Swift Parrots prefer foraging in mature trees that provide a higher quality and quantity of nectar than regrowth trees.	**Low – Moderate** This species was not observed within the proposed powerline route. In NSW the Swift Parrot occurs widely during the winter period where winter blossom resources occur. There are scant records for this species in the locality (Atlas of NSW Wildlife data 2009) and no winter-flowering eucalypt species. Therefore woodland associated with the proposed powerline route is unlikely to represent suitable habitat for this species, although due to its mobility its occurrence within the proposed powerline route on an intermittent basis cannot be entirely discounted.	**Low** Due to the lack of suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.
Melanodryas cucullata Hooded Robin (V)	Primarily known from Eucalypt forest, woodland and scrub, although has been known to use cleared paddocks with regrowth or stumps in close proximity to wooded areas. Favours areas with sparse shrub cover and fallen timber. Appears unable to persist in remnants less than 100-200ha. Generally absent from Lower Hunter but has previously been recorded as far east as Quorrobolong (HSO pers. obs.).	**Low – Moderate** This species was not observed within the proposed powerline route during fauna surveys and habitat within the proposed powerline route is not considered highly suitable for this species, due to the generally very open habitat traversed. Some potential habitat for this species occurs at the interface of woodland habitats and open grassy areas, but this species generally prefers a mosaic of open woodland habitats.	**Low** Due to the lack of records and suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Melithreptus gularis – Black-chinned Honeyeater (V)	In NSW this species occurs in eastern Australia, along the inland slopes of the Great Dividing Range, extending to the coast between Sydney and Newcastle, NSW, Occupies dry Eucalypt woodland within an annual rainfall range between 400-700 mm, particularly within associations containing Ironbark and Box species (Garnett et al, 2000). It is estimated that the Black-chinned Honeyeater spends 60% of its time searching foliage for such food as insects, nectar and lerp.	**Low – Moderate** This species was not observed within the proposed powerline route during fauna surveys and no habitat within the proposed powerline route is considered suitable for this species, due to the generally very open habitat traversed. Woodland habitat elsewhere within the proposed powerline route does not contain the Box-Ironbark association preferred by this species.	**Low** Due to the lack of records and suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.
Polytelis swainsonii Superb Parrot (V,V*)	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the Southwest Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box.	**Low** This species was not observed within the proposed powerline route during fauna surveys and no habitat within the proposed powerline route is considered suitable for this species, due to the generally very open habitat traversed. Woodland habitat elsewhere within the proposed powerline route is not consistent with the tall riparian vegetation preferred by this species.	**Low** Due to the lack of records and suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.
Neophema pulchella Turquoise Parrot (V)	In NSW this species occurs in eucalypts woodlands and open forests, with a ground cover of grasses and low understorey of shrubs (NPWS, 2002). The species has also been recorded in a variety of other habitats, including savannah and riparian woodlands and farmland (Morris 1980; Quinn and Reid 1996). It forages primarily on the seeds of shrubs, grasses and herbs, both native and introduced. Breeding pairs nest in small hollow branches of Eucalypts. There is a record for this species just to the west of the township of Capertee.	**Low** This species was not observed within the proposed powerline route during fauna surveys. Grassy habitat within the proposed powerline route may represent potential foraging habitat for this species where it occurs in proximity to woodland habitats. The proposed powerline route contains a scarcity of small hollow suited to the breeding purposes of this species. Some potential habitat for this species occurs at the interface of woodland habitats and open grassy areas, but this species generally prefers a mosaic of open woodland habitats.	**Low** Although habitat within the proposed powerline route represents potential foraging habitat for this species, it is unlikely that this habitat will be significantly altered during the construction of the power lines. Furthermore an abundance of similar grassy habitat occurs in proximity to those areas where this species has been recorded. As a consequence it is unlikely that the proposed powerline route will affect this species.
Ninox strenua Powerful Owl (V)	Occurs in coastal and adjacent ranges of eastern Australia in sclerophyll forests and woodlands where suitable prey species occur (being predominantly arboreal mammals such gliders and flying foxes, but also preys on birds). Requires large and specific hollow characteristics for nesting. Pairs appear to mate for life and occupy exclusive territories in the order of 1000 ha in size.	**Low** This species was not observed within the proposed power line route during fauna surveys. Habitat within the proposed powerline route is unlikely to represent potential habitat for this species due to its generally open nature. Elsewhere the proposed powerline route contains a scarcity of hollow-bearing trees, suited to the arboreal mammal prey of Powerful Owls or breeding purposes of this species. Nevertheless this species occurs in the Gardens of Stone National Park to the south and habitat within the proposed powerline route may represent part of the home range of locally occurring individuals. Habitat within the proposed powerline route is not considered of sufficient quality to support this species in isolation from surrounding habitat.	**Low** Due to the lack of records and highly suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Lophoictinia isura Square-tailed Kite (V)	Found in a range of habitats, locally within sclerophyll forests and woodlands where appropriate / preferred prey species occur (being predominantly terrestrial mammals). Requires large Eucalypt hollows for nesting and prefers to roost in these hollows as well.	**Low – Moderate** This species was not observed within the study area during fauna surveys. In NSW the Square-tailed Kite breeds in the north and moves widely in the south outside of the breeding season, where it forages over structurally rich vegetation communities where an abundance of its favoured passerine bird species prey occurs. There is only a single record for this species well to the west of the Newnes Plateau (Atlas of NSW Wildlife data 2009) in the locality, but due to its widespread movements its presence within the proposed powerline routes on at least an intermittent basis cannot be discounted.	**Low** The small amount of woodland habitat to be removed is not considered to represent a significant impact upon this wide-ranging species is unlikely to be affected by the proposal.
Stagonopleura guttata Diamond Firetail (V)	Occupies open woodlands / forests and associated habitats with grassy understorey. Generally found west of the Divide or in drier semi-coastal areas such as the upper Hunter Valley. Appears unable to persist in remnants less than 200ha. A small number of records exist from the Lower Hunter Region (HBOC, Atlas of NSW Wildlife data 2009).	**High** This species was observed within the proposed powerline route to the south of its crossing of Airly Creek. Five individuals were observed foraging in pasture land adjacent to woodland remnants occurring outside an associated fence-line.	**Low** Although habitat within the proposed powerline route represents foraging habitat for this species, it is unlikely that this habitat will be significantly altered during the construction of the proposed power line. Furthermore an abundance of similar grassy habitat occurs in proximity to those areas where this species has been recorded. As a consequence it is unlikely that the proposed powerline route will affect this species. *Nevertheless as this species was recorded on proposed powerline route in the vicinity of the proposed powerline route it has been accorded further assessment in Section 5 of this report.*
Anthochaera phrygia Regent Honeyeater (E, E*)	Occurs in temperate woodlands and open forest, including forest edges. Seasonal movements appear to be dictated by the flowering of various species of *Eucalyptus* sp. that are characteristic of the dry forests and woodlands of South-Eastern Australia. The Regent Honeyeater prefers to forage on large-flowered *Eucalypts*. They also forage on mistletoe and *Banksia* flowers, and arthropods. Nesting occurs mainly between November and January, but breeding has been recorded in all months between July and February.	**Low – Moderate** There are a large number Regent Honeyeater records to the east of the proposed powerline route (Atlas of NSW Wildlife data 2009) and the Capertee Valley is known as an important breeding area for this species. However, this species favours vegetation with Box-Ironbark associations and riparian areas where there are higher densities of outer foliage and mistletoe. Suitable habitat for this species does not occur within the proposed powerline route. As such Regent Honeyeaters are considered to have a low chance of occurrence within the powerline route.	**Low** Due to the paucity of preferred habitat within the proposed powerline route and its vicinity this species is unlikely to be affected by the proposal.
Mammals			
Potorous tridactylus Long Nosed Potoroo (V,V*)	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. The fruit-bodies of hypogeous (underground-fruiting) fungi are a large component of the diet of the Long-nosed Potoroo. They also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil.	**Low** Habitat within the proposed powerline route does not contain areas of sufficient understorey density for the requirements of this species. It is unlikely that this species might occur with the proposed powerline route.	**Low** Due to the lack of records and suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Dasyurus maculatus Spotted-tailed Quoll (V, E*)	Found in a variety of forested habitats from sclerophyll forests, rainforests and coastal woodlands. This species creates a den in fallen hollow logs or among rocky outcrops. Generally does not occur in otherwise suitable habitats that are in close proximity to urban development. A number of records occur across the Newnes Plateau (Atlas of NSW Wildlife data). It is an opportunistic hunter of a variety of prey.	**Low** Habitat of sufficient quality and extent for this species does not occur within the proposed powerline route or the vicinity. There are no records for this species within the proposed powerline route.	**Low** Due to the lack of records and suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.
Petaurus norfolcensis Squirrel Glider (V)	Occurs in eucalypt forests and woodlands where it feeds on sap exudates and blossoms. In these areas tree hollows are utilised for nesting sites. Also requires winter foraging resources when the availability of normal food resources may be limited, such as winter-flowering shrub and small tree species.	**Low - Moderate** This species was not recorded within the proposed powerline route. The Squirrel Glider is a species of open forests and woodlands containing hollow-bearing trees for nesting purposes and a diversity of vegetation types including understorey proteaceous plant species to provide food resources throughout the year. Although records for this species occur within the wider locality (Atlas of NSW Wildlife data 2009) habitat within the proposed powerline route is considered unsuitable for this species due to the paucity of mature and hollow-bearing trees and proteaceous shrub species.	**Low** Due to the lack of records and suitable habitat on proposed powerline route this species is unlikely to be affected by the proposal.
Petrogale penicillata Brush-tailed Rock-wallaby (E,V*)	Occurs in forests and woodlands along the Great Divide and on the western slopes in escarpment country with suitable caves and rocky overhangs for shelter. Records exist from the Watagan Mountains where it is associated with the above habitats (DEC 2005; RPS HSO pers. obs.).	**Low** There is no suitable habitat for this species within the vicinity of the proposed powerline route..	**Low** Due to the absence of suitable habitat within the proposed powerline route and its vicinity this species is unlikely to be affected by the proposal.
Phascolarctos cinereus Koala (V)	Occurs in forests and woodlands where it requires suitable feed trees (particular *Eucalyptus* spp.) and habitat linkages. Will occasionally cross open areas, although it becomes more vulnerable to predator attack and road mortality during these excursions. Records from the Upper Hunter are largely confined to substantial woodland and forest habitat within reserves.	**Low** This species was not observed within the proposed powerline route and there were no secondary indications that this species has occurred within the proposed powerline route in the recent past. No Koala feed tree species occur with the proposed powerline route.	**Low** A single Koala feed tree *Eucalyptus punctata* (Grey Gum) occurs within the proposed powerline route, but no individuals of this species will be removed for the proposal. Therefore it is unlikely that the proposal will impact upon this species.
Pteropus poliocephalus Grey-headed Flying Fox (V, V*)	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, birth and the rearing of young.	**Low** This species was not observed within the proposed powerline route although it is expected that it would visit the proposed powerline route on a seasonal basis when blossom resources are available, due to its wide ranging foraging movements. No flying fox camps were noted within the proposed powerline route during fauna surveys.	**Low** The very small amount of potential foraging habitat that will be removed for the proposed powerline route is unlikely to represent a significant impact upon this species.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Miniopterus schreibersii subsp. *oceanensis* Eastern Bentwing-Bat (V) *Miniopterus australis* Little Bentwing Bat (V) *Chalinolobus dwyeri* Large-eared Pied Bat (V,V*) *Saccolaimus flaviventris* Yellow-bellied Sheathtail-bat (V) *Falsistrellus tasmaniensis* Eastern False Pipistrelle (V) *Nyctophilus timoriensis* South-eastern Form (V,V*)	These threatened Microchiropteran bat species are highly mobile species with a range of habitat preferences that overlap and utilise a range of different habitat niches. They encompass two main sheltering habits; those that dwell in caves, and due to similar characteristics sometimes manmade structures, and those that dwell in tree hollows.	**Moderate – High** There are widespread foraging opportunities for Microchiropteran bats within woodland and adjacent grassland habitats within the study area and potential roosting habitats for both cave and hollow-dwelling within the locality. There is one hollow bearing tree occurring with the proposed powerline route which may represent roosting habitat for hollow-dwelling species. The proposed powerline route represents relatively poor habitat opportunities for Microchiropteran bat species, however, due to their mobility and potential habitat within the locality their presence within the powerline route cannot be discounted.	**Low** The very small amount of potential foraging and roosting habitat that will be removed for the proposed powerline route is unlikely to represent a significant impact upon these species in light of the much greater abundance of higher quality habitat elsewhere within the study area and wider locality.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Endangered Ecological Communities			
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (E,CE*)	Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. Other Commonly co-occurring eucalypts include Apple Box (*E. bridgesiana*), Red Box (*E. polyanthemos*), Candlebark (*E. rubida*), Snow Gum (*E. pauciflora*), Argyle Apple (*E. cinerea*), Brittle Gum (*E. mannifera*), Red Stringybark (*E. macrorhyncha*), Grey Box (*E. microcarpa*), Cabbage Gum (*E. amplifolia*) and others. The understorey in intact sites is characterised by native grasses and a high diversity of herbs; the most commonly encountered include Kangaroo Grass (*Themeda australis*) Poa Tussock (*Poa sieberiana*), wallaby grasses (*Austrodanthonia spp.*), spear-grasses (*Austrostipa spp.*), Common Everlasting (*Chrysocephalum apiculatum*), Scrambled Eggs (*Goodenia pinnatifida*), Small St John's Wort (*Hypericum gramineum*), Narrow-leafed New Holland Daisy (*Vittadinia muelleri*) and blue-bells (*Wahlenbergia spp.*). Shrubs are generally sparse or absent, though they may be locally common.	**Low** Ground-truthing of vegetation occurring within the vicinity of the proposed powerline route found that this EEC does not occur within the proposal footprint.	**Low** Due to the absence of this EEC within the proposed powerline route it is unlikely that this endangered community will be affected by this proposal.

