YTC RESOURCES LIMITED

Hera Project, via Nymagee

Ecology Assessment

Prepared by

OzArk Environmental &
Heritage Management Pty Ltd

November 2011

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Hera Project, via Nymagee

Ecology Assessment

Prepared for:

R.W. Corkery & Co. Pty Limited
62 Hill Street
ORANGE NSW 2800

Tel: (02) 6362 5411
Fax: (02) 6361 3622
Email: orange@rwcorkery.com

On behalf of:

YTC Resources Limited
2 Corporation Place
ORANGE NSW 2800

Tel: (02) 6361 4700
Fax: (02) 6361 4711
Email: office@ytcresources.com

Prepared by:

OzArk Environmental & Heritage Management Pty Ltd
PO Box 2069
DUBBO NSW 2830

Tel: (02) 6882 0118
Fax: (02) 6882 0630
Email: phil@ozarkehm.com.au

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EXECUTIVE SUMMARY

This report was commissioned by R.W. Corkery & Co. Pty. Limited (RWC) on behalf of YTC Resources Limited, (the Proponent). It details the results of a flora and fauna assessment completed for threatened species, populations, critical habitat and ecological communities that could be affected by the proposed Hera Project (the Project) in accordance with current NSW and Commonwealth legislation.

The Proponent proposes to develop the Project, which would involve the establishment of mining operations on "The Peak" property, (Lot 664 DP 761702), referred to as the 'Project Site'. "The Peak" property is covered by Western Lands Lease #2455. The Project would also include the expansion of one existing fresh water dam, construction of another surface water dam and the creation of a Tailings Storage Facility (**Figure 2**). Flora field surveys were carried out over four and half days from the 25 to 29 April 2010 and undertaken in conjunction with the site fauna survey.

135 species of flora have been identified with in the Project Site, of which 133 are native species and two are listed as noxious. One nationally threatened plant species, Lobed Blue-grass (*Bothriochloa biloba)* was recorded within the Project Site during the assessment. Given the high degree of existing ground surface disturbance, the likelihood of the Cobar Greenhood Orchid (*Pterostylis cobarensis*), a national and NSW threatened plant species considered as having the potential to occur within the Project Site, actually occurring within the Project Site is low. However, this is unable to be confirmed in the non-flowering period when the survey was undertaken. No endangered national or NSW ecological communities (EEC) were recorded.

Vegetation within the Project Site is assessed as being consistent with vegetation communities previously described by Benson *et al.* (2006). The Project Site can be divided into four main vegetation types according to the *BioMetric* classification system (**Table 12**).

- *Poplar Box - Gum-barked Coolibah - White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion* (Benson 103). This is the general vegetation within the Project Site that mixes and intergrades with the three other vegetation types on slopes and hills. Benson 103 broadly consists of 88.9% of the vegetation assessed within the Project Site. This vegetation type is broken down further sub-communities reflecting the dominant species:
  - *Eremophila and hopbush regrowth* (Benson 103), community located in the north-western section of the Project Site, and comprises 0.9% of the total vegetation within the Project Site.
  - *Bothriochloa biloba* (Benson 103), in the vicinity of the House Tank and the existing site entrance. This consists of approximately 0.05% of the total vegetation within the Project Site.
  - *Yarran* (*Acacia homalophylla*) (Benson 103) located immediately south of the proposed location of the Tailings Storage Facility adjacent to the internal road in the area. It comprises 0.09% of the total vegetation within the Project Site.
- *Grey Mallee - White Cypress Pine woodland on rocky hills of the eastern Cobar Peneplain Bioregion* (Benson 180). This vegetation type occurs on "The Peak" topographic feature and intergrades with Benson 174. Benson 180 consists of broadly 2.8% of vegetation assessed within the Project Site.

- *Mallee - Smooth-barked Coolibah woodland on red earth flats of the eastern Cobar Peneplain Bioregion* (Benson 174). This vegetation type occurs in clusters within the vegetation type. Benson 180 consists of broadly 4.3% of vegetation assessed within the Project Site.
- Cleared grassland / shrubland and cleared areas associated with tracks. This consists of approximately 3.2% of the total vegetation within the Project Site.

Smooth-barked Coolibah (*E. Intertexta*), a dominant canopy species associated with the aforementioned communities, has been lopped, ringbarked or removed throughout much of the Project Site. As a result, general diversity and natural ratios of species is unbalanced. White Cypress Pine (*Callitris glaucophylla*) has invaded much of the disturbed space within the northern half of the Project Site, with the southern section of the Project Site around the two dams (Pete's Tank and Back Tank West) and broad drainage lines being dominated by Bimble Box (*E. populneus*).

The fauna survey revealed that the Project Site supports a moderate diversity of native fauna. A total of 103 vertebrate fauna species (97 native and six introduced) were recorded during survey and incidental observations, comprising the following.

- five reptile species (no threatened species, one with local conservation concern).
- three frog species (no threatened species, two with local conservation concern).
- 78 bird species, including six TSC Act threatened species, one EPBC Act migratory species and fourteen species of local conservation concern;
- seven species of ground mammal; and
- ten species of michopteran bat species (two TSC Act threatened species).

It is likely that other threatened species not recorded to date, occur within the Project Site given that they share similar habitat requirements with some of the species recorded. Species previously recorded in the Project Site by Charles Sturt University Johnstone Centre-Environmental Consulting (CSUJC-EC, 2006), not observed during the current assessment, are assumed to still occur.

7-part tests and / or Assessments of Significance were prepared for the following threatened species recorded or considered as highly likely to occur within the Project Site:

- Kultarr (*Antechinomys laniger*) (TSC Act);
- Major Mitchell's Cockatoo (*Cacatua leadbeateri)* (TSC Act);
- Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*); (TSC Act);
- Little Pied Bat (*Chalinolobus picatus*) (TSC Act);
- Grey-crowned Babbler (*Pomatostomus temporalis temporalis* (eastern subspecies) (TSC Act);
- Brown Treecreeper (*Climacteris picumnus victoriae)* (TSC Act);
- Hooded Robin (*Melanodryas cucullate*) (TSC Act);
- Chestnut Quail-thrush (*Cinclosoma castanotus*) (TSC Act);
- Speckled Warbler (*Pyrrholaemus saggitatus*) (TSC Act);
- Pied Honeyeater (*Certhionyx variegates*) (TSC Act);

- Diamond Firetail (*Stagonopleura guttata*) (TSC Act);
- Superb Parrot (*Polytelis swainsonii*) (TSC and EPBC Act);
- Black-chinned Honeyeater (*Melithreptus gularis gularis* (eastern subspecies) (TSC Act);
- Turquoise Parrot (*Neophema pulchella*) (TSC Act);
- Spotted Harrier (*Circus assimilis*) (TSC Act);
- Pine Donkey Orchid (*Diuris tricolor*) (TSC Act); and
- Lobed Blue-grass *(Bothriochloa biloba)* (EPBC Act).

The completed 7-part tests and/or Assessments of Significance for each 'affected' threatened species determined that a Species Impact Statement (SIS) and/or Referral to the Commonwealth Minister for the Environment are not required for the Project.

Table 1 presents the proposed area of disturbance classified by vegetation community.

Key amelioration / mitigation and habitat compensation measures through the implementation of the proposed Biodiversity Offset Strategy, noted below, are aimed at minimising impacts of development on flora and fauna, by:

- the preservation of tree hollows;
- promoting native grass regeneration;
- creating structural complexity within the existing vegetation;
- planting winter flowering eucalypts and understorey;
- feral animal and weed control; and
- fencing around dams.

It is concluded that by adopting these mitigation measures there would be no significant environmental impacts to threatened species, communities or populations of flora or fauna, as a result of the Project. This conclusion would be consistent with the principles of Environmentally Sustainable Development (ESD), and therefore no further assessment is required.

Table 1
Proposed area of Disturbance Classified by Vegetation Community

Project Details			
Proponent			YTC Resources Limited
Area of the Project Site			1,532ha
Area of the 'Peak' property			2,128 ha
Mining method			Sublevel open stoping
Maximum rate of production			Approximately 350 000t of ore per year
Project life			9 years
Hours of operation- Site preparation and box cut			7 days per week, 7:00am to 6:00pm
Transportation operations			7 days per week, 7:00am to 10:00pm
Rehabilitation operations			7 days per week, 7:00am to 6:00pm
All other activities			7 days per week, 24 hours per day
Capital cost			Approximately $80 million
Number of employees			Approximately 100
Economic Contribution	- local and regional		Approximately $15 million/year
	- State and national		Approximately $25 million/year
	- taxes, royalties and rates		Approximately $3 million/year
Area of Proposed Disturbance (ha)			
Surface Infrastructure	**Total Area (ha)**	**Area Veg Comm to be removed (ha)**	**Vegetation Community type**
Tailings Storage Facility	43.8	0.8	Benson 103 - White Cypress Pine Dominated Area
		43	Benson 103
Back Tank East	11.3	8.51	Benson 103 - Bimble Box Dominated Area
		2.8	Benson 103
Pete's Tank	1.7	0.02	Benson 103
		1.68	Benson 103 - Bimble Box Dominated Area
Mine Camp	2.2	0.9	Cleared Grassland / Shrubland / Disturbed
		1.3	Benson 103 - Eremophila & Hopbush Regrowth
Surface Facilities Area	15.4	3	Benson 174
		0.13	Benson 180
		12.27	Benson 103
Main Site Access Road	0.96	0.48	Cleared Grassland / Shrubland / Disturbed
		0.18	Benson 174
		0.34	Benson 103 - White Cypress Pine Dominated Area
Light Vehicle Access Road	1.84	0.69	Cleared Grassland / Shrubland / Disturbed
		0.33	Benson 103 - Eremophila & Hopbush Regrowth
		0.54	Benson 103 - White Cypress Pine Dominated Area
		0.29	Benson 103
Mine Camp Road	0.064	0.064	Benson 103 - Eremophila & Hopbush Regrowth
Total area to be disturbed	**77.3**	**77.3**	

Table 1 (Cont'd)
Proposed area of Disturbance Classified by Vegetation Community

Vegetation Communities within The Project Site (ha)						
	Vegetation in Project Site		Vegetation Communities to be Disturbed			
Vegetation Community	Approximate area within the Project Site	Approximate proportion of Project Site	Area (ha)	% of total vegetation community area	% of Project Site area	% of the Peak Property area
Benson 103	1146.88	74.8%	58.4	75.6%	3.8%	2.7%
Benson 103 - Bimble Box Dominated Area	119.63	7.8%	10.2	13.2%	0.7%	0.5%
Benson 103 - White Cypress Pine Dominated Area	50.94	3.3%	1.7	2.2%	0.1%	0.1%
Benson 103 - Eremophila & Hopbush Regrowth	15.17	1.0%	1.6	2.1%	0.1%	0.1%
Benson 174	84.84	5.5%	3.2	4.1%	0.2%	0.1%
Benson 180	70.06	4.6%	0.1	0.2%	0.0%	0.0%
Cleared Grassland / Shrubland / Disturbed	44.93	2.9%	2.1	2.7%	0.1%	0.1%
TOTAL	1532.5	100.0%	**77.3**	100.0%	5.0%	3.6%
Note: The extent and proportions of vegetation communities and cleared areas are based on GIS mapping techniques and as such are approximate figures only.						

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1. INTRODUCTION

1.1 PROJECT OVERVIEW

This report was commissioned by R.W. Corkery & Co. Pty. Limited (RWC) on behalf of YTC Resources Limited (YTC). It details the results of a flora and fauna assessment completed in accordance with Section 5a of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), for threatened species populations and ecological communities that could be affected by the Project.

YTC proposes to develop the Project, which would involve the establishment of mining operations on "The Peak" property (Lot 664 DP 761702). 'The Peak' property is covered by Western Lands Lease #2455.The Project would also include the expansion of one existing dams, construction of another dam and the creation of a tailings storage facility.

All mining, processing and related activities would be undertaken within the Project Site located approximately 4km south of the township of Nymagee in Western NSW (**Figure 1**). A description of the proposed activities is presented in Section 2.

A number of these activities have already been approved under a Part 4 application in 2006. The activities approved, described in detail in the *Review of Environmental Factors* document (R.W Corkery, 2006), are summarized in Section 1 of the *Environmental Assessment* prepared for the Project. The current ecological assessment supports the *Environmental Assessment* for project approval under part 3A of the EP&A Act.

1.2 BACKGROUND TO THE PROJECT

RWC, on behalf of Triako Resources Pty Ltd, prepared a *Review of Environmental Factors* (REF) for Category 3 exploration activities on the Hera Deposit in 2005 and a second REF for the establishment and operation of an Exploration Decline in 2006. As part of the 2006 REF, an ecological assessment was undertaken by Charles Sturt University Johnstone Centre-Environmental Consulting (CSUJC-EC, 2006) within "The Peak" property. Following the acquisition of the Project by YTC, an addendum to the 2005 REF was prepared by RWC for an exploration program in November 2009. The 2009 REF detailed the location of five additional exploration sites and five additional diamond drill sites. These drill sites, in the general location of the previous approved drilling, were in addition to the ten diamond drill sites proposed in the original REF. RWC has now been engaged by YTC to prepare an *Environmental Assessment* to support an application for project approval for the Project, described briefly in Section 1.1. OzArk has been commissioned to undertake the flora and fauna assessments of the Project impact footprint, which overlaps with components of the 2006 CSU JC-EC assessment. Results of the CSUJC-EC 2006 report have been detailed in Section 4.2.3 of this document.

1.3 PROJECT SCOPE AND OBJECTIVES

The purpose of the ecological assessment is to undertake baseline studies to determine the flora and fauna present within the Project Site. More specifically, the aims of this assessment are to:

- conduct a literature review and database search to identify all threatened biota known to occur or that could potentially occur within the Project Site;

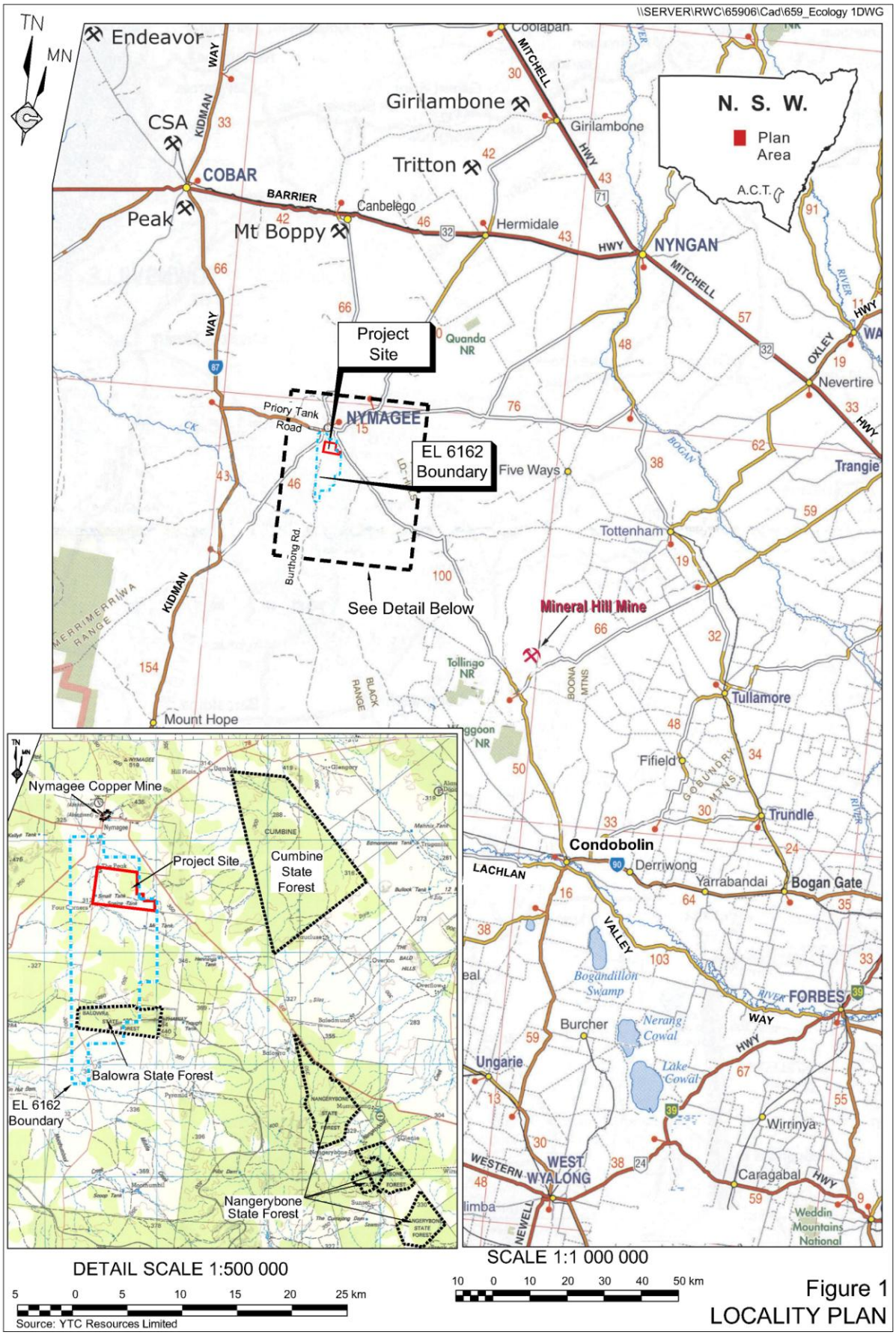


Figure 1
LOCALITY PLAN

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

- identify flora and fauna species, ecological communities and habitats that exist within the Project Site;
- assess the significance of potential impacts arising from proposed activities on threatened biota known to occur or that could potentially occur within the Project Site, with respect to Section 5A (7-part test) of the *Environmental Planning & Assessment Act 1979* (EP&A Act) and schedules within the EPBC Act; and
- provide recommendations, to mitigate the effects of the proposed activities on threatened biota and their habitats within the Project Site.

1.4 DEFINITIONS

The following definitions and term as are used through this report.

Activity — has the same meaning as in the EP&A Act, and to the physical 'activity' in relation to land that is specified by a regulation to be a work for the purposes of the Act. In this assessment the activity is referred to as a 'Project'.

Endangered population — population specified in Part 2 of Schedule 1 of the TSC Act *1995.*

Endangered ecological community (EEC) — an ecological community specified in Part 3 of Schedule 1 of the TSC Act or within the schedules of the EPBC Act.

Hera Deposit — The ore body of interest.

Impact Footprint — An area within the Survey Area that would be mechanically destroyed, disturbed or altered to establish infrastructure associated with the Project. The Impact Footprint for the Project is shown on **Figure 2**, marked as 'proposed activities' and 'approved activities'.

Likely — taken to be a real chance or possibility (NPWS, 1996).

Locality — the area within a 50km radius of the Project Site.

Local population — the population that occurs within a given area, unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary can be demonstrated (NPWS, 1996). In this instance a local population are those that occur within the Project Site.

Project Site — for the purposes of this report, the area that includes all project components of the Project is referred to as the 'Project Site' and encompasses areas that would be disturbed during the Project.

Region — a biogeographical region that has been recognised and documented such as the Interim Biogeographical Regions of Australia (IBRA). The region within which the Project Site falls under is the NSW Cobar Peneplain Bioregion (CPBR).

Survey Area — a specific area that has been ecologically assessed within the Project Site including any areas which are likely to be affected by the Project, either directly or indirectly (NPWS, 1996).

Surface Facilities Area — The Surface Facilities Area would comprise the processing plant, contractor offices, laydown and workshop areas, car park, power station, fuel tank and refuelling area, run-of-mine (ROM) pad, the temporary waste rock emplacement, and a portal leading to the underground mine via a box cut and a decline.

Threatened biota — those threatened species, endangered populations or endangered ecological communities which are considered known or likely to occur in one or more Survey Areas.

Threatened species — a species specified in Schedule 1 Part 1 (endangered species), Part 4 (presumed extinct) and Schedule 2 (vulnerable species) of the TSC Act or within the Schedules of the EPBC Act.

1.5 REPORT AUTHORSHIP

The ecological assessment was undertaken by Heidi Kolkert (BA, BSc (Hons) in Zoology, Regional Practising Member of the NSW Ecological Consulting Society) of OzArk under the former NSW Industry and Investment (I&I) Ethics Approval No 07 / 1601 & NSW Scientific Research License 11194. Philip Cameron (Senior Ecologist) accompanied the ecologist on the first day and night of assessment.

This report was prepared by Heidi Kolkert, edited by Phil Cameron and Mr Ben Churcher of OzArk EHM.

1.6 CONSTRAINTS

1.6.1 DEC Biodiversity Survey Guidelines November 2004

The NSW Office of Environment and Heritage (OEH) Threatened Biodiversity Survey Guidelines (DEC, 2004:3, 34) states:

'It is advised that where adequate surveys have not been conducted within the Survey Area due to time limitations (you can also infer season timing etc), the precautionary principle should always be adopted. This involves assuming that threatened biodiversity which are likely to occur in the Survey Area (based upon the presence of suitable habitat and recent records) inhabit the whole of the Survey Area. The Assessment of Significance (7-part tests) would then be conducted on this basis.'

Limitations will always exist in surveys undertaken within a Project Site over a short period (e.g. seasonality of animals and plants, diurnal / nocturnal movements of animals, weather patterns and a general lack of prolonged baseline assessments) and this fact is recognised by OEH as noted above. This assessment addresses these limitations by reporting threatened biodiversity as likely to occur within the Project Site (based upon the presence of suitable habitat and recent records) rather than in more definitive terms.

In addition, those listed species identified as likely to occur within the Project Site have been assumed, in accordance with the Precautionary Principle, to occur.

1.6.2 Survey Constraints

This sub-section describes the general constraints that intrinsically exist within surveys undertaken over short durations.

Results from surveys conducted over short periods (4.5 days in the case of this Project) can pose limitations in their interpretations since not all animals and plants can be fully accounted for within any given Survey Area. The potential for inaccuracy increases exponentially with the size of a Survey Area. This report is based upon data acquired from recent surveys, field and desk top assessments, however, it should be recognised that the data gathered is indicative of the environmental conditions of the Project Site at the time the report was prepared.

The presence of threatened species in any one location is not static. It changes over time, often in response to longer term natural forces that can, at any time, be dramatically influenced by anthropomorphic disturbance and changes in long term weather patterns. Weather conditions, seasonality, food availability and social dynamics play an important role in faunal activity, species occurrence and hence survey success. These factors were not tested during this assessment. Ideally, surveys would be conducted over different seasons and during suitable climatic conditions.

In order to overcome some of these limitations, database searches were conducted for threatened species, populations and ecological communities known to occur within the region as well as consultation with landowners. As such, the 'precautionary approach' for species occurrence has been adopted.

This assessment has reviewed state and national agency records to establish predictive models concerning the likelihood of flora and fauna species to occur within the Project Site (see section 4.4 and 4.5). Any failings of the database records have been mentioned within the appropriate sections of this report.

Further notes are as follows.

- The methods used to detect the majority of animals listed were considered to be consistent with OEH requirements and were able to detect species currently listed as threatened.
- Habitat suitable for threatened orchids such as the Cobar Greenhood Orchid exists within the Project Site. However, a targeted survey for orchids during their flowering period on 15 October 2011 did not identify any within the proposed areas of disturbance. In addition, previous surveys by Chaqrles Sturt University Johnstone Centre-Environmental Consulting (2006) (CSUJC-EC, 2006) were conducted during the flowering period of threatened orchids over the Project Site. No orchids were identified during that survey. As a result, it is unlikely that threatened orchids occur within the proposed area of disturbance.
- The moon was bright and almost full during the assessment period with a full moon noted on the last night of trapping (28.4.2010). The lunar cycle may also affect bat and other faunal activity, prey availability, and thus behaviour. Studies examining the trapping success of three dasyurids (S*. Crassicaudata, P. gilesi and P. Tenuirostris*), however, showed moonlight had no effect (Read, 1984).
- CSUJC-EC (2006) undertook a number of flora and fauna surveys within the Project Site during December 2004, June 2005 and September 2005, and OzArk undertook this assessment in April 2010. Thus, overall there has been a good coverage of seasons and climatic conditions sampled over the entire Project Site.

- At the time of the current ecological assessment exploration drilling was being undertaken (approved in 2007). This may have affected the distribution of fauna within the Survey Area and the Project Site.
- Due to the scale of the Project the final location of infrastructure may alter between the time of the assessment and the final design. This may result in further impacts not accounted for within this report. Resizing or relocating of Pete's Tank, Back Tank East and the Tailings Storage Facility has also occurred. Discrepancies of Impact Footprints on the maps provided have resulted in the precautionary principle being considered. Thus, all impacts are considered at the upper scale of what is proposed by YTC.

