Werris Creek Coal Pty Limited

ABN:69 107 169 103

Proposed Modification to the Werris Creek Coal Mine

Fauna Impact Assessment

Prepared by

Ecotone Ecological Consultants Pty Ltd

March, 2009

Specialist Consultant Studies Compendium: Part 5

Fauna Impact Assessment

of the

Proposed Modification to the Werris Creek Coal Mine

Prepared for:

R.W. Corkery & Co. Pty Limited
Suite 15, 256 Anson Street
ORANGE NSW 2800

On behalf of:

Werris Creek Coal Pty Limited
PO Box 125
WERRIS CREEK NSW 2341

Prepared by:

Ecotone Ecological Consultants Pty Ltd
39 Platt Street
WARATAH NSW 2298

Tel: (02) 4968 4901
Fax: (02) 4968 4960
Email: brian@ecotoneconsultants.com.au

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EXECUTIVE SUMMARY

Werris Creek Coal Mine proposes to modify the area of its existing open cut and associated overburden emplacement. The proposed modification would involve additional disturbance to approximately 21 hectares of vegetation, predominantly open grassland with some scattered trees and woodland areas. Notably, the area to be disturbed by the modified open cut and overburden emplacement was included as part of a previous fauna survey and impact assessment undertaken by Countrywide Ecological Service (CES) in 2003 and 2004 (CES, 2004) for the current Werris Creek Coal Mine layout. Two threatened fauna species, the Hooded Robin (*Melanodryas cucullata*) and the Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*), were recorded by CES (2004). A single Hooded Robin was recorded on a single occasion and the Eastern Bentwing Bat was recorded during an Anabat survey.

A field habitat assessment was undertaken in December 2008 to compare the type and condition of habitat areas recorded by CES (2004) in 2003 with those present in 2008. All habitat areas appeared unchanged. Updated threatened and migratory species searches were completed and potential habitat was identified on the subject site for a total of 15 threatened or migratory species. Impact assessment of the proposed modification on all 15 threatened or migratory species was undertaken in accordance with the relative requirements of NSW *Threatened Species Conservation Act 1995* (TSC Act) and Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) which revealed that the proposed modification would be unlikely to significantly impact on any threatened or migratory species known or likely to occur on the subject site.

Mitigation measures are provided to minimise potential impacts on both threatened and protected fauna species.

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1 INTRODUCTION

1.1 Background, Objectives and Scope

1.1.1 Background

This Fauna Impact Assessment (FIA) report has been prepared at the request of R.W. Corkery & Co. Pty. Limited on behalf of Werris Creek Coal Pty Limited (WCC) to investigate the possible impacts on native, and in particular threatened, species of a proposed modification to the layout of the Werris Creek Coal Mine. The Werris Creek Coal Mine commenced operations in March 2005 under Development Consent DA-172-7-2004 issued by the Minister for Planning on 18 February 2005 and is approved to produce up to 2 million tonnes of coal per annum (Mtpa). **Figure 1** provides the regional setting of the mine, in central northern New South Wales, approximately 250km northwest of the Port of Newcastle to which it is connected by rail. **Figure 2** provides the local setting of the mine approximately 4km south of Werris Creek and 11km north-northwest of Quirindi.

A modification to the layout of the open cut area of the mine, and associated overburden emplacement, has been proposed by WCC as the existing mine design creates a narrowing highwall face (from which the coal is mined) which would eventually reduce the production rate as the area of exposed coal is reduced. The modified open cut area layout provides for a continued widening of the advancing highwall, which maximises the area of exposed coal allowing for the current production rate to be maintained. The modified open cut area would also better accommodate a possible continuation of mining to the north (the Werris Creek Coal resource extends beyond the currently approved northern limit of the mine) should this be proposed and approved.

The FIA builds upon the survey and assessment work completed by Countrywide Ecological Service (CES) in 2003 and 2004 (CES, 2004) for the now approved layout of the Werris Creek Coal Mine. Accordingly, the study area for the FIA was largely restricted to those areas of the Werris Creek mine site to be modified that extend beyond the approved areas of mining and associated activities. **Figure 3** identifies the modified layout of the mine corresponding to the study area.

This assessment has been completed to support a Statement of Environmental Effects being prepared by RWC to accompany the application for the proposed modification, sought under Section 96(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.1.2 Objectives

The general objectives of the FIA are as follows.

- Compare the modified open cut area to the area studied by CES (2004).
- Complete an inspection of the area covered by the modified mine layout in order to:
  - compare the habitat present with that reported by CES (2004);
  - determine the condition and location of specific fauna habitats;
  - assess the area for threatened species and their habitats; and
  - assess the need for any additional fauna survey.