Key: **(V)** = Vulnerable Species listed under *Threatened Species Conservation Act 1995* (TSC Act 1995).

(E) = Endangered Species listed under *TSC Act 1995*.

(V*) = Vulnerable Species listed under *Environment Protection and Biodiversity Conservation Act 1*999 (EPBC Act 1999).

(E*) = Endangered Species listed under *EPBC Act 1999*.

(CE*) = Critically Endangered Species listed under *EPBC Act 1999*

(M*) = Listed as a Migratory species under the *EPBC Act 1999*

(EP) = Listed as an Endangered Population under the *TSC Act 1995*

5 ASSESSMENT OF THREATENED SPECIES, POPULATIONS AND ECOLOGICAL COMMUNITIES

As per the assessment carried out within Table 4-1, the following species / communities have been deemed appropriate to be subject to further detailed assessment due to a precautionary approach to identifying potential levels of impacts likely to result from the proposal. This is despite the overall proposal being likely to result in a comparatively low level of disturbance to intact habitats for threatened flora and fauna.

Flora

No threatened flora species were recorded within or considered to have suitable habitat which might suggest any potential to occur within the proposed powerline route.

Endangered Ecological Communities

No vegetation which might be considered to represent an EEC or remnant elements of an EEC were observed to occur within the proposed powerline route, despite targeted searches due to the occurrence of such vegetation within the wider locality.

Fauna

Three threatened fauna species were recorded within the immediate vicinity of the proposed powerline route, as follows:

- *Callocephalon fimbriatum* Gang-gang Cockatoo
- *Climacteris picumnus* Brown Treecreeper
- *Stagonopleura guttata* Diamond Firetail

These fauna species are described further below.

Gang-Gang Cockatoo

The Gang-gang Cockatoo is a distinctive Cockatoo species, being generally dark grey patterned by pale margins and squarish feathers. The male has a red head whilst the female lacks any head pattern. A small crest exists, which is generally more obvious in the male. The species is distributed from southern Victoria through south and central-eastern New South Wales (NSW) to the mid-north coast and Hunter Region. Isolated records are known from as far north as Coffs Harbour and as far west as Mudgee (Chambers 1995).

In summer, the Gang-gang Cockatoo occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, this species occurs at lower altitudes in drier, more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas (Shields and Crome 1992). The species in general, and creches of young birds in particular, undertake nomadic as well as seasonal movements and may occur at apparently random points within the range described above. The Gang-gang Cockatoo requires hollows in the trunks or large limbs of large trees in which to breed (Gibbons and Lindenmayer 2000). Breeding usually occurs in tall mature sclerophyll forests that have a dense understorey, and occasionally in coastal forests. Breeding usually occurs between October and January, and individuals are likely to breed from around four years of age (Chambers 1995).

Data from the Birds Australia 'Atlas of Australian Birds' clearly indicate that the Gang-gang Cockatoo has declined dramatically within NSW. A comparison of the first and second 'Atlas of Australian Birds' (Barrett and Silcocks 2002) showed that between atlas periods (1977-

1981 and 1998-2001), the overall reporting rate for Gang-gang Cockatoos declined by 44% across its NSW range.

Habitat for Gang-Gang Cockatoos occurs within the study area within woodland and open forest habitats. This species was heard within woodland occurring on the southwest ridgeline of the proposed powerline route and in woodland to the east of the proposed powerline route's crossing of Airly Creek. Including the above observation, Gang-Gang Cockatoos were noted on the southwest ridge on two separate occasions and each time the birds were recorded within intact woodland habitat of moderate to high quality well to the east of the proposed powerline route's crossing of the ridge.

The proposed powerline's route over the southwest ridge closely follows an existing farm access track which is lined by degraded woodland vegetation largely limited to canopy elements (see Plates 1 & 2). Provision of the proposed powerline route will therefore represent a widening of the existing cleared space provided for the existing farm track and will be limited to the removal of sixteen mature trees and one immature tree. The potential for these trees to represent potential habitat for Gang-Gang Cockatoos is considered low due to the general low quality of habitat as a consequence of the somewhat leached quality of associated soils as evidenced by an absence of understorey elements (see Plate 1). Therefore the small amount of low quality woodland habitat to be removed at the western extremity of the southwest ridge is not considered significant in relation to the viability of locally occurring Gang-Gang Cockatoos, due to their unlikely use of this part of the ridge as a consequence of its degraded nature. The proposed powerline route is unlikely to adversely impact upon this species elsewhere within the proposed powerline route, due to the lack of any potential habitat for Gang-Gang Cockatoos within the route and therefore no potential degradation of habitat in which the birds were recorded. Therefore, the action proposed is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

No habitat within the proposed powerline route will become fragmented or isolated from other areas of habitat as a result of the proposed powerline route.