2. DESCRIPTION OF THE PROPOSED ACTIVITIES

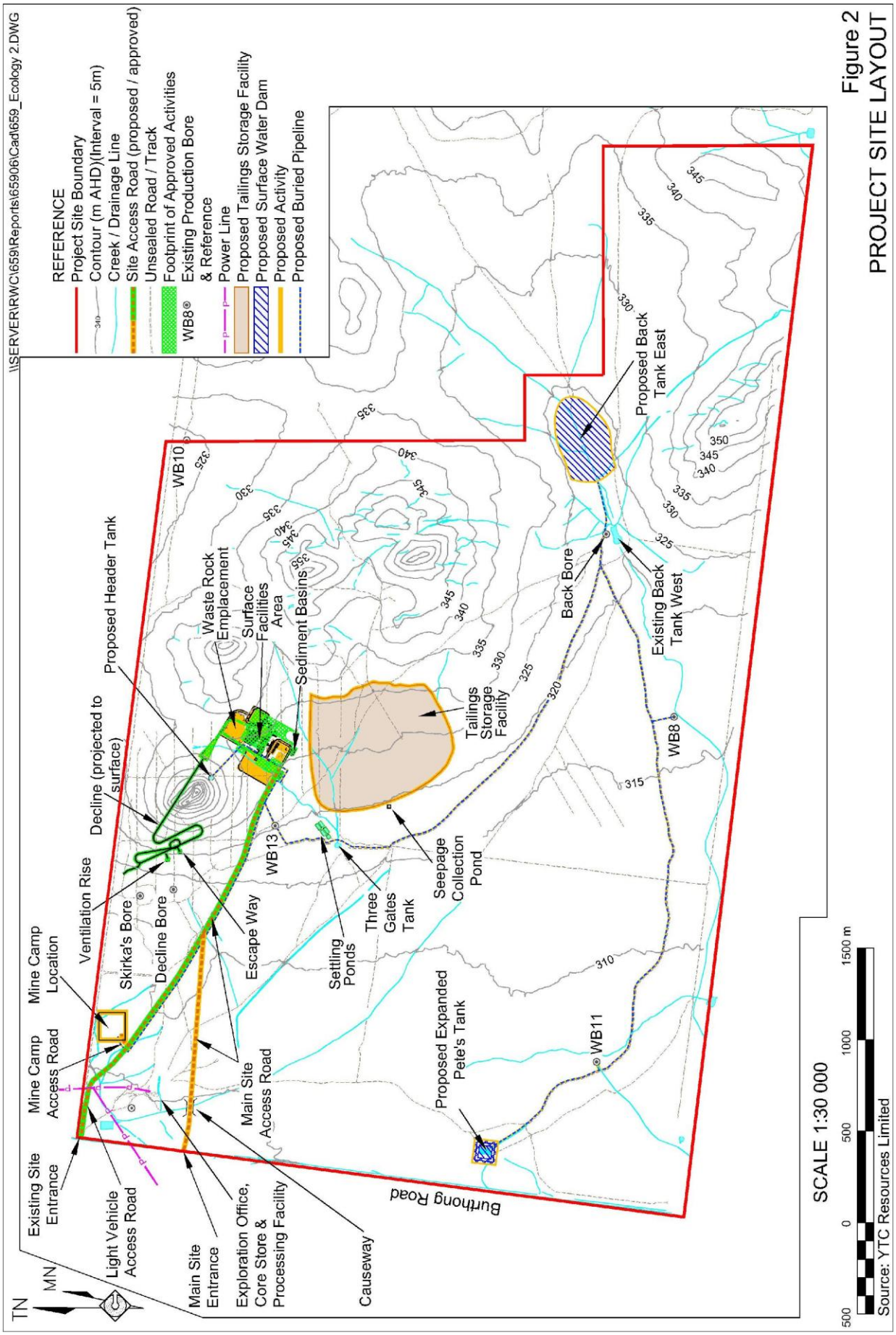
2.1 OPERATION OF THE PROJECT

As identified in Section 1.7 of the *Environmental Assessment*, a number of components of the Hera Project have been previously approved. These include the following (**Figure 2**).

- Construction and use of infrastructure required for an underground mine including a box cut, portal and decline, magazine and ventilation rises.
- Construction and use an integrated ore stockpile area and temporary Waste Rock Emplacement.
- Installation and use of one or more diesel generators within the power station and the associated Fuel Storage and Recycling Area.
- Construction and use of site offices, ablutions facilities, vehicle parking, workshop, laydown area and associated infrastructure.
- Establishment of on-site communications facilities.
- Construction and use of water management structures.
- Construction and use of an access road (referred to in this document as the Light Vehicle Access Road). For the purposes of this application, the Light Vehicle Access Road would be used by light vehicles only.

The Project would include the following activities which would require approval (**Figure 2**).

- Extraction of waste rock and ore material, using underground sublevel open-stope mining methods at the maximum rate of material would be approximately 350 000t per year for approximately 5.5 years.
- Construction and use of a Surface Facilities Area that would incorporate a range of approved infrastructure, including expanded site offices for the Proponent and Contractors, ablutions facilities, vehicle parking, power station, fuel storage, refuelling area, workshop and laydown areas.
- Construction and use of a Processing Plant within the Surface Facilities Area comprising crushing and grinding, gravity separation, flotation, leach and gold recovery circuits and ancillary infrastructure to produce approximately 33 000oz of gold, 74 000oz of silver, 10 000t of lead and 10 000t of zinc per year.


\\SERVER\RWC\659\Reports\659061Cad\659_Ecology 2.DWG
REFERENCE
Project Site Boundary
Contour (m AHD)(Interval = 5m)
Creek / Drainage Line
Site Access Road (proposed / approved)
Unsealed Road / Track
Footprint of Approved Activities
Existing Production Bore & Reference
Power Line
Proposed Tailings Storage Facility
Proposed Surface Water Dam
Proposed Activity
Proposed Buried Pipeline
Figure 2
PROJECT SITE LAYOUT
Proposed Back Tank East
Back Bore
Existing Back Tank West
WB10
WB8
WB13
WB11
Waste Rock Emplacement
Surface Facilities Area
Sediment Basins
Proposed Header Tank
Decline (projected to surface)
Tailings Storage Facility
Ventilation Rise
Skirka's Bore
Decline Bore
Escape Way
Settling Ponds
Three Gates Tank
Seepage Collection Pond
Mine Camp Location
Mine Camp Access Road
Main Site Access Road
Proposed Expanded Pete's Tank
Existing Site Entrance
Light Vehicle Access Road
Main Site Entrance
Exploration Office, Core Store & Processing Facility
Causeway
Buttong Road
TN
MN
SCALE 1:30 000
500 0 500 1000 1500 m
Source: YTC Resources Limited

- Construction and use of a temporary Waste Rock Emplacement, incorporating an acid rock drainage encapsulation area and an associated Leachate Management Pond.
- Construction and use of a Tailings Storage Facility with the associated Seepage Collection Pond.
- Construction of a Mine Camp and Mine Camp Access Road for mine personnel.
- Construction and use of a surface water harvesting system, including expansion of Pete's Tank and construction of Back Tank East and associated water reticulation system.
- Construction and use of the Main Site Access Road and the associated intersection to allow site access from Burthong Road by light and heavy vehicles.
- Transportation of concentrate from the Project Site to the Proponent's customers via public roads surrounding the Project Site.
- Construction and use of ancillary infrastructure, including soil stockpiles, core storage yards, internal roads and tracks, and sediment and erosion management structures not already approved.
- Construction and rehabilitation of a final landform that would be geotechnically stable and suitable for an end land use of agriculture or nature conservation.

Impacts to biota associated with the Project would include vegetation clearing and disturbance of soils to build mining infrastructure and creating artificial drainage lines, a new Tailings Storage Facility and increasing the size of existing standing bodies of water. Indirect impacts associated with the operation of the Project may include; increased light and noise, pollution (dust, hydrocarbon and leachate management) and waste management.

Disturbed areas no longer required for any Project-related activities would be progressively rehabilitated to create a final stable and sustainable landform able to support the end land use of agriculture and nature conservation. Rehabilitation activities would utilise native tree, shrub and grass species and/or pasture species comparable with either the existing vegetation communities or pastures in the local area.

The Tailings Storage Facility requires further discussion due to construction impacts and more importantly potential operational impacts to existing biota such as wetland / migratory species that it may attract. Leachate from the storage of tailings (tailings) has potential to contain heavy metals, and cyanide. Tailings would be stored in the Tailings Storage Facility which would be designed to minimise the potential for leachate to escape.

2.2 TAILINGS MANAGEMENT

Design and operational features of the Tailings Storage Facility can be found in Section 2 of the *Environmental Assessment* and will not be repeated here.

In summary, however, ground ore material from which the metaliferous minerals have been removed would be pumped to the Tailings Storage Facility. These tailings would contain <1mg/L *weak-acid-dissociable* (WAD) cyanide levels as a 35% hydrogen peroxide solution will be used as an oxidising agent to destroy all cyanide in the final stages of the leach circuit prior to the treated solution being pumped into the Tailings Storage Facility.

The ore to be processed has low potential to form acidic or metal-rich leachate so, even without any environmental management controls in place, the risk of cyanide-related detrimental groundwater contamination occurring is low. The Tailings Storage Facility would be constructed and operated in a manner which reduces potential for leachate to escape. Piezometers would be installed in appropriate locations around the Tailings Storage Facility and monitored regularly to assess its integrity.

The National Governments National Industrial Chemicals Notification and Assessment Scheme (NICNAS) recently released guidelines on Sodium Cyanide (Australian Government NICAS 2010) management. The International Cyanide Management Code (the Code) and several other papers (Donato 1999, 2002, 2003a, 2003b, Donato *et al.* 2007) provide a review of the effects, amelioration techniques and management of gold cyanide-bearing tailings solutions.

WAD Cyanide concentrations below 50mg/L are deemed safe to wildlife and are considered an interim benchmark for discharge into Tailings Storage Facility's (Donato *et al.* 2007). The main WAD cyanide complexes in precious metal mine tailings are stable in a Tailings Storage Facility environment but can release cyanide ions under varying environmental conditions including ingestion and absorption by wildlife (Donato *et al.* 2007).

Risk to biota is primarily to fauna, particularly wetland birds or wildlife dependant on the local resource of water for drinking, swimming, diving foraging. The Project is unlikely to have a large body of free standing water as discharge locations would be varied and the facility would be managed in such a manner that the area of pooled water within the facility would be minimized.

Through the review of relevant literature on the potential impacts of any cyanide on species in Tailings Storage Facility on the surrounding wildlife, a thorough understanding of the potential risks of the project can be elucidated. Subsequently, a number of management measures can be devised for the protection of the wildlife within the Project Site.

3. DESCRIPTION OF THE EXISTING ENVIRONMENT

3.1 BIOREGIONAL AND REGIONAL ENVIRONMENTAL CONTEXT

3.1.1 The Cobar Peneplain Bioregion

3.1.1.1 Introduction

A bioregion is a complex land area composed of a cluster of interacting ecosystems that are repeated in similar form throughout. Region descriptions seek to describe the dominant landscape scale attributes of climate, lithology, geology, landform and vegetation (Thackway & Creswell, 2000). Reviewing a bioregion assists to contextualise the impact of the any proposed development in relation to similar local and regional landforms, vegetation and the fauna and flora that occupy it. Additionally, state legislative ecological community protection is often dependant on what particular bioregion it occurs within.

The Survey Area lies within the Cobar Peneplain Bioregion (CPBR) within central NSW, west of the Great Dividing Range. This bioregion extends from just south of Bourke to north of Griffith and has a total area of 7,334,664ha occupying 9.2% of the State. The CPBR encompasses the townships of Cobar, Nymagee, Byrock, Girilambone, Lake Cargelligo and Rankins Springs with Louth and Tottenham lying at its boundary. In the north of the bioregion,

Yanda Creek, a major stream, discharges directly into the Darling River which meanders across the bioregional boundary in the northwest. In the east, several small streams flow occasionally into the Bogan River as it criss-crosses the eastern boundary of the bioregion. The Lachlan River with contributions of minor runoff from smaller streams, traverses the bioregion in the south.

The CPBR lies wholly within the Murray–Darling Basin and includes the Barwon, Macquarie, Yanda, Darling, Lachlan and Murrumbidgee catchments (Australian Terrestrial Biodiversity Assessment 2002).

3.1.1.2 Significant Flora of the Cobar Peneplain

Mallee woodland communities (with a diversity of Eucalyptus spp.) are widespread throughout the CPBR, occurring mainly on rocky hills and ridges. As much as 90% of the original mallee communities in the CPBR have been cleared, leaving the remnant mallee stands vulnerable to local extinction (Thackway & Creswell, 2000 citing Morton *et al.* 1995). Mallee is therefore considered to be of high conservation significance in the CPBR.

The belah tree is regarded as significant by the traditional owners of sections of the CPBR, the Ngiyampaa People. The Ngiyampaa name for the tree is the Pilaar. The Pilaarrkiyalu or belah tree people of the Cobar Peneplain (also belong to the larger Ngiyampaa group) state that Pilaarr is a symbol of who the people are and represents their kinship with their ngurrampaa or campworld (Thackway & Creswell, 2000 citing Harris *et al.* 2000).

The CPBR supports 24 flora species that are listed under the TSC Act. Of these, 9 are listed as vulnerable and 15 as endangered, with one species, *Osteocarpum pentapterum*, presumed extinct in NSW (TSC Act). Several species found in the CPBR are listed as vulnerable in the EPBC Act (**Appendix 5**; see **Table 3** for description).

3.1.1.3 Significant Fauna of the Cobar Peneplain

The major vegetation types within the CPBR are largely indicative of the fauna found within them, for example, Masters & Foster (2000) could accurately predict distribution of bird species and particular bird assemblages based purely on vegetation type. Some fauna species are widespread across the bioregion, occurring across all major vegetation types such as Carnaby's Wall Skink (*Cryptoblepharus carnabyi*) and South-eastern Morethia (*Morethia* sp.), Short-beaked Echidna (*Tachyglossus aculeatus*), Eastern Grey Kangaroo (*Macropus giganteus*) and Inland Mastiff Bat (*Mormopterus* sp.), as well as many woodland birds such as the Blue-faced Honeyeater (*Entomyzon cyanotis*), Rainbow Bee-eater (*Merops ornatus,* an EPBC listed migratory species) and Mistletoe Bird (*Diacaeum hirundinaceum*).

Other base trends cited within the bioregional overview (Australian Terrestrial Biodiversity Assessment 2002) are:

- The Kultarr (*Antechinomys laniger*) a "marsupial mouse". Distribution has declined in NSW and the species now occurs in a patchy distribution to the west of the Bogan River, which borders the CPBR (Dickman *et al.* 1993 as cited in Morton *et al.* 1995). Changes in, or intensification of, land use, is thought to threaten its security (Strahan, 1983). The kultarr is now listed as endangered in Schedule 1 of the TSC Act.
- The Greater Long-eared Bat (*Nyctophilus timoriensis*) and Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*) are now sparsely distributed due to loss

of habitat. These bats rely on trees for roosting and the absence of sufficient vegetation has rendered them at risk of predation by cats (Dickman *et al.* 1993, cited in Morton *et al.* 1995). Both species are listed as vulnerable in Schedule 2 of the TSC Act.

- The bird species of the CPBR are fairly typical of semi-arid climatic zones, although this bioregion is unusual in that it contains a higher than average proportion of endemic Australian bird species, a reflection of its regionally distinct dry climate. Declines of these species in the small areas of woodland in the bioregion are likely to continue unless adequate representative areas of woodland are protected from clearing and over-grazing. Despite the scarcity of remnant mallee stands in the bioregion this vegetation supports significant populations of the also vulnerable (TSC Act) Striated Grasswren (*Amytornis striatus striatus*) (Garnett, 1992, cited in Morton *et al.* 1995). The Shining Bronze-cuckoo (*Chrysococcyx lucidus*) and Speckled Warbler (*Pyrrholaemus saggitatus*) also rely on these small remnants, and are considered to be in decline in the bioregion (Smith *et al.* 1994, cited in Morton *et al.* 1995).

Of the 88 mammal species found in the Western Division at the time of European settlement, 27 were thought to be regionally extinct by the 1990s, these species include the Bilby (*Macrotis lagotis*), Greater Stick-nest Rat (*Leporillus*), Eastern Hare-wallaby (*Lagorchestes leporides*) and the Bridled Nail-tail Wallaby (*Onychogalea fraenata*). Many feral animals are now commonly seen throughout the bioregion. Of the mammals in the bioregion, domestic livestock, goats, rabbits and foxes were the most conspicuous during surveys. Species such as the fox (*Vulpes vulpes*) are becoming more widespread through western NSW, and together with cats (*Felis catus*), prey on native species.

Although not formally listed under state or national legislation, other fauna species (64 birds, 12 mammals, 23 reptiles and 8 frogs) are identified as being of conservation concern because their numbers are declining or they are locally extinct within the bioregion (NPWS, 2000).

3.1.2 Significant Wetlands in the Bioregion and Region

Barnock Station Wetland Complex, Currawinya Lakes, Coorong and Lakes Alexandrina and Albert Lake, Hattah-Kulkyne Lakes, Macquarie Marshes Nature Reserve and Riverland are the only wetlands of international and national significance in the far western region and Lake Cargelligo is the only bioregionally significant wetland wholly within the CPBR.

In relation to the current assessment, there are no locally occurring wetlands other than artificial dams associated with past agricultural activities (**Figure 2**), although the nearby Sandy Creek, and further south, the Darling River both possess important aquatic ecosystems.

3.1.3 Bioregional, Regional Scale Conservation

3.1.3.1 Bioregional Scale Conservation

This section details the areas of land dedicated for conservation within the CPBR. The ultimate net loss of habitat (and species dependant on it) within the Survey Area can be contextualised against what habitat is protected from development within the same bioregion.

According to the Australian Terrestrial Biodiversity Assessment (2002) approximately one-third (2 298 800ha or 31.34%) of the CPBR has been cleared of its native canopy. The remaining two-thirds has experienced this type of clearing or other forms of clearing, e.g. understorey and loss of condition, but are not yet detectable at state-wide scale.

Areas under conservation management in the bioregion occupy 182,623.45ha or 2.49% of the total. Mechanisms provided for under the *National Parks and Wildlife Act 1974* (NPW Act) are responsible for most of the conserved area. The majority of this is taken up by the two national parks and nine nature reserves which occupy 116,450.90ha or 1.59% of the bioregion. None of these reserves are also managed as wilderness under the *Wilderness Act 1987*. Of the remaining conservation tenures under the NPW Act , there are no Aboriginal areas, no state recreation areas and no regional parks in the bioregion, but there is one historic site of 1365.09ha or 0.02% of the bioregion. No landholders have entered into voluntary conservation agreements under the NPW Act, although landholders on 11 properties have agreed to wildlife refuges and these collectively occupy an area of approximately 60077.73ha or 0.82% of the bioregion. Under the provisions of the *Forestry Act 1916*, State Forests occupy an area of 81139.24ha or 1.11% of the bioregion, and there is one flora reserve which occupies 1703.70ha or 0.02% of the bioregion. There are six property agreements under the *Native Vegetation Act 1997* (NVC Act) with an area of 2481.55ha or 0.03% of the bioregion (Australian Terrestrial Biodiversity Assessment 2002).

It is noteworthy that Nymagee forms the general boundary between the Western and Central Divisions of NSW land administration regions. Land in the Western Division is generally held in perpetual leases with limitations on land use reflected by the higher retention of native vegetation compared to the mainly freehold lands of the Central Division (NPWS, 2001b).

3.1.3.2 Regional Scale Conservation

Bolwara and Cumbine State Forests are situated approximately 11km and 12km, respectively, to the south and east of the Project Site. There are several natural places listed in the Register of the National Estate in the Cobar LGA, however, they are not relevant to the Survey Area.

3.1.4 Regional Wildlife Corridors in the Cobar Peneplain Bioregion

The Nymagee-Rankin Springs (NRS) subregion of the Western CMA is considered to be the most vegetated and intact portion of the Cobar Peneplain. Ground dwelling species have few physical barriers preventing dispersal, but are more affected by the impacts of habitat removal from high feral goat and kangaroo populations. Ground dwelling animals within the Critical Weight Range would have very limited safe opportunities for dispersal in the region due to the lack of ground debris. Although Koala populations have declined in the CPBR, they have potential to use the Project Site (60% Bimble Box).

3.2 LOCAL ENVIRONMENTAL CONTEXT

At a smaller scale, the Project Site is situated within the Western Nymagee-Ranking Springs (NRS) Catchment Management Authority (CMA), bordering the Central West NRS CMA to the east of the Project Site.

3.2.1 Topography

The topography surrounding the Project Site is flat to gently undulating with elevations typically between 325m Australian Height Datum (AHD) and 375m AHD. Isolated, steep-sided hills that occur surrounding the Project Site, include the following.

- Mount Shume (482m AHD) located approximately 23km to the west-southwest of the Project Site.
- Mount Priory (438m AHD) located approximately 17km to the northwest of the Project Site.
- Mount Nymagee (519m AHD) located approximately 10km to the north of the Project Site.
- Mount Babinda (437m AHD) located approximately 22km to the northwest of the Project Site.
- Mount Hathaway (484m AHD) located approximately 10km to the south-southeast of the Project Site.

Elevations within the Project Site range from approximately 240m AHD to approximately 220m AHD in the southern half of the Project Site, in the vicinity of the storage dams, Pete's Tank and the Back Tank. The Surface Facilities Area would be located on a colluvial slope adjacent to the prominent, low hill known as the "Peak" which rises to 266m AHD (Skirka & David, 2003).

3.2.2 Hydrology

Surface waters in the general Surface Facilities Area location flow from 'Peak' hill to a number of ephemeral, poorly defined drainage lines. The majority of these drainage lines have been artificially constructed to strategically divert surface waters to four bunded dams on the property. Pete's Tank and Back Tank are located to the southeast and southwest within the Project Site and are proposed to be extended to ten times their existing volumes as part of this Project.

The Project Site is located in the headwaters of the Box Creek Catchment which flows generally to the west. Box Creek is located approximately 1.5km to the northwest of the Project Site and has headwaters crossing the western section of the Project Site flowing north.

Rain events are generally heavy and short in duration and results in flooding across the Project Site. Recent flooding on the southern half of the Project Site was evident during field survey.

3.2.3 Climate

Nymagee is in the semi-arid zone of NSW. On average, January is the hottest month with a mean maximum temperature of 35.0°C at the Cobar Post Office (closest official monitoring station). July is, on average the coolest month with an average maximum temperature of 16.0°C and an average minimum temperature of 5.0°C (BOM, 2010). Annual rain fall recorded at the Cobar Post Office is 352.8mm.

3.2.4 Vegetation

Native vegetation within and surrounding the Project Site can be broadly described following the *BioMetric* classification system as Poplar Box – Gum-barked Coolibah – White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion (Benson 103). This is part of the Semi-arid Woodlands (Shrubby sub-formation) vegetation formation and Western Peneplain Woodlands vegetation class. Further information on vegetation has been provided in the results section of this report.

3.2.5 Geology and Soils

The regional geology is associated with the Girilambone Group, Silurian Granitoids, the Mouramba Group, the Lower Amphitheatre Group and Shume Formation.

3.2.6 Existing Levels of Disturbance

"The Peak" property has a long and comprehensive history of surface and sub-surface disturbance relating to agricultural activities, and past and present mining exploration activities. Feral goat grazing and alluvial and colluvial processes during frequent flooding events have also compounded the level of current and ongoing surface disturbance.

Historic prospecting is indicated by the presence of a shallow shaft (approximately 30m deep) in the vicinity of "The Peak" topographic feature, approximately 26km of cleared grid lines over the Hera deposit area and approximately 50km of tracks and access roads. Prospecting on "The Peak" property apparently dates to the mid–1800s to early 1900s. According to Skirka and David (2003) the Hera deposit was initially identified by Buka Minerals in 1974. This was followed by drilling into sub-economic mineralization by CRA Exploration Pty Ltd (CRAE) in 1984 and Pasminco in 2000. In 2003, Triako Resources Ltd acquired the Hera Prospect and additional diamond drilling confirmed the continuity of high-grade gold mineralization and extended the prospect to the north (Skirka & David, 2003). More recently the Proponent acquired "The Peak" property including the Hera deposit and extended the diamond drilling and exploration activities to within the Project Site. There have been over 100 drill pads established over the Hera Deposit, with each pad being approximately 45m^2 (**Plate 5**).

Numerous ring-barked trees are the only surviving evidence of the Red Box and Mugga Ironbark that once would have populated the existing vegetation (**Plates 11** and **12**). Most of the local area has been selectively logged over the years (to supply hardwood to the Nymagee Copper Smelter up until 1920). Since this time, areas have been recolonised by White Cypress Pine, Bimble Box, Wilga, Budda, Turpentine and chenopods. Native shrub and tree invasion is a well-documented phenomenon on the Cobar Peneplain (Cobar Vegetation, 2006). According to R.W Corkery (2006), approximately 200ha of the property had been previously cleared for the purpose of woody weed management and maintaining stock carrying capacity. Currently approximately 52ha are cleared around the homestead in the north-western portion of the Project Site. It is likely that the only portions of land that remain relatively undisturbed today would be inaccessible to machinery and generally unsuited for agricultural grazing (i.e. hill sides and tops of steep rocky escarpments). However, the siliceous "Peak" hill itself is currently inhabited by feral goats and historically had quartz extracted and supplied to the Nymagee Copper Smelter (**Plate 3**).

In summary, the vegetation in the Project Site is native, yet derived[1] (**Plates 1** and **2**) as a result of the extensive and ongoing surface and sub-surface disturbances. This, however, does not preclude the ability for threatened species of animal to occur. For example, the ringbarked trees provide an overabundance of hollows and fissures for bats, birds, reptiles and marsupials to nest and roost within. Permanent water, as a result of damming, in addition to grasses in cleared areas, has created artificial habitats that support a variety of small species of birds (**Plate 15**).

4. DESKTOP AND BACKGROUND INFORMATION

4.1 PREVIOUS VEGETATION MAPPING / DESCRIPTIONS

Several assessments have been undertaken in an attempt to classify vegetation around NSW. Reports on the vegetation of the Cobar and Nyngan district had been produced as early as the 1900s by Cambage (1900a and b). In 1911 and 1913 Haviland reported on the indigenous plants of the Cobar district. Moore (1973) made observations on the ecology and control of invasive native scrub on mulga lands in north-western NSW and produced an annotated checklist of the vascular plants in part of north-western NSW in 1984.