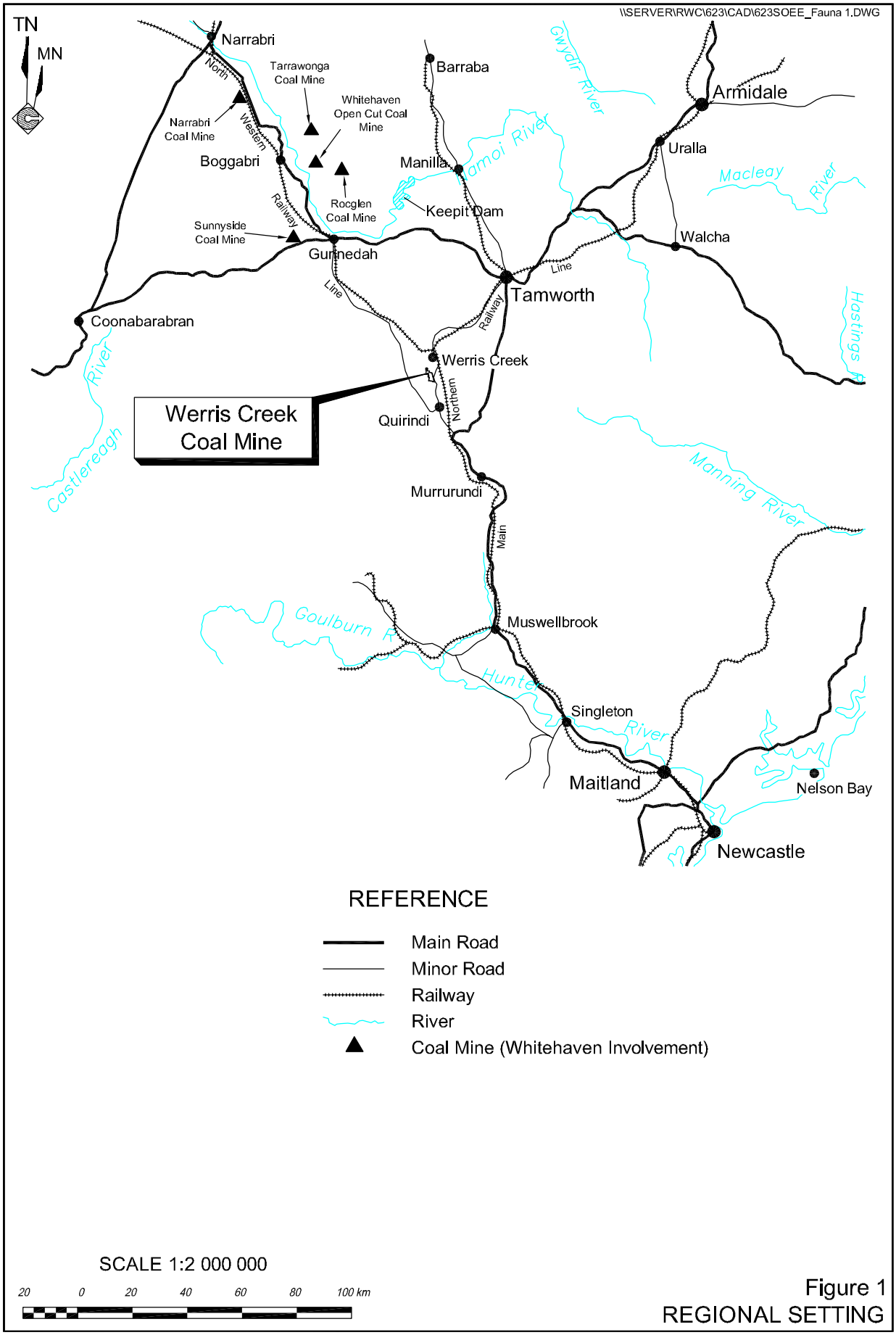

Figure 1
REGIONAL SETTING

Note: A colour version of this figure is available on the Project CD

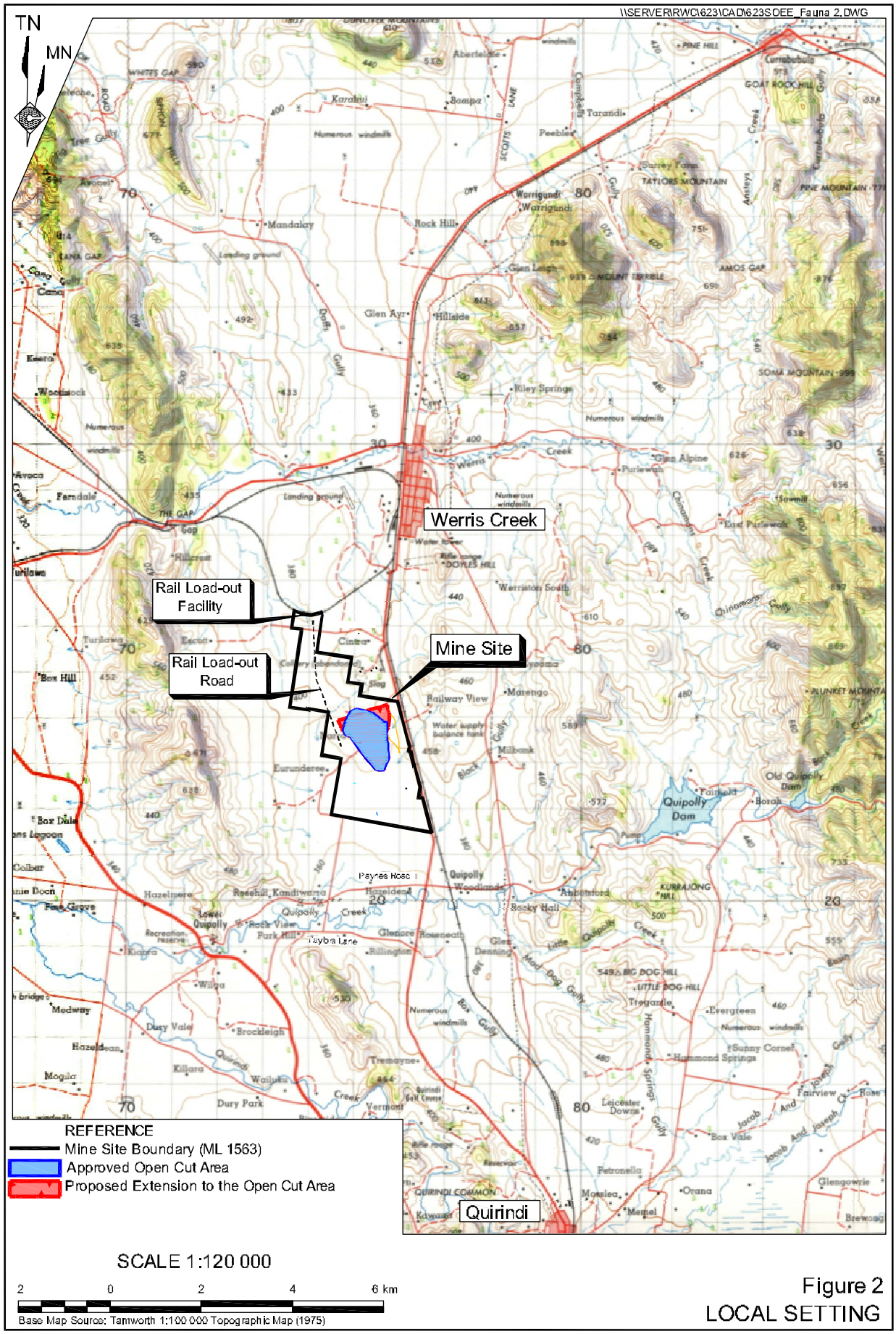

Figure 2
LOCAL SETTING

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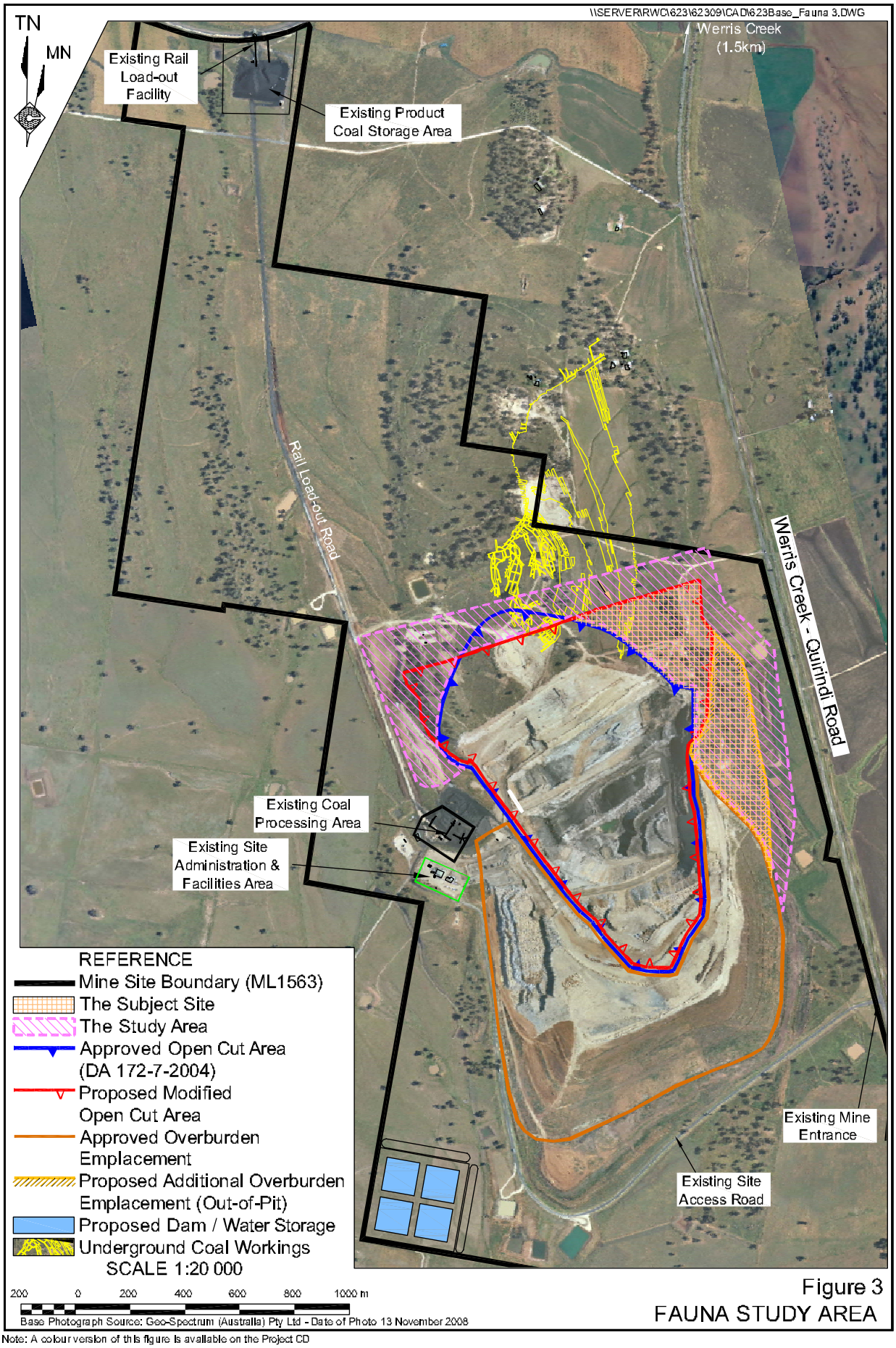

Figure 3
FAUNA STUDY AREA

Note: A colour version of this figure is available on the Project CD

- Update threatened species information for the study area.
- identify the potential impacts of the proposed modification on any threatened species or populations that occur or could occur within the study area;
- assess the potential impacts of the proposed modification on threatened fauna by application of the provisions of the relevant NSW and Commonwealth legislation; and
- provide discussion on measures to manage potential impacts and effects of the proposed modification, using the principles of "avoid, minimise and mitigate" in that order of preference.

1.1.3 Scope

The environmental studies have been conducted in three stages.

1. A desktop review of available literature pertaining to the site and surrounding locality.
2. A site visit and habitat assessment of the modified areas of the mine.
3. Assessment of impact of the proposed modification on fauna in accordance with the relevant NSW and Commonwealth legislation and planning instruments.

Within this report, reference is given to the relevant sections of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); NSW *Threatened Species Conservation Act 1995* (TSC Act); *National Parks and Wildlife Act 1974* (NP&W Act); *Environmental Planning and Assessment Act 1979* (EP&A Act); and subsequent amendments to these. Specific consideration is given to Section 5A of the *EP&A Act*.

Terminology commonly referred to in the FIA includes the following.

- The *subject site* is defined as the land area directly affected by the proposed modification – the modified open cut area (see **Figure 3**).
- The *study area* consists of the subject site plus the immediately surrounding land potentially affected by the proposed modification (approximate 100 metre radius) (see **Figure 3**).
- The *study locality* is the area of land within a 10 kilometre radius of the centre of the subject site (see **Figure 4**).

Table 1 provides a general description of the *subject site*, *study area* and *study locality*.

2 DESCRIPTION OF THE PROPOSED MODIFICATION

The proposed modification, if approved, would involve the following activities, the locations of which are shown on **Figure 3**.

- Modification to the open cut area. The northern extent of the open cut area would be widened such that the eastern perimeter corresponds with the eastern extent of the sub-cropping coal seams.

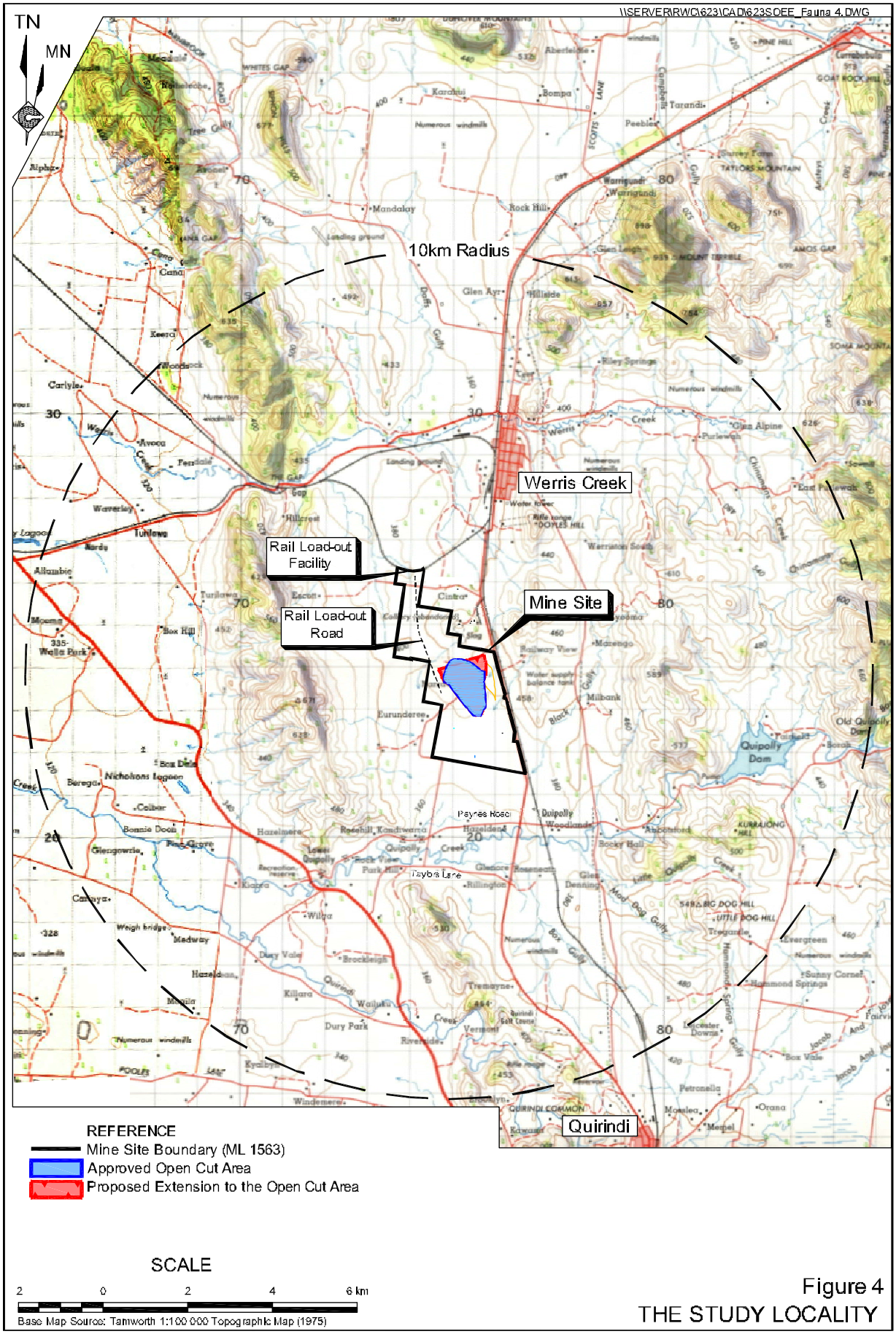

Figure 4
THE STUDY LOCALITY

Note: A colour version of this figure is available on the Project CD

- Dewatering the underground workings of the former Werris Creek Colliery to enable open cut mining through part of these workings.
- Construction of four surface dams to store the water pumped from the underground workings.
- Extension of the out-of-pit overburden emplacement to the north along the modified eastern perimeter of the open cut area.
- Modification to the overall shape of the overburden emplacement, with the height increased to approximately 445m AHD to accommodate the increased volume of overburden and revised mine plan associated with the modified open cut design.
- Construction of an additional train loading bin and conveyor at the rail load-out facility to facilitate the separation of product coal for specific markets and therefore increase the efficiency of train loading.