Brown Treecreeper

The eastern subspecies of the Brown Treecreeper, *Climacteris picumnus* ssp. *victoriae* is distributed through central NSW on the western side of the Great Dividing Range and sparsely scattered to the east of the divide in drier areas such as the Cumberland Plains of Western Sydney, and in parts of the Hunter, Clarence, Richmond and Snowy river valleys.

The Brown Treecreeper is a medium-sized insectivorous bird that frequents drier forests and woodlands, particularly open woodland lacking a dense understorey, but also grasslands where there are sufficient logs, stumps and dead trees nearby. It spends up to half its time on the ground and on fallen logs, often well away from cover, pecking at the bases of grass tussocks, turning over leaves and litter, feeding on invertebrate larvae and small insects, particularly ants. It frequently hops along the entire length of logs and spirals up live and dead tree trunks, to feed on ants and flying insects. The species sleeps inside hollow branches or trunks of trees, both living and dead, sometimes at great heights, and sometimes using old nest sites (Noske, 1982).

It is a sedentary species, and lives in permanent territories, which change little in size from year to year, regardless of the number of inhabitants. Typically, the species breeds cooperatively, between May and December (Dow 1980; Noske 1980). The breeding group consists of a breeding pair and a few subordinate males, some which may also help at other nests (Schodde and Tidemann, 1986). Groups rarely contain more than one female (Noske

1982). The clutch size is two to three. Young remain with the parents for two years or more (Noske, 1982).

Brown Treecreepers are threatened by vegetation clearance and the fragmentation of the woodland habitat including removal of dead timber. Increased isolation decreases treecreeper vagility and increases the vulnerability of populations to extinction as a result of stochastic events. This species appears unable to maintain viable populations in remnants less than 200ha and its abundance decreases as remnant size decreases (Barrett *et al*. 1994). Fragmentation also leads to a skewed sex ratio in Brown Treecreepers because female birds are unable to disperse to isolated remnants, increasing the chance of local extinctions (Walters *et al*, 1999). Habitat degradation, including loss of hollow bearing trees, threatens brown treecreeper populations. Grazing by stock in woodland areas leads to a decrease in diversity of ground-dwelling invertebrates decreasing the availability of food for the birds (Bromham *et al* 1999)

This species was recorded within woodland adjacent to the proposed powerline route's crossing of Airly Creek. A single bird was noted as using woodland to the east and west of the proposed powerline route and was observed to cross open land within which the proposed power line will be constructed.

The provision of power poles in the vicinity of Airly Creek will represent a setback of some 40m either side of the creek and the stringing of cables is unlikely to diminish the quality of associated habitat. The removal of some regrowth saplings (*Eucalyptus bridgesiana*) underneath the powerlines on the eastern side of the Airly Creek crossing (see Plate 3) is unlikely to diminish habitat opportunities for Brown Treecreepers, due to their exclusive use of mature woodland habitat in the vicinity of the proposed powerline route. As such, habitat currently utilised by Brown Treecreepers will continue to exist unaltered after the construction of the proposed powerline route has been completed.

It is considered highly unlikely that the construction of the proposed powerline will have a detrimental effect upon locally occurring individuals, due to the lack of interference with habitat used by this species or habitat potentially used by this species. Therefore, the action proposed is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Diamond Firetail

The Diamond Firetail ranges in Eastern Australia from the Eyre Peninsula, SA to Clermont, QLD. They live in a wide range of Eucalypt-dominated vegetation communities that have a grassy understorey, including woodland, open forests and mallee. Most occur on the inland slopes of the Great Dividing Range, with only small pockets near the coast (Garnett and Crowley, 2000). As with most Australian Finch species, Diamond Firetails are highly sociable birds. Members of a breeding colony feed in open areas next to their nests, mostly eating ripe and half ripe grass seeds, and occasionally insects. They drink frequently throughout the day and are generally found near water.

Diamond Firetails breed from August to January. The birds build a bulky, bottle shaped nest of long grass blades and stems. Both parents incubate the four to seven eggs, the young hatch within 12-15 days and leave the nest about 25 days later (Frith, 1977).

Much of the Diamond Firetail habitat has been cleared, and remaining fragments are gradually becoming unstable. Factors that have been postulated to be adversely affecting this species include the loss of key plants and habitats as a result of invasion of exotic grasses that are more suitable for flock-foraging species (Garnett and Crowley, 2000). The

noted expansion of Red-browed Firetails (*Neochmia temporalis*) due this factor has disadvantaged Diamond Firetails in some areas (Read, 1994).

This species was recorded within the proposed powerline route to the south of the Airly Creek crossing. Five birds were observed feeding in grassland within the powerline route where it occurred adjacent to woodland remnants offering shelter for the birds to retreat to. Although the proposed powerline will be constructed through and adjacent to habitat utilised by this species it is considered unlikely that such works will degrade the habitat such that it will no longer be useable to this species. Moreover, it is expected that this species will continue to utilise currently used habitat after the construction works are completed. Due to the abundance of similar habitat in the vicinity of inhabited areas and the relatively small area displaced by work crews at any given time during construction it is unlikely that significant pressure will be brought to bear on locally occurring individuals throughout the construction phase.

No habitat within the proposed powerline route will become fragmented or isolated from other areas of habitat as a result of the proposed powerline route.

Therefore, the action proposed is unlikely to have an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Other species
Although a number of other threatened species are known to occur within the wider locality of the proposed powerline route and as such there may be potential for these species to occur within the proposed powerline route on an intermittent basis, particularly in the case of arboreal mammals and highly mobile and nomadic species such as bats and nectivorous birds, the proposed powerline route does not traverse habitat that is likely to represent significant foraging and/or breeding opportunities for these species. Therefore it is considered unlikely that any fauna species potentially occurring within the proposed powerline route will adversely affected by the proposal such that the viability of local populations might be compromised or threatened with extinction.

5.1 Key Threatening Processes

A Key Threatening Process (KTP) is defined in the *TSC Act 1995* as a process that threatens, or could threaten, the survival or evolutionary development of species, populations or ecological communities. Something can be a threat if it:

- *adversely affects two or more threatened species, populations or ecological communities; or*

- *could cause species, populations or ecological communities that are not currently threatened to become threatened.*

KTP's are listed in Schedule 3 of the *TSC Act 1995*. Four KTP's have the potential to affect the site as a consequence of the proposed powerline route, being:

- Clearing of Native Vegetation;
- Loss of hollow-bearing trees – One hollow-bearing tree will require removal, this tree is located in the south near the existing railway line;
- Infection of native plants by *Phytophthora cinnamomi* ;and

- Invasion of native plant communities by exotic perennial grasses.

No other KTP's are believed to be likely as a consequence of the proposed waste emplacement site.

It is not expected that any of these KTP's are likely to be exacerbated by the proposal to any significant degree due to the minor alteration of existing habitats required by the proposal.

6 CONSIDERATIONS UNDER SEPP 44 – 'KOALA HABITAT PROTECTION'

First Consideration – Is the Land 'Potential Koala Habitat'?

Schedule 2 of State Environmental Planning Policy (SEPP) No. 44 – 'Koala Habitat Protection' lists 10 tree species that are considered indicators of 'Potential Koala Habitat'. The presence of any of the species listed on a site proposed for development triggers the requirement for an assessment for 'Potential Koala Habitat'. SEPP 44 defines potential Koala Habitat as:

> *"areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component".*

No tree species listed in Schedule 2 of SEPP No. 44 – 'Koala Habitat Protection' occur within the proposed powerline route, despite the occurrence of *E. punctata* elsewhere within the study area on the southwest ridge.

Therefore, the site is not considered to constitute 'Potential Koala Habitat' as defined by SEPP 44.

7 CONSIDERATIONS UNDER THE EPBC ACT 1999

Considerations have been made under the Commonwealth *EPBC Act 1999*. An *EPBC Act* Protected Matters Search was undertaken within the Department of the Environment, Water, Heritage and the Arts (DEWHA) on-line database to generate a list those matters of national environmental significance from the Lithgow LGA, which may have the potential to occur within the site. This data, combined with other local knowledge and records, was utilised to assess whether the type of activity proposed on the site will have, or is likely to have a significant impact upon a matter of National Environmental Significance (NES), or on the environment of Commonwealth land*.

* The site is not land owned by the Commonwealth, and hence this portion of the Act is not applicable.

The matters of NES and site-specific responses are listed below.

- *World Heritage areas:*

The site is not a World Heritage area, and is not in close proximity to any such area.

- *Wetlands protected by international treaty (the RAMSAR convention):*

The site is not part of any RAMSAR Wetland area, and is not in proximity to any such area.

- *Nationally listed threatened species and ecological communities:*

A number of threatened species nationally listed under the *EPBC Act 1999* have been recorded within a 10 km radius of or similar habitat within the site. Those terrestrial fauna and flora under consideration are listed as follows:

Threatened Species

Flora

• *Eucalyptus cannonii*	Cannons Stringybark
• *Philotheca ericifolia*	
• *Prostanthera stricta*	Mount Vincent Mintbush
• *Pultenaea sp. Genowlan Point*	
• *Thesium australe*	Austral Toadflax
• *Persoonia marginata*	Clandulla Geebung
• *Grevillea obtusiflora subsp. fecunda*	

Fauna

• *Anthochaera phrygia*	Regent Honeyeater
• *Polytelis swainsonii*	Superb Parrot
• *Dasyurus maculatus*	Spotted-tailed Quoll
• *Hoplocephalus bungaroides*	Broad-headed Snake
• *Litoria booroolongensis*	Booroolong Frog
• *Lathamus discolor*	Swift Parrot

- *Paralucia spinifera* Bathurst Copper Butterfly
- *Pteropus poliocephalus* Grey-headed Flying Fox
- *Chalinolobus dwyeri* Large-eared Pied Bat
- *Nyctophilus timoriensis* Eastern Long-eared Bat
- *Potorous tridactylus tridactylus* Long-nosed Potoroo
- *Petrogale penicillata* Brush-tailed Rock Wallaby

None of the State-listed threatened bird species observed during the survey are listed under the *EPBC Act*.