Morgan & Terrey (1992) undertook a bioregional assessment within NSW in an attempt to classify areas based on functional and geological differences. They identified the five sub regions / provinces within the Cobar Peneplain. The Project Site is within the Nymagee Downs Province (**Table 2**), which represents 28% of the total area of the Peneplain and is about equally contained within Western and Central Divisions. About 50% of vegetation within this Province has been cleared. Land system mapping of the Cobar Peneplain appears to have mostly occurred in the Western Division with the Central Division incompletely mapped. About 27% of the Nymagee Downs Province is unmapped. The land system mapping which has occurred in Cumbine State Forest has identified four land systems all of which have been identified as the most important land systems on the basis of rarity and endemism within the CPBR.

Table 2
Environmental Context of Nymagee Downs Area Extracted From Morgan & Terrey (1992)

Province	Geology	Landscape Features	Soils	Vegetation
Nymagee Downs	Ordovician to Devonian granites, quartzose sandstones, phyllites, slates and acid volcanics. Quaternary aeolian sands and alluvium.	Low hills and ridges with steep slopes. Form controlled by rock type, rounded hills with tors on granite, asymmetric strike ridges in sedimentary rocks. Sandplains from adjacent bioregions lap onto lower slopes.	Gritty red and yellow earthy sands on granite. Stony red earths and texture contrast soils on sedimentary rocks. Calcareous red earths in sandplains, minor earths and grey clays in alluvium.	Dwyer's mallee gum, White Cypress Pine, kurrajong, golden wattle on granite crests, Bimble Box and Red Box on slopes and creeks. White Cypress Pine, Red Box, belah with mallee, western wattle grey box and rosewood on crests and slopes of Sedimentary rocks. Mallee communities on sandplains. Dense Bimble Box and White Cypress Pine in creek lines.

[1] Meaning that different densities and abundances of certain shrubs, grasses and trees species existed pre and post European contact in the Project Site and broader locality i.e. less palatable plants now dominate and palatable ones are infrequent.

More recently, a number of botanical surveys have been undertaken within the CPBR and vegetation maps produced. Thackaway & Cresswell (2000) originally mapped the vegetation of the entire CPBR following on from Morgan and Terrey (1992). The vegetation of the Central Division of the NSW was classified and mapped using high resolution aerial photography and limited field assessment as part of the NSW National Parks and Wildlife Service mapping series (Metcalfe *et al.* 2003).

A review of the map produced for the NSW National Parks and Wildlife Service noted above shows that the Project Site is unmapped. However, Cumbine State Forest (situated approximately 12km to the east of the Project Site) has been mapped. Due to the close proximity and similar landform features of Cumbine State Forest to the Project Site, the following vegetation types can be extrapolated to apply to the Project Site resulting in three potential vegetation types occurring within it:

- Poplar Box Woodlands on flats and open depressions, red earths, grey and brown clays. Bimble Box (*Eucalyptus populnea bimble*), White Cypress Pine (*Callitris glaucophylla*), Rosewood (*Alectryon oleifolius*), Pin Bush (*Acacia colletioides*) and Cooba (*Acacia salicina)* are commonly recorded.
- Red Box, Poplar Box and Pine Woodlands occur on undulating rises, slopes, flats and open depressions, red earths and quartose and alluvial and colluvial deposits. Likely species to be encountered consist of Bimble box (*Eucalyptus populnea bimble*), Red Box (*Eucalyptus Intertexta*), White Cypress Pine *(Callitris glaucophylla*), Western Rosewood (*Alectryon oleifolius*).
- Dwyer's Red Gum, Ironbark and Green Mallee Woodlands occur on hills and ridges with gravelly to sandy red earths red brown and yellow earths and lithosols. Likely species to be encountered consist of *Eucalyptus dwyeri* (Dwyer's mallee gum), *E. sideroxylon* (Mugga Ironbark), *Callitris glaucophylla* (White Cypress Pine) and *Allocasuarina luehmannii* (Bulloak).

Keith (2004) mapped the vegetation formations in NSW and the ACT where a 'Vegetation Formation' is the top level of the classification hierarchy and relates to broad groups distinguished by structural and physiognomic features (rough statistical correlations between physical features). This is the minimum level of vegetation mapping in NSW. Vegetation Classes are groups of vegetation defined by overall floristic similarities within a vegetation formation; the next refinement of vegetation is a community. Vegetation communities are the basic unit that State and Commonwealth departments use to list for legislative protection. Plant communities are the most detailed level of mapping unit. They are homogeneous species that live together at the same time.

Native vegetation within the Project Site is part of the Semi-arid Woodlands (Shrubby sub-formation) Vegetation Formation, and is composed of the smaller Western Peneplain Woodlands Vegetation Class which is locally represented by poplar / Bimble Box (*Eucalyptus populnea subsp. bimbil*), Western Red Box (*Eucalyptus intertexta*) and White Cypress Pine (*Callitris glaucophylla*).

The most relevant and specific vegetation mapping undertaken over the current Survey Area was undertaken by Dykes (2002), who used satellite imagery and ground checking to map the vegetation of the Cobar Shire in the CPBR. According to that work, Belah Mallee Low Open-woodland (BCW) and Bimble Box Sinks Low-woodland (BOW) with pockets of Pine Woodland (CPW), Bimble Box Flats Woodland (BFW) occur over a large proportion of the Project Site.

During recent years OEH has been conducting extensive mapping and research within the CPBR aimed at describing and recording many of the natural assets (DECCW 2008 citing Gibbons *et al.* 2005) of the bioregion. Benson *et al.* (2006) and Benson (2008) have reviewed all previous published and much of the unpublished work on the topic to compile a comprehensive list and descriptions of the plant communities of the NSW western plains as part of a major project, the NSW Vegetation Classification and Assessment (NSWVCA) also referred to as the BioMetric database, to classify the vegetation of NSW. The vegetation communities recognised by Benson *et al.* (2006) forms the basis of a standard vegetation classification for the NSW State. Accordingly, the Benson *et al.* (2006) classification has been adopted for this assessment.

4.2 PREVIOUS ECOLOGICAL STUDIES

4.2.1 Cobar Peneplain Assessments

Several broad ecological assessments have been undertaken over the Cobar Peneplain. Masters and Foster (2000) investigated fauna distribution of the Cobar Peneplain and have reported that vegetation types occurring in the Cobar Peneplain allow fairly accurate predictions of the distribution of bird species and particular bird assemblages. Fauna surveys undertaken during the Cobar Peneplain bioregional assessment also concluded that major vegetation types were largely indicative of the fauna found (NPWS, 2001a and b).

Five general vegetation types (belah woodlands, mallee woodlands, White Cypress Pine - Bimble Box - Red box woodlands, riverine woodlands of Bimble Box and River Redgums and Mulga shrublands) within the Cobar Peneplain were assessed as part of the survey. Over 200 species of native fauna were recorded within these five vegetation types, including, 132 bird species, 40 reptile species, 24 mammal species (including 13 species of bat) and eight frog species. Although the Masters and Foster (2000) assessment did not survey sites within the Nymagee area, the vegetation types assessed and thus habitat available for threatened species would be expected to be similar within the Nymagee area to those discussed the Masters and Foster (2000) report.

4.2.2 Regional Development Driven Studies

Flora and fauna assessments have been undertaken over other mine sites in the Cobar region that are not mentioned in the following subsections; including the CSA Mine (Roderick *et al.* 1999 and Parsons Brinckerhoff Australia Pty Ltd 2006), Peak Gold Mines (including "The Peak"; Chesney Deposit; Perseverance**;** *New Cobar and New Occidental)*. However, these assessments prepared by other consultancies were unable to be obtained for review in this report.

Wonawinta Silver Project

Ecological survey for the Wonawinta Silver Project recently undertaken by OzArk (OzArk, 2010), covered the proposed Mine Site and the northern section of a water pipeline located approximately 50–80km to the west of the Mine Site. The areas surveyed comprised general Bimble Box (*E. populnea*) and White Cypress Pine (*Callitris glaucophylla*) dominated woodlands. No EECs or threatened plants were recorded in that survey.

Four threatened fauna species, however, were recorded in that survey including the Grey-crowned Babbler (TSC Act) and Halls Babbler (TSC Act) in woodland with good understorey. Major Mitchell's Cockatoos (TSC Act) and Superb Parrots (TSC & EPBC Acts) were observed

overflying the Wonawinta Survey Area. Threatened species also known to occur within the Wonawinta Mine Site include the Malleefowl, Spotted Harrier, and Kultarr. While potential habitat associated with sandstone outcrops was noted for Stimpson's Python (TSC Act), the cool weather proved an obvious constraint to observing this species. Eight species of microbats including 377 passes were detected within five habitat types over the Mine Site. Two threatened species of microbat the Yellow-bellied Sheathtail Bat *(Saccolaimus flaviventris)* and Little Pied Bat *(Chalinolobus picatus)* were recorded.

Given that similar landscape features (Bimble Box / mallee vegetation, tanks and sandstone outcrops) exist within locations of the Wonawinta and Hera Projects, it is likely that a similar assemblage of species will be present within both sites.

Mineral Hill Open Cut Mine

In 2007 OzArk undertook an ecological assessment of Mineral Hill Open Cut Mine, located 70km north of Condobolin (situated approximately 100km southwest of Nymagee). Vegetation recorded in this assessment was consistent with Keith's (2004) Western Peneplain Woodlands (OzArk, 2007) with the following sub-communities noted below.

- Dwyer's mallee gum (*Eucalyptus dwyeri*) community
- Red ironbark (*E. sideroxylon*) community
- Bellah (*Casuarina cristata*) community
- Grey box (*E. microcarpa*) bimble / Bimble Box (*E. populnea*) and White Cypress (*Callitris glaucophylla*).

No species of threatened plants were recorded; however, two EECs were recorded as noted below.

- Aquatic Ecological Community in the Natural Drainage System of the Lowland Catchment of the Lachlan River
- The Lowland Catchment of the Lachlan River is part of the Murray-Darling Basin. Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.

47 species of bird including three threatened species were recorded as noted below.

- Hooded Robin (*Melanodryas cucullate*, TSC Act);
- Grey Crowned Babbler (*Pomatostomus temporalis temporalis*, eastern subspecies TSC Act); and
- Barking Owl (TSC Act).

Ten species of microbat, including two threatened species (Yellow-bellied Sheathtail Bat and Little Pied Bat) were recorded within their Survey Area. 12 reptiles and a kangaroo and an echidna were the only other species recorded.

Elliot trapping for three consecutive nights during this assessment did not detect any native ground dwelling fauna.

Tallebung Mine

In 2008 OzArk undertook an ecological opportunities and constraints assessment of 400ha at the Tallebung Mine, 75km northwest of Condobolin, NSW (situated approximately 80km southwest of Nymagee).

Vegetation formations recorded include:

- Poplar Box – Gum-barked Coolibah – White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion (Benson 103) on flatter areas with deeper alluvial soils;
- Mugga Ironbark - Inland Grey Box – White Cypress Pine tall woodland of the NSW South Western Slopes Bioregion (Benson 217) on the lower slopes;
- Green Mallee – White Cypress Pine woodland on gravelly rises of central NSW (Benson 176) on the rocky hilltops; and
- Disturbed areas.

The effects of a prolonged drought combined with grazing feral animals reduced the potential for undetected threatened species of plants to remain extant within the Tallebung Mine Survey Area.

Two NSW threatened species of animals were formally recorded (Eastern Bent-wing Bat and Major Mitchell's Cockatoo). The Pink or Major Mitchell's Cockatoo was utilising large standing bodies of water adjacent to their Survey Area (former open cut areas) and using trees at the edge of the pits to roost in and survey for any danger prior to alighting to drink.

The Eastern Bent-wing Bat was recorded at the most western extent of its known distribution and was not predicted to occur by the OEH database. It was recorded within a deep (>50m) disused mine shaft 100m of the former open cut area.

Elliot trapping for three consecutive nights during this assessment did not detect any native ground dwelling fauna.

Endeavour Mine

An ecological assessment of Endeavour Mine (situated approximately 47km northwest of Cobar) was undertaken by OzArk in 2009. Poplar box - mulga - Ironwood woodland on red loam soils on plains in the Cobar Peneplain and eastern Mulga Lands Bioregions (Benson 109) was recorded within the Endeavour Mine Survey Area. Predominantly birds with the ability to utilise forest remnants, western invasive native scrub and disturbed environments were observed within, or overflying the Survey Area during the survey. 47 species of fauna were recorded with three species listed as threatened in NSW including Major Mitchell's Cockatoo and two species of microbat. Elliot trapping for three consecutive nights during the assessment did not detect any native ground dwelling fauna.

Mt Boppy Mine Ecology Assessment

OzArk undertook ecological survey of the Mount Boppy Mine Site in April 2011, located approximately 70km north of Nymagee near Canbelego (OzArk in prep). 120 species of fauna were recorded in the Project Site. These can be broken down into:

- 67 species of birds;
- Nine species of mammal including three marsupials and 11 species of microbat;
- 15 species of reptile including three frogs, three snakes and nine species of lizard / gecko.

10 threatened species were recorded in the Mt Boppy Survey Area including the: Yellow-bellied Sheathtail Bat, Little Pied Bat, Superb Parrot, Kultarr, Inland Forest Bat, Speckled Warbler, Pied Honeyeater, Grey-crowned Babbler, Grey Falcon and Black Chinned

Honeyeater. It is noteworthy that the Mt Boppy Survey Area has similar vegetation communities (Benson 103) to the current survey area and a similar assemblage of recorded species.

4.2.3 Local Development Driven Studies

Hera Deposit Ecology Assessment

An ecological assessment was undertaken by Charles Sturt University Johnstone Centre – Environmental Consulting (CSUJC-EC, 2006) as part of studies conducted to allow preparation of a *Review of Environmental Fact*ors (2006) for the proposed exploration of the Hera Deposit (2006). The flora survey in that study revealed 171 species of plants from 58 families. Of these species, 16% were exotics with the remaining being native species (including cosmopolitan species). No threatened flora species were recorded during the survey. The report noted that, approximately 95% of the site was covered by native vegetation, dominated by White Cypress Pine, Red Box and Bimble Box. The following five main vegetation communities were identified:

- Bimble (Poplar) Box / White Cypress Pine woodland
- Red Box / White Cypress Pine woodland
- Mallee (*Eucalyptus* spp.)
- Mugga Ironbark / White Cypress Pine woodland
- Cleared grassland / shrubland.

Native species generally dominated the ground cover of woodland and forested areas. The report noted that the diversity of ground cover was characterised by past and present disturbance history, with diversity generally poorer in areas that had been heavily grazed.

The fauna survey revealed that the Survey Area supports a high diversity of native fauna, particularly given the survey effort employed and timing of surveys. A total of 145 vertebrate fauna (139 native and six introduced) species were recorded within the Survey Area during surveying times and incidental observations comprising:

- 23 reptile species (no threatened or species of conservation concern);
- 7 frog species (no threatened or species of conservation concern);
- 95 bird species including nine threatened and 13 species of conservation concern; and
- 20 mammals including one threatened and one species of conservation concern.

Four Yellow-footed Antechinus (species of conservation concern with the Cobar Peneplain and Western Division of NSW - Dickman *et al.* 1993) were trapped within the rocky outcrop of the Peak area in December 2004. Trapping was also conducted in other areas of suitable habitat with only one House Mouse (September 2005) being captured.

The following threatened species were recorded within the property, at locations marked in **Figure 3**, as a result of the flora and fauna survey

- Major Mitchell's Cockatoo (*Cacatua leadbeateri*);

- Grey-crowned Babbler (*Pomatostomus temporalis temporalis*, eastern subspecies);
- Hooded Robin (*Melanodryas cucullate*);
- Chestnut Quail-thrush (*Cinclosoma castanotus*);
- Speckled Warbler (*Pyrrholaemus saggitatus*);
- Pied Honeyeater (*Certhionyx variegates*);
- Diamond Firetail (*Stagonopleura guttata*);
- Superb Parrot (*Polytelis swainsonii*);
- Black-chinned Honeyeater (*Melithreptus gularis gularis*, eastern subspecies); and
- Little Pied Bat (*Chalinolobus picatu*s).

Cumbine State Forest Biodiversity Survey

In 2007 a biodiversity survey was undertaken over four days in Cumbine State Forest, located 15km east of Nymagee by NSW National Parks. A total of 122 plant species were recorded during the survey, including 110 native species. Vegetation communities sampled via the quadrat method included:

- White Cypress Pine Woodland;
- Mallee Woodland;
- Micromyrtus Heathland; and
- Green Mallee Woodland.

A total of 91 bird species were identified during the survey. Of these, eight are listed as Vulnerable under the TSC Act

- Black-chinned Honeyeater (*Melithreptus gularis gularis*, eastern subspecies);
- Hooded Robin (*Melanodryas cucullate*);
- Chestnut Quail-thrush (*Cinclosoma castanotus*);
- Speckled Warbler (*Pyrrholaemus saggitatus*);
- Superb Parrot (*Polytelis swainsonii*);
- Major Mitchell's Cockatoo (*Cacatua leadbeateri*);
- Grey-crowned Babbler (*Pomatostomus temporalis temporalis*, eastern subspecies); and
- Brown Treecreeper (*Climacteris picumnus victoriae*).

The Superb Parrot is also listed as Vulnerable under the EPBC Act.

A total of 26 mammal species including 16 native species were identified using targeted fauna survey techniques. A further four native species were considered as probably occurring in Cumbine State Forest. The report concluded that Cumbine State Forest shelters significant bird species for the region and is testament to the importance of the remaining fragments of natural areas in the western part of the state.

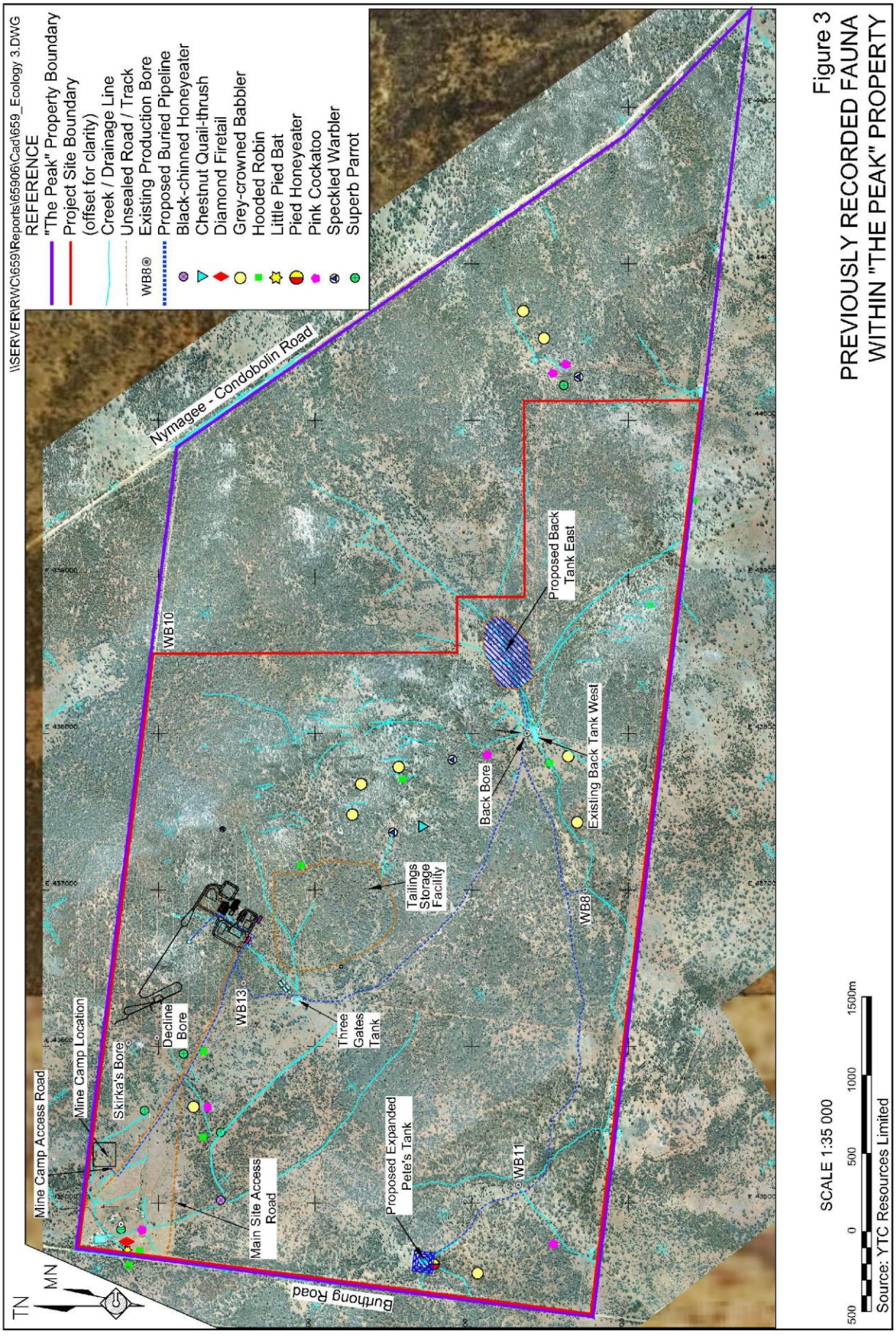


Figure 3
PREVIOUSLY RECORDED FAUNA
WITHIN "THE PEAK" PROPERTY

4.3 SUMMARY OF PREVIOUS ECOLOGICAL ASSESSMENTS

Vegetation in the Western Catchment Management Authority (CMA) is generally homogenous as a result of the underlying red soils, dominated by Bimble Box / White Cypress Pine Woodland and Mallee Woodland, and as demonstrated in previous studies noted above, fauna occurrence can be predicted by vegetation type. It is unlikely that species or vegetation not known for the area would be newly recorded within the Project Site.

4.4 DATABASE SEARCHES

4.4.1 Introduction

Table 3 presents a summary of the results of searches of the databases indicated for listed species, ecological communities and populations. Copies of the OEH, NSW Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS) and Commonwealth Department of Sustainability Environment, Water, Population and Communities (DSEWPaC) Protected Matters (EPBC Act) threatened species database searches have been provided as **Appendices 4** and **5**. Results of these searches are expanded and commented upon in the following sections.

Table 3
Desktop Database Search Results[2]

Page 1 of 2

Database Searched	Date of Search	Type of Search	Comment
Department of Sustainability Environment, Water, Population and Communities (DSEWPaC) Protected Matters (EPBC Act) Database: http: / / www.environment.gov.au / erin / ert / epbc / index.html	1.6.2011	Protected Matters Search: Point data search on Project Site with 10km buffer.	Two EECs, eight threatened species, 11 migratory species, one Commonwealth Lands, eight Listed Marine Species. Search indicates whether species or species habitat may or are likely to occur within area.
Department of Environment and Climate Change (OEH) Threatened Species online database: http: / / www.threatenedspecies.environment.nsw.gov.au / index.aspx	31.6.2011	Combined geographic and habitat search in Western (Nymagee-Rankin Springs) Catchment Management Authority and Central West (Nymagee-Rankin Springs) Catchment Management Authority	40 items predicted or known to occur in the Western (Nymagee-Rankin Springs) CMA. Two EECs, four threatened plants and 36 threatened fauna species. 44 items predicted or known to occur in the Western (Nymagee-Rankin Springs) CMA. Two EECs, four threatened plants and 38 threatened fauna species.

[2] It is noteworthy that where possible, the smallest search area, i.e. the Western (Nymagee –Rankin Springs) CMA was used. Where this selection was not possible on the database the larger Western CMA or Cobar LGA was used instead.

Table 3 (Cont'd)
Desktop Database Search Results[3]

Database Searched	Date of Search	Type of Search	Comment
NSW Government Wildlife Atlas GIS request. License Number CON99042	9.4.2010	Western Catchment Management Authority and Western (Nymagee-Rankin Springs) Catchment Management Authority	101 species of threatened fauna have been previously recorded within the Western CMA with 15 fauna species previously recorded in the Western (Nymagee-Rankin Springs) CMA. This includes: 10 threatened species previously recorded by CSUJC-EC (2006) within the Project Site. 60 species of threatened plant previously recorded within the Western CMA with only two of these previously recorded within the Western (Nymagee-Rankin Springs) CMA.
NSW Government Wildlife Atlas online database. http://wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/watlas.jsp)	31.5.2011	Selected Area 145.72000,-32.51000, 147.25000,-31.54000	Threatened Plants: Returned a total of 14 records of five species. Threatened animals: returned a total of 272 records of 26 species.
NSW Legislation website: SEPP 44: Koala Habitat Protection: http: // www.legislation.nsw.gov.au / fragview / inforce / epi%2B5%2B1995%2Bcd%2B0%2BN?	31.5.2011	Schedule 1: LGAs listed and Schedule 2: Feed Trees listed	Cobar LGA is not listed. However, koalas have potential to occur.
NSW DTIRIS – Records Viewer http://www.dpi.nsw.gov.au/fisheries/species-protection/records/viewer	31.5.2011	Protected aquatic biodiversity in the Cobar LGA.	Freshwater Catfish, Murray Cod and Silver Perch listed as occurring in the Cobar LGA. None previously recorded in the Project Site or in the locality of the Project Site
NSW DTIRIS - Noxious Weeds http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed	31.5.2011	Cobar LGA	85 listed noxious weeds.
Cobar Local Environmental Plan	9.4.2010	Local Environmental Plan	Nothing relevant to the Survey Area and the surrounds.
Cobar Shire Council (CSC)	29.3.2011	N/A	CSC have indicated that they are interested in the number of hollow bearing trees in projects within the Cobar LGA.

4.4.2 Significant Flora

A NSW Wildlife Atlas request (carried out on the 9th of April 2010), identified 60 species of threatened plant previously recorded within the Western CMA with only two of these (*Rulingia procumbens* and *Pterostylis cobarensis*) previously recorded within the Western NRS CMA

[3] It is noteworthy that where possible, the smallest search area, i.e. the Western (Nymagee –Rankin Springs) CMA was used. Where this selection was not possible on the database the larger Western CMA or Cobar LGA was used instead.