The rehabilitation objectives and methods would remain consistent within those currently implemented at the Werris Creek Coal Mine, although the proposed sequence of rehabilitation, and designated land use on the final landform has been modified slightly to provide for additional areas of native woodland establishment and conservation.

Table 1
Subject Site, Study Area and Locality Description

Subject Site	
Location	Four kilometres south of Werris Creek on Quirindi Road. Map Grid 56: 275000E and 6525000N
Area	Approximately 22 hectares
Elevation	Between 390m and 440m AHD
Current land use	The subject site is part of Werris Creek open cut coal mine. At the time of the habitat assessment part of the subject site was grazed by cattle and the remainder by native (macropod) grazers.
Significant habitat features	The habitat within the modified open cut area is restricted to isolated trees, small open woodland remnants, grassland areas and a small rocky outcrop. Tree hollows are common in some woodland area and in most mature scattered trees. The rocky outcrop provides the only outcrop area on the subject site and is likely several kilometres from other similar outcrop areas.
Study area	
Bioregion	Nandewar
LGA	Liverpool Plains
Surrounding landuse	Agriculture grazing land with some cropping, and Werris Creek Coal Mine.
Watercourses, drainage and catchment	No watercourses within the subject site. The study area would eventually drain into Werris Creek to the north-west and Quipolly Creek to the south-west.
Study Locality (10 km radius of subject site)	
Study locality description	The study locality encompasses the town of Werris Creek and the locality of Quipolly. The land-use of the locality is predominantly grazing. Much of the study locality has been cleared. Remnant areas of woodland are typically confined to hilly areas such as a three north-south running mountain ranges four kilometres to the west, and five and ten kilometres to the east. Quipolly Dam occurs 6.5 km to the south-east.
Catchment Management Area	Namoi CMA

The proposed modification to the open cut area and overburden emplacement would require the clearing of an additional 21ha of vegetation (with approximately 3ha of the currently approved open cut area now to remain undisturbed). This additional clearing would include two areas of native woodland vegetation (located on the western and eastern sides of the proposed modified open cut area and covering an area of approximately 8ha), with the remaining areas to be disturbed including exotic pasture with occasional trees.

3 PRELIMINARY DESKTOP ASSESSMENT

3.1 Review of Local Threatened and Migratory Fauna Species

For the purposes of the FIA, all threatened and migratory species previously recorded within the study locality, ie. a 10km radius of the subject site (see **Figure 4**), regardless of the year of the record, are considered as possible resident species on the subject site.

The following sources provided threatened species records within the study locality.

3.1.1 Countrywide Ecological Service (2004)

CES (2004) undertook a fauna survey of the current Werris Creek Coal Mine site as part of the original development application for the mine. CES (2004) established three trapping and survey sites amongst vegetation remaining within the modified open cut area (see **Figure 5** and **Table 2**).

Two threatened species were recorded in the study area by CES (2004), the Hooded Robin (*Melanodryas cucullata*) and Eastern Bentwing Bat (*Miniopterus schreibersii*). Both are listed as Vulnerable under Schedule 2 of the TSC Act. The Hooded Robin was recorded on a single occasion, in woodland on the eastern side of the subject site. It is presumed that the Eastern Bentwing Bat was recorded using an Anabat detector and not captured in a harp trap (the method of capture was not noted in the report).

Table 2
Survey Effort of CES (2004)[1] Across the Subject Site

	Woodland Area A	Woodland Area B	Scattered Trees
Hair tube trap-line	×	×	×
Nocturnal reptile search	×		
Pitfall trap line	×	×	×
Bird survey transects		×	×
Spotlighting transects	×	×	×
Anabat recording	×	×	×
Call playback		×	
Harp trap			×
Note 1: Trapping was undertaken in 2003			
Source: Modified after CES (2004)			

3.1.2 DECC Atlas of NSW Wildlife Database Records

Threatened species records within a 10km radius of the centre of the subject site were accessed using the DECC Atlas of NSW Wildlife Database (Tamworth (9035) 1: 100 000 map sheet – updated to 8 November 2008).

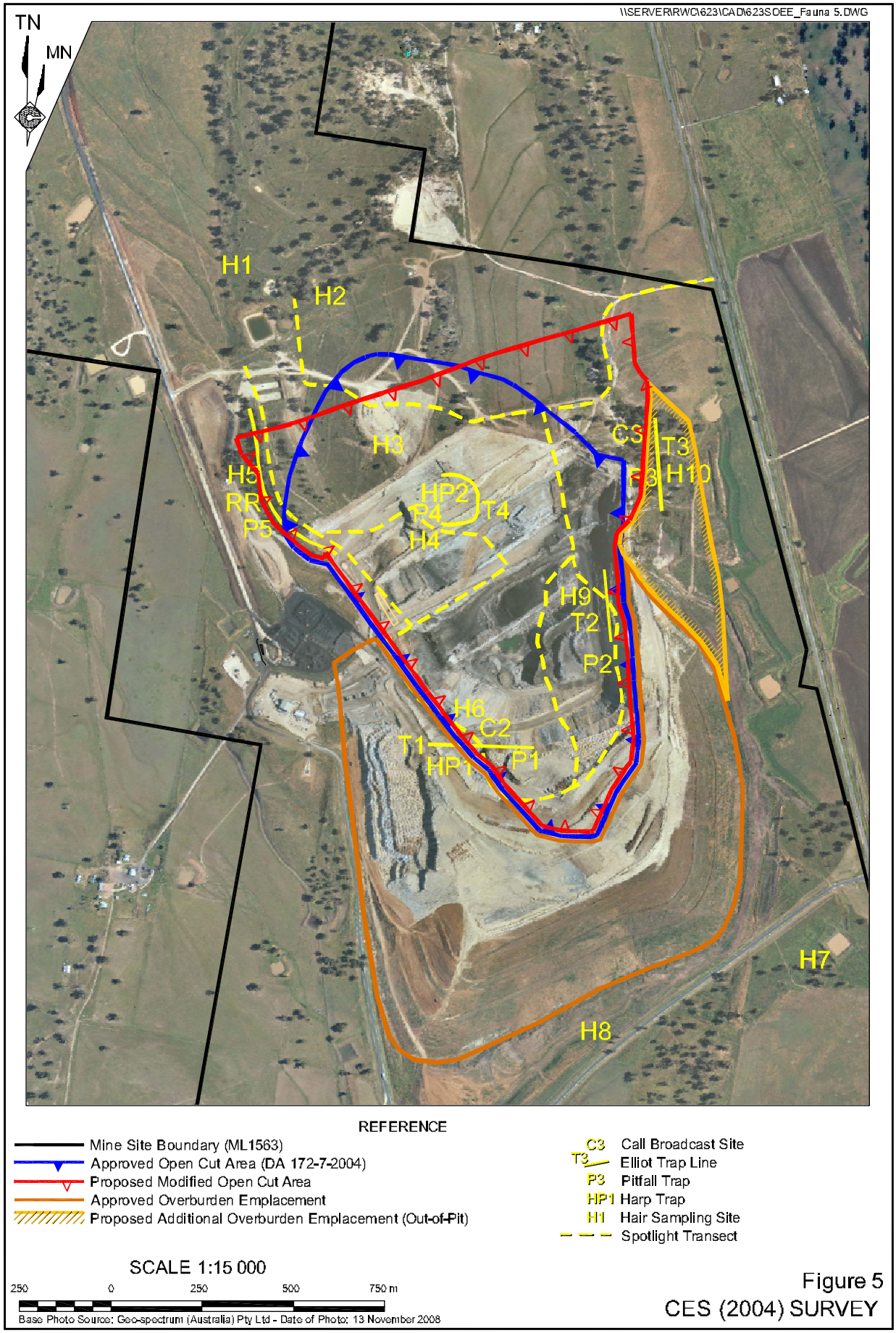

Figure 5
CES (2004) SURVEY

A total of six threatened terrestrial fauna species have previously been recorded within the study locality, comprising 4 bird and two mammal species (see **Table 3**). Of these, five species are currently listed as Vulnerable on Schedule 2 of the TSC Act and one species, the Regent Honeyeater, is listed as Endangered on Schedule 1 of the TSC Act. Two species are also listed on the Commonwealth EPBC Act, namely:

- the Regent Honeyeater is listed as an Endangered and Migratory species; and
- the Large-eared Pied Bat is listed as Vulnerable.

Table 3
Threatened Fauna Recorded Within a 10 Kilometre Radius of the Subject Site on the DECC Atlas of NSW Wildlife Database.

Scientific name	Common name	TSC Act status	EPBC Act status	Earliest / latest record	Number of records within 10km of site	Number of records within 2km of site
BIRDS						
Stagonopleura guttata	Diamond Firetail	V	-	2003	1	0
Xanthomyza phrygia	Regent Honeyeater	E1	E, Mi	1989	2	0
Pyrrholaemus saggitatus	Speckled warbler	V	-	1998 / 2005	1	0
Neophema pulchella	Turquoise Parrot	V	-	2003	2	0
MAMMALS						
Phascolarctos cinereus	Koala	V	-	2006	2	2
Chalinolobus dwyeri	Large-eared pied bat	V	V	1999 / 2003	1	0

Notes:
Status (TSC): refers to the NSW Threatened Species Conservation Act 1995 (TSC)
E1 Schedule 1, Part 1: Endangered species
V Schedule 2: Vulnerable species
Status (EPBC): refers to the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC)
E Endangered species
V Vulnerable species
Mi Migratory species

Please note: These records are based on information supplied by the Department of Environment and Climate Change and other sources, and may contain errors or omissions.

No critically endangered species or endangered populations were identified from the DECC Atlas of NSW Wildlife Database search and none are known to occur in the study locality.

3.1.3 Preliminary and Final Determinations of Species Listings on the TSC Act

The Scientific Committee under the TSC Act may at any time alter the list of species on Schedules 1, 1A and 2 of the TSC Act. Such changes may include the addition of new species, the removal of previously listed species or changes in the schedule status of a species. During a period of consideration by the Scientific Committee the species under consideration is listed as a Preliminary Determination. If the proposed Preliminary Determination is approved the change is listed as a Final Determination.

Where a development application has been lodged and is awaiting approval, the implications of any final determinations declared during that period depend on the schedule on which the species is to be listed. Final Determinations affecting Schedules 1 and 1A must still be considered in the assessment of significance of all applications prior to approval, even after lodgement. Final Determinations affecting Schedule 2 (vulnerable species) are not subject to impact assessment if they are declared after the date of lodgement of a development application, as long as the application is determined within 12 months of lodgement (s. 113C TSC Act).

For the purposes of this assessment and using a precautionary approach all species listed as preliminary determinations under the TSC Act are assessed as approved final determinations. This notwithstanding, at the date of submission of the FIA, no species listed as preliminary determinations (on the DECC website) are known to occur or have distributions that may include the subject site.