Endangered Ecological Communities

One EEC, that being the White-Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, which is listed under the *EPBC Act 1999,* has been mapped as occurring within a 10km radius of the proposed powerline route by DECC 2006. Ground truthing however found that this EEC does not occur within the proposed powerline route.

The potential for the proposal to significantly impact on individuals or local populations for the above species has been assessed under the provisions of the *EPBC Act 1999*. This assessment concluded that there will not be any significant impact associated with the proposed powerline upon any listed threatened species. Due to the absence of potential adverse impacts upon these species, it will not be necessary to refer the matter to DEWHA.

- *Nationally listed migratory species:*

No nationally listed migratory species were observed throughout the survey period, nevertheless a number of species are likely to fly over the site or through the site on an intermittent basis, those being, *Haliaeetus leucogaster* (White-bellied Sea-eagle), *Hirundapus caudacutus* (White-throated Needletail), *Merops ornatus* (Rainbow Bee-eater), *Myiagra cyanoleuca* (Satin Flycatcher), *Rhipidura rufifrons* (Rufous Fantail) *Xanthomyza phrygia* (Regent Honeyeater). In addition to these terrestrial migratory species one marine migratory species is considered to have a moderate or greater chance of occurring within the site, being *Lathamus discolor* (Swift Parrot).

- *All nuclear actions:*

No type of nuclear activity is proposed for the site.

- *The environment of commonwealth marine areas:*

The proposed activity on the site will not have a significantly adverse effect on any Commonwealth marine area, due to there being no such marine areas within the region.

Summary Statement:
Based on the above, it is considered the current proposal will not have a significant impact on any matters of NES under the *EPBC Act 1999*; hence referral to the DEWHA is not considered necessary.

8 KEY THRESHOLDS ASSESSMENT (PART 3A)

As required by the Draft *Guidelines for Threatened Species Assessment* for Part 3A applications (DEC / DPI 2005), the following assessment of Key Thresholds is provided for the proposed powerline at Airly Coal Mine.

1. **Whether or not the proposal, including actions to avoid or mitigate impacts or compensate to prevent unavoidable impacts will maintain or improve biodiversity values.**

It is considered that the information presented within this document demonstrates that there is unlikely to be a significant level of impact upon biodiversity values and that the long term outcome for biodiversity within the region is unlikely to be affected.

2. **Whether or not the proposal is likely to reduce the long-term viability of a local population of the species, population or ecological community.**

The threatened species, populations and ecological communities considered within the report and potentially occurring within the proposed powerline route are considered unlikely to be adversely affected by the proposal such that their long-term viability might be threatened or compromised.

3. **Whether or not the proposal is likely to accelerate the extinction of the species, population or ecological community or place it at risk of extinction.**

The threatened species, populations and ecological communities considered within the report and potentially occurring within the proposed powerline route are considered unlikely to experience any acceleration of extinction or be placed at a greater risk of extinction as a consequence of the proposed powerline development.

4. **Whether or not the proposal will adversely affect critical habitat.**

There is no declared “Critical Habitat” within the study area, and as such the proposal will not adversely affect any such habitat.

9 CONCLUSION AND RECOMMENDATIONS

Conclusion

RPS HSO was engaged by Centennial Airly to undertake Flora and Fauna Assessment over a proposed powerline route. A number of routes were assessed for significant ecological attributes, the proposed route being selected due to it representing the least potential impact upon local flora and fauna. It is this option on which the assessment has been based. To further minimise impacts within the site, access for the proposed powerline construction and maintenance will utilise existing farm access tracks where possible. Nevertheless no native vegetation will be removed during the construction of access tracks.

Five locally common vegetation communities were identified as occurring within the proposed powerline route. The proposed powerline route largely traverses MU 62 Cleared and Severely Disturbed vegetation.

The route was selected to avoid removal of mature trees with only sixteen mature trees and one immature tree (with one of the mature trees being hollow-bearing) requiring removal and remaining vegetation clearance limited to regrowth saplings in the vicinity of Airly Creek.

Three threatened fauna species were recorded within the vicinity of the proposed powerline route, being Diamond Firetail, Brown Treecreeper and Gang-Gang Cockatoo. No suitable habitat for the treecreeper and no significant habitat for the cockatoo occur within the proposed powerline route. Diamond Firetail habitat occurring within the powerline route will not be diminished during construction and operational phases of the powerline route and associated infrastructure. Otherwise it is expected that more mobile threatened species such as locally occurring birds and bats may traverse the site on at least an intermittent basis. Larval feed plants for the Bathurst Copper Butterfly occur within the locality, but the proposed powerline route avoids these areas.

Due to their generally open nature, the minimal removal of vegetation associated with the proposed works is considered highly unlikely to result in adverse impacts upon locally occurring threatened species or communities provided the recommendations contained below are considered.

Recommendations

The following recommendations have been outlined to provide ecological guidelines and site management strategies that may prevent any ongoing deleterious impacts upon habitat surrounding the proposed powerline route.

- It is recommended that precautions be implemented to avoid impacts upon waterways and associated vegetation to prevent the movement of sediments or contaminated waters / liquids into onsite drainage lines, particularly Airly Creek.

- It is recommended that appropriate measures be employed to ensure that machinery working within the site does not bring materials (soils etc.) onto the sites that may infect onsite vegetation with *Phytophthora cinnamomi*;

- It is recommended that ongoing weed monitoring be instituted and potential weed infestations be appropriately managed to ensure surrounding communities are protected from invasive species particularly where the proposed powerline route crosses the southwest ridge line.

- It is also recommended that measures be implemented to prevent the erosion of soil on the southwest ridgeline particularly where vegetation will be removed and that any planting required for substrate stability employ locally occurring native species where practical.

- During the construction phase, for any tree removal, and in particular where a hollow-bearing tree may be removed, all works should be supervised by an appropriately qualified person to recover any native fauna that are potentially displaced.

- Centennial Airly has commenced discussions with the Hawkesbury Nepean CMA to undertake voluntary revegetation works within Airly Creek in the vicinity of the creek crossing. These works will include staged revegetation works to remove weeds such as Weeping Willows to ensure bank stabilisation, and planting of native vegetation. Revegetation will involve planting of native vegetation to improve the connectivity between the two current disjunct vegetation assemblages to the east and west of the existing access track. It is recommended that these works be undertaken.

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APPENDIX A: PERSONNEL INVOLVED IN THE PROJECT

Curriculum Vitae

Name:	Toby Lambert
Office:	RPS Harper Somers O'Sullivan
Position in Company:	Senior Ecologist
Qualifications / Memberships:	Bachelor of Environmental Science Ecological Consultants Association of NSW NSW Driver's Licence (Class C) OH&S Induction Training (Green Card) NPWS Scientific Investigation Licence NSW Animal Ethics Research Authority

Areas of Expertise:

- Environmental and ecological impact assessment reporting
- Flora, fauna and habitat survey methodology design and management
- Detailed understanding of threatened species legislation and issues
- Terrestrial fauna surveys
- Renewable energy assessment
- Bushland and vegetation management
- Complex holistic project management
- Local, State and Commonwealth project co-ordination
- Dispute resolution and mediation

Recent Experience Includes:

Toby has over twelve years experience in undertaking and managing a diverse array of ecological and environmental surveys and assessments. Toby has produced ecological and environmental documentation for private and public projects ranging in complexity. These include a number of wind farms throughout Australia and New Zealand, coal mines and a range of infrastructure projects within the Hunter region. Toby has also managed ecological masterplanning for residential projects in Sydney, the Central Coast and the Hunter. Toby is also currently the project manager for the environmental component of the development of the Hunter Economic Zone industrial estate at Kurri Kurri, the largest industrial estate in NSW.

Toby's fields of special competence are Environmental Impact Assessment and mediation, flora, fauna and habitat survey method, design and identification, detailed understanding of legislation and threatened species issues, terrestrial fauna surveys and project management.

Curriculum Vitae

Name: Allan Richardson

Office: RPS Harper Somers O'Sullivan

Position in Company: Ecologist

Qualifications / Awards

B.Env.Sc. (Environmental Management)
B.Env.Sc. (Hons) (Biology) – Migratory Wading Bird Study
2002 Hunter Environmental Institute Scholarship
Waterways Authority Boating Licence
OH&S Induction Training (Green Card)
NSW Driver's Licence (Class C)
NPWS Scientific Licence
NSW Animal Ethics Research Authority

Memberships: Hunter Bird Observers Club

Areas of Expertise:

- Ornithological Surveys and Research
- Targeted and general Terrestrial flora and fauna surveys
- Threatened Flora & Fauna Assessment, Reporting and Legislation
- GPS Survey and GIS Mapping Projects
- High Level Nature Photography
- Tertiary and General Ecological Tutoring, Demonstrating and Presenting

Recent Experience Includes:

Allan Richardson has broad range of Ecological Assessment reporting experience underpinned by over 25 years of ecological field experience. Project experience has primarily included a range of flora and fauna assessment disciplines as required by a wide range of corporate to domestic client requirements. Allan has a strong grounding in threatened species ecology in both coastal and western NSW regional areas, with specialist migratory wader studies expertise in Central NSW and Roebuck Bay in North Western Australia.