(**Table 4**). An additional search of the NSW Wildlife Atlas online database (carried out on the 31st of May 2011) revealed further species recorded in the searched area (centred over the Project Site). OEH identifies a further two species of threatened plant (*Diuris Tricolor* and *Atriplex infrequens*) listed on the TSC Act as likely to occur in the Western NRS CMA, with one further threatened species of plant (*Monotaxis macrophylla*) identified as likely to occur within the adjacent Central West (NRS) CMA. Species considered as having potential to occur are discussed in **Table 4**.

Table 4
Threatened Plants Species Previously Recorded in the Western NRS CMA and Predicted by DSEWPaC and OEH as Likely To Occur In The Western NRS CMA and Central West NRS CMA

Page 1 of 2

Scientific Name	Common Name	Threat[1]	Database[1]						Comment - Prediction
			1	2	3	4	5	6	
Acacia curranii	Curly-bark Wattle	V EPBC Act							Not recorded. Species or species habitat likely to occur within the Project Site. Mallee and ridge communities have already been highly disturbed in the Project Site which reduces the potential of recording this species, however a targeted search is still required.
Austrostipa metatoris	A Speargrass	E EPBC Act E TSC Act							Not recorded. Listed by DSEWPaC as species or species habitat likely to occur within the Project Site.
Austrostipa wakoolica	A Speargrass	E EPBC Act E TSC Act							Not recorded. OEH database predicts species is likely to occur in the Central West NRS CMA.
Atriplex infrequens	A Saltbush	V TSC Act							Not recorded. Listed on the OEH database as likely to occur in the Western NRS CMA. Predicted habitat does not occur in the Project Site.
Bothriochloa biloba	Lobed Bluegrass	V EPBC Act							Not recorded. Targeted species search is required. Not in EBPC searched area but considered likely due to previous survey results in analogous habitat.
Diuris tricolor	Pine Donkey Orchid	V TSC Act							Wildlife Atlas: four records. Species recorded in Wildlife Atlas online database search. Listed by DSEWPaC as species or species habitat likely to occur within the Project Site. OEH database predicts species is likely to occur in the Western NRS CMA and Central West NRS CMA.
Monotaxis macrophylla	Large-leafed Monotaxis	E TSC Act							Wildlife Atlas: three records. Species recorded in Wildlife Atlas online database search. OEH database predicts species is likely to occur in the Central West NRS CMA.
Pterostylis cobarensis	Cobar Green Hood Orchid	V EPBC Act V TSC Act							Listed on all databases. Previously recorded in Western NRS CMA (Wildlife Atlas: One record). Species recorded in Wildlife Atlas online database search (three records). Habitats are eucalypt woodlands, open mallee or Callitris shrublands on low stony ridges and slopes in skeletal sandy-loam soils.

Table 4 (Cont'd)
Threatened Plants Species Previously Recorded in the Western NRS CMA and Predicted by DSEWPaC and OEH as Likely To Occur In The Western NRS CMA and Central West NRS CMA

Scientific Name	Common Name	Threat[1]	Database[1]						Comment - Prediction
			1	2	3	4	5	6	
Pterostylis cobarensis (Cont'd)	Cobar Green Hood Orchid	V EPBC Act V TSC Act							Likely to occur within the Project Site. Targeted search during the flowering period is required.
Rulingia procumbens	No common name	V EPBC Act V TSC Act							Wildlife Atlas: six records. Previously recorded in Western NRS CMA approximately 20km west of Project Site. Species recorded in Wildlife Atlas online database search (one record). OEH database predicts species will occur in the Western NRS CMA. Likely habitat exists for this species in the Project Site and as such a targeted search is required.
Swainsona sericea	Silky Swainsona Pea	V TSC Act							Wildlife Atlas: One record. Species recorded in Wildlife Atlas online database search. Habitat unlikely to occur in the Project Site.

Note 1: Key to datadases
1. OEH Central West (Nymagee Rankin Springs) CMA
2. OEH Western (Nymagee Rankin Springs) CMA
3. Wildlife Atlas request Western (Nymagee Rankin Springs) CMA (April 2010)
4. Wildlife Atlas online database area search (May 2011)
5. CSUJC-EC (2006) records
6. DSEWPaC Protected Matters search

Key to Threat Classification
V – Vulnerable (TSC Act or EPBC Act)
E – Endangered (EPBC Act)
E1 – Endangered (TSC Act)
E2 – Endangered Population (TSC Act)
E4 – Presumed Extinct(TSC Act)
E4A – Critically Endangered (TSC Act)

4.4.3 Noxious Weeds

A search of the NSW DTIRIS Noxious Weeds List was carried out on the 31 May 2011 to elucidate weeds declared noxious in the Cobar Local Government Area LGA. 85 noxious weeds were returned as a result of the search, with all having potential to be recorded within the Survey Area.

4.4.4 Significant Fauna

OEH predicts that 34 threatened fauna species listed in the schedules of the TSC Act have potential to occur in the Western NRS CMA. 38 threatened fauna species identified in the Central West NRS CMA OEH database search are also included in **Table 5**. The majority of the records are centred on areas with a large 'patch size' of native vegetation. Of these, the Major Mitchell's Cockatoo, Grey-crowned Babbler, Brown Treecreeper, Chestnut Quail-thrush and several robin species are the most frequently recorded threatened species in the locality.

Table 5

Threatened Fauna Species Previously Recorded in the Western NRS CMA and Listed by DSEWPaC and OEH as Likely To Occur In The Western NRS CMA and Central West NRS CMA

Scientific Name	Common Name	Status	Database Records[1]						Comment Wildlife Atlas Western NRS CMA	Prediction
			1	2	3	4	5	6		
Antechinomys laniger	Kultarr	E1 TSC Act	■	■	■		■		Four records. Recorded 2km east of Nymagee.	Habitat likely to occur in the Project Site.
Ardeotis australis	Australian Bustard	E1 TSC Act		■						Habitat for this species has potential to occur in the Project Site.
Ardea alba	Great Egret	EPBC Act						■		Habitat for this species does not occur in the Project Site.
Ardea ibis	Cattle Egret	EPBC Act						■		Habitat for this species does not occur in the Project Site.
Botaurus poiciloptilus	Australasian Bittern	E TSC Act	■	■						Habitat for this species is unlikely to occur in the Project Site as no permanent freshwater wetlands exist.
Burhinus grallarius	Bush Stone-curlew	E TSC Act	■	■						Habitat for this species has potential to occur in the Project Site.
Cacatua leadbeateri	Major Mitchell's Cockatoo	V TSC Act	■	■	■	■	■		Four records (10 individuals). Species recorded 2km northeast of Project Site.	Habitat for this species is likely to occur in the Project Site.
Calyptorhynchus lathami	Glossy Black-cockatoo	E2 TSC Act	■				■			Habitat for this species has potential to occur in the Project Site.
Calyptorynchus banksii	Red-tailed Black Cockatoo	V TSC Act					■			Habitat for this species has potential to occur in the Project Site.
Certhionyx variegatus	Pied Honeyeater	V TSC Act	■	■	■	■	■		One record	Known to occur in Project Site. Habitat likely to occur in the Project Site.
Cinclosoma castanotus	Chestnut Quail-thrush	V TSC Act				■				Known to occur in Project Site. Habitat likely to occur in the Project Site.
Chalinolobus picatus	Little Pied Bat	V TSC Act	■	■	■	■	■		Three records. Species recorded 2km northeast of Project Site.	Habitat for this species likely to occur in the Project Site.

Table 5 (Cont'd)
Threatened Fauna Species Previously Recorded in the Western NRS CMA and Listed by DSEWPaC and OEH as Likely To Occur In The Western NRS CMA and Central West NRS CMA

Scientific Name	Common Name	Status	Database Records[1]						Comment Wildlife Atlas Western NRS CMA	Prediction
			1	2	3	4	5	6		
Circus assimilis	Spotted Harrier	V TSC Act	■	■			■			Habitat for this species has potential to occur in the Project Site.
Climacteris picumnus	Brown Treecreeper	V TSC Act			■	■	■		One record (three individuals)	Known to occur in Project Site. Habitat likely to occur in the Project Site.
Crinia sloanei	Sloane's Froglet	V TSC Act	■	■						Habitat for this species has potential to occur in the Project Site.
Daphoenositta chrysoptera	Varied Sittella	V TSC Act					■			Habitat for this species has potential to occur in the Project Site.
Dasyurus maculatus	Spotted-tailed Quoll	V TSC Act V EPBC Act	■	■						Habitat for this species has potential to occur in the Project Site.
Delma australis	Marble-faced Delma	E1 TSC Act		■						Habitat for this species is unlikely to occur in the Project Site
Epthianura albifrons	White-fronted Chat	V TSC Act					■			Habitat for this species has potential to occur in the Project Site.
Falco hypoleucos	Grey Falcon	V TSC Act	■	■			■			Habitat for this species has potential to occur in the Project Site.
Gallinago hardwickii	Latham's Snipe	EPBC Act						■		Standing water bodies within the Project Site may create artificial habitat for this species, however species is unlikely to occur.
Grantiella picta	Painted Honeyeater	V TSC Act	■	■			■			Habitat for this species has potential to occur in the Project Site.
Grus rubicunda	Brolga	V TSC Act	■	■			■			Wetland habitat is not available in the Project Site.
Haliaeetus leucogaster	White-bellied Sea Eagle	EPBC Act						■		Habitat for this species does not occur in the Project Site.

Table 5 (Cont'd)
Threatened Fauna Species Previously Recorded in the Western NRS CMA and Listed by DSEWPaC and OEH as Likely To Occur In The Western NRS CMA and Central West NRS CMA

Scientific Name	Common Name	Status	Database Records[1]						Comment Wildlife Atlas Western NRS CMA	Prediction
			1	2	3	4	5	6		
Hirundapus caudacatus	White-throated Needletail	EPBC Act								Habitat for this species does not occur in the Project Site.
Hamirostra melanosternon	Black-breasted Buzzard	V TSC Act								Habitat for this species has potential to occur in the Project Site.
Hieraaetus morphnoides	Little Eagle	V TSC Act								Habitat for this species has potential to occur in the Project Site.
Leipoa ocellata	Malleefowl	E1 TSC Act V EPBC Act							Five records. Species recorded 12km west of Project Site.	Known to occur in Project Site. Habitat likely to occur in the Project Site.
Limosa limosa	Black-tailed Godwit	V TSC Act								Habitat for this species is unlikely to occur in the Project Site.
Lophoictinia isura	Square-tailed Kite	V TSC Act								Habitat for this species is unlikely to occur in the Project Site.
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V TSC Act							One record (21 individuals).	Known to occur in Project Site. Habitat likely to occur in the Project Site.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V TSC Act								Known to occur in Project Site. Habitat likely to occur in the Project Site.
Merops ornatus	Rainbw Bee-eater	EPBC Act								Habitat for this species does not occur in the Project Site.
Neophema pulchella	Turquoise Parrot	V TSC Act								Habitat for this species is unlikely to occur in the Project Site.
Ninox connivens	Barking Owl	V TSC Act								Breeding habitat for this species is unlikely to occur in the Project Site. Territory or feeding resources has a possibility of occurring the Project Site.

Table 5 (Cont'd)
Threatened Fauna Species Previously Recorded in the Western NRS CMA and Listed by DSEWPaC and OEH as Likely To Occur In The Western NRS CMA and Central West NRS CMA

Scientific Name	Common Name	Status	Database Records[1]						Comment Wildlife Atlas Western NRS CMA	Prediction
			1	2	3	4	5	6		
Ningaui yvonneae	Southern Ningaui	V TSC Act								Although no searches indicate this species, it is considered to have potential to have habitat in mallee and spinifex dominated areas. Unlikely to occur in the Project Site.
Nyctophilus timoriensis (South-eastern form)	Greater Long-eared Bat	V TSC Act V EPBC Act							One record.	Habitat for this species is likely occur in the Project Site.
Oxyura australis	Blue-billed Duck	V TSC Act								Standing water bodies within the Project Site may create artificial habitat for this species, however species is unlikely to occur.
Onychogalea fraenata	Bridled Nailtail Wallaby	E4 TSC Act E EPBC Act							One record.	Presumed extinct. This species is unlikely to occur in the Project Site.
Petrogale penicillata	Brush-tailed Rock-wallaby	E1 TSC Act V EPBC Act							One record.	Habitat for this species is likely occur in the Project Site.
Pachycephala inornata	Gilbert's Whistler	V TSC Act								Habitat for this species has potential to occur in the Project Site.
Petaurus norfolcensis	Squirrel Glider	V TSC Act								Habitat for this species is unlikely to occur in the Project Site.
Petroica phoenicea	Flame Robin	V TSC Act								Habitat for this species is unlikely to occur in the Project Site.
Phascogale tapoatafa	Brush-tailed Phascogale	V TSC Act								Habitat for this species is unlikely to occur in the Project Site.
Phascolarctos cinereus	Koala	V TSC Act								Although feed trees for this species are likely to occur in the Project Site. Koalas are unlikely to occur in the Project Site.

Table 5 (Cont'd)
Threatened Fauna Species Previously Recorded in the Western NRS CMA and Listed by DSEWPaC and OEH as Likely To Occur In The Western NRS CMA and Central West NRS CMA

Scientific Name	Common Name	Status	Database Records[1]						Comment Wildlife Atlas Western NRS CMA	Prediction
			1	2	3	4	5	6		
Polytelis swainsonii	Superb Parrot	V TSC Act V EPBC Act							Two records (18 individuals).	Known to occur in Project Site. Habitat likely to occur in the Project Site.
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V TSC Act							Four records (29 individuals). Species recorded 2km northeast of Project Site.	Known to occur in Project Site. Habitat likely to occur in the Project Site.
Pyrrholaemus brunneus	Redthroat	V TSC Act								Habitat for this species has potential to occur in the Project Site.
Pyrrholaemus saggitatus	Speckled Warbler	V TSC Act							One record.	Known to occur in Project Site. Habitat likely to occur in the Project Site.
Rostratula benghalensis australis	Painted Snipe (Australian subspecies)	E TSC Act E EPBC Act								Habitat for this species does not occur in the Project Site. Standing water bodies within the Project Site may create artificial habitat for this species, however species is unlikely to occur.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V TSC Act							One record.	Habitat for this species likely to occur in the Project Site.
Sminthopsis macroura	Stripe-faced Dunnart	V TSC Act								Habitat for this species has potential to occur in the Project Site.
Stagonopleura guttata	Diamond Firetail	V TSC Act							One record (six individuals). Species recorded 2km northeast of Project Site.	Known to occur in Project Site. Habitat for this species is likely to occur in the Project Site.
Stictonetta naevosa	Freckled Duck	V TSC Act								Standing water bodies within the Project Site may create artificial habitat for this species, however species is unlikely to occur.

Table 5 (Cont'd)

Threatened Fauna Species Previously Recorded in the Western NRS CMA and Listed by DSEWPaC and OEH as Likely To Occur In The Western NRS CMA and Central West NRS CMA

Scientific Name	Common Name	Status	Database Records[1]						Comment Wildlife Atlas Western NRS CMA	Prediction
			1	2	3	4	5	6		
Tiliqua occipitalis	Western Blue-tongued Lizard	V TSC Act								Habitat for this species has potential to occur in the Project Site.
Tyto novaehollandiae	Masked Owl	V TSC Act								Potential to occur in the Project Site. Breeding habitat unlikely as no major watercourses transect the Project Site

Note 1: Key to databases

1. OEH Central West (Nymagee Rankin Springs) CMA
2. OEH Western (Nymagee Rankin Springs) CMA
3. Wildlife Atlas request Western (Nymagee Rankin Springs) CMA (April 2010)
4. Wildlife Atlas online database area search (May 2011)
5. CSUJC-EC (2006) records
6. DSEWPaC Protected Matters search

Key to Threat Classification in Table 5

V – Vulnerable (TSC Act or EPBC Act)
E – Endangered (EPBC Act)
E1 – Endangered (TSC Act)
E2 – Endangered Population (TSC Act)
E4 – Presumed Extinct(TSC Act)
E4A – Critically Endangered (TSC Act)

4.4.5 Endangered Ecological Communities

The OEH database predicts that two EECs have the potential to occur in the Western NRS CMA, with a further EEC predicted to occur in the Central West NRS CMA (**Table 6**). Based on previous vegetation mapping that has occurred in the area, no EECs are expected to occur within the Project Site.

Table 6
Ecological Communities with Legislative Protection Within the Western NRS CMA and Central West NRS CMA

Scientific Name	Common Name	Level of Threat	Database Record					
			1	2	3	4	5	6
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Inland Grey Box Woodland	EEC (EPBC Act).						
Artesian Springs Ecological Community	Artesian Springs Ecological Community	EEC (TSC Act).						
Weeping Myall Woodlands	Weeping Myall Woodlands	EEC (TSC Act). EEC (EPBC Act).						

Key to database record location in Table 6
1. OEH Western (Nymagee Rankin Springs) CMA
2. OEH Central West (Nymagee Rankin Springs) CMA
3. Wildlife Atlas request Western (Nymagee Rankin Springs) CMA (April 2010)
4. Wildlife Atlas online database area search (May 2011)
5. CSUJC-EC (2006) records
6. DSWEPaC Protected Matters search

4.4.6 Endangered Populations

There are no endangered populations predicted to occur in the OEH Western NRS CMA, Central West NRS CMA or the DSEWPaC / EPBC Act searched area. A Wildlife Atlas search indicates that no endangered populations have been previously recorded in the Western NRS CMA.

4.4.7 Critical Habitats

There are no habitats listed as 'critical' within the Cobar LGA.

4.4.8 Endangered or Threatened Aquatic Species, Populations & Critical Habitats

There are no threatened aquatic flora species listed by NSW DTIRIS which have potential to be recorded in the Western NRS CMA.

No habitats listed as critical or endangered populations are identified for the area by NSW DTIRIS or the DSEWPaC online databases.

With respect to aquatic fauna listed under the *Fisheries Management Act 1994* (FM Act), two threatened fish species (one also listed under the EPBC Act) have potential to occur or have habitat within the Cobar LGA, namely

- Murray cod (*Maccullichella peelii peelii*) listed as vulnerable (EPBC Act); and
- Macquarie Perch (*Macquaria australasica*).

It is unlikely that any of the waterways within the Project Site would provide habitat for threatened fish species as they are ephemeral in nature, however, after inundation following heavy rainfall small drainage lines may be used for the dispersal of individuals and breeding of young.

4.5 SUMMARY OF LISTED SPECIES, COMMUNITIES AND POPULATIONS

Species previously recorded by the CSUJC-EC (2006) ecological survey and Wildlife Atlas Western NRS CMA search area have the highest potential to be recorded within the Project Site. Furthermore, any species identified as having habitat present within the Project Site, as listed in the OEH and DSEWPaC / EPBC Act searches, have potential to be recorded. Of these, the Pine Donkey Orchid (*Diuris Tricolor)*, Cobar Greenhood Orchid (*Pterostylis cobarensis*), Lobed Blue-grass (*Bothriocloa biloba),* Large-leafed Monotaxis (*Monotaxis macrophylla)* and *Rulingia procumbens* have the most potential to occur within the Project Site. The Cobar Greenhood Orchid occurs on seasonally moist to waterlogged sites, on heavy fertile soils and has the potential to be recorded after seasonal inundation during the flowering period.

Any threatened species with habitat niches in the mid- to upper-storey vegetation such as hollow-dependant birds, bats and any of the region's rare honeyeaters are more likely to be recorded within the Project Site than species which have ecological niches in the understorey. The likelihood of these occurring will also vary, depending on the levels of disturbance and availability of specific habitat. Migratory species which move within the landscape to exploit favourable conditions have boom-and-bust populations and, as such, the potential for any species, listed on the OEH database or mapped on the Wildlife Atlas, to occur within the Project Site have not been discounted.

The Kultarr (*Antechinomys laniger),* Brush-tailed Rock-Wallaby *(Petrogale penicillata)* and Malleefowl (*Leipoa ocellata*) are the only threatened ground dwelling fauna with habitat occurring within the Project Site. However, the degree of ground surface disturbance lowers the likelihood of encountering these species. Rocky ridge tops favoured by Brush-tailed Rock-wallabies exist within the Project Site, however, these features are also the preferred grazing, birthing and general resting sites for goats which stash newborns under rocky crevices.

The Brush-tailed Rock-Wallaby is also considered locally extinct. The Kultarr inhabits a variety of sparsely vegetated, arid to semi-arid plains on stony, sandy and clayey soils, preferring less disturbed habitat areas, open shrub and mallee woodland, acacia woodlands and shrublands and hummock grasslands with sparse ground cover (Dickman *et al.* 1996). The Southern Ningaui (*Ningaui yvonneae*) has less potential to occur within the Project Site as its presence is highly associated with spinifex clumps which do not occur within the Survey Area (based on previous vegetation mapping). The Spotted-tailed Quoll (*Dasyurus maculates)* an arboreal marsupial has potential habitat in the Survey Area, particularly within densely vegetated creek lines, rocky habitat and hollow bearing trees.

The abundance of tree stags with hollows and proximity to water increases the likelihood of hollow dependant fauna occurring within the Project Site. Threatened species with particular habitat niches within the Project Site that have been previously recorded include the Major Mitchell's Cockatoo (*Cacatua leadbeateri*), Grey-crowned Babbler (*Pomatostomus temporalis temporalis* (eastern subspecies)), Hooded Robin (*Melanodryas cucullate*), Chestnut Quail-thrush (*Cinclosoma castanotus*), Speckled Warbler (*Pyrrholaemus saggitatus*), Pied Honeyeater (*Certhionyx variegates*), Diamond Firetail (*Stagonopleura guttata*), Superb Parrot (*Polytelis swainsonii*), Black-chinned Honeyeater (*Melithreptus gularis gularis* (eastern subspecies)) and Little Pied Bat (*Chalinolobus picatus*).

Information available on the distribution of reptiles and frogs in the Nymagee district is limited. Limited records from the Wildlife Atlas for the locality demonstrate a paucity of previous surveys. However, Sloane's Froglet (*Crinia sloanei*) has been previously recorded within the Nymagee district locality.

Species profiles detailing information on ecological requirements have been prepared for each threatened species (**Table 24**) and have been annotated to justify decisions used to undertake Assessments of Significance at a NSW or National level.

Table 7 summarises the threatened species, communities and population predicted to occur within the Project Site as a result of the information presented in **Tables 4, 6** and **23**.

Table 7
Listed Species, Communities, Populations with the Potential to Occur within the Project Site

Page 1 of 2

Species		Classification	Data Source
Plant Species			
Pine Donkey Orchid	*Diuris tricolor*	TSC Act	Background database searches indicate potential.
Large-leafed Monotaxis	*Monotaxis macrophylla*	TSC Act	Background database searches indicate potential.
Lobed Blue-grass	*Bothriocloa biloba*	EPBC Act	Background database searches indicate potential.
Cobar Greenhood Orchid	*Pterostylis cobarensis*	TSC Act EPBC Act	Background database searches indicate potential.
No common name	*Rulingia procumbens*	TSC Act	Background database searches indicate potential.
Fauna Species			
Black-chinned Honeyeater	*Melithreptus gularis gularis*	TSC Act	Recorded CSUJC-EC (2006)
Brush-tailed Rock-wallaby	*Petrogale penicillata*	TSC Act EPBC Act	Background database searches indicate potential.
Chestnut Quail-thrush	*Cinclosoma castanotus*	TSC Act	Recorded CSUJC-EC (2006)
Diamond Firetail	*Stagonopleura guttata*	TSC Act	Recorded CSUJC-EC (2006)
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	TSC Act	Recorded CSUJC-EC (2006)

Table 7 (Cont'd)
Listed Species, Communities, Populations with the Potential to Occur within the Project Site

Species		Classification	Data Source
Plant Species			
Hooded Robin	*Melanodryas cucullate*	TSC Act	Recorded CSUJC-EC (2006)
Kultarr	*Antechinomys laniger*	TSC Act	Background database searches indicate potential.
Little Pied Bat	*Chalinolobus picatus*	TSC Act	Recorded CSUJC-EC (2006)
Major Mitchell's Cockatoo	*Cacatua leadbeateri*	TSC Act	Recorded CSUJC-EC (2006)
Malleefowl	*Leipoa ocellata*	TSC Act EPBC Act	Background database searches indicate potential.
Pied Honeyeater	*Certhionyx variegates*	TSC Act	Recorded CSUJC-EC (2006)
Gilbert's Whistler	*Pachycephala inornata*	TSC Act	Background database searches indicate low potential.
Sloane's Froglet	*Crinia sloanei*	TSC Act	Background database searches indicate potential.
Speckled Warbler	*Pyrrholaemus saggitatus*	TSC Act	Recorded CSUJC-EC (2006)
Spotted-tailed Quoll	*Dasyurus maculates*	TSC Act EPBC Act	Background database searches indicate potential.
Superb Parrot	*Polytelis swainsonii*	TSC Act EPBC Act	Recorded CSUJC-EC (2006)
Redthroat	*Pyrrholaemus brunneus*	TSC Act	Background database searches indicate low potential.
Ecological Communities			
None predicted to occur within the Survey Area			
Populations			
None predicted to occur within the Survey Area			

5. FIELD SURVEY METHODOLOGY

5.1 INTRODUCTION

The assessment was undertaken in accordance with the DEC[4] Biodiversity Survey Guidelines Working Draft 2004, Threatened Species Assessment Guidelines: The Assessment of Significance (DECC, 2007) and Field Survey Methods (DECCW, 2009). Data was collected in the impact footprints following the BioBanking Assessment Methodology and Credit Calculator Operational Manual. This data has not been incorporated into this report but remains on project files for future use.