3.1.4 EPBC Act Protected Matters Report

The EPBC Act Protected Matters Search Tool was accessed on the 16th of December 2008 to identify the Protected Matters under the Commonwealth EPBC Act that may be relevant within the study locality (see **Table 4**).

Table 4
Protected Matters (excluding flora) Under the Commonwealth EPBC Act 1999 Within 10km of the Subject Site

Page 1 of 2

Protected matter	Potentially relevant?	Details
Matters of national environmental significance		
World heritage properties	Yes	None
National heritage places	Yes	None
Wetlands of international significance (Ramsar sites)	Yes	None
Commonwealth marine areas	No	None
Threatened species – fauna (terrestrial species only)	Yes	Nine species: **Species or species habitat may occur within area according to EPBC modeling.** • Australian Painted Snipe *Rostratula australis* (**V**) • Eastern Long-eared Bat *Nyctophilus timoriensis* (**V**) • Large-eared Pied Bat *Chalinolobus dwyeri* (**V**) • Regent Honeyeater *Xanthomyza Phrygia* (**E**) • Superb Parrot *Polytelis swainsonii* (**V**) • Swift Parrot *Lathamus discolor* (**E**) • Booroolong Frog *Litoria booroolongensis* (**E**) **Species or species habitat likely to occur within area according to EPBC modeling.** • Bell's Turtle *Elseva belli* (**V**) • Border Thick-tailed Gecko *Underwoodisaurus sphyrurus* (V)

Table 4 (Cont'd)
Protected Matters (excluding flora) Under the Commonwealth EPBC Act 1999 Within 10km of the Subject Site

Protected matter	Potentially relevant?	Details
Matters of national environmental significance		
Migratory species (terrestrial species only)	Yes	Nine species : **Species or species habitat likely to occur within area according to EPBC modeling.** • White-bellied Sea Eagle *Haliaeetus leucogaster* (**Mi**) **Species or species habitat may occur within area according to EPBC modeling.** • White-throated Needletail *Hirundapus caudacutus* (**Mi**) • Rainbow Bee-eater *Merops ornatus* (**Mi**) • Regent Honeyeater *Xanthomyza Phrygia* (**Mi, E**) **Breeding likely to occur within area according to EPBC modeling.** • Satin Flycatcher *Myiagra cyanoleuca* (**Mi**) *Wetlands Species* **Species or species habitat may occur within area according to EPBC modeling.** • Latham's Snipe *Gallinago hardwickii* (**Mi**) • Painted Snipe *Rostratula benghalensis s. lat.* (**Mi**) • Cattle Egret *Ardea ibis* (**Mi**) • Great Egret *Ardea alba* (**Mi**)
Other matters protected by the EPBC Act		
Commonwealth lands	Yes	Commonwealth lands identified within the study locality do not occur in the vicinity of the study area.
Commonwealth heritage places	No	-
Places on the register of the national estate	Yes (natural places only)	None
Listed marine species	No	-
Whales and other cetaceans	No	-
Critical habitats	Yes	None
Commonwealth reserves	Yes	None
Extra information		
State and territory reserves	Yes	None
Other commonwealth reserves	Yes	None
Regional forest agreements	Yes	None

Notes:
E Listed as **Endangered** under the Commonwealth EPBC Act.
V Listed as **Vulnerable** under the Commonwealth EPBC Act.
Mi Listed as **Migratory** under the Commonwealth EPBC Act.

Six vulnerable, three endangered and nine migratory species, listed on the EPBC Act have been recorded or are predicted to occur with a ten kilometre radius of the study locality.

3.2 Summary of Local Threatened Species

Following the above literature review and database searches the following 23 threatened or migratory species have been identified within a 10 kilometre radius of the subject site.

- Cattle Egret
- Great Egret
- Australian Painted Snipe
- Latham's Snipe
- Painted Snipe
- Superb Parrot
- Swift Parrot
- Turquoise Parrot
- Speckled Warbler
- Hooded Robin
- White-bellied Sea Eagle
- Diamond Firetail
- Satin Flycatcher
- Rainbow Bee-eater
- White-throated Needletail
- Koala
- Large-eared Pied Bat
- Border Thick-tailed Gecko
- Eastern Bentwing-bat
- Eastern Long-eared Bat
- Booroolong Frog
- Bell's Turtle

An assessment of their likelihood of occurrence on these species on the subject site was subsequently undertaken (Section 5.1) following a habitat assessment of the subject site and a review of the habitat requirements of each threatened or migratory species(Section 4.1).

4 SECOND STAGE ECOLOGICAL INVESTIGATION – FIELD SURVEYS

4.1 Habitat Assessment of the Study Area

A habitat assessment of the modified open cut area was undertaken on the 17th of December 2008. During the habitat assessment areas of woodland, clumps of scattered trees, and farm dams were investigated for potential threatened or migratory species habitat. While general habitat features were noted in grassland and scattered tree areas (see **Table 5**), habitat assessment proformas were completed only at each of the two small woodland areas (see **Figure 6**) that would be cleared (or partially cleared) by the modified mine area layout.

4.2 Opportunistic Fauna Records.

A total of 16 protected species were recorded opportunistically during the site visit on the 17th of December 2008 (see **Table 6**). No threatened or migratory species were recorded.

5 ASSESSMENT OF IMPACT

5.1 Potential for Threatened Fauna Species to Occur Within the Modified Open Cut Area

Section 3.2 identifies the 23 threatened and/or migratory fauna species that have been recorded or are predicted to occur within a 10km radius of the subject site. Several factors suggest that the *subject site* is unlikely to provide likely habitat for most threatened species including but are not limited to:

- the small size of the remnant woodland areas;
- the lack of connectivity between the remaining woodland remnants;
- the lack of understorey in most areas; and
- the lack of nearby large remnants of natural vegetation.

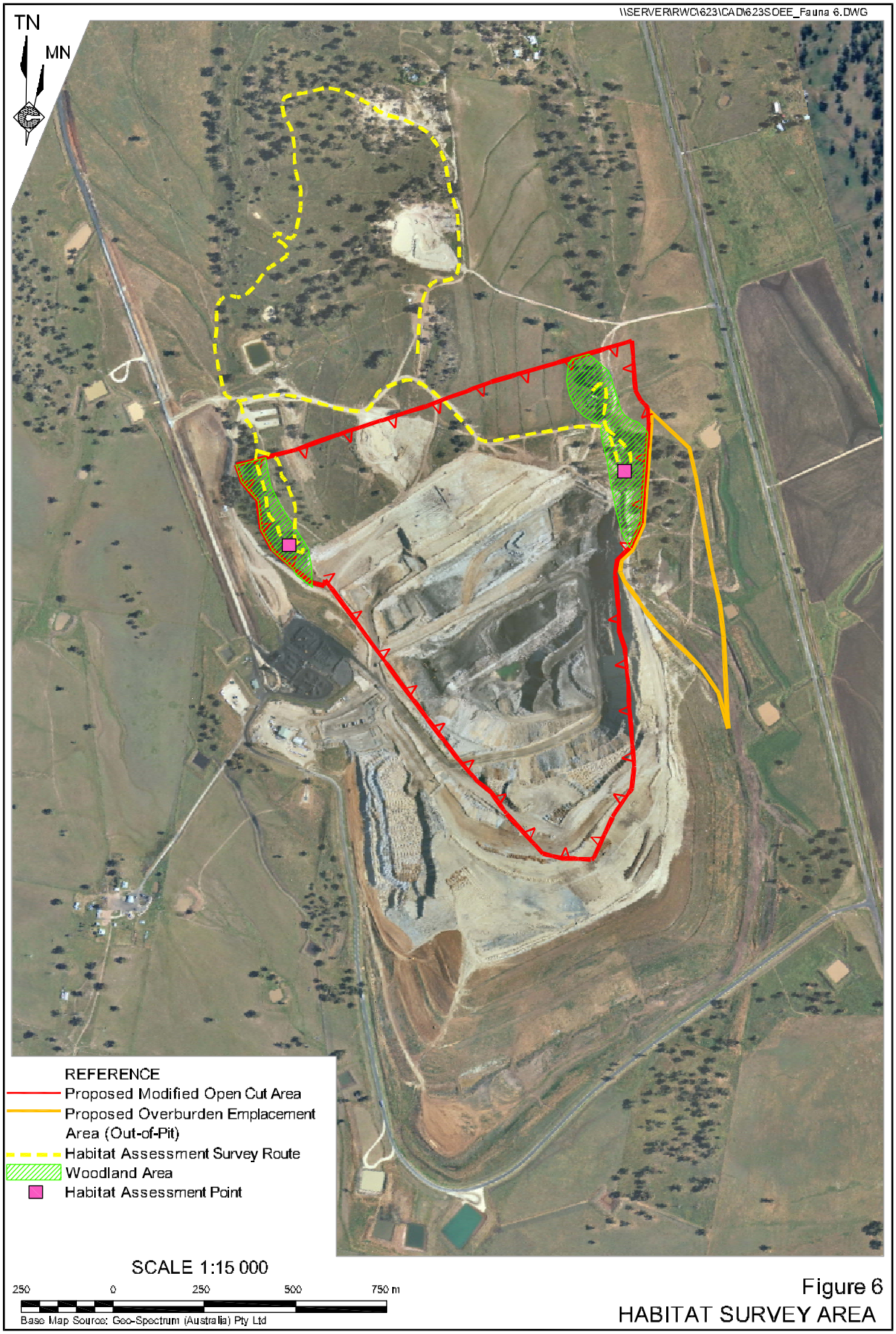

Figure 6
HABITAT SURVEY AREA

Plate A: Woodland Area A

Plate B: Woodland Area B

Table 5
Summary of Habitat Features Within the Study Area

Habitat feature	Habitat description
1. Woodland Area A (see **Plate A**)	Open woodland on a rocky ridgeline dominated by middle-aged eucalypt trees. Trees appeared healthy with little dieback or insect attack. Scattered scrub layer to less than 1.5 metres. Ground cover predominately grass to 1.0 metre with areas of boulder cover. West to south-west aspect, in parts moderately steep. Few fallen logs. No dead standing trees, saplings or mistletoe were recorded. Tree hollows were uncommon and only small (25 – 50 mm) and medium (50 – 100 mm) sized hollows were recorded. Moderate to high level of weed infestation. No obvious erosion. No domestic grazers, but some macropod grazers present although having little affect.
2. Woodland Area B (see **Plate B**)	Lower slope open woodland of mature eucalypts with a grassy understorey. Trees appeared healthy with little dieback or insect attack. Scattered scrub layer to less than 1.5 metres. Ground cover predominately grass to 1.0 metre. No areas of rock or boulder cover. Slight southerly aspect and gently slope. Few natural fallen logs and some piles of fallen trees. Scattered dead standing trees. No saplings or mistletoe were recorded. Tree hollows were common in all size classes except extra large (> 300 mm). Moderate level of weed infestation. No obvious erosion except along dirt tracks. Grazing by cattle in parts. Small farm dam – soil banks with no aquatic or emergent vegetation. Moderate to low levels of 'pugging' along the banks by cattle. No water-birds were recorded
3. Scattered Paddock Trees	Predominately mature trees containing some to many hollows. Tree hollows were common in all size classes except extra large (> 300 mm). Grassy understorey. Little dieback and no mistletoe were recorded.
4. Grassland Areas	Mix of grass and weed cover to 1.2 metres. Contoured erosion banks present in some areas.
5. Water-bodies	Farm/mine dam – moderate sized farm dam with grassy banks to 1.2 metres. Contains water through most years. Quarry depression – small sized depression with grassy banks to 0.5 metres. Contains water through most years.