Allan's wide ranging interest across different ecological disciplines, has been a central part of important threatened species projects, including, the Critically Endangered North Rothbury Persoonia, Hunter Estuary Green and Golden Bell Frog populations, Migratory Wader habitat usage surveys and seasonal Swift Parrot movements. Allan's broad ecological experience also represents an important part of RPS HSO's threatened flora and vegetation community mapping, targeted fauna survey works and threatened species habitat assessments over both small and large spatial areas for a range of client needs. His depth of experience and a strong knowledge of Australian fauna and regional vegetation contribute strongly to RPS HSO's ability to meet the consultation and regulatory needs of the development community.

Curriculum Vitae

Name: Shaun Corry

Office: RPS Harper Somers O'Sullivan

Position in Company: Ecologist

Qualifications / Memberships:
Dip Conservation and Land Mgt
NSW Driver's Licence (Class C)
Waterways Authority Boating Licence
OH&S Induction Training (Green Card)
NPWS Scientific Investigation Licence
NSW Animal Ethics Research Authority

Areas of Expertise:

- Flora and fauna identification and habitat assessment
- Targeted threatened flora and fauna surveys
- Delineation and mapping of vegetation communities
- Endangered Ecological Community (EEC) assessment
- Experience with GPS/GIS for project design and mapping
- Conducting Field Surveys for Flora, Fauna and Habitat Identification
- Report Preparation including Fauna & Flora Assessments
- Ecological Monitoring and Reporting
- Bushfire Threat Assessment & Management reporting
- Understanding of environmental legislation

Recent Experience Includes:

Shaun has a broad range of Ecological Assessment reporting experience and ecological field experience. Experience within the consulting industry has primarily included a wide range of flora assessment disciplines as required by a wide range of public and private clients. Shaun has a strong grounding in threatened flora species, endangered ecological communities and populations throughout NSW. Shaun has undertaken flora and fauna surveys including targeted surveys for threatened flora species within the Blue Mountains, Hunter, Central Coast, Mid North Coast and Southern Queenland.

APPENDIX B: EXPECTED FAUNA LIST

Below is a list of fauna species that could be *reasonably* expected to be found within the site at some occurrence. Such an approach has been taken given the unlikelihood to record *all* potentially occurring species within an area during formal fauna surveys (due to seasonality, climatic limitations, crypticism etc).

Family sequencing and taxonomy follow for each fauna class:

Birds – Christidis and Boles (1994).

Herpetofauna - Cogger (1996).

Mammals - Strahan (ed.) (1995) and Churchill (1998).

✓ - Species observed or indicated by scats, tracks etc. on site during this investigation.

* - Indicates an introduced species

Known and Expected Bird List

Appendix Key: **1** = Results of ecological investigations conducted within the study area
✓ = Species Detected
* = introduced species
(C) = listed as CAMBA species
(J) = listed as JAMBA species
(E) = listed as Endangered in NSW.
(V) = listed as Vulnerable in NSW.
(EV) = Species listed under the Commonwealth EPBC Act as Vulnerable
(EE) = Species listed under the Commonwealth EPBC Act as Endangered
(EM) = Species listed under the Commonwealth EPBC Act as Migratory
(EMa) = Species listed under the Commonwealth EPBC Act as Marine
Species indicated in **BOLD** font are those threatened species known from within Lithgow LGA (Atlas of NSW Wildlife data)

Data Source: ✓ = Species recorded during this survey

Family Name	*Scientific Name*	Common Name	Recorded
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill	✓
	Acanthiza lineata	Striated Thornbill	✓
	Acanthiza nana	Yellow Thornbill	
	Acanthiza pusilla	Brown Thornbill	✓
	Acanthiza reguloides	Buff-rumped Thornbill	✓
	Aphelocephala leucopsis	Southern Whiteface	
	Calamanthus pyrrhopygius	Chestnut-rumped Heathwren	
	Gerygone fusca	Western Gerygone	
	Gerygone mouki	Brown Gerygone	
	Gerygone olivacea	White-throated Gerygone	
	Origma solitaria	Rockwarbler	
	Pycnoptilus floccosus	Pilotbird	
	Pyrrholaemus saggitatus	**Speckled Warbler (V)**	
	Sericornis citreogularis	Yellow-throated Scrubwren	
	Sericornis frontalis	White-browed Scrubwren	✓
	Sericornis magnirostris	Large-billed Scrubwren	
	Smicrornis brevirostris	Weebill	✓

Family Name	*Scientific Name*	Common Name	Recorded
Accipitridae	*Accipiter cirrocephalus*	Collared Sparrowhawk	
	Accipiter fasciatus	Brown Goshawk	✓
	Accipiter novaehollandiae	Grey Goshawk	
	Aquila audax	Wedge-tailed Eagle	
	Elanus axillaris	Black-shouldered Kite	
	Haliaeetus leucogaster	White-bellied Sea-Eagle	
	Haliastur sphenurus	Whistling Kite	
	Hieraaetus morphnoides	Little Eagle	
	Lophoictinia isura	**Square-tailed Kite (V)**	
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar	
Alaudidae	*Alauda arvensis**	Eurasian Skylark	
	Mirafra javanica	Horsfield's Bushlark	✓
Alcedinidae	*Alcedo azurea*	Azure Kingfisher	
	Dacelo novaeguineae	Laughing Kookaburra	✓
	Todiramphus sanctus	Sacred Kingfisher	
Anatidae	*Anas gracilis*	Grey Teal	✓
	Anas rhynchotis	Australasian Shoveler	✓
	Anas superciliosa	Pacific Black Duck	
	Aythya australis	Hardhead	
	Biziura lobata	Musk Duck	
	Chenonetta jubata	Australian Wood Duck	✓
	Cygnus atratus	Black Swan	
	Malacorhynchus membranaceus	Pink-eared Duck	
	Oxyura australis	**Blue-billed Duck (V)**	
Apodidae	*Hirundapus caudacutus*	White-throated Needletail (EM)	
Ardeidae	*Ardea pacifica*	White-necked Heron	
	Egretta novaehollandiae	White-faced Heron	

Family Name	*Scientific Name*	Common Name	Recorded
	Nycticorax caledonicus	Nankeen Night Heron	
Artamidae	*Artamus cinereus*	Black-faced Woodswallow	
	Artamus cyanopterus	Dusky Woodswallow	✓
	Artamus leucorynchus	White-breasted Woodswallow	
	Artamus superciliosus	White-browed Woodswallow	
	Cracticus nigrogularis	Pied Butcherbird	✓
	Cracticus torquatus	Grey Butcherbird	✓
	Gymnorhina tibicen	Australian Magpie	✓
	Strepera graculina	Pied Currawong	✓
	Strepera versicolor	Grey Currawong	
Cacatuidae	*Cacatua galerita*	Sulphur-crested Cockatoo	✓
	Cacatua sanguinea	Little Corella	
	Callocephalon fimbriatum	**Gang-Gang Cockatoo (V)**	✓
	Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo	
	Calyptorhynchus lathami	**Glossy Black-Cockatoo (V)**	
	Eolophus roseicapillus	Galah	✓
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	✓
	Coracina papuensis	White-bellied Cuckoo-shrike	✓
	Coracina tenuirostris	Cicadabird	
	Lalage tricolor	White-winged Triller	
Caprimulgidae	*Eurostopodus mystacalis*	White-throated Nightjar	
Charadriidae	*Elseyornis melanops*	Black-fronted Dotterel	
	Vanellus miles	Masked Lapwing	✓
Cisticolidae	*Cisticola exilis*	Golden-headed Cisticola	
Climacteridae	*Climacteris erythrops*	Red-browed Treecreeper	

Family Name	*Scientific Name*	Common Name	Recorded
	Climacteris picumnus victoriae	**Brown Treecreeper (eastern subspecies) (V)**	✓
	Cormobates leucophaea	White-throated Treecreeper	✓
Columbidae	*Geopelia cuneata*	Diamond Dove	
	Geopelia humeralis	Bar-shouldered Dove	
	Geopelia placida	Peaceful Dove	
	Leucosarcia melanoleuca	Wonga Pigeon	
	Macropygia amboinensis	Brown Cuckoo-Dove	
	Ocyphaps lophotes	Crested Pigeon	✓
	Phaps chalcoptera	Common Bronzewing	✓
	Phaps elegans	Brush Bronzewing	
Coraciidae	*Eurystomus orientalis*	Dollarbird	
Corcoracidae	*Corcorax melanorhamphos*	White-winged Chough	✓
Corvidae	*Corvus coronoides*	Australian Raven	✓
	Corvus mellori	Little Raven	✓
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo	
	Cacomantis variolosus	Brush Cuckoo	
	Chalcites basalis	Horsfield's Bronze-Cuckoo	
	Chalcites lucidus	Shining Bronze-Cuckoo	
	Chalcites osculans	Black-eared Cuckoo	
	Cuculus pallidus	Pallid Cuckoo	✓
	Cuculus saturatus	Oriental Cuckoo	
	Eudynamys orientalis	Pacific Koel	
	Scythrops novaehollandiae	Channel-billed Cuckoo	
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird	✓
Dicruridae	*Grallina cyanoleuca*	Magpie-lark	✓
	Monarcha melanopsis	Black-faced Monarch	
	Monarcha trivirgatus	Spectacled Monarch	