It should be noted that ecological surveys, such as this one, has its limitations due to short survey periods, seasonality of animals and plants, weather patterns and a general lack of prolonged baseline assessments that can be undertaken within a Project Site or a specified Survey Area. These constraints and their implications are discussed in Section 1.6. The Hera ecology assessment, while undertaken within these constraints, does present a good indication of the fauna and flora that are likely to be present within the Project Site given that species occurrence can also be predicted from habitats, terrain present and from identification of tracks and scats within the Project Site.

5.2 FLORA SURVEY METHODS AND EFFORTS

5.2.1 Community Nomenclature, Vegetation Survey and Mapping

Vegetation of the Project Site was mapped as broad community types using a combination of aerial photographs, previously mapped vegetation and known vegetation types that occur in the northern section of the Project Site as a result of the CSUJC-EC 2006 study.

Flora field surveys were carried out over five and half days from 25–29 April 2010 and on 15 October 2011 and were undertaken in conjunction with the site fauna surveys. Assessment of the Survey Area and especially the Impact Footprint was undertaken using both pedestrian (approximately 80% of the Project Site) and vehicle assessment, depicted in **Figure 4**. The GPS co-ordinates of the five vegetation plots surveyed are given in **Table 10**. Survey of the general Project Site was conducted according to the Random Meander Method described by Cropper (1993), known to be a suitable method for detecting the presence of rare species during flora surveys. It is noted several general traverses were undertaken across the highlighted areas (**Figure 4**) within vegetation suspected as having the potential for threatened species (i.e. under cypress pines in drainage lines).

Targeted searches for threatened flora species deemed as having potential to occur and any additional rare or significant plant species were undertaken within a total of five vegetation plots in addition to several transects, as shown in **Figure 4**, and general traverses on foot in the Impact Footprint. In addition, the field survey on 15 October 2011 targeted threatened orchids. That survey was undertaken following soaking rain, an ideal time to detect such species. A hand-held GPS in conjunction with aerial maps of the Project Site were used to identify the co-ordinates of the specific vegetation types within the surveyed area. A summary of the flora (and fauna) survey methods and effort are provided in **Table 8**.

[4] The departments formally known as the NSW DEC,DECC and DECCW are now a division of the NSW Department of Premier and Cabinet known as the Office of Environment and Heritage OEH.

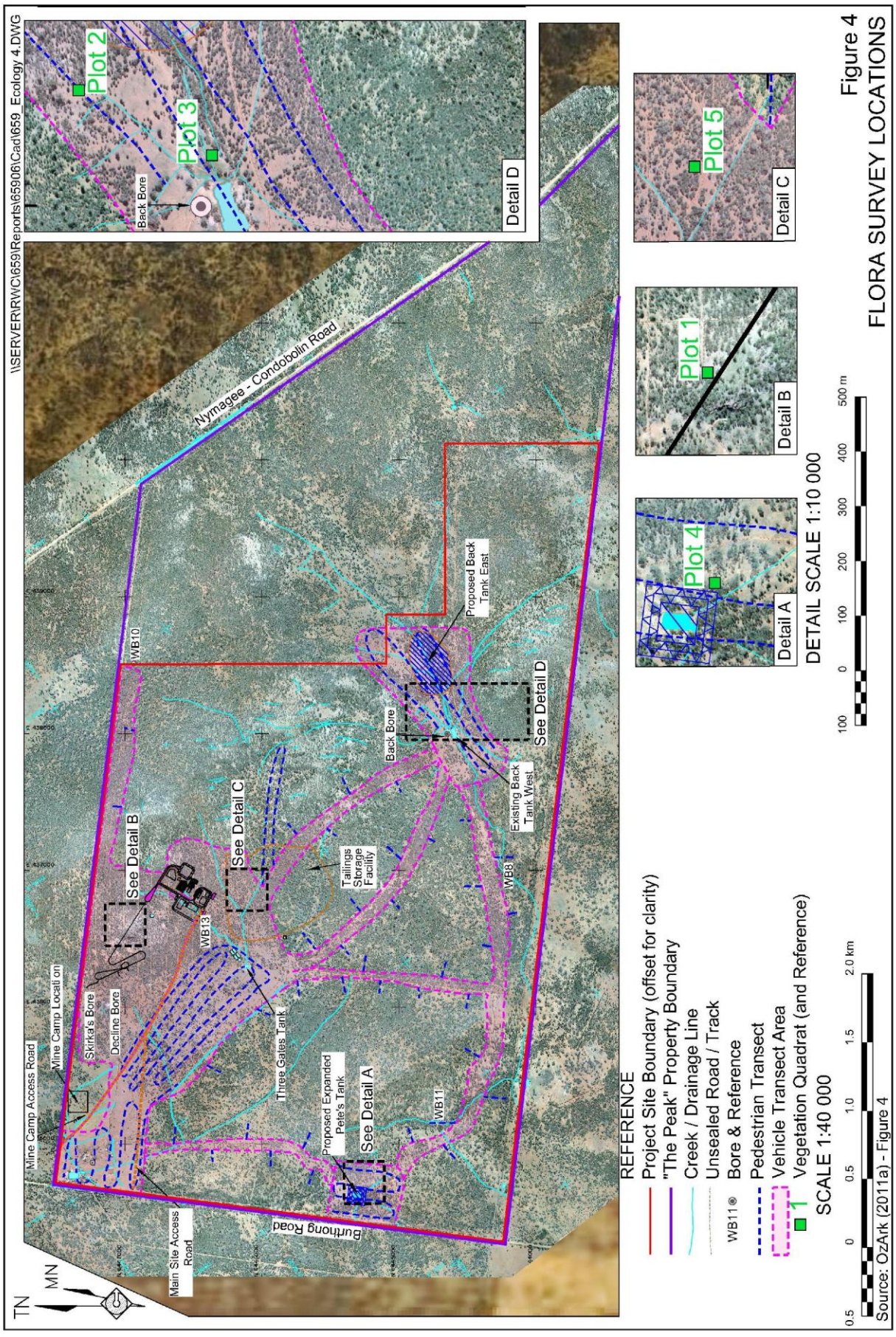

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Figure 4
FLORA SURVEY LOCATIONS
Plot 1
Plot 2
Plot 3
Plot 4
Plot 5
Detail A
Detail B
Detail C
Detail D
Back Bore
DETAIL SCALE 1:10 000
100 0 100 200 300 400 500 m
Nymagee - Condobolin Road
Mine Camp Access Road
Mine Camp Location
Skirka's Bore
Decline Bore
Three Gates Tank
Proposed Expanded Pete's Tank
Tailings Storage Facility
Proposed Back Tank East
Existing Back Tank West
Back Bore
Burtlong Road
Main Site Access Road
See Detail A
See Detail B
See Detail C
See Detail D
WB10
WB11
WB13
WB8
TN
MN
REFERENCE
Project Site Boundary (offset for clarity)
"The Peak" Property Boundary
Creek / Drainage Line
Unsealed Road / Track
WB11 Bore & Reference
Pedestrian Transect
Vehicle Transect Area
1 Vegetation Quadrat (and Reference)
SCALE 1:40 000
0.5 0 0.5 1.0 1.5 2.0 km
Source: OzArk (2011a) - Figure 4

Table 8
Details of Flora and Fauna Surveys

Survey Method	Stratification Unit						Total Survey Effort
	Surface Facilities Area Benson 180	Back Tank East and Back Tank West Benson 103	Proposed Expanded Pete's Tank Benson 103	Tailings Storage Facility Benson 103	Aquatic Assessment Benson 103 and 174	General Comments	
Flora (20m x 20m) quadrants	One quadrant Complete species list	Two quadrants Complete species list	One quadrant Complete species list	One quadrant Complete species list	Not considered an appropriate method for these waterways.	Undertaken as 'spot checks' to align vegetation remnant with a BioMetric unit. In total, six undertaken.	Five quadrants.
Flora Transects	Yes	Yes	Yes	Yes	Yes	A targeted orchid survey was undertaken on 15 October 2011.	Entire Impact Footprint assessed including access roads and general other areas.
Fauna - Spotlighting	30 minutes 2 nights	30 minutes 2 nights	30 minutes 2 nights	20 minutes 2 nights	30 minutes 2 nights		4 hours and 40 minutes split over two nights.
Fauna - Diurnal Bird (20 minute spot searches) (am and pm)	Yes, daily	Yes, daily	Yes, daily	Yes, daily	Yes, daily	Bird watching was undertaken opportunistically throughout the Project Site and was undertaken over all vegetation types.	At least three hours per day was spent bird watching.

Table 8 (Cont'd)
Details of Flora and Fauna Surveys

Survey Method	Stratification Unit						Total Survey Effort
	Surface Facilities Area Benson 180	Back Tank East and Back Tank West Benson 103	Proposed Expanded Pete's Tank Benson 103	Tailings Storage Facility Benson 103	Aquatic Assessment Benson 103 and 174	General Comments	
Elliot Traps	Yes 15 Type' A' Elliot traps 4 nights	Yes 10 Type' A' Elliot traps 4 nights	Yes 9 Type' A' Elliot traps 3 cage traps 4 nights	No	Dam sites included	Type 'A' traps targeting small mouse sized marsupials, specifically the Kultarr. Large cage traps targeted quolls and possums.	148 trapping events
Pitfall traps	No	No	No	4 pitfall traps 2 nights	No	Pitfall traps targeting small marsupials, specifically the Kultarr.	8 trapping events
Herpetofauna Searches (am and pm)	All basking places observed: logs, crack, and fissures in trees observed. Ground debris turned over where suitable habitat existed.	All basking places observed: logs, crack, and fissures in trees observed. Ground debris turned over where suitable habitat existed.	All basking places observed: logs, crack, and fissures in trees observed. Ground debris turned over where suitable habitat existed.	All basking places observed: logs, crack, and fissures in trees observed. Ground debris turned over where suitable habitat existed.		Herpetofauna searches were undertaken opportunistically throughout the Project Site and were undertaken in all vegetation types.	
AnaBat	Yes. 4.30pm to 7.30am 1 night	Yes. 4.30pm to 7.30am 1 night	Yes. 4.30pm to 7.30am 1 night	Yes. 4.30pm to 7.30am 1 night		The four major areas of impact were targeted.	4 nights 60 hours

Table 8 (Cont'd)
Details of Flora and Fauna Surveys

Survey Method	Stratification Unit						Total Survey Effort
	Surface Facilities Area Benson 180	Back Tank East and Back Tank West Benson 103	Proposed Expanded Pete's Tank Benson 103	Tailings Storage Facility Benson 103	Aquatic Assessment Benson 103 and 174	General Comments	
Call Playback	Yes	Yes	Yes	Yes	Yes	Yes. Call playback within the Project Site for the Masked Owl (*Tyto novaehollandiae*) and Barking Owl (*Ninox connivens)* was undertaken over two nights. Due to a lack of response and suitable habitat it was determined that these species were not in the area.	2 nights
Opportunistic Observations	Yes	Yes	Yes	Yes	Yes	Yes. All vegetation types were assessed and examined for threatened flora and fauna, with particular emphasis on the identified Impact Footprint within the Project Site.	N/A

NOTES:
- Stag watching was conducted as a precursor to spotlighting where suitable habitat was available; Impact Footprint was targeted.

Detailed botanical survey for native plants was carried out and the observed species composition within the community was aligned to a *BioMetric vegetation community.* Plant identification was made in accordance with nomenclature of Harden (1990, 2002) and Cunningham *et al.* (1992). Eucalyptus species were additionally identified using the EUCLID software (Centre for Plant and Biodiversity Research, 1997). The national conservation significance of flora was determined by referencing *Rare or Threatened Australian Plants* (ROTAP–Briggs and Leigh) and the Schedules associated with the TSC Act or the EPBC Act.

It is noteworthy that the antecedent rainfall and surface flooding (one week prior to the survey) resulted in colonisation of the disturbed ground by grasses and ground covers and promoted flower head development. This enabled the majority of grasses to be identified to species level.

5.2.2 Habitat Values of Hollow Bearing Trees

All hollow-bearing trees with habitat value within the Impact Footprint were physically inspected. Trees in adjacent areas were also inspected; however, no formal mapping was undertaken as quantifying them for the purpose of this report is not essential. Each tree was visually inspected (with or without binoculars as required) with habitat values being determined by the OzArk ecologist. The values noted above are subjective and do not take into account koala habitat (SEPP 44) trees, the tree identified being a component of EEC / Critically EEC habitat for commonly occurring species. The above criteria were developed by OzArk purely to address impacts to those species listed in the OEH and DSEWPaC database search results.

5.2.3 Terrestrial Orchid Survey

Survey for threatened terrestrial orchid species is highly reliant on accessibility to fertile, flowering material to enable confident identification. In some species, e.g. the leafless saprophyte *Cryptostylis hunteriana*, plants are not visible at any other time of the year and indeed one species (the underground Orchid, *Rhizanthella slateri*) undergoes its entire life cycle within the leaf litter and upper layers of soil (Bishop, 1996). Consequently, it is imperative that any survey for terrestrial orchid species is undertaken during the relevant flowering periods. Only two orchids (*Diuris tricolor* and *Pterostylis cobarensis*) have the potential to occur within the Survey Area (noted by the OEH and EPBC Protected Matters Report and database searches) and both flower during September to November. CSUJC-EC (2006) undertook targeted survey during the spring flowering period and did not identify either species. In addition, OzArk undertook a targeted orchid survey within the proposed areas of disturbance on 15 October 2011. That survey followed soaking rain, an ideal time to detect both species.

5.3 FAUNA SURVEY METHODS AND EFFORTS

5.3.1 Ultrasonic Bat Call Detection

An Anabat SD2 bat recorder (Titley Electronics) was set as a stationary sound-activated unit to record between the hours of 4.30pm and 7.30am consecutively each night at one of four locations (**Figure 5**). This allowed each vegetation and landscape area to be sampled and continuous recording of approximately 15 hours at each location, resulting in a total effort of over 60 recorded hours.

Bat calls, recorded using AnaBat SD2, were downloaded onto a laptop computer on site the following morning. Bat analysis was undertaken by Lesryk Environmental Pty Ltd.

Further details of survey efforts for bat call detection are provided in **Tables 8** and **11**.

5.3.2 Call Playback

Nocturnal birds were surveyed through call playback and spotlighting. Use of the playback of pre-recorded CDs (Nature Sound) for the detection of the Masked Owl (*Tyto novaehollandiae*) and Barking Owl (*Ninox connivens*) was undertaken within the Impact Footprint Areas. Calls were played through a portable CD player and megaphone at Three Gates Tank, Back Tank and Pete's Tank and surrounding access roads within the Survey Area (**Figure 5**). Calls were played for a period of not less than five minutes each, and a waiting period of fifteen minutes was allowed after the end of the playback to listen for any response followed by ten minutes general searching time using spotlights.

5.3.3 Bird Survey

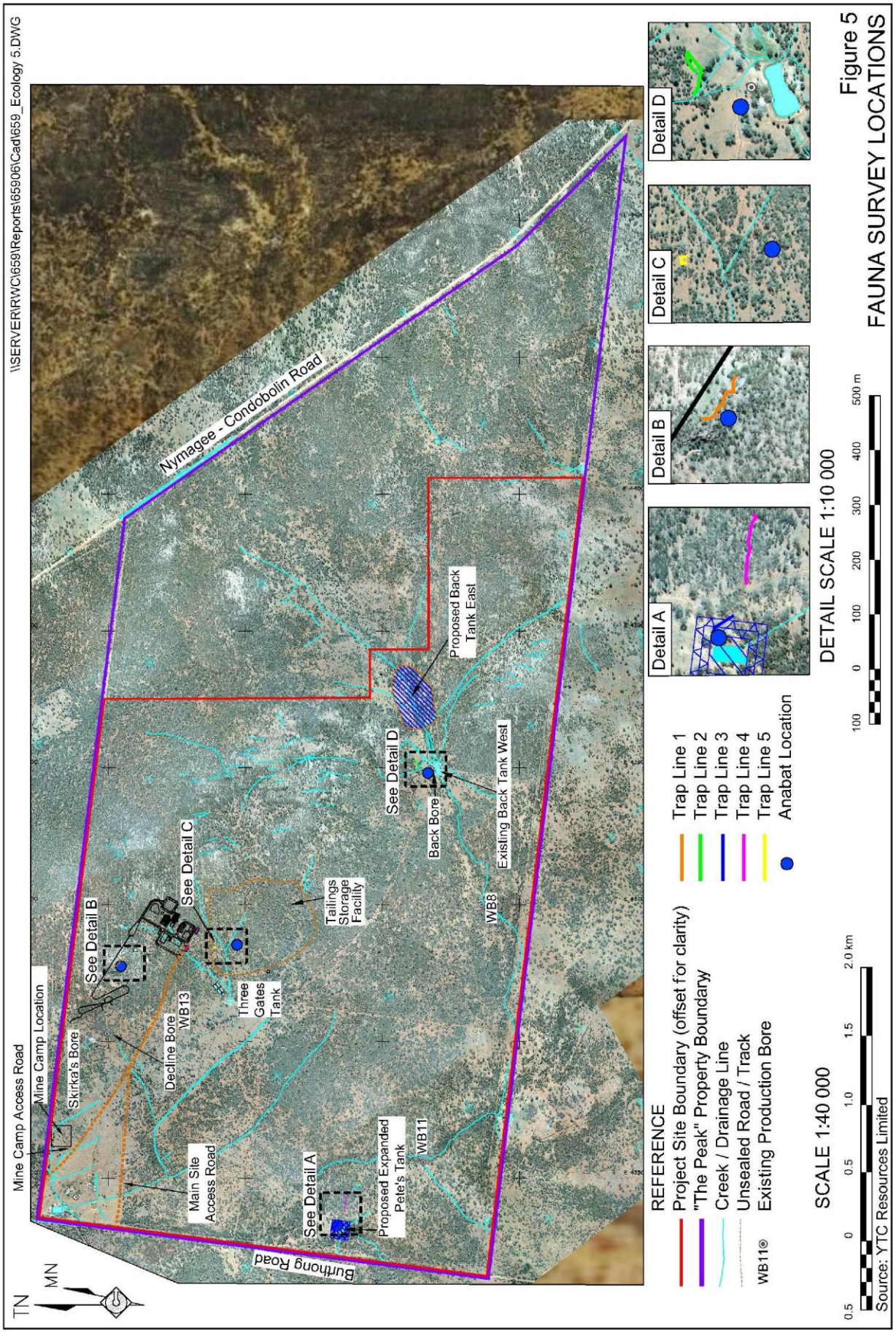
Both nocturnal and diurnal bird surveys were conducted in the four main Impact Footprints and opportunistically during all other activities within the Survey Area (minimum 20 minutes duration). All vegetation types were surveyed for bird species. Targeted bird watching was undertaken near any habitat trees to identify possible nesting or roosting areas. Birds were identified via visual observation and characteristic call. Bird species of conservation significance were determined by referencing to Smith *et al.* (1994) and Reid (1999).

5.3.4 Scat and Tracks

All scats and raptor pellets (owls, eagles and hawks) encountered during the course of the field survey were collected and examined to determine species presence. Scats and tracks were identified in accordance with Trigg (2004).

5.3.5 Herpetofauna Survey

Both nocturnal and diurnal herpetological surveys were conducted at each Impact Footprint and opportunistically during all other activities within the Survey Area. Herpetofauna was also surveyed during the spotlighting surveys. The diurnal component consisted of hand searches for frogs and reptiles under rocks, logs, bark, ground debris and other debris around drainage lines and dams, specifically targeting the Back and Pete's Tanks. Prolonged drought conditions were broken by heavy rainfall and a minor flooding event immediately prior to the field survey at the Project Site which enhanced frog surveys. In particular, burrowing frog species often emerge after heavy rain allowing easy identification. The habitat of the Survey Area was assessed in terms of its suitability for threatened herpetofauna species.


\\SERVER\RWC\659\Reports\659006\Cad\659_Ecology 5.DWG
Nymagee - Condobolin Road
Mine Camp Access Road
Mine Camp Location
Skirka's Bore
Decline Bore
WB13
Three Gates Tank
See Detail B
See Detail C
Tailings Storage Facility
Main Site Access Road
See Detail A
Proposed Expanded Pete's Tank
WB11
Buthong Road
See Detail D
Back Bore
Proposed Back Tank East
Existing Back Tank West
WB8
Detail A
Detail B
Detail C
Detail D
DETAIL SCALE 1:10 000
100 0 100 200 300 400 500 m
REFERENCE
Project Site Boundary (offset for clarity)
"The Peak" Property Boundary
Creek / Drainage Line
Unsealed Road / Track
WB11 Existing Production Bore
Trap Line 1
Trap Line 2
Trap Line 3
Trap Line 4
Trap Line 5
Anabat Location
SCALE 1:40 000
0.5 0 0.5 1.0 1.5 2.0 km
Source: YTC Resources Limited
TN MN
Figure 5
FAUNA SURVEY LOCATIONS

5.3.6 Live Trapping

The live trapping of small to medium-sized terrestrial and arboreal mammals was undertaken over four consecutive nights. The live-trapping survey was conducted along five transect lines (refer **Table 8**, **Figure 5**). Transects traversed each of the four main Impact Footprints and were aimed to adequately sample the full range of habitat types available within the Project Site. 'A' type aluminium folding traps (Elliott Scientific) were used on each transect line with the addition of cage traps and pitfall traps. The traps were set on the ground around logs, dense grass and animal runways. Details of the numbers of specific trap types and vegetation types are presented in **Table 8** while the GPS co-ordinates of the trap locations are provided in **Table 9**. Traps were generally set at intervals of approximately 10–15m apart and were baited with a standard mixture of peanut butter, rolled oats, fish paste, fish sauce and honey rolled into a 10-cent sized ball. Grasses and leaves were placed in all of the Elliott traps to protect any captured animal from the elements. All traps were placed in sheltered and shaded positions. Traps were checked between 6.30am and 9.30am daily and reset after removal of any trapped mammals.

5.3.7 Pitfall Trapping

Four pit-traps made from clean and emptied 20-litre oil drums were placed flush to the ground surface in the Tailings Storage Facility area over two consecutive nights. Pits were placed up to 15m apart and connected to adjacent understorey by drift fencing. Between 10cm and 20m of drift fence was used around each pit trap. The traps were lined with leaf litter and bark to shelter captured fauna from predators and excessive sun. Pit traps were checked between 8:30am and 9:30am daily. Details of the numbers of specific trap types and vegetation types are presented in **Table 8** while the GPS co-ordinates of the trap locations are provided in **Table 9**.

5.3.8 Survey of Aquatic Habitats

Aquatic habitats (existing storage dams, creeks and drainage lines) were assessed via visual inspection. Dams were walked (circumnavigated) and revisited during nocturnal targeted assessments. Details of the survey are noted in **Table 8**.

Habitat value was assigned following the convention developed by Fairfull and Witheridge (2003) and adopted by NSW Department of Trade and Investment, Regional Infrastructure and Services.

5.3.9 Species Identification, Observation and Analysis

All fauna was readily identified through the use of available standard references, where required. Although not formally listed in legislation, other fauna species have been identified as being of conservation concern because their numbers are declining or they are locally extinct within the bioregion (NSW NPWS 2001a and b) and will be discussed in the results section of this report.

Table 9
Elliot Trap GPS Positions.

Trap No.	Trap Line 1 (Surface Facilities Area)		Trap Line 2 (Back Tank)		Trap Line 3 (Pete's Tank)		Trap Line 4 (Pete's Tank)		Trap Line 5 (Tailings Storage Facility)	
	Elliot Type 'A'		Elliot Type 'A'		Cage Trap		Elliot Type 'A'		Pitfall Trap	
	Benson 180		Benson 103 (low)		Benson 103		Benson 103		Benson 103	
	GDA Zone 55		GDA Zone 55		GDA Zone 55		GDA Zone 55		GDA Zone 55	
	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing
1	436664	6447149	438179	6444954	434771	6445527	434868	6445464	436796	6446406
2	436664	6447142	438166	6444944	434790	6445522	434884	6445465	436795	6446415
3	436665	6447135	438162	6444953	4334810	6445488	434897	6445464	436805	6446417
4	436668	6447126	438145	6444943			434917	6445462	6436809	6446402
5	436686	6447117	438141	6444936			434932	6445458		
6	436690	6447108	438145	6444927			434948	6445461		
7	436696	6447109	438127	6444931			434981	6445454		
8	436705	6447106	438110	6444934			434997	6445452		
9	436713	6447103	438107	6444937			434990	6445447		
10	436713	6447089	438098	6444942						
11	436711	6447089								
12	436722	6447090								
13	436730	6447091								
14	436738	6447088								
15	436742	6447085								

Table 10
Vegetation Plots - Quadrat Corner GPS Positions.

Point	Vegetation Plot 1 (Surface Facilities Area)		Vegetation Plot 2 (Back Tank)		Vegetation Plot 3 (Back Tank West)		Vegetation Plot 4 (Pete's Tank)		Vegetation Plot 5 (Tailings Storage Facility)	
	Benson 180		Benson 103 (low)		Benson 103 (slope)		Benson 103		Benson 103	
	GDA Zone 55		GDA Zone 55		GDA Zone 55		GDA Zone 55		GDA Zone 55	
	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing
1	436690	6447170	438210	6444825	438334	6445051	434823	6445430	436922	6446311
2	436705	6447172	438199	6444822	438317	6445050	434807	6445446	436909	6446313
3	436710	6447185	438204	6444317	438318	6445067	434816	6445413	436915	6446327
4	436671	6447187	438219	6444815	438334	6445067	434806	6445420	436936	6446329

Table 11
Anabat Detector Locations

Point	Anabat (Surface Facilities Area) Benson 180		Anabat (Back Tank West) Benson 103 (low)		Anabat (Pete's Tank) Benson 103		Anabat (Tailings Storage Facility) Benson 103	
	26th April 2010		25th April 2010		28th April 2010		27th April 2010	
	GDA Zone 55		GDA Zone 55		GDA Zone 55		GDA Zone 55	
	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing
1	436665	6447099	438079	6444854	434771	6445515	436821	6446250

6. RESULTS

6.1 VEGETATION COMMUNITIES RECORDED

135 species of flora have been identified with in the Project Site, of which 133 are native species and two are listed as noxious.