Table 6
Protected Species Recorded Opportunistically During Site Visit.

Scientific name	Common name
Birds	
Accipiter fasciatus	Brown Goshawk
Cacatua galerita	Sulphur-crested Cockatoo
Platycercus eximius	Eastern Rosella
Psephotus haematonotus	Red-rumped Parrot
Nymphicus hollandicus	Cockatiel
Eolophus roseicapillus	Galah
Ocyphaps lophotes	Crested Pigeon
Acanthiza chrysorrhoa	Yellow-rumped Thornbill
Manorina melanocephala	Noisy Miner
Artamus cyanopterus	Dusky Woodswallow
Cracticus torquatus	Grey Butcherbird
Cracticus nigrogularis	Pied Butcherbird
Gymnorhina tibicen	Australian Magpie
Mammals	
Macropus giganteus	Eastern Grey Kangaroo
Macropus robustus	Common Wallaroo
Reptiles	
Morethia boulengeri	South-eastern Morethia Skink

However, the *subject site* may provide habitat for several listed threatened species on an occasional basis, particular threatened species with large home range areas or migratory species. Threatened species requiring large or well connected woodland remnants, or structurally diverse habitats are unlikely to occur on the subject site.

Table 7 provides an assessment of the likelihood of occurrence of the 23 threatened and/or migratory fauna species identified in Section 3.2 on the *subject site*.

Table 7
Assessment of the Likelihood of Threatened and/or Migratory Fauna Species Occurring Within the Subject Site

Common name	Most recent record	Record within		Preferred habitat* and comments	Habitat Available On Site		
		10km	2km		Breeding	Shelter	Foraging
Species *LIKELY* to occur							
Eastern Bentwing-bat	2003 – CES (2004)	0	1	Forages within a variety of habitat types including moist and dry eucalypt forest, woodland, rainforest, heath and open environments, including urban areas. Reliant on suitable roosting/breeding habitat in caves and mine tunnels, though will also roost in stormwater channels, road culverts and other comparable structures (including buildings). Estimated nightly foraging range of 20 kilometres. Known to be associated with Western Slopes Grassy Woodlands in the Namoi catchment management area (DECC threatened species website). The Eastern bentwing-bat was recorded by CES (2004) using an Anabat detector. The woodland and scattered tree areas of the subject site likely provide foraging habitat for the Eastern bentwing-bat. The lack of caves or tunnels indicates that the subject site is unsuitable breeding or shelter habitat.	N	N	Y
Hooded Robin	2003 – CES (2004)	0	1	Prefers open areas adjacent to large blocks of woodland, particularly with areas of dead timber and sparse shrub cover. Also recorded in open forests and acacia shrublands. Home range areas from 10 hectares during the breeding season to 30 hectares during the non-breeding season. Prefers structurally diverse habitats comprising mature trees, regenerating trees, shrubs and tall grasses. Known to be associated with Western Slopes Grassy Woodlands in the Namoi catchment management area (DECC threatened species website). A single Hooded Robin was recorded by CES in 2003. Following the initial identification by CES (2004), the Hooded Robin was not subsequently recorded by CES during the remainder of their survey. Nor was the Hooded Robin recorded during the field survey on the 17th of December 2008. While the failure to regularly record the Hooded Robin suggests that the subject site is unlikely to support a viable population, it is possible that such a population or populations occur in the locality and infrequently use the subject site for dispersal and other movements. If populations of the Hooded Robin do occur in the locality it is likely that the Hooded Robin would use the subject site on an occasional basis.			

Table 7 (Cont'd)
Assessment of the Likelihood of Threatened and/or Migratory Fauna Species Occurring Within the Subject Site

Common name	Most recent record	Record within		Preferred habitat* and comments	Habitat Available On Site		
		10km	2km		Breeding	Shelter	Foraging
Species that **MAY** occur							
Cattle Egret	EPBC modelling - may occur – migratory species			Shallow open wetlands and mudflats. Moist pastures with tall grass. Often associated with grazing cattle. A single farm dam represents the only area of water habitat within the subject site and is unlikely to provide important habitat for the species. However the Cattle egret is often associated with grazing cattle and as a highly mobile species may occur on the subject site on a rare basis. The cattle egret was not recorded on the Tamworth 1:100 000 map sheet.	N	Y	Y
Great Egret	EPBC modelling - may occur – migratory species			Wetlands, flooded pastures, estuarine mudflats, dams, mangroves and reefs. A single farm dam represents the only area of water habitat within the subject site and may provide occasional foraging habitat for the great egret. Two records of the great egret occur on the Tamworth 1:100 000 map sheet (outside a 10km radius from the subject site).	N	Y	Y
Swift Parrot	EPBC modelling - may occur			The migratory nature of this species makes them difficult to assess Known to frequent sclerophyll forest and woodlands with winter flowering trees (e.g. spotted gum, red ironbark, *Eucalyptus crebra*, *E. siderophloia*, forest red gum and swamp mahogany) on an opportunistic basis along the coast and ranges of NSW. Known to be associated with Western Slopes Grassy Woodlands in the Namoi catchment management area (DECC threatened species website). While only a small area of woodland is present on the subject site, Swift Parrots may visit any flowering eucalypt trees between March and October in any year.	N	Y	Y
Turquoise Parrot	2006	2	0	Open eucalypt woodland or forest with a grassy or sparsely shrubby understorey. Favours grasslands on the edge of these habitat types, particularly timbered grassland on mountain slopes and ridges. Feeds on seeds of native and introduced grasses and other herbs. Requires suitable hollows in tree limbs, logs or fence posts for breeding. Usually seen in pairs or small, possibly family groups and have also been reported in flocks of up to thirty individuals. Known to be associated with Western Slopes Grassy Woodlands in the Namoi catchment management area (DECC threatened species website). The Turquoise Parrot is unlikely to regularly use the subject site due to the small areas woodland and scattered trees. However on rare occasions it may utilise the site while moving through the landscape.	N	Y	Y
Regent Honeyeater	2003	2	0	Inhabits dry open forest and woodland, particularly box-ironbark woodlands, and riparian forests of river-sheoak. Feeds on nectar from a wide range of eucalypts and mistletoe. When nectar is scarce feeds on lerp, honeydew and insects. Regent Honeyeaters undertake large-scale nomadic movements most likely in search of flowering areas, or other unknown resource requirements. Every few years Regent Honeyeaters are found foraging coastal swamp mahogany and spotted gum forests, particularly on the Central Coast of NSW. The nomadic nature of this species makes it difficult to assess. Known to frequent areas with densely blossoming winter-flowering trees on an opportunistic basis along the coast and ranges of NSW.	Y	Y	Y

Table 7 (cont'd)
Assessment of the Likelihood of Threatened and/or Migratory Fauna Species Occurring Within the Subject Site

Common name	Most recent record	Record within		Preferred habitat* and comments	Habitat Available On Site		
		10km	2km		Breeding	Shelter	Foraging
Species that *MAY* occur (cont'd)							
Regent Honeyeater (cont'd)	2003	2	0	Known to be associated with Western Slopes Grassy Woodlands in the Namoi catchment management area (DECC threatened species website). As a nomadic species that may appear in any area with flowering eucalypt trees, the Regent Honeyeater may find occasional foraging habitat on the subject site. However the small areas of the identified woodland habitat and scattered trees suggest that the subject site is unlikely to be suitable for breeding or extended use of the subject site by the Regent Honeyeater.	Y	Y	Y
White-throated Needletail	EPBC modelling – likely to occur. Migratory Species			High open spaces of sky above all habitat types. Foraging habitat occurs well above the subject site. Due to the relatively small size of the subject site the white-throated needletail may occur occasionally above the subject site.	N	N	Y
Rainbow Bee-eater	EPBC modelling – likely to occur. Migratory Species			Migrate throughout mainland from northern Australia in September to April. Occurring in woodland, open forest, semi-arid scrub, grasslands and timbered plains, avoiding dense forest. Pursue flying insects. Nest in ground tunnels. The woodland areas within the subject site may provide potential foraging and shelter habitat. As a highly mobile migratory species the rainbow bee-eater may occur at any area of suitable habitat, however the small area of woodland and scattered tree cover suggest that the subject site is unlikely to provide an important habitat area for the species.	N	Y	Y
Diamond Firetail	2004	1	0	Found in grassy woodlands, open forest with a grassy groundcover, woodland, mallee, acacia scrub lands and timber belts along watercourses and roadsides. Often found in riparian area and sometimes in lightly wooded farmland. Feeds entirely on the ground, eating grass and herb seeds, green leaves and insects. Small globular nests are built in dense understorey or high in the canopy, often under raven and hawk nests. Breeding occurs between August and January. Roost in dense shrubs or small roost nests. Known to be associated with Western Slopes Grassy Woodlands in the Namoi catchment management area (DECC threatened species website). Any area of grassland with nearby eucalypt woodland may provide potential habitat for the Diamond Firetail. Due to the relatively small area of woodland and scattered trees present, the subject site may provide occasional foraging habitat for the Diamond Firetail.	Y	Y	Y
Satin Flycatcher	EPBC modelling – breeding likely occur. Migratory Species			Forests and woodlands, mangroves and coastal heath scrubs. Woodland areas on the subject site may provide potential habitat for the satin flycatcher. However the small size of and lack of connectivity between woodland remnants suggests that the subject site may only be used infrequently by the satin flycatcher.	Y	Y	Y
Koala	2006	2	1	Forest and woodland habitats that contain suitable regional eucalypt feed trees. Known to feed on more than 70 eucalypt and 30 non-eucalypt species. Home range size depends on habitat quality and ranges from a single hectare to several hundred hectares. Spend most of their time in trees but will descend to the ground to move across open ground between trees. Known to be associated with Western Slopes Grassy Woodlands in the Namoi catchment management area (DECC threatened species website). While the small areas of woodland o the subject site suggest that Koalas are unlikely to occur, any area of woodland within a kilometre of other woodland area is potential habitat. Additionally Koalas have been recorded in many highly disturbed rural and mining environments. The subject site may form part of an individual's home range area if Koalas occur locally.	Y	Y	Y

Table 7 (cont'd)
Assessment of the Likelihood of Threatened and/or Migratory Fauna Species Occurring Within the Subject Site