Family Name	*Scientific Name*	Common Name	Recorded
	Myiagra cyanoleuca	Satin Flycatcher	
	Myiagra inquieta	Restless Flycatcher	✓
	Myiagra rubecula	Leaden Flycatcher	
	Rhipidura albiscapa	Grey Fantail	✓
	Rhipidura leucophrys	Willie Wagtail	✓
	Rhipidura rufifrons	Rufous Fantail	
Estrildidae	*Lonchura castaneothorax*	Chestnut-breasted Mannikin	
	Neochmia modesta	Plum-headed Finch	
	Neochmia temporalis	Red-browed Finch	✓
	Stagonopleura bella	Beautiful Firetail	
	Stagonopleura guttata	**Diamond Firetail (V)**	✓
	Taeniopygia bichenovii	Double-barred Finch	✓
	Taeniopygia guttata	Zebra Finch	
Eupetidae	*Cinclosoma punctatum*	Spotted Quail-thrush	
	Psophodes olivaceus	Eastern Whipbird	
Falconidae	*Falco berigora*	Brown Falcon	
	Falco cenchroides	Nankeen Kestrel	✓
	Falco longipennis	Australian Hobby	
	Falco peregrinus	Peregrine Falcon	
	Falco subniger	Black Falcon	
Fringillidae	*Carduelis carduelis**	European Goldfinch	
Hirundinidae	*Cheramoeca leucosterna*	White-backed Swallow	
	Hirundo neoxena	Welcome Swallow	✓
	Petrochelidon ariel	Fairy Martin	✓
	Petrochelidon nigricans	Tree Martin	✓
Laridae	*Larus novaehollandiae*	Silver Gull	
Maluridae	*Malurus cyaneus*	Superb Fairy-wren	✓

Family Name	*Scientific Name*	Common Name	Recorded
	Malurus lamberti	Variegated Fairy-wren	
	Stipiturus malachurus	Southern Emu-wren	
Megapodiidae	*Alectura lathami*	Australian Brush-turkey	
Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater	
	Acanthorhynchus tenuirostris	Eastern Spinebill	✓
	Anthochaera carunculata	Red Wattlebird	✓
	Anthochaera chrysoptera	Little Wattlebird	
	Entomyzon cyanotis	Blue-faced Honeyeater	
	Epthianura albifrons	White-fronted Chat	
	Gliciphila melanops	Tawny-crowned Honeyeater	
	Grantiella picta	**Painted Honeyeater (V)**	
	Lichenostomus chrysops	Yellow-faced Honeyeater	✓
	Lichenostomus fuscus	Fuscous Honeyeater	
	Lichenostomus leucotis	White-eared Honeyeater	✓
	Lichenostomus melanops	Yellow-tufted Honeyeater	
	Lichenostomus penicillatus	White-plumed Honeyeater	✓
	Manorina melanocephala	Noisy Miner	✓
	Manorina melanophrys	Bell Miner	
	Meliphaga lewinii	Lewin's Honeyeater	
	Melithreptus brevirostris	Brown-headed Honeyeater	✓
	Melithreptus gularis gularis	**Black-chinned Honeyeater (eastern subspecies) (V)**	
	Melithreptus lunatus	White-naped Honeyeater	
	Myzomela sanguinolenta	Scarlet Honeyeater	
	Philemon citreogularis	Little Friarbird	
	Philemon corniculatus	Noisy Friarbird	✓
	Phylidonyris niger	White-cheeked Honeyeater	

Family Name	*Scientific Name*	Common Name	Recorded
	Phylidonyris novaehollandiae	New Holland Honeyeater	✓
	Phylidonyris pyrrhoptera	Crescent Honeyeater	
	Plectorhyncha lanceolata	Striped Honeyeater	
	Xanthomyza phrygia	**Regent Honeyeater (E, E*)**	
Menuridae	*Menura novaehollandiae*	Superb Lyrebird	✓
Meropidae	*Merops ornatus*	Rainbow Bee-eater	
Motacillidae	*Anthus australis*	Australian Pipit	✓
Muscicapidae	*Turdus merula**	Eurasian Blackbird	
	Zoothera lunulata	Bassian Thrush	
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	
Oriolidae	*Oriolus sagittatus*	Olive-backed Oriole	
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush	✓
	Falcunculus frontatus	Eastern Shrike-tit	
	Pachycephala pectoralis	Golden Whistler	✓
	Pachycephala rufiventris	Rufous Whistler	✓
Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote	✓
	Pardalotus striatus	Striated Pardalote	
Passeridae	*Passer domesticus**	House Sparrow	
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican	
Petroicidae	*Eopsaltria australis*	Eastern Yellow Robin	✓
	Melanodryas cucullata	Hooded Robin	
	Melanodryas cucullata cucullata	**Hooded Robin (south-eastern form) (V)**	
	Microeca fascinans	Jacky Winter	✓
	Petroica boodang	Scarlet Robin	
	Petroica goodenovii	Red-capped Robin	
	Petroica phoenicea	Flame Robin	✓
	Petroica rosea	Rose Robin	

Family Name	*Scientific Name*	Common Name	Recorded
Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant	
	Phalacrocorax melanoleucos	Little Pied Cormorant	
	Phalacrocorax sulcirostris	Little Black Cormorant	
	Phalacrocorax varius	Pied Cormorant	
Phasianidae	*Coturnix pectoralis*	Stubble Quail	✓
	Coturnix ypsilophora	Brown Quail	✓
Podargidae	*Podargus strigoides*	Tawny Frogmouth	
Podicipedidae	*Podiceps cristatus*	Great Crested Grebe	
	Poliocephalus poliocephalus	Hoary-headed Grebe	
	Tachybaptus novaehollandiae	Australasian Grebe	✓
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler	
	Pomatostomus temporalis temporalis	**Grey-crowned Babbler (eastern subspecies) (V)**	
Psittacidae	*Alisterus scapularis*	Australian King-Parrot	
	Glossopsitta concinna	Musk Lorikeet	
	Glossopsitta pusilla	Little Lorikeet	
	Lathamus discolor	**Swift Parrot (E,E*)**	
	Melopsittacus undulatus	Budgerigar	
	Neophema pulchella	**Turquoise Parrot (V)**	
	Platycercus adscitus eximius	Eastern Rosella	✓
	Platycercus elegans	Crimson Rosella	✓
	Psephotus haematonotus	Red-rumped Parrot	✓
	Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet	
	Trichoglossus haematodus	Rainbow Lorikeet	
Ptilonorhynchidae	*Ptilonorhynchus violaceus*	Satin Bowerbird	
Pycnonotidae	*Pycnonotus jocosus**	Red-whiskered Bulbul	
Rallidae	*Fulica atra*	Eurasian Coot	✓
	Gallinula tenebrosa	Dusky Moorhen	

Family Name	*Scientific Name*	Common Name	Recorded
	Gallirallus philippensis	Buff-banded Rail	
	Porphyrio porphyrio	Purple Swamphen	
	Pozana fluminea	Australian Spotted Crake	
	Pozana pusilla	Baillon's Crake	
	Pozana tabuensis	Spottless Crake	
	Rallus pectoralis	Lewin's Rail	✓
Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper (EM)	
	Gallinago hardwickii	Latham's Snipe (EM)	
Strigidae	*Ninox boobook*	Southern Boobook	
	Ninox connivens	**Barking Owl (V)**	
	Ninox strenua	**Powerful Owl (V)**	
Sturnidae	*Acridotheres tristis**	Common Myna	
	*Sturnus vulgaris**	Common Starling	✓
Sylviidae	*Acrocephalus australis*	Australian Reed-Warbler	
	Cincloramphus cruralis	Brown Songlark	
	Cincloramphus mathewsi	Rufous Songlark	✓
	Megalurus gramineus	Little Grassbird	
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill	
	Platalea regia	Royal Spoonbill	
	Threskiornis molucca	Australian White Ibis	
	Threskiornis spinicollis	Straw-necked Ibis	
Turnicidae	*Turnix varia*	Painted Button-quail	
Tytonidae	*Tyto alba*	Barn Owl	
	Tyto novaehollandiae	**Masked Owl (V)**	
	Tyto tenebricosa	**Sooty Owl (V)**	
Zosteropidae	*Zosterops lateralis*	Silvereye	

Known and Expected Mammal List

Appendix Key: **1** = Results of ecological investigations conducted within the study area
✓ = Species Detected
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(E) = listed as Endangered in NSW.
(V) = listed as Vulnerable in NSW.
(EV) = Species listed under the Commonwealth EPBC Act as Vulnerable
(EE) = Species listed under the Commonwealth EPBC Act as Endangered
Species indicated in **BOLD** font are those threatened species known from within Lithgow LGA (NPWS, 2003)