Vegetation in the Project Site is assessed as being consistent with vegetation previously described by Benson *et al.* (2006). The Project Site can be divided into four main vegetation types according to the *BioMetric* classification system (**Table 12** and **Figure 6**) as described below.

- Poplar Box – Gum-barked Coolibah – White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion (Benson 103). This is the general vegetation type within the Project Site that mixes and intergrades with the three other vegetation types on slopes and hills. Benson 103 consists of approximately 88.9% of the total vegetation within the Project Site (**Plates 1** and **2**). Benson 103 is however broken into two further subsets reflecting the change in dominant canopy:
  - Benson 103 – Bimble Box dominated
  - Benson 103 – White Cypress Pine Dominated
  - Benson 103 – Eremophila and hopbush regrowth community located in the north-western section of the Project Site.
  - Benson 103 **–** Yarran (*Acacia homalophylla*) located immediately south of the proposed location of the Tailings Storage Facility adjacent to the internal road in the area.

  As can be seen in **Figure 6** there are dense populations of plant species within Benson 103 that still form part of the community.
- Grey Mallee – White Cypress Pine woodland on rocky hills of the eastern Cobar Peneplain Bioregion (Benson 180). This vegetation type occurs on “The Peak” and integrates with Benson 174.
- Mallee – Smooth-barked Coolibah woodland on red earth flats of the eastern Cobar Peneplain Bioregion (Benson 174). This vegetation type occurs in clusters within Benson 103 (**Plate 13**).
- Cleared grassland / shrubland and cleared areas associated with tracks (**Plates 15** and **16**).
- Bothriochloa Biloba, in the vicinity of the House Tank and the existing site entrance and forms a component of the cleared grassland / shrubland community.

Red Box (*E. Intertexta*) has been lopped, ringbarked or removed throughout much of the Project Site. As a result, general diversity and natural ratios of species is unbalanced. White Cypress Pine has invaded much of the disturbed areas within the northern half of the Project Site, while the southern half of the Project Site around the two storage dams (Back Tank West and Pete’s Tank) and associated broad drainage lines are dominated by low branching 'mallee' formed Bimble Box *(Eucalyptus populnea subsp. Bimbil*; **Plate 6**).

Table 12
Biometric Description of Vegetation Communities within the Survey Area

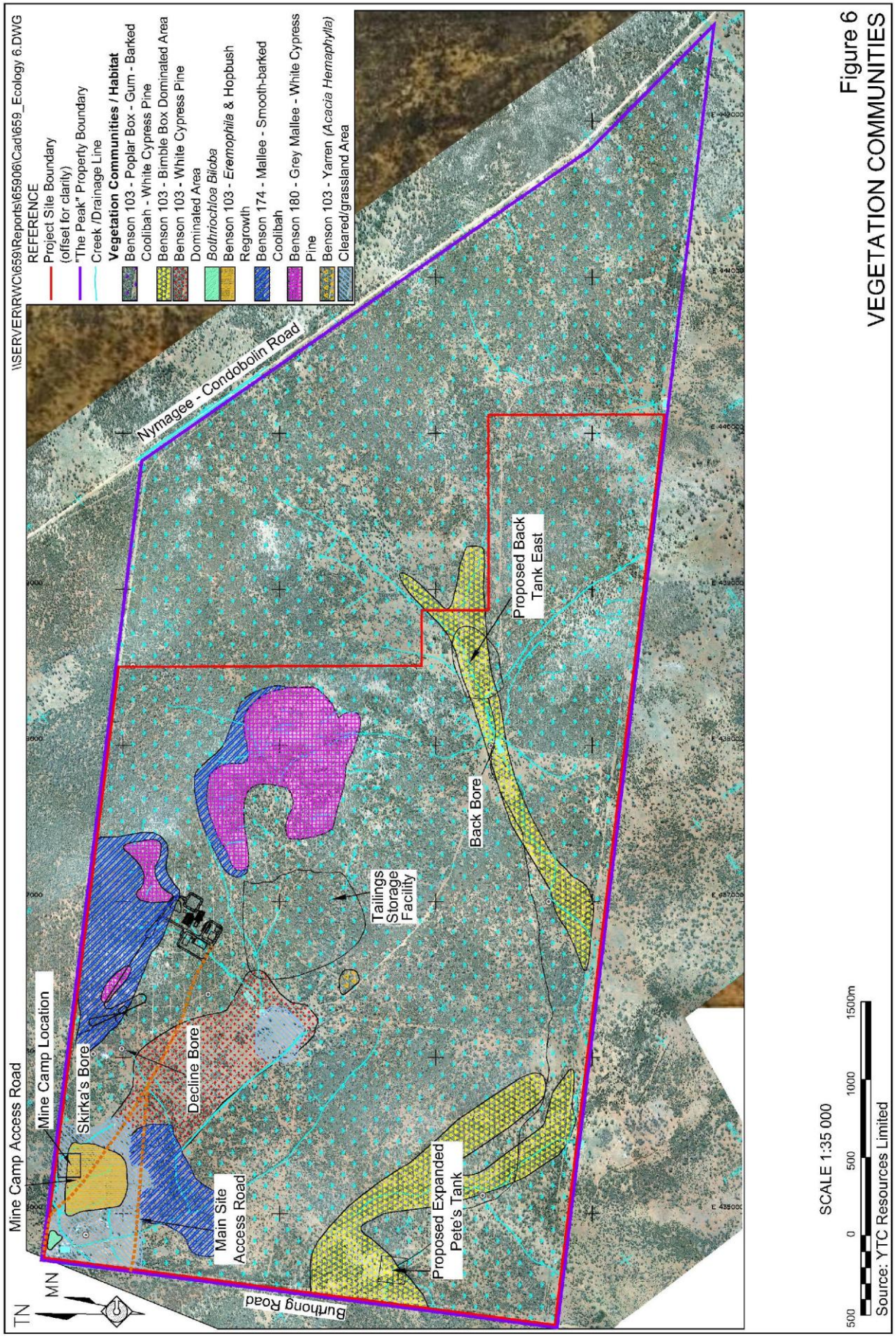
Vegetation Type	Dominant Canopy spp	Main Associated spp	Landscape Position	Characteristic Mid-storey spp	Characteristic Groundcover spp	Other Diagnostic Features	Vegetation formation [CMA] Vegetation class	Cleared Estimate rounded to nearest 5%
Poplar Box - Gum-barked Coolibah - White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion (Benson 103)	Poplar or Bimble Box (*Eucalyptus populnea subsp. bimbil*), White Cypress Pine (*Callitris glaucophylla*), Smooth-barked Coolibah or Western Red Box (*Eucalyptus intertexta*)	Belah (*Casuarina cristata*), Ironwood (*Acacia excelsa subsp. angusta*), Whitewood (*Atalaya hemiglauca*), Beefwood (*Grevillea striata)*, Kurrajong (*Brachychiton populneus subsp. populneus*), Western Rosewood (*Alectryon oleifolius subsp. canescens*)	Occurs on alluvial flats, footslopes and broad ridges of undulating plains mainly in the Cobar Peneplain Bioregion.	Wilga (*Geijera parviflora*), Budda (*Eremophila mitchellii)*, Tarbush (*Eremophila glabra*), *Acacia deanei subsp. paucijuga, Dodonaea viscosa subsp. angustissima, Dodonaea viscosa subsp. spatulata, Bertya cunninghamii, Dodonaea viscosa subsp. cuneata,* Thorny Saltbush *(Rhagodia spinescens),* Silver Cassia *(Senna form taxon 'artemisioides'),* Emubush *(Eremophila longifolia)*	*Maireana microphylla,* Curly Windmill Grass *(Enteropogon acicularis), Sclerolaena birchii, Speargrass (Austrostipa scabra subsp. scabra), Sclerolaena diacantha, Einadia nutans subsp. nutans, Aristida jerichoensis var. subspinulifera, Thyridolepis mitchelliana, Monachather paradoxa,* Windmill Grass *(Chloris truncata), Eragrostis lacunaria, Vittadinia cervicularis var. cervicularis, Calotis lappulacea*	Open woodland to 25m high. Occurs on clay loam, sandy loam or lateritic soils. This community covers a large section of north-central NSW and varies in its understorey depending on soils and land use.	Semi-arid Woodlands (Shrubby subformation) Western Peneplain Woodlands	10

Table 12 (Cont'd)
Biometric Description of Vegetation Communities within the Survey Area

Vegetation Type	Dominant Canopy spp	Main Associated spp	Landscape Position	Characteristic Mid-storey spp	Characteristic Groundcover spp	Other Diagnostic Features	Vegetation formation [CMA] Vegetation class	Cleared Estimate rounded to nearest 5%
Grey Mallee - White Cypress Pine woodland on rocky hills of the eastern Cobar Peneplain Bioregion (Benson 180)	Grey Mallee (*Eucalyptus morrisii*), White Cypress Pine (*Callitris glaucophylla*), Currawang (*Acacia doratoxylon*)	Dwyer's Red Gum (*Eucalyptus dwyeri*), Green Mallee (*Eucalyptus viridis*), Smooth-barked Coolibah or Western Red Box (*Eucalyptus intertexta*)	Restricted to steep hills and ridges on the eastern side of the Cobar Peneplain Bioregion mainly around Nymagee and to the north to Coolabah, but with small areas in Nombinnie and Yathong Nature Reserves.	*Eremophila latrobei subsp. latrobei, Cassinia laevis, Dodonaea boroniifolia,* Pandorea pandorana (inland form*), Prostanthera ringens,* Sticky Wallaby Bush *(Beyeria viscosa), Acacia decora, Dodonaea lobulata, Dodonaea viscosa subsp. angustifolia, Prostanthera striatiflora, Acacia burrowii, Eremophila serrulata,* Budda *(Eremophila mitchellii)*	*Austrostipa densiflora, Eriachne mucronata, Amphipogon caricinus var. caricinus, Cheilanthes sieberi subsp. sieberi,* Speargrass *(Austrostipa scabra subsp. scabra), Aristida jerichoensis var. subspinulifera, Dianella longifolia var. longifolia, Lomandra patens,* Kangaroo Grass *(Themeda australis), Calotis cuneifolia, Thyridolepis mitchelliana*	Mid-high woodland (or very tall mallee woodland). This community occurs on shallow, stony and loamy soils derived from Ordovician and Devonian chert, quartzite and volcanic rocks.	Semi-arid Woodlands (Shrubby subformation) Inland Rocky Hill Woodlands	5

Table 12 (Cont'd)
Biometric Description of Vegetation Communities within the Survey Area

Vegetation Type	Dominant Canopy spp	Main Associated spp	Landscape Position	Characteristic Mid-storey spp	Characteristic Groundcover spp	Other Diagnostic Features	Vegetation formation [CMA] Vegetation class	Cleared Estimate rounded to nearest 5%
Mallee - Smooth-barked Coolibah woodland on red earth flats of the eastern Cobar Peneplain Bioregion (Benson 174)	Red Mallee (*Eucalyptus socialis*), White Mallee (*Eucalyptus dumosa),* Smooth-barked Coolibah or Western Red Box (*Eucalyptus intertexta*)	Narrow-leaved Red Mallee (*Eucalyptus leptophylla*), Inland Grey Box (*Eucalyptus microcarpa*), Green Mallee (*Eucalyptus viridis*), Mugga Ironbark (*Eucalyptus sideroxylon*), Kurrajong (*Brachychiton populneus subsp. populneus*), Currawang (*Acacia doratoxylon*), Belah (Casuarina cristata), Western Rosewood (*Alectryon oleifolius subsp. canescens*)	On flats and low rises on peneplains that are composed of basic volcanics or metasediment substrates.	*Acacia deanei, Acacia colletioides, Acacia havilandiorum, Acacia buxifolia subsp. buxifolia, Bertya cunninghamii,* Tarbush *(Eremophila glabra),* Budda *(Eremophila mitchellii),* Wilga *(Geijera parviflora),* Dead Finish *(Acacia tetragonophylla), Turkeybush (Eremophila deserti), Emubush (Eremophila longifolia), Philotheca difformis subsp. difformis, Dodonaea viscosa subsp. cuneata, Dodonaea boroniifolia*	*Sclerolaena birchii, Triodia scariosa subsp. scariosa, Austrodanthonia fulva, Speargrass (Austrostipa scabra subsp. scabra), Austrodanthonia caespitosa, Solanum ellipticum, Calotis cuneifolia, Vittadinia cervicularis var. cervicularis, Ruby Saltbush (Enchylaena tomentosa), Ptilotus obovatus var. obovatus*	Tall mallee forest or woodland up to 15m tall but usually about 8m tall, or post-disturbance shrubland about 5m tall. Mainly distributed on the eastern edge the Cobar Peneplain Bioregion including parts of the Honeybugle basic volcanic intrusion. A high proportion of the eastern areas are cleared and further clearing remains a threat. Many areas are scalded from soil erosion.	Semi-arid Woodlands (Shrubby subformation) Sand Plain Mallee Woodlands	25


\\SERVER\RWC\659\Reports\65906\Cad\659_Ecology 6.DWG
REFERENCE
Project Site Boundary
(offset for clarity)
"The Peak" Property Boundary
Creek /Drainage Line
Vegetation Communities / Habitat
Benson 103 - Poplar Box - Gum - Barked Coolibah - White Cypress Pine
Benson 103 - Bimble Box Dominated Area
Benson 103 - White Cypress Pine Dominated Area
Bothriochloa Biloba
Benson 103 - Eremophila & Hopbush Regrowth
Benson 174 - Mallee - Smooth-barked Coolibah
Benson 180 - Grey Mallee - White Cypress Pine
Benson 103 - Yarren (Acacia Hemaphylla) Cleared/grassland Area
Nymagee - Condobolin Road
Mine Camp Access Road
Mine Camp Location
Skirka's Bore
Decline Bore
Main Site Access Road
Tailings Storage Facility
Back Bore
Proposed Back Tank East
Proposed Expanded Pete's Tank
Burthong Road
TN
MN
SCALE 1:35 000
500 0 500 1000 1500m
Source: YTC Resources Limited
Figure 6
VEGETATION COMMUNITIES

In general, Gum–barked Coolibah (*Eucalyptus intertexta*), Bimble Box (*Eucalyptus populnea subsp. Bimbil*) and White Cypress Pine *(Callitris glaucophylla*) occurred throughout the Survey Area in varying densities. Sticky Wallaby Bush (*Beyeria viscosa*) Wallaby Bush (*Bertya cunninghamii*), Western Golden Wattle (*Acacia decora*), Punty Bush (*Cassia eremophila*), Eremophila (*Eremophila sp.),* Wedge leaf hopbush (*Dodonaea viscosa subsp. Cuneata*), Bush Mallee Pea (*Eutaxia microphylla)* and Silver Cassia *(Senna form taxon 'artemisioides',* dominated the mid canopy layer and provided a dense understorey in moderately disturbed / cleared areas. A generally herbaceous grassy understorey was intermittently present throughout including *Austrostipa* sp., *Aristida sp., Austrodanthonia sp., Chenopodium sp. Maireana sp. and* saltbushes*.*

6.2 THREATENED FLORA SPECIES RECORDED

One population of Lobed Blue-grass (*Bothriocloa biloba* (protected under the EPBC Act)) was recorded on the north-eastern side of the driveway between the homestead and Burthong Road (approximately 140m x 40m) in a previously cleared and disturbed area shown in **Figure 6**. It is not likely to extend beyond this cleared habitat.

6.3 NOXIOUS WEEDS RECORDED

Bathurst Burr (*Xanthium spinosum*) and Galvanised Burr (*Sclerolaena birchii*), Class 4 noxious weeds in the Cobar LGA (*Noxious Weeds Act 1993 (*NW Act)), were identified in the Survey Area. The growth and spread of these plants must be controlled according to the measures specified in a management plan published by the local control authority.

6.4 FAUNA RECORDED

6.4.1 Introduction

The fauna survey revealed that the Project Site supports a moderate diversity of native fauna. A total of 103 vertebrate fauna species (97 native and six introduced) were recorded during survey and incidental observations, comprising the following.

- five reptile species (no threatened species, one with local conservation concern).
- three frog species (no threatened species, two with local conservation concern).
- 78 bird species, including six TSC Act threatened species, one EPBC Act migratory species and fourteen species of local conservation concern;
- seven species of ground mammal; and
- ten species of michopteran bat species (two TSC Act threatened species).

Table 13 provides a summary of all threatened fauna species recorded within the Project Site during the current and previous surveys within the Project Site, whilst **Appendix 2** provides a list of all fauna species recorded during the current assessment. All microbats recorded in the four main Impact Footprints were presumed to have potential to be recorded throughout the Project Site where analogous habitat exists. **Figure 3** shows the locations of threatened species previously recorded in the Project Site by CSUJC-EC in 2006. Species recorded during the current survey were identified within habitat type, not location.

All species recorded during this assessment have been previously recorded within the locality or region.

Table 13
Recorded Threatened Species

Scientific Name	Common Name	Level of Threat	Benson 103	Benson 174	Benson 180	Cleared / Disturbed	Survey
Circus assimilis	Spotted Harrier	TSC Act				**O**	OzArk 2010
Cacatua leadbeateri	Major Mitchell's Cockatoo	TSC Act	**X**			**X O**	OzArk 2010 CSUJC-EC 2006
Stagonopleura guttata	Diamond Firetail	TSC Act	**X**			**O X**	OzArk 2010 CSUJC-EC 2006
Melanodryas cucullata	Hooded Robin	TSC Act	**O X**			**X O**	OzArk 2010 CSUJC-EC 2006
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	TSC Act	**O X**	**O**	**O**	**O X**	OzArk 2010 CSUJC-EC 2006
Neophema pulchella	Turquoise Parrot	TSC Act				**O**	OzArk 2010
Certhionyx variegates	Speckled Warbler	TSC Act	**X**				CSUJC-EC 2006
Certhionyx variegates	Pied Honeyeater	TSC Act	**X**				CSUJC-EC 2006
(Cinclosoma castanotus)	Chestnut Quail-thrush	TSC Act	**X**				CSUJC-EC 2006
Melithreptus gularis gularis	Black-chinned Honeyeater	TSC Act	**X**				CSUJC-EC 2006
Polytelis swainsonii	Superb Parrot	TSC Act EPBC Act	**X**			**X**	CSUJC-EC 2006
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	TSC Act	**O**				OzArk 2010
Chalinolobus picatus	Little Pied Bat	TSC Act	**X**		**O**		OzArk 2010 CSUJC-EC 2006

Key to Table 13: OzArk records = **O** CSUJC-EC 2006 records = **X**

6.4.2 Bird Species Recorded

6.4.2.1 Introduction

78 species (77 native and one introduced) were recorded during five days and five nights of survey. The majority of species were observed during diurnal bird surveys with only a tawny frogmouth recorded as a result of spotlighting or call playback.

The Project Site has moderate to high bird diversity, as deduced from the current survey. The most notable observation was a general lack of nocturnal birds. The lack of scrubby understorey and heavy grazing has possibly impacted upon habitat for small marsupial and mice prey birds such as owls, nightjars, boobooks and frogmouths within the Project Site.

The cleared / disturbed area adjacent to the homestead has proximity to a small dam (House Tank) and various small seeded grasses, thus the recording of small robins, finches and grass parrots in this area is unsurprising. Families of threatened Grey-crowned Babblers and Hooded Robins (TSC Act) were also common in all vegetation types within the Project Site and along with Red-capped Robins, Eastern Yellow Robins, Yellow-rumped Thornbills and Mallee Ringnecks, were the highest recorded bird species.

Generally, bird species recorded within the Project Site are characteristic of the assemblages found in similar habitat types in the locality as described in Section 4.

6.4.2.2 Threatened Species

Six species listed as threatened under the TSC Act (Grey-crowned Babbler, Hooded Robin, Diamond Firetail, Turquoise Parrot, Major Mitchell's Cockatoo and Spotted Harrier) were recorded (**Table 13**). No threatened or migratory species listed under the EPBC Act were recorded within the Project Site.

Five further threatened species not recorded during the current survey, have been previously recorded in the Project Site by CSUJC-EC (2006) and are assumed to still occur.

Furthermore, it is likely that other threatened species not recorded to date may occur within the Project Site since habitats similar to those surveyed exist all over the Survey Area. A complete set of listed species considered likely to occur with the Project Site is presented in **Table 5**.

6.4.2.3 Species of Conservation Concern

14 bird species of conservation concern as identified by Reid (1999) and Smith *et al.* (1994) (but not listed under the TSC Act), were recorded. These include: the Southern Whiteface, Restless Flycatcher, Eastern Yellow Robin, Jacky Winter, Red-capped Robin, White-browed Babbler, Noisy Friarbird, Western Gerygone, Noisy Friarbird, Jacky Winter, Crested Bellbird, Rufous Whistler, Wedge-tailed Eagle and Spotted Bowerbird. These species, while not listed under the TSC Act, are listed as of some conservation concern and/or near threatened and likely to become threatened if appropriate management of remaining habitat is not undertaken. Furthermore, many of these species share similar habitat requirements with the listed threatened species and provide an indication of the habitat quality and hence potential habitat for threatened species with similar habitat requirements.

6.4.3 Mammal Species Recorded

No mammals were trapped during the survey period. Seven ground-dwelling mammals were recorded where understorey vegetation remained, particularly on "The Peak" topographic feature and in the vicinity of the Back Tank West site.

Tracks and scats of the fox, and to a lesser extent the cat, were frequently recorded within the Project Site in all habitat types. Rabbit and goat tracks and scats were most commonly recorded throughout the Project Site, however, were absent from the grassland near the homestead.

The house mouse and black rat, although not encountered, are known to occur in high densities around the homestead.

Ten species of Microchiropteran bat were recorded over the four consecutive nights of Anabat recording. The Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*) and Little Pied Bat (*Chalinolobus picatus*) are listed under the TSC Act (**Appendix 2**).

In regards to those species that were detected, the Chocolate Wattled Bat (*Chalinolobus morio*) is considered to be at, or beyond, the limits of its distribution within the Project Site. However, given that there are no clear lines, and based on the ecologist's knowledge of recent distribution shifts in other species (i.e. Little Bentwing Bat) it is considered possible that this species would be present. Regardless, the calls were not all that characteristic and have the possibility of being confused with Little Forest Bat (*Vespadelus vulturnus).*

Gould's Wattled Bat (*Chalinolobus gouldii*) was the most numerously recorded bat, with the number of calls (183) at Pete's Tank indicating a small local colony. However, a number of those Gould's Wattled Bat (*Chalinolobus gouldii*) calls identified with a confidence level of 'Possible' or 'Probable' may also be confused with either the Inland Freetail Bat (*Mormopterus sp. 3*) (above 30 kHz) or Southern Freetail Bat (*Mormopterus sp. 4*) (below 30 kHz). Likewise the reverse is true.

A review of ecological requirements, as described by OEH threatened species website, has been provided for Little Pied Bat and Yellow-bellied Sheathtail-Bat in **Table 24.**

6.4.4 Reptiles and Amphibians

This assessment recorded a total of five species of reptile and three species of amphibian (**Appendix 2**). When considering the recent heavy rain and numerous dams, these results were lower than expected. This, however possibly reflects the high levels of disturbance to any habitats suitable for these species. No frogs were recorded around dams and all three recordings within the Project Site were incidental sightings. The Crucifix Frog (*Notaden bennettii*; **Plate 14**) recorded in the Project Site, like many burrowing frogs emerge after heavy rain to breed in temporary ponds.

Changes in hydrology as well as habitat degradation particularly loss of ground cover due to feral goats is also believed to have contributed to the low diversities of frogs and reptiles recorded.

6.5 HABITATS RECORDED WITHIN THE PROJECT SITE

6.5.1 Introduction

The survey identified the type and quality of fauna habitat features and resources present within the Project Site. General fauna attributes were noted and habitat features specific to threatened species were targeted. Four main habitat types were identified within the Project Site, however only one (Benson 103) is likely to be altered (impacted or enhanced) by the Project. Benson 103 is one of the most well represented vegetation type in the Western CMA and locality. Some impacts are proposed in the Mallee dominated areas (a regionally significant vegetation type) as can be noted on **Figure 6**.

6.5.2 Hollow-bearing Trees

Over 50 high habitat value, hollow bearing tree stags were recorded in the area to the west of the Tailing Storage Facility either side of the proposed Main Access Road. These hollow bearing trees dominate the Benson 103 White Cypress Pine area shown in **Figure 6**, and would provide abundant habitat for small marsupials, hollow dependent birds, bats and reptiles. However, a lack of ground debris in this area, and the fact that only a handful of live trees were of the appropriate age to possess hollows, reduces the potential for safe passage of small ground dwelling marsupials and mice.

As a general observation only a handful of live trees were of an age to possess hollows.

6.5.3 Structural Habitat Areas

The suitability of habitat for locally occurring species is dependent on vegetation structure, habitat complexity, floristics, connectivity, quality and the presence of key threatening processes as defined by the NSW Scientific Committee. Remnant vegetation appears to be 'moderate to good quality' and in good health, it possesses a few old growth trees (despite it being logged in the past), variable amounts of dead tree stags and down timber depending on location. The canopy of trees / tall shrubs provides nectar and other resources for locally occurring threatened birds. There are generally high levels of weed invasion and good internal / external connectivity. These generic features provide habitat for a range of fauna.