Common name	Most recent record	Record within		Preferred habitat* and comments	Habitat Available On Site		
		10km	2km		Breeding	Shelter	Foraging
Species that *MAY* occur (cont'd)							
Large-eared Pied Bat	2003	1	0	Range of well-wooded habitats, including dry sclerophyll forests and woodlands of coastal and semi-arid areas. Occasionally in sub-alpine woodlands and at the edge of rainforest and semi-arid areas. Reliant on suitable roosting habitat including caves and mine tunnels (though may use other structures, eg. abandoned fairy martin nests). Known to be associated with Western Slopes Grassy Woodlands in the Namoi catchment management area (DECC threatened species website). The woodland and scattered tree areas of the subject site may provide foraging habitat for the large-eared pied bat. The lack of caves or tunnels indicates that the subject site is unsuitable breeding or shelter habitat.	N	N	Y
	EPBC modelling – may occur						
Eastern Long-eared Bat	EPBC modelling – may occur			Eastern long-eared bats roost in tree hollows and fissures. On the mainland, this species is known from tall eucalypt forest as well as mallee, open savannah and black box woodland. Appear to have a preference for semi-arid areas. The woodland and scattered tree areas of the subject site may provide both foraging and breeding habitat for the large-eared pied bat.	Y	Y	Y
Border Thick-tailed Gecko	EPBC modelling – likely to occur			Found only on the tablelands and slopes of northern NSW (south to Tamworth and west to Moree) and southern Qld. Most common in granite country of the New England tablelands. Occurs on rocky hills with dry open eucalypt forest and woodland. Favours areas with rock slabs, boulders, fallen timber and deep leaf litter. Woodland Area A may contain potential rocky habitat for the Border thick-tailed gecko. The potential suitability of the rocky ridgeline of woodland area A is reduced by its high degree of isolation from other suitable habitat areas and its overall small area.	Y	Y	Y
Species *UNLIKELY* to occur							
Australian Painted Snipe	EPBC modelling - may occur – migratory species			Permanent and temporary shallow inland and coastal wetlands (can be freshwater or brackish), particularly where there is a cover of vegetation. Individuals have been known to use artificial wetlands (such as sewage ponds, dams and water-logged grasslands. No suitable habitat occurs on the subject site for the Australian painted snipe. The single farm dam on the site does not contain suitable vegetation cover for the Australian Painted Snipe to occur. The Australian painted snipe was not recorded on the Tamworth 1:100 000 map sheet.	N	N	N
Latham's Snipe	EPBC modelling - may occur – migratory species			Wetlands with low vegetation in shallows. No suitable habitat occurs on the subject site for Latham's snipe. The single farm dam on the site does not contain suitable vegetation cover or shallow areas for Latham's Snipe to occur. Latham's snipe was not recorded on the Tamworth 1:100 000 map sheet.	N	N	N
Painted Snipe (nb. probably the Australian Painted Snipe in Australia now)	EPBC modelling - may occur			Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally occurs from September to December. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter. No suitable habitat occurs on the subject site for the painted snipe. The single farm dam on the site does not contain suitable vegetation cover for the painted snipe to occur. The painted snipe was not recorded on the Tamworth 1:100 000 map sheet.	N	N	N

Table 7 (cont'd)
Assessment of the Likelihood of Threatened and/or Migratory Fauna Species Occurring Within the Subject Site

Common name	Most recent record	Record within		Preferred habitat* and comments	Habitat Available On Site		
		10km	2km		Breeding	Shelter	Foraging
Species *UNLIKELY* to occur (cont'd)							
Superb Parrot	EPBC modelling – may occur			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 south west 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. Nest in small colonies, often with more than one nest in a single tree. Breed between September and January. May forage up to ten kilometres from nesting sites, primarily in grassy box woodland. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain. While potentially suitable hollows for breeding occur in woodland and scattered trees, breeding for the species typically occurs on the South Western Slopes and along rivers in the Riverina. The superb parrot has not been recorded on the Tamworth 1:100 000 map sheet.	Y	Y	Y
Booroolong Frog	EPBC modelling – may occur			Permanent flowing rocky streams with fringing vegetation or groundcover. Forage up to 100 metres from streams and creeks. Detectable September – December. No streams or creeks occur on or nearby the subject site. No suitable habitat exists for the Booroolong frog.	N	N	N
Bell's Turtle	EPBC modelling – likely to occur			Only found in upper reaches of the Namoi, Gwydir and MacDonald Rivers on the North West Slopes of NSW. Uses shallow to deep pools in upper tributaries of major rivers in granite country. Often found in sections of river 30 to 40 metres wide in grazing land. No suitable rivers occur on the subject site. No suitable habitat exists for the Booroolong frog.	N	N	N
Speckled Warbler	2005	1	0	The speckled warbler lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. Known to be associated with Western Slopes Grassy Woodlands in the Namoi catchment management area (DECC threatened species website). The lack of connectivity of woodland remnants and an absence of understorey species in most areas suggests that the speckled warbler is unlikely to occur in the subject area.	Y	Y	Y
White-bellied Sea-eagle	EPBC modelling – likely to occur - migratory Species			Inhabit areas near large bodies of water No large bodies of water occur nearby. There is no suitable habitat for the white-bellied sea eagle present on the subject site.	N	N	N

*Compiled from: Australian Museum Fact Sheets, Barrett et al. 2003, Churchill 1998, Cogger 1995, DECC threatened species information (website), Garnett & Crowley 2000, Morcombe 2004 and Strahan 2002.

Of the 23 threatened and/or migratory fauna species assessed in the **Table 7**, 15 have the potential to occur on the subject site, two of which are considered likely to occur.

Likely to occur

- Hooded Robin (threatened species – TSC Act).
- Eastern Bentwing-bat (threatened species – TSC Act).

May occur

- Cattle Egret (migratory species – EPBC Act).
- Great Egret (migratory species – EPBC Act).
- Swift Parrot (threatened species – TSC Act & EPBC Act).
- Turquoise Parrot (threatened species – TSC Act).
- Regent Honeyeater (threatened species – TSC Act & EPBC Act).
- White-throated Needletail (migratory species – EPBC Act).
- Rainbow Bee-eater (migratory species – EPBC Act).
- Diamond Firetail (threatened species – TSC Act).
- Satin Flycatcher (migratory species – EPBC Act).
- Koala (threatened species – TSC Act).
- Large-eared Pied Bat (threatened species – TSC Act & EPBC Act).
- Eastern Long-eared Bat (threatened species – EPBC Act).
- Border Thick-tailed Gecko (threatened species – EPBC Act).

Assessment of the potential impacts of the proposal on these species have been undertaken in Sections 5.2 (for the eight species listed under the TSC Act) and 5.3 (for the 10 species listed under the EPBC Act)[1].

5.2 Threatened Fauna Assessment Under Section 5A of EP&A Act and Section 94 of the TSC Act.

Following a desktop review of the threatened species previously recorded within a 10km radius of the subject site and a field habitat assessment, eight fauna species listed on the TSC Act have been assessed as 'may occur' or 'likely to occur' on the subject site (see **Table 7**). The eight species (and likelihood of occurrence) are the:

- Eastern Bentwing-bat (likely to occur);
- Hooded Robin (likely to occur);
- Swift Parrot (may occur);
- Turquoise Parrot (may occur);
- Regent Honeyeater (may occur);
- Diamond Firetail (may occur);
- Koala (may occur); and
- Large-eared Pied Bat (may occur).

[1] Three species are listed as threatened under both TSC Act and EPBC Act.

The following seven-part test assessment of the potential impacts of the proposed modification on each of the eight species were undertaken in accordance with section 5A of the EP&A Act and section 94 of the TSC Act and the *Threatened Species Assessment Guidelines – The Assessment of Significance* (DECC 2007).

(a) ***In the case of a threatened species, whether the action proposed is likely to have an adverse affect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.***

- Hooded Robin (*Melanodryas cucullata cucullata*) – Vulnerable

  A single Hooded Robin was recorded on the subject site by CES (2004) in 2003. Subsequent bird surveys by CES during the remainder of their survey period failed to identify any further individuals. The Hooded Robin was not recorded during the habitat assessment for this report on the 17th of December 2008. The Hooded Robin is a resident species where it occurs, occupying approximately a 10 hectare home range area during breeding season and a 30 hectare home range during the non-breeding season. The Hooded Robin is also a conspicuous species in the field regularly perching on clear branches or fence posts. While the species has been recorded on the subject site it is unlikely that the individual recorded was a resident as further records would have been recorded by CES (2004) or by Ecotone in 2008, due to the species typical resident and conspicuous behaviour. The individual recorded may have been a dispersing juvenile or an immigrating or emigrating adult from an unknown off-site population.

  While the loss of woodland and scattered tree habitat from the subject site may significantly affect any resident Hooded Robins, the failure to identify resident robins suggests that no resident population will be affected. The loss of woodland and scattered tree habitat is also unlikely to significantly affect dispersing/immigration/emigrating individuals due to a relatively consistent coverage of scattered trees and small woodland areas to the north, east and west of the subject site. To the south the subject site is bounded by the existing coal mine, however, further south scattered trees and small woodland areas are common. The proposed modification is unlikely to have an adverse affect on the life cycle of the Hooded Robin such that a viable local population of the Hooded Robin would be likely to be placed at the risk of extinction.

- Swift Parrot (*Lathamus discolour*) – Endangered

  The Swift Parrot has not been recorded on the subject site or within a 10km radius (NPWS Wildata database) of the subject site. Due to the nomadic and migratory nature of the species, the Swift Parrot may appear at any suitable flowering winter eucalypts in south eastern Australia (reaching as far north as southern Queensland). Given the migratory and nomadic nature of the Swift Parrot and the resulting potential foraging area across south-eastern Australia it is unlikely that the removal of woodland areas and scattered trees would significantly reduce the foraging resource available to the species. The proposed modification is unlikely to have an adverse affect on the life cycle of the Swift Parrot such that a viable local population of the Swift Parrot would be likely to be placed at the risk of extinction.

- Turquoise Parrot (*Neophema pulchella*) – Vulnerable

  The Turquoise Parrot has been recorded twice (1990 & 2006 - NPWS Wildata database) in a 10km radius of the subject site but has not been recorded on the subject site. Due to the small area of woodland and scattered trees to be removed it is unlikely that the removal of such vegetation would significantly impact on the life cycle of the Turquoise Parrot. Additionally the failure to record the species on the subject site suggests that at best the subject site may provide occasional or rare habitat for the species. The proposed modification is unlikely to have an adverse affect on the life cycle of the Turquoise Parrot such that a viable local population of the Turquoise Parrot would be likely to be placed at the risk of extinction.

- Regent Honeyeater (*Xanthomyza Phrygia*) – Endangered

  The Regent Honeyeater has not been recorded on the subject site but has been recorded twice within a 10km radius on the NPWS Wildata database (6.4 & 6.2 km from the subject site, both records in 1989). Due to the nomadic and migratory nature of the species, the Regent Honeyeater may appear at any suitable flowering winter eucalypts in south eastern Australia. Given the migratory and nomadic nature of the Regent Honeyeater and the resulting potential foraging area across south-eastern Australia it is unlikely that the removal of woodland areas and scattered trees would significantly reduce the foraging resource available to the species. The proposed modification is unlikely to have an adverse affect on the life cycle of the Regent Honeyeater such that a viable local population of the Regent Honeyeater would be likely to be placed at the risk of extinction.