Data Source: ✓ = Species recorded during this survey

Family Name	*Scientific Name*	Common Name	Recorded
Acrobatidae	*Acrobates pygmaeus*	Feathertail Glider	
Bovidae	*Bos taurus**	European Cattle	✓
	*Capra hircus**	Goat	✓
Burramyidae	***Cercartetus nanus***	**Eastern Pygmy-possum (V)**	
Canidae	*Canis lupus familiaris**	Dog	
	*Canis lupus**	Dingo, domestic dog	
	*Vulpes vulpes**	Fox	✓
Cervidae	*Cervus sp.**	Unidentified Deer	
Dasyuridae	*Antechinus flavipes*	Yellow-footed Antechinus	
	Antechinus stuartii	Brown Antechinus	
	Antechinus swainsonii	Dusky Antechinus	
	Antechinus/Sminthopsis sp.	unidentified 'Marsupial Mouse'	
	Dasyuridae sp.	unidentified dasyurid	
	Dasyurus maculatus	**Spotted-tailed Quoll (V, V*)**	
Emballonuridae	***Saccolaimus flaviventris***	**Yellow-bellied Sheathtail-bat (V)**	
Equidae	*Equus caballus**	Horse	

Family Name	*Scientific Name*	Common Name	Recorded
Felidae	*Felis catus**	Cat	
Leporidae	*Lepus capensis**	Brown Hare	
	*Oryctolagus cuniculus**	Rabbit	✓
Macropodidae	*Macropus giganteus*	Eastern Grey Kangaroo	✓
	Macropus robustus	Common Wallaroo	✓
	Macropus rufogriseus	Red-necked Wallaby	✓
	Petrogale penicillata	**Brush-tailed Rock-wallaby (E, V*)**	
	Wallabia bicolor	Swamp Wallaby	
Molossidae	*Mormopterus "Species 2"*	Undescribed Freetail Bat	
	Mormopterus norfolkensis	Eastern Freetail-bat (V)	
	Mormopterus planiceps	Little Mastiff-bat	
	Mormopterus sp.	Mastiff-bat	
	Tadarida australis	White-striped Freetail-bat	
Muridae	*Hydromys chrysogaster*	Water-rat	
	*Mus musculus**	House Mouse	
	Rattus fuscipes	Bush Rat	
	Rattus lutreolus	Swamp Rat	
	*Rattus rattus**	Black Rat	
Ornithorhynchidae	*Ornithorhynchus anatinus*	Platypus	
Peramelidae	*Isoodon/Perameles sp.*	unidentified Bandicoot	
Petauridae	***Petaurus australis***	**Yellow-bellied Glider (V)**	
	Petaurus breviceps	Sugar Glider	
	Petaurus norfolcensis	**Squirrel Glider (V)**	
Phalangeridae	*Trichosurus caninus*	Short-eared Possum	
	Trichosurus sp.	Brushtail possum	
	Trichosurus vulpecula	Common Brushtail Possum	

Family Name	*Scientific Name*	Common Name	Recorded
Phascolarctidae	***Phascolarctos cinereus***	**Koala (V)**	
Potoroidae	*Bettongia gaimardi*	Tasmanian Bettong	
Pseudocheiridae	*Petauroides volans*	Greater Glider	
	Pseudocheirus peregrinus	Common Ringtail Possum	
Rhinolophidae	*Rhinolophus megaphyllus*	Eastern Horseshoe-bat	
Suidae	*Sus scrofa**	Pig	
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna	✓
Vespertilionidae	***Chalinolobus dwyeri***	**Large-eared Pied Bat (V, V*)**	
	Chalinolobus gouldii	Gould's Wattled Bat	
	Chalinolobus morio	Chocolate Wattled Bat	
	Falsistrellus tasmaniensis	**Eastern False Pipistrelle (V)**	
	Miniopterus australis	**Little Bentwing-bat (V)**	
	Miniopterus schreibersii oceanensis	**Eastern Bentwing-bat (V)**	
	Myotis adversus	**Large-footed Myotis (V)**	
	Nyctophilus geoffroyi	Lesser Long-eared Bat	
	Nyctophilus gouldi	Gould's Long-eared Bat	
	Nyctophilus sp.	Long-eared bat	
	Scoteanax rueppellii	**Greater Broad-nosed Bat (V)**	
	Scotorepens balstoni	Inland Broad-nosed Bat	
	Scotorepens orion	Eastern Broad-nosed Bat	
	Vespadelus darlingtoni	Large Forest Bat	
	Vespadelus pumilus	Eastern Forest Bat	
	Vespadelus regulus	Southern Forest Bat	
	Vespadelus vulturnus	Little Forest Bat	
Vombatidae	*Vombatus ursinus*	Common Wombat	✓

Known and Expected Reptile List

Appendix Key: **1** = Results of ecological investigations conducted within the study area
✓ = Species Detected
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(E) = listed as Endangered in NSW.
(V) = listed as Vulnerable in NSW.
(EV) = Species listed under the Commonwealth EPBC Act as Vulnerable
(EE) = Species listed under the Commonwealth EPBC Act as Endangered
(EMa) = Species listed under the Commonwealth EPBC Act as Marine
Species indicated in **BOLD** font are those threatened species known from within Lithgow LGA (NPWS, 2003)

Data Source: ✓ = Species recorded during this survey

Family Name	*Scientific Name*	Common Name	Recorded
Agamidae	*Amphibolurus muricatus*	Jacky Lizard	
	Amphibolurus nobbi	Nobbi	
	Physignathus lesueurii	Eastern Water Dragon	
	Pogona barbata	Bearded Dragon	
	Rankinia diemensis	Mountain Dragon	
Chelidae	*Chelodina longicollis*	Eastern Snake-necked Turtle	
Elapidae	*Austrelaps ramsayi*	Highland Copperhead	
	Austrelaps superbus	Lowland Copperhead	
	Cryptophis nigrescens	Eastern Small-eyed Snake	
	Drysdalia rhodogaster	Mustard-bellied Snake	
	Furina diadema	Red-naped Snake	
	Hoplocephalus bungaroides	**Broad-headed Snake (E, V*)**	
	Notechis scutatus	Tiger Snake	
	Parasuta dwyeri	Dwyer's Snake	
	Parasuta spectabilis	Mallee Black-headed Snake	
	Pseudechis guttatus	Spotted Black Snake	
	Pseudechis porphyriacus	Red-bellied Black Snake	
	Pseudonaja textilis	Eastern Brown Snake	
	Vermicella annulata	Bandy-bandy	
Gekkonidae	*Diplodactylus vittatus*	Wood Gecko	

Family Name	*Scientific Name*	Common Name	Recorded
	Oedura lesueurii	Lesueur's Velvet Gecko	
	Phyllurus platurus	Broad-tailed Gecko	
	Underwoodisaurus milii	Thick-tailed Gecko	
Pygopodidae	*Pygopus lepidopodus*	Common Scaly-foot	
Scincidae	*Acritoscincus duperreyi*	Eastern Three-lined Skink	
	Acritoscincus platynota	Red-throated Skink	
	Carlia tetradactyla	Southern Rainbow-skink	
	Cryptoblepharus virgatus	Cream-striped Shinning-skink	
	Ctenotus robustus	Robust Ctenotus	
	Ctenotus taeniolatus	Copper-tailed Skink	
	Egernia cunninghami	Cunningham's Skink	
	Egernia saxatilis	Black Rock Skink	
	Egernia saxatilis intermedia		
	Egernia striolata	Tree Skink	
	Egernia whitii	White's Skink	
	Eulamprus heatwolei	Yellow-bellied Water-skink	
	Eulamprus leuraensis	**Blue Mountains Water skink (E, E*)**	
	Eulamprus quoyii	Eastern Water-skink	
	Eulamprus tenuis	Barred-sided Skink	
	Eulamprus tympanum	Southern Water-skink	
	Hemiergis decresiensis	Three-toed Earless Skink	
	Lampropholis delicata	Dark-flecked Garden Sunskink	
	Lampropholis guichenoti	Pale-flecked Garden Sunskink	
	Lampropholis sp.	unidentified grass skink	
	Lerista bougainvillii	South-eastern Slider	
	Lygisaurus foliorum	Tree-base Litter-skink	
	Morethia boulengeri	South-eastern Morethia Skink	

Family Name	*Scientific Name*	Common Name	Recorded
	Pseudemoia entrecasteauxii	Tussock Cool-skink	
	Pseudemoia pagenstecheri	Tussock Skink	
	Saiphos equalis	Three-toed Skink	
	Saproscincus mustelinus	Weasel Skink	
	Tiliqua nigrolutea	Blotched Blue-tongue	
	Tiliqua scincoides	Eastern Blue-tongue	
Typhlopidae	*Ramphotyphlops nigrescens*	Blackish Blind Snake	
Varanidae	***Varanus rosenbergi***	**Rosenberg's Goanna (V)**	
	Varanus sp.	Unidentified Goanna	
	Varanus varius	Lace Monitor	

Known and Expected Frog List

Appendix Key: **1** = Results of ecological investigations conducted within the study area
✓ = Species Detected
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(V) = listed as Vulnerable in NSW.
(EV) = Species listed under the Commonwealth EPBC Act as Vulnerable
(EE) = Species listed under the Commonwealth EPBC Act as Endangered
Species indicated in **BOLD** font are those threatened species known from Within Lithgow LGA (NPWS, 2003)