More specifically, the vegetation communities within the Project Site are comprised of a total of six (including the subsets) main structural vegetation types which all have slightly different key habitat elements. **Figure 6** presents the distribution of each of these habitat types. **Appendix 4** shows threatened species predicted or known to occur within these vegetation types.

- **Benson 103 – Bimble Box Dominated Area**: Comprises woodland along the drainage channels that is recognised by possessing dense poplar / Bimble Box (*E. populnea*) with some Western Red Box (*E. intertexta*). It also has the following characteristics:
  - Possesses the highest quality of Benson 103 within the assessed areas. Habitat was diverse, with connectivity along the drainage line and into surrounding vegetation continuous;
  - A moderate habitat value for this area was recorded as the ground layer had some leaf litter and coarse woody debris. However, this area is prone to flooding which washes the ground debris into clumps around the base of trees. Leaf litter is an important resource for the woodland as well as a niche habitat for many species of insects and reptiles. Several species of birds and small terrestrial animals feed upon the insects that work within this layer to break it down, babbler species, apostle birds and white winged choughs are good examples;
  - The area also possessed some hollow logs, tree stumps, stony / sand / clay soils and occasionally space to dense understorey with a moderate to tall tree canopy;
  - Sandy red soils prone to periodic flooding is an excellent habitat to recorded most threatened orchids;
  - Bimble box flower in late summer and Western Red Box in autumn to winter;

- Although native mistletoes are parasites on eucalypts, casuarinas and other plants they provide important food and nesting sites for wildlife, particularly during drought. Many species of honeyeaters and flycatchers are associated with the dense foliage of mistletoes and the abundant nectar they produce. Mistletoes are a critical resource for a range of insects including a suite of butterflies that use them as their sole egg laying site;
- The role of seeds and fruit is better understood. The most obvious seeds eaters are parrots, particularly the glossy black cockatoo in the western region;
- Leaves provide food and the ability to obtain food for a number of species. Direct feeding occurs from possums and koalas, the lerp and honeydew produced by the tree in response to insect attack is eaten by species of gliders and a suite of birds such as pardalotes and honeyeaters. Leaves also provide nesting material; and
- Flowers are a primary source of pollen and nectar. Eucalypts would flower at different times of the year (fewer species in winter). The seasonality of flowering is a key factor in the migratory patterns of several species of birds. The swift parrots are winter flowering eucalypt dependant and are a species associated with white box, grey box, red iron bark and golden wattle vegetation communities. Pollen and nectar attract large numbers of insects that support a multitude of birds, reptiles and mammals, especially microbats.

- **Benson 103 – White Cypress Pine Dominated Area**: Open woodland located within the northwest section of the Project Site has the following characteristics:
  - Similar to that described above, however less canopy diversity. Mainly White-Cypress Pine / Bimble Box dominated;
  - Very little ground timber or leaf litter for microhabitat;
  - Numerous / disproportionate number of dead tree stags and hollows. Standing dead trees would more often contain hollows that are used by cavity dependant species;
  - Tree hollows are located in the canopy. Hollows are used for nesting and sheltering for a suite of hollow dependant species (insects, reptiles, birds and mammals). More than 300 species of vertebrates are known to use hollows; over 100 species of birds are dependent on hollows, many of which would return to the same hollow year after year to breed. Tree hollows may take more than 100–200 years to replace naturally. Mammals would use many hollows to avoid detection by prey species within one season; i.e. sugar gliders would use up to five. Tree hollows are also used by invasive species such as feral bees, starlings and European blackbirds all of which out compete parrots;
  - Branches provide perching locations for birds, especially from where they have a good view of potential predators or competing individuals of the same or related species. Branches provide a platform for nests. Treecreepers hunt for ants on the branches; particularly smooth barked branches and manna (the gums that seeps from wounds) is eaten by gliders. Some trees show distinct wounds where gliders have ‘tapped’ the gum. These tapping sites need to be changed every few days as the tree would heal the wound;

  - Vegetation structurally complex in places i.e. tall trees, some mallee with thick understorey of tall, mid and low stature shrubs which attracted many small birds; and
  - The territories of some birds such as the flame robin significantly overlap in areas with large numbers of dead trees and stumps.

- **Benson 103:** Has the combined habitat characteristics of those noted above although has had less previous disturbance.
- **Benson 180**: Rocky locations had the following characteristics:
  - Excellent rocky habitat;
  - No tree hollows, due to mallee and Wilga (Geijera parviflora) dominated vegetation. However, the Green Mallee (E. viridis) is a rarer vegetation type only occurring on rocky hilltops in the CPBR;
  - Heavy infestation of weeds and chenopods with sporadic grasses and virtually no shrubs. Species represented are all unpalatable to goats / kangaroos and are considered as 'invasive native scrub';
  - Virtually no substantive dead and down timber / ground debris; and
  - Many small birds recorded due to suitability of habitat.
- **Benson 174**: Mallee dominated areas had the following characteristics:
  - Excellent habitat complexity.
  - No tree hollows, due to Mallee dominated vegetation;
  - Substantive dead and down timber / ground debris.
  - Many small birds recorded due to suitability of habitat.
- **Cleared / Disturbed Areas** had the following characteristics:
  - This area is centred on the homestead in the Project Site and has the lowest habitat quality but still can support a diverse range of species. Clearing has left only isolated trees with understorey colonised by native grasses, and Budda (*Eremophila mitchellii*). Logs, rocks etc are scarce and more competitive, robust species have, most likely, forced more sensitive native species from the area; and
  - Foraging areas for native birds and common larger reptiles.
- **Eremophila and hopbush dominated areas**
  - Provide abundant flowering nectar resources for the regions threatened honeyeaters; and
  - Shrubby protected areas for small species of bird, robins and finches.
- **Drainage Lines and Waterways** – Back Tank West and Pete's Tank areas had the following characteristics:
  - Drought refuges provide important sources of permanent water for locally occurring species.

6.5.4 Habitat Values of Trees within the Impact Footprint

High habitat value hollow bearing dead tree stags (*E. Intertexta* or *C glaucophylla*) are scattered within the Project Site but outside of the Impact Footprint.

Benson 103 occurs within areas identified for the construction of the Surface Facilities Area, Tailings Storage Facility, Pete's Tank and Back Tank East within the Impact Footprint (see **Figures 2** and **6**). Approximately 58ha of this habitat type will be impacted with approximately 43ha of vegetation requiring removal within the Tailings Storage Facility, approximately 12.27ha for the Surface Facilities Area, approximately 3ha of vegetation for the proposed expansion of the existing Pete's Tank and creation of Back Tank East and approximately 0.29ha for the creation of the Light Vehicle Access Road. Expansion / creation of these dams would remove trees and hollow-bearing trees suitable for a variety of hollow dependant fauna.

A very small area of 0.1ha of Benson 180 would be disturbed at the edge of the Surface Facilities Area.

7. DISCUSSION

Vegetation communities and species recorded within the Project Site are consistent with previous assessments outlined in **Section 4**.

No ground-dwelling fauna was trapped during the survey period. This could be due to a number of reasons including seasonality factors and absence of the species from the Project Site. Species absence is the most acceptable conclusion, reflecting the current and ongoing disturbances associated with grazing, exploration activities and the occurrence of flooding prior to the surveys. The lack of small ground-dwelling mammals is further reflected by the absence of Yellow-footed Antechinus (previously caught in 2004) and Kultarr which locals have positively identified within diverse native grasses. It is suspected that suitable habitat for the Kultarr would occur if feral grazing was controlled.

Suitable rocky outcropping habitat on the 'Peak' hill favoured by threatened species such as the Brush-Tailed Rock Wallaby, Kultarr and Strip-faced Dunnart have had all understorey components removed by uncontrolled feral goat grazing (**Plate 3**). Conversely, disturbances such as historic ringbarking and logging have created an abundance of dead tree stags and hollows that would not usually occur in such a high density in the recorded habitats (**Plates 8** and **9**). The territories of some robins and potentially the Hooded Robin and Red-capped Robin significantly overlap in areas with large numbers of dead trees and stumps. This may explain the general abundance of these two robins, with many males within a single territory range.

Large stags with hollows also provide roosting habitat for a range of hollow dependent fauna including microbats, antechinus species and possums. The Anabat results from around the Project Site indicate the high density of microbats, most likely a result of the abundant dead tree stags. An old mine shaft on 'Peak' hill has also provided artificial habitat for cave dwelling microbats (*Mormopterus sp*.) to occur, as further demonstrated by the Anabat results. Furthermore, dense stands of White Cypress Pine / eremophila species have colonised canopy spaces made available by historic logging, creating artificial shrubby habitat. Dense juvenile cypress pines provide protection for small thornbills, weebills and robins and foraging habitat for the Grey-crowned Babbler, whilst the cleared grassy areas around the homestead provide open foraging opportunities.

Given an abundance of habitats within the Project Site it is not surprising that bird diversity is high. Bird diversity was greatest around the House Tank adjacent to the homestead (outside the Impact Footprint). These cleared and disturbed areas have allowed the colonisation of grasses (particularly small seeded grasses) and in conjunction with proximity to water, make an excellent foraging area for small parrots and finches, such as the Diamond Firetail.

The Hooded Robin (**Plate 7**), Willie Wag Tail, White Plumed Honeyeater, Red-capped Robin, Mallee Ringneck (**Plate 17**) and Grey-crowned Babbler were the most commonly recorded species. The Hooded Robin in particular appeared unperturbed by the current drilling operations and was noted throughout the day feeding and defending territory around the core storage site, where heavy machinery, cars and the diamond cutting saw was operating (**Plate 16**). Although the Hooded Robin is known to be sensitive to land clearing the numerous families of Hooded Robins recorded in the four main Impact Footprints are indicative of their ability to withstand other types of disturbance.

Threatened species including the Hooded Robin, Diamond Firetail, Major Mitchell's Cockatoo, Grey-crowned Babbler were also recorded by CSUJC-EC (2006) in analogous habitat within the Project Site. All of these species (except Major Mitchell's Cockatoo) occur in the area as a result of artificially constructed dams. These birds are primary colonisers and the high densities reflects their ability to settle in revegetated landscapes if the key structural elements are provided (large size of a remnant, habitat complexity, nearby stands of native grasses and a quickly establishing understorey / shrub layer). Thus, viable local and regional populations are known to occur outside the Impact Footprint in areas to remain unaltered by the Project.

Previously recorded species within the Project Site including the Chestnut quail-thrush, Speckled Warbler, Pied Honeyeater, Black-chinned Honeyeater and Superb Parrot not observed during the current assessment are assumed to still occur.

A lack of leptospermum species, acacias, banksias and grevilleas (all more palatable to goats than the existing vegetation) in the Project Site reduces the potential for arboreal marsupials to occur.

The Superb Parrot previously recorded within the Project Site in 2006 (CSJCU-EC, 2006) was not recorded during the current survey. The Superb Parrot exemplifies many of the challenges associated with research and conservation of wide-ranging and migratory species. The parrot usually migrates to northern NSW for winter and was noted elsewhere within the Cobar region during the assessment period. However, landscape use by the parrot does not always conform to traditional schematic and categorical landscape / fragmentation models and responds to site-level variables and the surrounding landscape context. The Superb Parrot favours lower elevation sites, dominated by scattered, open woodlands, where Blakely's Red Gum is a significant component (Manning *et al.*, 2006).

The Project, regarded as a multi-scale response, requires a multi-scale conservation and restoration strategy hence, it is important to consider impacts to native vegetation within a landscape perspective. A review of aerial photography in the wider region clearly shows that Mugga Ironbark (considered to be the critical key feeding resource as its winter flowering) has been largely removed from the Nymagee area. Strategies for restoration of larger habitat remnants to benefit this species would include regeneration of trees particularly Blakely's Red Rum along with other key species such as Mugga Ironbark and golden wattle that were missing within the Project Site.

The general absence of leaf litter and ground debris in each vegetation community has restricted the ability for many small ground-dwelling mammals, such as the Malleefowl and Bush-stone Curlew to occur.

Four dams (Back Tank West, Pete's Tank, House Tank, Three Gates Tank) are fed by natural and modified drainage lines throughout the Project Site. Dams and drainage lines do not possess aquatic or semi-aquatic vegetation other than sedge. It is recognised that for the majority of the time, these waterways do not provide opportunities for habitation by native fish species; however, after inundation they may potentially be used for the dispersal of individuals and breeding of the young.

With respect to threatened plants, the degree of ground surface disturbance reduces the likelihood of the Cobar Greenhood Orchid occurring within the Project Site; however, this is unable to be confirmed in the non-flowering period.

Critical Habitat and Endangered / Critically Endangered Populations

NSW or nationally listed critical habitats and / or critically endangered populations were not recorded within the Project Site.

8. POTENTIAL IMPACTS OF THE PROJECT

8.1 EXISTING IMPACTS WITHIN THE PROJECT SITE

Existing levels of disturbance have been detailed in Section 3.5.6. The Project Site flora has been extensively disturbed as a result of previous agricultural activities, exploration activities, mining operations, feral goat grazing and periodic flooding. These activities have contributed directly to the reduction in quality and fragmentation of habitat. Feral goat grazing has also contributed to a range of continual disturbances such as increased edge effects and woody weed infestation.

Approximately 2,044.6ha of the total 2,128ha of "The Peak" property is vegetated. Approximately 53ha has been previously cleared around the homestead. The total disturbed area noted in **Table 14** and **19** does not include areas disturbed as a result of previous logging or areas cleared for prior exploration or drill sites.

The majority of previous mining / clearing activities have improved habitat for hollow dependant native fauna as the observed ringbarking has created an abundance of dead hollow bearing timber. Furthermore the abundant understorey created by dense White Cypress Pine suits large local populations of Grey-Crowned Babblers, robins and thornbills.

Feral goat grazing on the 'Peak' hill that overlies the proposed decline and underground mining, vegetated with Benson 180 is the most serious current impact threatening the presence and future potential presence of threatened flora and fauna. The Project may further decrease the ecological value of the Project Site, however, there is potential to retain dead hollow bearing stags, retain an old exploration mine shaft on the 'Peak' hill and positively improve habitat through cypress pine thinning and providing compensatory habitat.

8.2 POTENTIAL IMPACTS OF THE PROJECT

There are three basic categories for impacts associated with proposed mining projects:

1. Direct or site establishment /construction;
2. Indirect / operational; and
3. Rehabilitation and decommissioning impacts.

These impacts are discussed below in the context of terrestrial environments and impacts associated with the Tailings Storage Facility.

Expansion of Pete's Tank and construction of Back Tank East has the potential to reduce ground-dwelling habitat (logs, branches, leaf litter grassy understorey) shrubs and some trees. However, given that hollow bearing trees and mature trees would be left intact in the proposed flooding area means that in the long term the number of tree stags and hollow-bearing trees in the environment will be increased.

Table 14 presents the anticipated direct impacts on vegetation communities within the Project Site.

Table 14
Direct Impacts on Vegetation Communities within the Project Site

Surface Infrastructure	Total Area (ha)	Area Veg Comm to be removed (ha)	Vegetation Community type
Tailings Storage Facility	43.8	0.8	Benson 103 - White Cypress Pine Dominated Area
		43	Benson 103
Back Tank East	11.3	8.51	Benson 103 - Bimble Box Dominated Area
		2.8	Benson 103
Pete's Tank	1.7	0.02	Benson 103
		1.68	Benson 103 - Bimble Box Dominated Area
Mine Camp	2.2	0.9	Cleared Grassland / Shrubland / Disturbed
		1.3	Benson 103 - Eremophila & Hopbush Regrowth
Surface Facilities Area	15.4	3	Benson 174
		0.13	Benson 180
		12.27	Benson 103
Main Site Access Road	0.96	0.48	Cleared Grassland / Shrubland / Disturbed
		0.18	Benson 174
		0.34	Benson 103 - White Cypress Pine Dominated Area
Light Vehicle Access Road	1.84	0.69	Cleared Grassland / Shrubland / Disturbed
		0.33	Benson 103 - Eremophila & Hopbush Regrowth
		0.54	Benson 103 - White Cypress Pine Dominated Area
		0.29	Benson 103
Mine Camp Road	0.064	0.064	Benson 103 - Eremophila & Hopbush Regrowth
Total area to be disturbed	**77.3**	**77.3**	

Table 15 provides a summary of the 'typical' impacts likely to be associated with the Project. They have been part adapted from the Environment Institute of Australia and New Zealand Ecology Group (EIANZ) *Ecological Impact Assessment Draft June 2009 Guidelines* which serve to identify 'typical' impacts associated with mining and development of infrastructure.

Table 15
Expected Impacts of the Project

Construction Impacts	Impact Footprint
Vegetation clearing.	Yes. Extent and empirical nature of impacts known (see **Figure 2**, **Table 14**).
Temporary access routes for construction (on site and off site).	Assumed to be existing farm roads. Not an issue as the proposed activities are located largely within already disturbed areas
Temporary storage areas (aggregate piles) and permanent storage areas (stockpile locations, sheds etc).	Yes. Extent and empirical nature of impacts known (see **Figure 2**, **Table 14**).
Temporary and permanent works compounds.	Yes. Extent and empirical nature of impacts known (see **Figure 2**, **Table 14**).
Pre-fabrication areas and set down points.	As above
Removal and site cleanup of temporary compounds, site offices, set down points and storage areas.	Yes. Extent and empirical nature of impacts known (see **Figure 2**, **Table 14**).
Demolition operations.	Not required.
Removal and disruption of surface soils.	Yes. Extent and empirical nature of impacts known (see **Figure 2**, **Table 14**).
Environmental incidences (i.e. dust, noise, vibration, spills).	Other specialist consultants will address these issues.
Provision of services and utilities (powerlines, lighting, internal road networks, communications, water supply, drainage, sewage).	Yes. Extent and empirical nature of impacts known (see **Figure 2**, **Table 14**).
Fires.	No fires are required.
Construction of new structures and hard surfaces, modification of existing structures.	Yes. Extent and empirical nature of impacts known (see **Figure 2**, **Table 14**).
Blasting (mineral extraction).	Yes. Extent and empirical nature of impacts known (see **Figure 2**, **Table 14**).

8.3 LIKELY INDIRECT OR OPERATIONAL IMPACTS

Indirect impacts are those that would occur after construction of infrastructure associated with each proposed activity within the Project Site. A summary of the indirect (operational) impacts typical of mining operations such as the Project is provided by **Table 16**.

There will not be any impacts to EECs as none have been identified within the Project Site.

General impacts likely to affect threatened fauna species include the following.

- Loss of habitat as a direct result of clearing and trampling or as in the case of the whole region from predation by goats, results in a removal or reduction of vegetation;

- Creation of disturbed edge areas which can encourage introduction of competitive native and introduced species that out-compete other native species and dominate native vegetation;
- Changes in hydrology which could lead to changes in vegetation assemblages;
- Erosion and sedimentation which could promote introduced species and alter conditions for native species;
- Changes in habitat resources can disrupt extant food-chain processes such as an increase in cleared areas encouraging an increase in aerial predation from raptors;
- Disruption to essential behavioural patterns because of noise generation, artificial lighting, dust and air quality, road traffic, human interference, invasion of introduced species and predation by feral animals; and
- Mortality due to drinking polluted waters, collision with artificial structures such as power lines and road traffic.

8.4 REHABILITATION AND DECOMMISSIONING IMPACTS

Impacts associated with the decommissioning of the infrastructure can be summarised as follows.

- Removal of contaminated water or soil;
- Removal or demolition of disused structures that may have been colonised, i.e. by roosting animals;
- Removal of major infrastructure (roads, power lines) and ancillary infrastructure, i.e. culverts, fences etc;
- Neglect or failure of any structure that would remain on site which has potential to pollute;
- Site restoration / rehabilitation; and
- One-off environmental accidents and incidences.

8.5 KEY THREATENING PROCESSES

The OEH list of Key Threatening Processes (KTP) for the Project was reviewed on 7 December 2010.

34 KTPs are currently listed under the TSC Act. An assessment of these 34 KTPs for the Project are listed in **Table 17**. The following five KTPs will be impacted upon by the Project.

- Clearing of native vegetation;
- Loss of hollow-bearing trees;
- Invasion of native plant communities by exotic perennial grasses;
- Removal of dead wood and dead trees; and
- Bushrock removal.

Table 16
Indirect (Operational) Impacts

Indirect / Operational Impact	Effect and Application to the Project Site	Impact Footprint Area		
		Surface Facilities Area	Tailings Storage Facility	Pete's Tank and Back Tank East
Implementation of landscape design, mitigation, compensatory habitat.	The proposed rehabilitation activities within the Project Site, at face value, are positive. However, if undertaken incorrectly it may alter vegetation communities / site hydrology or place other species at risk through competition and or direct impacts (planting trees within native grassland). In addition, the proposed Biodiversity Offset Strategy would result in the preservation and protection of approximately 628ha of vegetation within the Biodiversity Offset Area.	Yes. If surface impacts can avoid clearing areas of substantive vegetation then the Impact Footprint would be able to recolonise with native species. Approximately 15.4ha of vegetation may be removed. All eucalypts to be removed (or as many as possible) are to be salvaged and spread onto an existing cleared area to create habitat complexity. Furthermore, rows of trees and shrubs planted within designated areas will allow the colonisation of native grasses. This would recreate original habitat prior to any impacts. Thinning of cypress pine in a mosaic pattern would also be recommended to increase the levels of biodiversity on the property. As for the Surface Facilities Area in conjunction with voluntary rehabilitation within the Project Site can be viewed as possible compensatory habitat for this Project. Further details are provided below.	Yes. Approximately 43.8ha of vegetation will be removed.	Yes. Impacts to vegetation will occur over a 13ha area. Only trees around the wall of the dam (20m strip around the perimeter of the dam) will require removal. Trees in the flooded zone will not be cleared and remain *in situ*, eventually die and create further habitat stags. Thus, creating additional habitat (hollows, fissures) for threatened species. Leaving trees in the flooded zone is seen as a positive outcome for birds, which will be able to nest in a predator (cat and fox) free environment.

Table 16 (Cont'd)
Indirect (Operational) Impacts

Indirect / Operational Impact	Effect and Application to the Project Site	Impact Footprint Area		
		Surface Facilities Area	Tailings Storage Facility	Pete's Tank and Back Tank East
Artificial Lighting	Artificial lighting has the potential to change predator– prey relationships and species densities for a number of animals', i.e. large floodlights often associated with mining areas or new roads in previously unlit areas provide light that attracts insects that in turn attracts bats. These bats would then be preyed upon by other species such as owls. Whilst this dynamic may be self-determining, a negative impact on other species may occur where they do not benefit from the increased insects at the locality due to the exposed and isolated nature of the area. Additionally there may potentially be a higher density of predators occurring in the area, thus reducing the long-term survivability of a locally occurring population.	Yes. Artificial lighting is likely to attract insects, etc. The effect is likely to be self-limiting. Other species such as gliders are not considered to be present within the Project Site and as such this aspect of the Project is likely to increase population of the noted animals during the life of the Project.	No artificial lighting is associated with the Project.	No artificial lighting is associated with this Project.
Changes in Hydrology (general)	Changes in hydrology through road building, damming and agricultural practices can have the effect of either increasing or decreasing, nutrient loading in water, sedimentation, salinity, the general flow of water, volume and speed. These in turn would alter ecosystem functions.	Changes in hydrology have been addressed in the REF (RWC 2009). It is not considered likely that any general changes would affect native biota.	Changes in site hydrology are expected, to ensure periodic flooding does not waterlog the area surrounding the Tailings Storage Facility.	Both these dams will be expanded. Channels and drainage lines will be enhanced to ensure surface water is channelled to these dams.

Table 16 (Cont'd)
Indirect (Operational) Impacts

Indirect / Operational Impact	Effect and Application to the Project Site	Impact Footprint Area		
		Surface Facilities Area	Tailings Storage Facility	Pete's Tank and Back Tank East
Changes in Hydrology (Tailings Storage Facility)	The Tailings Storage Facility contains the end-products of the gold-making process where a mixture of ore, water, and chemicals including sodium cyanide used to leach out the metals may be present. Sodium cyanide is water-soluble and can kill if ingested in high concentrations by the fauna. Other non-ingestion related risks are associated with spills, seepage or flooding of the Tailings Storage Facility (direct, indirect or environmental breach of containment).	Yes. Extent and empirical nature of impacts known (see **Figure 2**).	As above	As above
Habitat Fragmentation	Operational habitat fragmentation occurs in mining areas not having adequate administrative controls i.e. strict policy of adherence to dedicated roads, tracks and paths.	Yes	Yes	No
Erosion	Inadequate soil conservation can result in long term: • pollution of waterways and affect aquatic fauna and flora; and • removal of valuable topsoil thus affecting the microclimate for the regions threatened species of plants and EECs.	Yes. Erosion will be managed with mitigation and amelioration measures.	Yes. As for the Surface Facilities Area.	Yes. As for the Surface Facilities Area.