- Diamond Firetail (*Stagonopleura guttata*) – Vulnerable

  The Diamond Firetail has not been recorded on the subject site. Only a single NPWS Wildata database record of the Diamond Firetail is known within a 10km radius of the subject site, recorded in 2003. Due to the small area of woodland and scattered trees to be removed it is unlikely that the removal of such vegetation would significantly impact on the life cycle of the Diamond Firetail. Additionally the failure to record the species on the subject site suggests that at best the subject site may provide occasional or rare habitat for the species. The proposed modification is unlikely to have an adverse affect on the life cycle of the Diamond Firetail such that a viable local population of the Diamond Firetail would be likely to be placed at the risk of extinction.

- Koala (*Phascolarctos cinereus*) – Vulnerable

  The Koala has not been recorded on the subject site. Two NPWS Wildata database records of the Koala occur within a 10km radius of the subject site (2.1km and 8.2km). A preferred food tree species of the Koala, white box (*Eucalyptus albens*), is present on the site in the form of both woodland and scattered trees. However, no Koalas or signs of Koala activity have been recorded on the subject site. It is unlikely that the subject site forms home range habitat for Koalas, however, the subject site may provide dispersal/immigration/emigration habitat for Koalas in the region. The loss of woodland and scattered trees from the subject site is unlikely to affect the life cycle of the Koala in the locality as no Koalas were recorded on the site and similar habitat occurs in the surrounding area to maintain movement through the landscape. The proposed modification is unlikely to have an adverse affect on the life cycle of the Koala such that a viable local population of the Koala would be likely to be placed at the risk of extinction.

Further assessment of the potential impacts of the modified open cut area on the Koala is undertaken in Section 5.4 (SEPP 44) of this report.

- Cave-roosting bats
  - Large-eared Pied Bat *Chalinolobus dwyer*) – Vulnerable
  - Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) – Vulnerable

  No roosting or breeding habitat in the form of tunnels or caves occurs on the subject site. The subject site provides potential foraging habitat for both species. Using Anabat detectors the Eastern Bentwing-bat was recorded on the subject site in 2003. The Large-eared Pied-Bat has not been recorded on the subject site. The removal of woodland and scattered tree habitat will reduce the amount of available foraging habitat to both species, however the reduction in foraging range is unlikely to adversely affect either species life cycle.

  The Eastern Bentwing-bat is known to forage up to 20km from its cave roosting sites and the removal of vegetation on the subject site is unlikely to significantly reduce the area of foraging habitat available for the species. While less is known about the foraging range of the Large-eared Pied Bat it also likely forages over a large area and will be relatively unaffected by the reduction in potential foraging habitat. The proposed modification is unlikely to have an adverse affect on the life cycle of the Eastern Bentwing-bat or the Large-eared Pied-bat such that a viable local population of either species would be likely to be placed at the risk of extinction.

(b) ***in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species likely to be placed at risk of extinction.***

Not applicable, no endangered populations are known or likely to occur in the study locality.

(c) ***in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:***

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable, the report does not include a flora component.

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

- Hooded Robin (*Melanodryas cucullata cucullata*) – Vulnerable
- Swift Parrot (*Lathamus discolour*) – Endangered
- Turquoise Parrot (*Neophema pulchella*) – Vulnerable
- Regent Honeyeater (*Xanthomyza Phrygia*) – Endangered
- Diamond Firetail (*Stagonopleura guttata*) – Vulnerable
- Koala (*Phascolarctos cinereus*) – Vulnerable
- Cave-roosting bats
  - Large-eared Pied Bat *Chalinolobus dwyer*) – Vulnerable
  - Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) – Vulnerable

(i) The modification to the open cut area will result in an area of approximately 21ha of vegetation being removed. The majority of the habitat to be removed is grassland with scattered tree cover. The total area of open woodland to be removed is less than nine hectares.

(ii) The removal of woodland and scattered tree habitat from the subject site will result in a small increase in the degree of fragmentation and isolation of surrounding woodland and scattered tree habitats. Within a two kilometre radius of the subject site, similar sized areas of open woodland occur to the north-west, north, north-east, east and south-east. Similar areas of scattered tree cover within a 2km radius occur in all directions.

(iii) The woodland and scattered tree habitat to be removed appears to be representative of surrounding habitat occurring within a 2km radius of the subject site (aerial photography interpretation). The loss of the woodland and scattered tree habitat is unlikely to affect the species ability to move within the landscape due to the presence of similar habitat within 2km of the subject site. The ecological integrity or security of surrounding habitat is unlikely to be affected by the removal of woodland and scattered tree habitat from the subject site. The area of habitat to be removed has a low level of importance for the species primarily due to the small area of the habitat, the availability of surrounding similar habitat and the absence of a resident population.

(e) ***whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).***

No areas of designated critical habitat so far identified under the provisions of the *Threatened Species Conservation Act* 1995 apply to the study area.

(f) ***whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.***

- Hooded Robin (*Melanodryas cucullata cucullata*) – Vulnerable
- Swift Parrot (*Lathamus discolour*) – Endangered

- Turquoise Parrot (*Neophema pulchella*) – Vulnerable
- Regent Honeyeater (*Xanthomyza Phrygia*) – Endangered
- Diamond Firetail (*Stagonopleura guttata*) – Vulnerable
- Large-eared Pied Bat (*Chalinolobus dwyer*) – Vulnerable
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) – Vulnerable

No draft or final recovery plans or threat abatement plans or threatened species priorities action statements have been prepared for the Hooded Robin, Swift Parrot, Turquoise Parrot, Regent Honeyeater, Diamond Firetail, Large-eared Pied Bat or Eastern Bentwing-bat, in NSW.

- Koala (*Phascolarctos cinereus*) – Vulnerable

As no Koalas were identified on the subject site the proposed modification of the open cut area is consistent with the objectives of the Recovery Plan for the Koala (DECC 2008) and the National Koala Conservation Strategy (ANZECC 1998). However, if Koalas use the subject site on an occasional or even rare basis, primarily during landscape movements, the proposed modification of the open cut area would be inconsistent with Objective 1a (identify and conserve habitat important for Koala conservation) of the Recovery Plan for the Koala (DECC 2008) and Objective 1.1 (identify and conserve habitat important for Koala conservation) of the National Koala Conservation Strategy (ANZECC 1998).

(g) ***whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process***

To date, thirty-three (33) key threatening processes are listed on Schedule 3 of the TSC Act. Three are relevant to the proposed modification to the open cut area and are discussed below.

1. Clearing of native vegetation

The proposed modification will require the removal of approximately 21ha of habitat, comprising improved-pasture grassland, scattered tree and woodland habitat. The removal of the scattered and woodland trees will increase the impact of the clearing of native vegetation key threatening process listed on Schedule 3 of the TSC Act.

2. Loss of hollow-bearing trees

The proposed modification would result in the removal of hollow-bearing trees. Hollow-bearing trees were common amongst the scattered trees and Woodland Area B. While less common, hollow-bearing trees also occurred in Woodland Area A. The removal of hollow-bearing trees will increase the impact of the clearing of native vegetation key threatening process listed on Schedule 3 of the TSC Act.

3. Removal of dead wood and dead trees

The proposed modification would result in the removal of some dead standing trees and dead wood. Dead standing trees are uncommon across the subject site with most occurring in Woodland Area B. Dead wood in the form of fallen logs occur in Woodland Area B however most were the result of previous clearing activities. The removal of dead wood and dead trees will increase the impact of the removal of dead wood and dead trees key threatening process listed on Schedule 3 of the TSC Act.

Seven-part test conclusions: The proposed modification is unlikely to significantly impact upon any local population of threatened species or any endangered population, ecological community or their habitats.

5.3 Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act was gazetted in 2000 and replaced several earlier Commonwealth statutes. This Act focuses Commonwealth interests on matters of National Environmental Significance (NES) including integrated biodiversity conservation and the management of important protected areas. The Act also establishes a streamlined environmental assessment and approvals process.

The matters of NES as identified in the Act which require assessment and approval to be addressed by the Commonwealth include:

- World heritage properties
- National heritage places
- RAMSAR wetlands
- Nationally threatened species and ecological communities (Part 13, Division 1, Subdivision A of the EPBC Act)
- Migratory species
- Commonwealth marine areas
- Nuclear actions (including uranium mining)

The assessment and approval process applies to any action that has, will have or is likely to have a significant impact on a matter of NES. An 'action' is defined as a project, development, undertaking or an activity or series of activities. On the 18th of January 2007, a bilateral agreement was signed between the Commonwealth and the state of NSW accrediting the NSW assessment process of environmental impact for the purposes of the EPBC Act, provided that the assessment was completed in accordance with the bilateral agreement. This has effectively removed the need for duplication of assessment effort by both the Commonwealth and state.

With regard to native fauna and fauna habitat, the only matters of NES relevant to the study area are nationally listed threatened species and migratory species. The relevant criteria given in the administrative guidelines for the Act to determine whether the action will or is likely to have a significant impact on a nationally threatened species are as identified in **Table 8**.

Table 8
Assessment of Potential Impact on Fauna Listed Under the EPBC ACT 1999.

Critically Endangered and Endangered Ecological Communities	None
Critically Endangered and Endangered Species:	Swift Parrot and Regent Honeyeater
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	*a) lead to a long-term decrease in the size of a population;* No populations of the Swift Parrot or Regent Honeyeater were identified on the subject site. The Swift Parrot and Regent Honeyeater may visit the subject site on an opportunistic, occasional basis and are unlikely to be greatly affected by the proposed modification due to the large area of foraging habitat available to them (flowering eucalypts in southeast Australia).
	b) reduce the area of occupancy of the species; No populations of the Swift Parrot or Regent Honeyeater were identified on the subject site. While some potential foraging habitat for the Swift Parrot and Regent Honeyeater would be lost as a result of the proposed modification, this is unlikely to have a significant impact on either of these species due to the large area of foraging habitat available to them (flowering eucalypts in southeast Australia).
	c) fragment an existing population into two or more populations; No populations of the Swift Parrot or Regent Honeyeater were identified on the subject site. The proposed modification would not fragment an existing population of the Swift Parrot or Regent Honeyeater into two or more populations.
	d) adversely affect habitat critical to the survival of a species; No populations of the Swift Parrot or Regent Honeyeater were identified on the subject site. The proposed modification would not adversely affect habitat critical to the survival of the Swift Parrot or Regent Honeyeater.
	e) disrupt the breeding cycle of a population; No breeding habitat for the Swift Parrot or Regent Honeyeater has been recorded within the subject site and none is likely to be affected. The proposed modification would not disrupt the breeding cycle of a population of either of these species.
	f) modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; The proposed modification would not affect the habitat of the Swift Parrot or Regent Honeyeater to such an extent that one or more of these species would be likely to decline.
	g) result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;* The proposed modification is highly unlikely to result in an invasive species harmful to the Swift Parrot or Regent Honeyeater from becoming established within the study area.
	h) introduce disease that may cause the species to decline; or The proposed modification is highly unlikely to result in the introduction of a disease that would cause the Swift Parrot or Regent Honeyeater to decline.
	i) interfere with the recovery of the species. While the proposed modification would result in the loss of some potential foraging habitat for the Swift Parrot and Regent Honeyeater, this would not interfere significantly with the recovery of these species.
Vulnerable Species:	Large-eared Pied Bat, Eastern Long-eared Bat and Border Thick-tailed Gecko
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	*a) lead to a long-term decrease in the size of an important population** of a species;* Large-eared Pied Bat - the large-eared pied bat was not recorded on the subject site by CES (2004). Only potential foraging habitat exists for the large-eared pied bat and the proposed modification would be unlikely to significantly reduce the amount of foraging habitat for the species, such that it would result in a long-term decrease in the size of the population. Eastern Long-eared Bat – the eastern long-eared bat was not recorded on the subject site by CES (2004). Potential roosting, breeding and foraging habitat occur on the subject site. While there is potential habitat for the species on the subject site, the failure to detect the species on the site suggests that the removal of vegetation for the proposed modification will not lead to a long-term decrease in the size of an important population. However, if the species does occur and breed on the site, there is the potential that a breeding colony may be destroyed during the tree-clearing process. Border Thick-tailed Gecko – the border thick-tailed gecko was not identified on the site by CES (2004). Potential habitat exists for the species in Woodland Area A along the rocky ridgeline, however, the quality of the habitat is marginal and small in total area. It is unlikely that the removal of the potential habitat as part of the proposed modification would result in a long-term decrease in the size of an important population of the border thick-tailed gecko.