Data Source: ✓ = Species recorded during this survey

Family Name	*Scientific Name*	Common Name	Recorded
Hylidae	***Litoria booroolongensis***	**Booroolong Frog (E, E*)**	
	Litoria caerulea	Green Tree Frog	
	Litoria citropa	Blue Mountains Tree Frog	
	Litoria dentata	Bleating Tree Frog	
	Litoria ewingii	Brown Tree Frog	
	Litoria fallax	Eastern Dwarf Tree Frog	
	Litoria latopalmata	Broad-palmed Frog	
	Litoria lesueuri	Lesueur's Frog	
	Litoria peronii	Peron's Tree Frog	
	Litoria phyllochroa	Leaf-green Tree Frog	
	Litoria sp.	Unidentified Tree Frog	
	Litoria verreauxii	Verreaux's Frog	
	Litoria wilcoxii		
Myobatrachidae	*Crinia parinsignifera*	Eastern Sign-bearing Froglet	
	Crinia signifera	Common Eastern Froglet	✓
	Heleioporus australiacus	**Giant Burrowing Frog (V, V*)**	
	Limnodynastes dumerilii	Eastern Banjo Frog	
	Limnodynastes fletcheri	Long-thumbed Frog	
	Limnodynastes ornatus	Ornate Burrowing Frog	
	Limnodynastes peronii	Brown-striped Frog	

Family Name	*Scientific Name*	Common Name	Recorded
	Limnodynastes tasmaniensis	Spotted Grass Frog	✓
	Mixophyes balbus	**Stuttering Frog (E, V*)**	
	Neobatrachus sudelli	Sudell's Frog	
	Pseudophryne australis	**Red-crowned Toadlet (V)**	
	Pseudophryne bibronii	Bibron's Toadlet	
	Pseudophryne sp.		
	Uperoleia laevigata	Smooth Toadlet	

Known and Expected Insects List

Appendix Key: **1** = Results of ecological investigations conducted within the study area
✓ = Species Detected
* = introduced species
(E) = listed as Endangered in NSW.
(V) = listed as Vulnerable in NSW.
(EV) = Species listed under the Commonwealth EPBC Act as Vulnerable
(EE) = Species listed under the Commonwealth EPBC Act as Endangered
Species indicated in **BOLD** font are those threatened species known from within Lithgow LGA (NPWS, 2003)

Data Source: ✓ = Species recorded during this survey

Family Name	*Scientific Name*	Common Name	Recorded
Keroplatidae	*Arachnocampa richardsae*	Glow Worm	
Lycaenidae	*Candalides hyacinthina hyacinthina*	Varied Dusky Blue	
	Paralucia aurifera	Bright Copper	
	Paralucia spinifera	**Bathurst Copper Butterfly (E, E*)**	
Papilionidae	*Graphium macleayanus*	Macleay's swallowtail	
Petaluridae	***Petalura gigantea***	**Giant Dragonfly (E)**	
Saturniidae	*Opodiphthera eucalypti*	Emperor Gum Moth	

APPENDIX C: FLORA SPECIES LIST

Flora Species List

The following list includes all species of vascular plants observed on site during fieldwork. It should be noted that such a list couldn't be considered comprehensive, but rather indicative of the flora present on the site. It can take many years of flora surveys to record all of the plant species occurring within any area, especially plant species that are only apparent in some seasons such as Orchids.

A number of species cannot always be accurately identified during a brief survey, generally due to a lack of suitable flowering and/or fruiting material. Any such species are identified as accurately as possible, and are indicated in the list as indicated:

- specimens that could only be identified to genus level are indicated by the generic name followed by the abbreviation "sp.", indicating an unidentified species of that genus;

- specimens for which identification of the genus was uncertain are indicated by a question mark ("?") placed in front of the generic, which is followed by the abbreviation "sp." and;

- specimens that could be accurately identified to genus level, but could be identified to species level with only a degree of certainty are indicated by a ("?") placed in front of the epithet.

Authorities for the scientific names are not provided in the list. These follow the references outlined below.

Harden, G. (ed) (2000). *Flora of New South Wales, Volume 1*. Revised edition. UNSW, Kensington, NSW.

Harden, G. (ed) (2002). *Flora of New South Wales, Volume 2*. Revised edition. UNSW, Kensington, NSW.

Harden, G. (ed) (1992). *Flora of New South Wales, Volume 3.* UNSW, Kensington, NSW.

Harden, G. (ed) (1993). *Flora of New South Wales, Volume 4*. UNSW, Kensington, NSW.

Names of families and higher taxa follow a modified Cronquist System (1981). Introduced species are indicated by an asterisk "*".

Threatened species listed under the Threatened Species Conservation Act 1995 (*TSC Act 1995*) or the Environmental Protection of Biodiversity and Conservation (*EPBC Act 1999*) and / or Rare or Threatened Australian Plant (ROTAP) listed species are indicated in **bold font** and marked as:

(V) = Vulnerable Species listed under the TSC Act
(E) = Endangered Species listed under the TSC Act
(EE) = Species listed under the Commonwealth EPBC Act 1999 as Endangered
(EV) = Species listed under the Commonwealth EPBC Act 1999 as Vulnerable
(R) = ROTAP as per Briggs and Leigh (1996)

The following standard abbreviations are used to indicate subspecific taxa:

ssp. - subspecies
var.- variety

Flora Species List

Scientific Name	Common Name	Powerline route (cleared - MU62)	Powerline route and surrounds (treed areas)
FILICOPSIDA			
DENNSTAEDTIACEAE			
Pteridium esculentum	Bracken	x	
SINOPTERIDACEAE			
Cheilanthes sieberi subsp. *sieberi*	Poison Rock Fern	x	x
MAGNOLIIDAE			
ASTERACEAE			
Calotis cuneifolia	Purple Burr Daisy	x	
*Carthamus lanatus**	Saffron Thistle	x	
Cassinia arcuata	Sifton Bush	x	x
Chrysocephalum apiculatum	Common Everlasting	x	
*Cirsium vulgare**	Spear Thistle	x	
*Conyza albida**	Fleabane	x	
Gnaphalium sphaericum	Common Cudweed	x	
*Hypochaeris radicata**	Flatweed	x	
Lagenifera stipitata	-		x
Ozothamnus diosmifolius	Ball Everlasting	x	x
*Silybum marianum**	Variegated Thistle	x	
*Taraxacum officinale**	Dandelion	x	
CLUSIACEAE			
*Hypericum perforatum**	St Johns Wort	x	

Scientific Name	Common Name	Powerline route (cleared - MU62)	Powerline route and surrounds (treed areas)
EPACRIDACEAE			
Astroloma humifusum	Cranberry Heath		x
Brachyloma daphnoides	-	x	
Lissanthe strigosa	Peach Heath	x	x
Melichrus urceolatus	Urn Heath	x	
Stypandra glauca	Nodding Blue Lily		x
EUPHORBIACEAE			
Poranthera microphylla			x
FABACEAE			
Bossiaea prostrata	-		x
Daviesia acicularis	-		x
Hardenbergia violacea	False Sarsparilla		x
Hovea linearis	-		x
Podolobium ilicifolium	Prickly Shaggy Pea	x	x
Pultenaea linophylla	-	x	x
Pultenaea microphylla	-	x	
*Trifolium repens**	White Clover	x	
LORANTHACEAE			
Amyema pendulum	Mistletoe	x	x
MIMOSACEAE			
Acacia brownii	-	x	x
Acacia dawsonii		x	
Acacia falciformis	Broad-leaved Hickory		x

Scientific Name	Common Name	Powerline route (cleared - MU62)	Powerline route and surrounds (treed areas)
Acacia floribunda	Sally Wattle	x	x
Acacia gunnii	Ploughshare Wattle		x
Acacia ulicifolia	Prickly Moses	x	
MYRTACEAE			
Eucalyptus bridgesiana	Apple Box	x	
Eucalyptus dalrympleana subsp. *Heptantha*	Mountain Gum		x
Eucalyptus melliodora	Yellow Box	x	
Eucalyptus polyanthemos subsp. *polyanthemos*	Red Box		x
Eucalyptus punctata	Grey Gum		x
Eucalyptus sparsifolia	Narrow-leaved Stringybark		x
Leptospermum continentale	-	x	
PITTOSPORACEAE			
Bursaria spinosa var. *spinosa*	Blackthorn		x
PLANTAGINACEAE			
*Plantago lanceolata**	Ribwort	x	
PROTEACEAE			
Grevillea ramosissima	-	x	
Persoonia linearis	Narrow-leaved Geebung		x
ROSACEAE			

Scientific Name	Common Name	Powerline route (cleared - MU62)	Powerline route and surrounds (treed areas)
Rubus rosifolius	Forest Bramble	x	
*Rubus ulmifolius**	Blackberry	x	
SANTALACEAE			
Exocarpos strictus	Pale Ballart		x
SAPINDACEAE			
Dodonaea viscosa subsp. *cuneata*	-		x
SCROPHULARIACEAE			
*Verbascum thapsus**	Aarons Rod	x	
LILIIDAE			
JUNCACEAE			
Juncus mollis		x	
LOMANDRACEAE			
Lomandra filiformis subsp. *filiformis*	Wattle Mat-rush	x	x
ORCHIDACEAE			
Caladenia carnea	Pink Finger Orchid		x
POACEAE			
Aristida ramosa	Wire Grass	x	
Austrodanthonia laevis	Wallaby Grass		x

Scientific Name	Common Name	Powerline route (cleared - MU62)	Powerline route and surrounds (treed areas)
Austrodanthonia monticola	-	x	
Austrostipa ramosissima	Stout Bamboo Grass	x	
Echinopogon caespitosus var. *caespitosus*	Tufted Hedgehog Grass	x	x
Eragrostis leptostachya	Paddock Lovegrass	x	x
Eragrostis sp.	Lovegrass		x
*Setaria gracilis**	Slender Pigeon Grass	x	
Themeda australis	Kangaroo Grass	x	