Table 8 (Cont'd)
Assessment of Potential Impact on Fauna Listed Under the EPBC ACT 1999.

Critically Endangered and Endangered Ecological Communities	None
Vulnerable Species: Large-eared Pied Bat, Eastern Long-eared Bat and Border Thick-tailed Gecko	
	b) reduce the area of occupancy of an important population; No populations of the large-eared pied bat, eastern long-eared bat or border thick-tailed gecko were identified on the subject site. Due to the absence of an identified population the proposed modification would not result in a reduction in the area of occupancy of an important population.
	c) fragment an existing important population into two or more populations; The proposed modification would not fragment an existing important population of the large-eared pied bat, Eastern long-eared bat or the border thick-tailed gecko into two or more populations.
	d) adversely affect habitat critical to the survival of a species; The proposed modification would not adversely affect habitat critical to the survival of the large-eared pied bat, Eastern long-eared bat or border thick-tailed gecko.
	e) disrupt the breeding cycle of an important population; Large-eared Pied Bat – no potential breeding habitat for the large-eared pied bat occurs on the subject site. The breeding cycle of the large-eared pied bat will not be disrupted. Eastern Long-eared Bat – Potential breeding habitat in the form of hollow bearing trees occurs on the subject site for the eastern long-eared bat. The eastern long-eared bat was not recorded on the site by CES (2004). Due to the small fragmented nature of the habitat and the small area of potential habitat to be removed the breeding cycle of an important population of the eastern long-eared bat would not be disrupted. Border Thick-tailed Gecko – no important populations of the border thick-tailed gecko are known or likely to occur on the subject site. The proposed modification would not disrupt the breeding cycle of an important population of the border thick-tailed gecko.
	f) modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; Some foraging habitat is likely to be lost as a result of the proposed modification but this would not affect the large-eared pied bat, Eastern long-eared bat or the border thick-tailed gecko to the extent that the species is likely to decline. Some potential breeding habitat of the Eastern long-eared bat and the border thick-tailed gecko will be lost are a result of the proposed modification but due to the small area of habitat to be removed is unlikely to result in either species' decline.
	*g) result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat***;* The proposed modification is highly unlikely to result in an invasive species harmful to the large-eared pied bat, Eastern long-eared bat or border thick-tailed gecko becoming established within the study area.
	h) introduce disease that may cause the species to decline; or It is highly unlikely that the proposal would result in the introduction of a disease that may cause the large-eared pied bat, Eastern long-eared bat or border thick-tailed gecko to decline.
	i) interfere substantially with the recovery of the species. The proposed modification would not interfere substantially with the recovery of the large-eared pied bat, Eastern long-eared bat or border thick-tailed gecko.
Migratory Species:	Cattle Egret, Great Egret, Regent Honeyeater, White-throated Needletail, Rainbow Bee-eater and Satin Flycatcher
An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:	*a) substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat# for a migratory species;* No important habitat for any of the migratory species listed above occurs on the site and therefore no important habitat would be substantially modified as a result of the proposal.
	b) result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or It is highly unlikely that an invasive species that is harmful to any of the above listed migratory species would become established within the study area as a result of the proposal.

Table 8 (Cont'd)
Assessment of Potential Impact on Fauna Listed Under the EPBC ACT 1999.

Critically Endangered and Endangered Ecological Communities	None
Migratory Species:	Cattle Egret, Great Egret, Regent Honeyeater, White-throated Needletail, Rainbow Bee-eater and Satin Flycatcher
	c) seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion[##] of the population[###] of a migratory species. The proposal would not seriously disrupt the lifecycle of any of the above listed migratory species.

^ 'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as foraging, breeding, roosting or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long term evolutionary development
- for the reintroduction of populations or recovery of the species or ecological community

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act.

A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations or
- a population, or collection of local populations, that occurs within a particular bioregion.

* Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a critically endangered or endangered species by direct competition, modification of habitat, or predation.

** An important population is one that is necessary for a species' long-term survival and recovery. This may include populations that are:

- key source populations either for breeding or dispersal,
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

*** Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a vulnerable species by direct competition, modification of habitat, or predation.

\# An area of 'important habitat' for a migratory species is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- habitat that is of critical importance to the species at particular life-cycle stages; and/or
- habitat utilised by a migratory species which is at the limit of the species range; and/or
- habitat within an area where the species is declining.

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness and species specific behavioural patterns (for example, site fidelity and dispersal rates).

'Population', in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.

The proposed modification to the open cut area will not have a significant impact on any of the endangered, vulnerable or migratory species listed under the EPBC Act and consider as possibly occurring on the subject site (see **Table 8**). No other matters of NES or other matters protected by the EPBC Act are directly relevant to the subject site. Therefore the specific assessment process under the provisions of the *EPBC Act* 1999 is not required for the proposed modification, since it does not constitute an action that is likely to have an impact on any matter of national environmental significance.

5.4 SEPP 44 – Koala Habitat Protection

SEPP 44 was implemented on the 13th of February 1995 to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the trend of Koala population decline. Prior to an application for, or modification to a development consent for bushland areas being approved, the following considerations need to be assessed:

a) Identification of "potential Koala Habitats" within the proposed development area; if the total tree cover contains 15% or more of the Koala food tree species listed in Schedule 2 of SEPP 44 then it is deemed to be "potential" Koala habitat,

b) Identification of "core Koala habitat" within the development area. "Core Koala habitat" is defined as an area of land with a resident population of Koalas, evidenced by attributes such as breeding females (females with young), recent sightings and historical records of a Koala population,

c) Identification of "core Koala habitat" will require that a plan of management must accompany the DA application, and

d) If the rezoning of lands, other than to environmental protection, involves potential or core Koala habitat then the Director of planning may require a local environmental study be carried out.

The Liverpool Plains LGA is not listed in Schedule 1 of SEPP 44. However, Liverpool Plains LGA was formed from the merger of all or parts of Quirindi, Murrurundi, Parry and Gunnedah Shire Councils. Both Quirindi and Parry Shire Councils are listed on Schedule 1 of SEPP 44. A SEPP 44 assessment of the proposed modification has been undertaken under the assumption that the old shire council boundaries (now non-existent) still determine the areas to which SEPP 44 applies.

One Schedule 2 food tree species, white box (*Eucalyptus albens*), occurs across the subject site and forms more than 15% of the tree cover. The subject site is therefore 'potential Koala habitat'. CES (2004) did not find any sign of Koala occupation on the subject site during a fauna survey of the site. Only two recent (2006) records of the Koala occur within a 10km radius of the subject site. No Koalas are known to occur on the subject site and no signs of Koala presence were recorded during the habitat assessment. Due to the lack of a resident population on the subject site, determined by the absence of breeding females, recent sightings or historical records, the subject site does not form "core Koala habitat". As the subject site is not core Koala habitat no further assessment under SEPP 44 is required.

6 CONCLUSIONS

The proposed modification would result in the removal of approximately 21ha of vegetation including less than nine hectares of open woodland. Two threatened species, the Hooded Robin and the large-eared pied bat were recorded on the site in 2003 (CES 2004). A single individual of the Hooded Robin was recorded once and not again during further survey work by CES (2004).

The Large-eared Pied Bat was recorded through Anabat survey and was presumed to forage over the existing subject site. A site inspection and habitat assessment in December 2008 identified potential habitat on the subject for additional threatened species. An additional 13 threatened or migratory species under the TSC Act or EPBC Act were assessed as potentially having suitable habitat within the subject site. Assessment of the likelihood of the impact from the proposed vegetation clearing on all 15 species according to the TSC and EPBC Acts revealed that the proposed modification would not significantly impact on any threatened species known or likely to occur on the subject site.

In light of this conclusion, no Species Impact Statement is required in accordance with the TSC Act, nor is a referral necessary in accordance with the EPBC Act.

7 RECOMMENDATIONS

In order to maximise conservation of local flora and fauna and to ameliorate potential impacts of the proposed modification on the local natural environment (including potential habitat for threatened or significant species or communities), it is recommended that the following measures be adopted within the subject site as part of this proposal:

- Tree removal should be timed so as to avoid the breeding season of nesting birds and hollow-reliant fauna (December - March).
- Prior to tree felling a suitably qualified and experience ecologist should inspect and mark all hollow bearing trees within the proposed felling area.
- At the time of felling a suitably qualified and experience ecologist should supervise the felling of all hollow-bearing trees and where possible instruct felling machinery operators on an appropriate method to minimise harm to wildlife that may remain with tree hollows.
- Where possible felled trees should be placed on the ground amongst existing trees to provide habitat for ground cover dependent species.

8 REFERENCES

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Appendix 1

Project Personnel and Relevant Licences

(No. of pages excluding this page = 1)

Report Component	Study Team Members	Qualifications
Fauna Habitat Assessment, and Report Writing	Steven Cox	B.Appl.Sc (Hons)
Plans and Drawings	Jenny Lewis	B.Sc (Res. & Env. Mgt.), TAFE Cert II (Conserv. & Land Mgt. Nat. Area Rest.) MECA (NSW)

Relevant licences held by Ecotone Ecological Consultants

TYPE	FOR	LICENCE NO	NAME	DATE VALID TO	ORGANISATION	LOCATION
Animal Research Authority	Vertebrate Fauna Surveys	08/8633	Brian Wilson	15-Nov-09	Animal care and ethics committee of the Director-General of NSW Agriculture	NSW
Certificate of Approval	Vertebrate Fauna Surveys	08/8633	Brian Wilson	15-Nov-11		
Licence to	Access NPWS Wildlife Atlas Data Base	CON93002	Brian Wilson	30-Jun-09	NSW Department of Environment and Climate Change	
Scientific Licence	Harm/ trap/ release: protected fauna; pick/ hold: native flora	S10555	Brian Wilson Stefan Rose Jenny Lewis Amy Williams Narawan Williams Anne Williams	30-Nov-08 awaiting approval for 2009		
	As above plus bat banding	S10556	Ray Williams	31-Dec-08 as above		