Table 16 (Cont'd)
Indirect (Operational) Impacts

Indirect / Operational Impact	Effect and Application to the Project Site	Impact Footprint Area		
		Surface Facilities Area	Tailings Storage Facility	Pete's Tank and Back Tank East
Noise	Operational noise has the potential to disrupt breeding or neonate behaviours, particularly the regions threatened parrots, Grey-Crowned Babblers and smaller birds such as robins resulting in abandonment and death of the young.	No	No	No
Dust	Dust has the potential to suppress plant growth and be a vector for soil borne diseases.	Dust would be managed in accordance with *The Protection of the Environment Operations Act 1997* (POEO Act) requirements.	No	No
Disease	Health status of vegetation may change if proposed works or operation of the Project introduces a disease or change the environment such that flow on effects affects it.	Unlikely.	Trees in areas surrounding the Tailings Storage Facility will die and possibly may result in edge effects.	No
Introduced Species	Ground disturbing activities may increase weed invasion and opportunities for feral animals.	Yes. Both are already common within the locality, however, it is unlikely that local populations would increase. Through pest management feral goat population may decrease.	No	No
Trauma to fauna	Considered to be the greatest operational threat to fauna within the Project Site. Vehicle trauma within the Project Site on the regional roads, (particularly along Burthong Road) is known to kill a substantive number and diversity of wildlife, including threatened species (Superb Parrot, Koalas and grey-crowned babblers). Increased numbers of vehicles along this road would increase the potential risk for trauma to wildlife.	Yes. Risks to fauna within the Project Site. Traffic associated with the Project can be controlled through Administrative Controls (conditions of employment to abide by speed limits and OHS reporting of breeches).	The risks of death to fauna through cyanide poisoning have been discussed in this report and management measures will be taken to mitigate against the risk.	No

The nature and extent of the proposed impacts have been discussed in the preceding sections.

Table 17
Relevance of Key Threatening Processes

Page 1 of 2

Key Threatening Process	KTP active prior to this Project	Will the Project exacerbate KTP?	Will the proposed compensatory habitat mitigate the Impact
Alteration of habitat following subsidence due to longwall mining	No	No	No
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	**Yes**	No	No
Anthropogenic climate change	**Yes**	Unable to determine	Unable to determine
Bushrock removal	**Yes**	**Yes**	**Yes**
Clearing of native vegetation	**Yes**	**Yes**	**Yes**
Competition and grazing by the feral European rabbit (*Oryctolagus cuniculus*)	**Yes**	No	No
Competition and habitat degradation by feral goats (*Capra hircus*)	**Yes**	No	**Yes**, through the adoption of pest control programme.
Competition from feral honey bees (*Apis mellifera*)	**Yes**	No	No
Death or injury to marine species following capture in shark control programs on ocean beaches	No	No	No
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments	No	No	No
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners	No	No	No
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	**Yes**	No	No
Herbivory and environmental degradation caused by feral deer	No	No	No
Importation of red imported fire ants (*Solenopsis invicta*)	No	No	No
Infection by *psittacine circoviral* (beak and feather) disease affecting endangered psittacine species and populations	**Yes**	No	No
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	No	No	No
Infection of native plants by *Phytophthora cinnamomi*	No	No	No
Introduction of the large earth bumblebee (*Bombus terrestris*)	No	No	No

Table 17 (Cont'd)
Relevance of Key Threatening Processes

Key Threatening Process	KTP active prior to this Project	Will the Project exacerbate KTP?	Will the proposed compensatory habitat mitigate the Impact
Invasion and establishment of exotic vines and scramblers	No	No	No
Invasion and establishment of Scotch broom (*Cytisus scoparius*)	No	No	No
Invasion and establishment of the cane toad (*Bufo marinus*)	No	No	No
Invasion, establishment and spread of *Lantana camara*	No	No	No
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)	No	No	No
Invasion of native plant communities by exotic perennial grasses	**Yes**	**Yes**	**Yes** (in revegetation areas of Surface Facilities Area).
Invasion of the yellow crazy ant (*Anoplolepis gracilipes* (Fr. Smith) into NSW	No	No	No
Loss of hollow-bearing trees	**Yes**	**Yes**	**Yes**, but very long term through revegetation.
Loss or degradation (or both) of sites used for hill-topping by butterflies	No	No	No
Predation and hybridisation of feral dogs (*Canis lupus familiaris*)	No	No	No
Predation by the European red fox (*Vulpes vulpes*)	**Yes**	No	**Yes**, through the adoption of pest control programme.
Predation by the feral cat (*Felis catus*)	**Yes**	No	**Yes**, through the adoption of pest control programme.
Predation by *Gambusia holbrooki* Girard, 1859 (plague minnow or mosquito fish)	**Yes**	No	No
Predation by the ship rat (*Rattus rattus*) on Lord Howe Island	No	No	No
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)	**Yes**	No	No
Removal of dead wood and dead trees	**Yes**	**Yes**	**Yes.** Habitat values removed would be recycled in revegetated areas.

9. RECOMMENDED IMPACT AMELIORATION MEASURES

General examples of ways to manage impacts expected from these processes are provided in **Table 18**.

Table 18
General Examples of Project Impacts Mitigation

Category	Examples	Relevance to the Project
Protection and avoidance	• Relocating or changing the design of the proposal • Restricting access of construction crew and machinery • Implementing stringent sediment and erosion control measures • Creating buffer areas between a significant area and the footprint of the proposal.	• Avoidance of dense dead tree stags and hollows in the Project Site. This will reduce potential impacts to Kultarr and many hollow dependant species that would utilise tree hollows. Big hollow bearing trees in areas to be dammed should be left intact and upright. • Restricting access to only areas to be impacted is feasible in a mining project. • Soil and sediment control devices are an integral component of the project. • Buffer areas would be the same as point one above.
Enhancement	• Bush regeneration activities • Replacing animal habitats such as tree hollows and rocky outcrops • The use of underpasses / overpasses in order to allow passage of native animals between natural areas	• The proposed Biodiversity Offset Strategy would result in the preservation and protection of approximately 628ha of vegetation within the Biodiversity Offset Area. • The most beneficial habitat compensation within the Project Site would be to fence (chain mesh) a suitably sized area, place removed trees and logs from the Impact Footprint in this area, undertake feral animal controls (including fox baiting) and let the grassy habitat regenerate. • It is likely that the threatened Striated Grass Wren and small ground dwelling marsupials would find and utilise this habitat. • The rehabilitation plan of the spoil should include the use of native species known to occur on the site for rehabilitation. • It is not likely that provision of artificial tree hollows would make much of a difference in the western zone. • Not a feasible option for this project.
Compensation	• Biodiversity offsets • Construction of artificial replicas of important habitat features (e.g. artificial nesting sites for birds, frog-friendly ponds).	• The proposed Biodiversity Offset Strategy would result in the preservation and protection of approximately 628ha of vegetation within the Biodiversity Offset Area. • Regenerating, revegetating and rehabilitating the Project Site through a 'Biodiversity Offset Strategy' are proposed. Basically, habitat removed within the Impact Footprint will be moved into surrounding habitat (outside the impact areas) to create habitat diversity. • There is scope within the Project to undertake construction of artificial habitats but this has not been part of the scope of this ecology assessment.

Table 18 (Cont'd)
General Examples of Project Impacts Mitigation

Category	Examples	Relevance to the Project
Management	• Weed and feral animal control programs • Bushfire management • Ongoing monitoring programs • Restricting livestock, domestic pets and humans to certain areas	• Currently biodiversity is limited due to the high numbers of goats, kangaroos, foxes and cats in the environment. Maintaining this situation would ensure fewer native animals is impacted by land clearing. It would be advisable that once land clearing has occurred to then appropriately address feral animals. Predation by the European red fox and feral cat are both listed as key threatening processes under the EPBC Act and the TSC Act, with threat abatement plans prepared under guidelines set by each Act (Environment Australia 1999; NPWS 2001a). Although outside the Impact Footprint, the mallee "The Peak" is subject to the highest goat disturbance and would be an appropriate place to implement management plans. The Proponent would address the management of feral animals (particularly goats) within the Project Site as they have already had a detrimental impact upon the native wildlife of the area, particularly reptile, bird and ground dwelling mammal species. • The area has few exotic weeds, however, a Weed Management Strategy would be developed as part of the Project. The abundance of 'invasive native scrub' also demonstrates a dramatic shift in landscape ecology since European settlement. The weed management plan would combat the spread of weeds prior during and after construction work. The Proponent should regularly inspect the site having particular regard to the requirements for weed species listed as 'noxious' under the NW Act. Weed inspection should occur at three months and twelve months after the ground disturbing works. • All species present are believed to respond to fire. Controlled burning may be beneficial but not recommended within the context of this study. • Ongoing monitoring may be limited to weed eradiation and to establishing Kultarr population and distribution trends. • Restricting livestock to the Project Site has been undertaken. Restriction of human movement (vehicles etc) would benefit soil conservation.

9.1 AMELIORATION MEASURES FOR GENERAL LAND MANAGEMENT

Considering the nature and extent of the Project, amelioration measures should include the following:

- General land management amelioration measures (e.g. pest animal control and weed management strategy);

- Amelioration measures to be undertaken prior to commencement of the Project e.g. pre-clearance survey of the Surface Facilities Area and Tailings Storage Facility, and development of administrative controls such as development of policies, procedures or inductions to inform workers;
- Amelioration measures to be undertaken during the Project (e.g. clearly marking areas to be cleared and developing administrative controls to define tracks and trails which would minimise impact within native vegetation, increasing the area of extent native vegetation using indigenous species, rehabilitation of existing remnant and improving structural complexity);
- Amelioration measures to be undertaken after the Project has been completed (e.g. monitoring of the Project Site); and
- Review all tracks / access roads and rationalise Project requirements.

These measures should be implemented to ensure that no 'significant effect' would occur upon any threatened biota, or their habitats that are known to occur or could potentially occur within the Project Site. These measures would also ensure that the impacts upon other native flora and fauna and the general environment of the Project Site would also be minimised.

9.2 AMELIORATION MEASURES TO BE UNDERTAKEN PRIOR TO COMMENCEMENT OF PROJECT

The following recommendations are made to minimize impacts of the Project on the ecological values of the Project Site.

9.2.1 General Management of Impacts to Existing Biota

The Proponent should consider development of a Biodiversity Management Plan (BMP) for the Project Site. A BMP would identify and manage existing and rehabilitated native vegetation and habitat within the Project Site, with particular reference to threatened biota, and providing certainty for a designated period of time. A BMP is an important administrative control and can easily be incorporated in the conditions of consent and would allow for:

- long term security so that native vegetation and habitat within the Project Site can be better managed for both financial and environmental outcomes;
- clear provisions that can reduce the need for repeated development applications;
- the basis for providing financial support to the Proponent to improve the condition of native vegetation and habitat within the Project Site;
- consistency between agreed management actions within the Project Site and those Recovery Strategies / Priority Action document for each species or community; and
- clarification for existing and proposed land use (continued cropping / grazing etc).

A BMP should include, but not be limited to the following:

- Pest animal and plant control (feral goat, cat, dog, fox, invasive native species i.e. noisy minor / black kite and noxious weeds) as follows:
  - A pest animal strategy should be developed by targeting the introduced goat, fox, rabbit, hare and feral cat. The main outcome of this strategy should be a management plan aimed at implementing on ground works to control these pest species. The strategy and subsequent management plan should be developed in conjunction with relevant strategies documented by OEH, NSW Livestock Health and Pest Authority, Western CMA and neighbouring properties; and
  - A weed control program implemented for the Project Site should specifically focus upon the removal of noxious weeds and reducing further weed invasion. It is also important to deter the growth of weeds in recently disturbed areas, and the transportation of weeds into the Project Site and through the Survey Area. Planting fast growing indigenous native grasses (but not monoculture forming) to minimise potential weed invasion would protect exposed areas and is recommended in the revegetation plan. Treatment of Galvanised Burr, a class 4 noxious weed and Bathurst Burr, should be delayed until the habitat can established for small birds i.e. until wattles used in the revegetation programme are established.
- Identify the proposed Biodiversity Offset Area (**Figure 7**) on the BMP as a 'no impact' area.
- Development of compensatory habitat whereby positive management actions are used to balance environmental outcomes in the case of clearing native vegetation and habitat. A positive outcome must be determined for each environmental outcome, i.e. water quality, land degradation, salinity and biodiversity (including threatened species);
- Grazing management plan (e.g. can be useful for the suppression of weeds):
  - Given that the Project Site has been under some form of grazing since European settlement, grazing as a management tool should be considered where it would not cause management issues and conflict with exploration / mining activities; and
  - Grazing should be restricted or prevented altogether within existing remnants and during plant establishment and when plants are starting their annual growth. Heavy grazing during this time can substantially weaken plantings and natural revegetation. Crash grazing is an option but would only occur when plants are dormant, such as in winter, this would effectively act as pruning thus promoting plant vigour and seed and root production during subsequent growth periods until plants are well established. Vegetation should also be spelled around the time of flowering and seed production in order to allow for continual replacement and maintenance of vegetation cover. Grazing impact would need to be monitored during initial grazing periods. This would enable the program to assess whether grazing intensity is too high or too low, and to move stock before vegetation degradation becomes a problem.

It is unlikely that a BMP or equivalent management plan could be fully implemented prior to the commencement of the Hera Project, however, it could be approved and have a designated budget. The pest animal strategy, weed control program and grazing strategy could be prepared and implemented prior to the proposed commencement of activities to ensure that no 'significant effect' would occur upon any threatened biota, or their habitats that are known to occur or could potentially occur within the Survey Area.

9.2.2 Management of Impacts to Threatened Fauna and Communities

Given that fauna surveys within the Project Site have positively identified threatened species with key habitat elements within the proposed Impact Footprint, limited pre-clearance using an appropriately qualified and experienced ecologist survey is a requisite.

Actions required to be undertaken prior to the Project commencing are provided below.

- One of the greatest risks to threatened and regionally significant fauna is vehicle trauma. A reporting system should be adopted resulting in disciplinary action for employees breaking the legal speed limit to and from work. This OH&S requirement not only protects the employer, who is responsible for the employee on their journeys to and from work, it would reduce the risk of harm to wildlife. Implementation of this system is achieved through administrative controls such as inductions, policies and procedures.
- All threatened species recorded during the survey or CSUJC-EC (2006) except the Superb Parrot, are considered likely to have breeding opportunities in the Survey Area. To manage risk of new, unobserved nests being impacted through clearing of undergrowth associated with the Project, administrative controls are required:
  - All staff, particularly the machine operators should, prior to commencement of soil surface disturbance, receive an induction;
  - The induction should inform the operator on the threatened species that have the potential to exist within the Project Site and should be provided with adequate information on each threatened species. Information that could be deemed suitable for this purpose would be OEH species profiles fact sheet on the threatened bird species comprising descriptions and photographs of the species, their habitats including 'typical' nest shapes. The induction should state that the fact sheet would remain in each vehicle and would require to be presented upon request. If a suspected nest in encountered the Proponent or a representative would be immediately informed and the issue resolved quickly, as required.
  - To reduce risk of impact to tree-dependant microbats, clearing of substantive trees should be scheduled between April to September. Administrative controls should ensure the induction incorporates proper management procedures for the handling of any species of bats during tree clearing to prevent infection with zoonoses (a disease that animals carry which can affect humans). Only suitably qualified personnel should be allowed to handle the removal of bats of any species.

9.3 AMELIORATION MEASURES TO BE ADOPTED DURING SITE ESTABLISHMENT PHASE

During site establishment within the Project Site the following amelioration measures should be undertaken.

1. Areas to be cleared should be clearly marked to ensure no accidental clearing occurs. Administrative controls should include inducting employees regarding the nature and extent of clearing required as well as having no impact to surrounding vegetation (only using designated roads, tracks and trails or predefined areas in disturbed sites). Pre- and post-clearing audits should be conducted and any non-compliance of conditions of consent should be immediately reported;
2. Any infrastructure and machinery required for the Project should be positioned to avoid retained native vegetation, e.g. adjacent vegetation outside designated clearing areas but remain within areas assessed in the report;
3. Contractors should examine all trees for the presence of birds or nestlings and arboreal mammals before felling or pushing and then only commence with tree removal immediately after visual inspection;
4. When a hollow-bearing dead stag requires clearing, it is advisable to gradually 'nudge' it intermittently so that any animal occupying it has the chance of vacating the area after the initial disturbance period (tap it with the dozer, wait five minutes, repeat, etc). It is recommended that tree removal only occurs in the Surface Facilities Area and the Tailings Storage Facility area, with trees to remain in the *in situ* proposed within the proposed dam areas to be flooded;
5. Where clearing of native vegetation is unavoidable within the Surface Facilities Area and Tailings Storage Facility Impact Footprint, tree trunks, major branches, and, if possible, minor branches should be salvaged as much as possible and should be relocated to inter-row areas to be revegetated. This activity would create habitat with structural complexity and encourage many species including robins to return to the revegetated areas. Dead and fallen trees is a critical habitat component but is largely absent in the locality. Fallen trees should not be stacked in one location but evenly scattered throughout the Project Site to provide habitat for rabbits. Signs should be erected stating the purpose of the scattered trees and their value to the wildlife and that no fire wood collection is permitted;
6. Any noxious weed and other weed material encountered during activities, should be destroyed and/or removed from the site using appropriate methods to ensure weeds do not spread to other locations within the Project Site, especially in regards to invasion of drainage lines and storage dams;
7. Drainage and surface water runoff should be controlled in such a way as that no polluted waters leave the site;
8. Sediment and erosion control structures, which conform with the relevant guidelines, should be installed;
9. Exposed surface soil should be stabilised as soon as possible, with mulching, covering or replanting with native species, to avoid potential erosion; and
10. All water supplies should be fenced to prevent goats, foxes, cats and kangaroos having free access to water.

The following safeguards, relating to the unnamed drainage channels, should be adopted within the Project Site during proposed expanded storage dam construction activities to minimise impacts to the local waterways and downstream creeks[5].

1. The proposed activities should be planned so that the amount of in-stream work is kept to a minimum;
2. In-stream work should occur as a single event, where possible,;
3. Restrict in-stream work to low flow periods, where possible;
4. Limit machinery access to a single point on one bank;
5. Limit distance between machinery access point and location of activity;
6. Use an in-stream pad built of washed gravel where in-stream equipment activity would generate excess sediment;
7. Keep the access track to the activity location site as narrow as possible (within the constraints of safety and construction requirements);
8. Clear vegetation from unstable or erodible banks by hand, avoiding the use of heavy machinery;
9. Stockpile topsoil removed from the access track and from areas of the proposed Back Tank East and expanded Pete's Tank to designated areas outside of the active floodplain and use measures, such as sediment fences and holding ponds, to prevent stockpile runoff from entering the watercourse;
10. Minimize the length of time that unstable and erodible soils are exposed;
11. Stabilize erodible soils as soon as practical by seeding, spreading mulch or installing erosion control blankets; and
12. Machinery to be used for the construction activities should be well-maintained (e.g. free of fluid leaks) and enter the site in a clean (washed) condition.

9.4 AMELIORATION MEASURES TO BE ADOPTED AFTER PROJECT COMPLETION

The following amelioration measures are recommended to be adopted following Project completion.

1. Rehabilitation of the Project Site should be monitored to ensure native vegetation regeneration is successful (e.g. permanent plots can be established to gauge germination success) and to control weed invasion;
2. Appropriate Biodiversity Offset Strategy should be implemented to ensure an outcome of "no net loss" of native vegetation and habitat. Net loss biodiversity offsets can include, but not limited to, existing retained native vegetation areas within the Project Site.

[5] Recommendations are an adaptation of those generally required by NSW DTIRIS [NSW Fisheries].

3. Implement fully the Biodiversity Offset Strategy including ensuring that the strategy would be implemented in perpetuity. This should include the preparation of a *Biodiversity Management Plan* in consultation with the relevant government agencies and surrounding community within 12 months of receipt of project approval. That plan should:
   - specify biodiversity-related actions to be undertaken during the life of the Project and for the appropriate number of years after the site has been decommissioned;
   - incorporate the above commitments;
   - describe management of the proposed Biodiversity Offset Area;
   - describe the proposed revegetation and amelioration program, including identification of areas to be revegetated and the species to be used; and
   - involve, where practicable, local community groups in management of biodiversity within proposed offset area.
4. Adequate and industry best practice land management measures (e.g. implementation of a weed and feral animal control program and a Biodiversity Management Plan) should be implemented;
5. The Grey-crowned Babbler, Hooded Robin, Diamond Firetail and microbat populations should be monitored to ensure recovery of local populations are successful:
6. Annual formal surveys of the Grey-crowned Babbler, Hooded Robin, Diamond Firetail should target detection of breeding locations that when located can be monitored to gauge breeding success. Relevant (standard) ecological information should be compiled so as to allow year to year comparisons of any changes in habitat usage and population trends;
7. Annual bat monitoring should occur (three consecutive nights per event) to establish any trend in population changes since commissioning the activity; and
8. Furthermore, annual formal surveys for the Kultarr (following offset works), should aim to establish a population census and gather information that would be used to manage this species potential within the Project Site. Relevant (standard) ecological information should be compiled so as to allow year to year comparisons of any changes in habitat usage and population trends.

The Tailings Storage Facility has the potential to pose a risk to the health of biota. The risk can be managed through administrative controls (policies, procedures, work routines) and through engineering controls (preventing access with built structures, creating alternative habitats in nearby locations).

1. It is recommended that the Proponent adopts the following administrative controls which are consistent with the Federal Government's National Industrial Chemicals Notification and Assessment Scheme (NICNAS) *Priority Existing Chemical Assessment Report No 31*: *Sodium Cyanide* (Commonwealth of Australia, 2010) and *Guidelines for Sodium Cyanide Management* (Australian Government NICNAS 2002). The guidelines specify Standards of Practice to identify performance goals and objectives that must be met to comply with the Code.

Four principles (and corresponding Standards of Practice) that are directly relevant to the Project are as follows.

a) **Operations**: Manage cyanide process solutions and waste streams to protect human health and the environment:

- Implement management and operating systems designed to protect the environment including contingency planning, inspections and preventative measures.

b) **Emergency Response**: Protect communities and the environment through development of emergency response strategies and capabilities:

- Prepare detailed emergency response plans for potential cyanide effects; and
- Develop procedures for internal and external emergency notification and reporting.

c) **Training**: Train workers and emergency response personnel to manage cyanide in a safe and environmentally protective manner:

- Train workers to understand the hazards associated with cyanide use and discharge; and
- Train appropriate personnel to operate according to systems and procedures that protect the environment.

d) **Dialogue**: Engage in public consultation and disclosure:

- Make available operational and environmental information regarding cyanide available to stakeholders; and
- Initiate dialogue describing cyanide management procedures and responsively address identified concerns.

In relation to addressing the four principles listed above, the following additional recommendations are made.

2. Implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions. Engineering controls should be used to discourage wildlife from entering the Tailings Storage Facility as follows:

a) Prevent terrestrial animals from accessing the Tailings Storage Facility / evaporation ponds with perimeter fencing using a combination of a tall (height >1.8m) chain mesh fence (to exclude large mammals) with a fine mesh skirt at its base (to exclude small mammals and reptiles);

b) Exclude access to tailings water with overhead bird netting;

c) Provide alternative waterholes. In this instance, habitat restoration of the site will include the expansion of Pete's Tank and creation of Back Tank East. Although surface-disturbing activities would be required a concomitant habitat restoration will be achieved by the extension of the dams' surface areas and provision of habitat complexity (variable depths and widths of the dam floor, addition of logs etc and installation of a valve to raise or lower water level for the benefit of biota);

d) The following plant species, known to be commercially available and to flourish in the locality, should be used for revegetation activities in the vicinity of the storage dams :

- Reed bed plantings – *Phragmities australis, Bolboschoenus cadwelii, Baumea articulate, Schoenoplectus validus, Schoenoplectus murticans, Alisma plantago-aquatica, Triglochin procerum*;
- Edge plants – *Philydrum lanuginosum, Juncus astatus, Carex fascicularis, C. appressa and Cyperus exaltatus*; and

e) If creation of an alternative habitat is considered an option then its management (rising of the water levels etc) would need to be documented and included in the BMP.

3. The use of the following deterrents to prevent animal species from entering the Tailings Storage Facility and ingesting the water contained within it should be considered:

   a) Hydrogen guns (non-lethal deterrents) may be considered to 'scare' any populations of birds from the Tailings Storage Facility. These guns are best used only infrequently as birds quickly become accustomed when regularly used;

   b) Use of a rotating spot light on a random sequence to be used as a deterrent at night. The spot light should be ideally set on a floating platform (able to rise and fall with the water level) to scare away birds at night (mainly ducks) but not affect residents of the neighbouring properties (beam set to edge of water on bank), not have regular intervals (so that animals would become accustomed to the light) and not to encourage other animals (insects) to become dependent on it; and

   c) Wildlife ladders should be incorporated into the design of the Tailings Storage Facility to provide an escape route to any animal that may have fallen into the tailings slurry.

4. Implement monitoring programs to evaluate the effects of cyanide use on wildlife by undertaking routine wildlife observation and cyanide concentration data collection:

   a) Mine environment personnel should be trained to collect wildlife and cyanide concentration data from areas surrounding the Tailings Storage Facility (daily inspections, targeted inspections i.e. when Superb Parrots are migrating, utilisation of specialist equipment such as Anabat equipment);

   b) Information collation should be undertaken using standardised methods. The methodologies employed may include, but not be limited to, using optical aids such as telescopes at the Tailings Storage Facility and use of reference material to ensure accurate identification of wildlife. The standard techniques and equipment should be used for cyanide sampling;

   c) Information captured should be recorded in an appropriate manner (customized spreadsheet or database templates) for subsequent data analysis; and

   d) The data captured should be stored in a central collection point on a regular basis for quality control and analysis.

5. Implement monitoring programs to evaluate the effects of cyanide use on wildlife by undertaking routine wildlife utilisation and mortality observations:
    a) Mine environment personnel should be trained to conduct the wildlife observations survey within three hours of sunrise (it is noted that total observation time is expected to be 30 minutes on a regular shaped tailings storage facility);
    b) The survey counts should identify all wildlife visitations and mortality associated with the Tailings Storage Facility;
    c) Habitat utilisation within the Tailings Storage Facility should be recorded as either supernatant[6] solution, bare ground (dam walls), wet slurry, aerial (above the tailings), dry tailings or feeding on carcasses found within the Tailings Storage Facility and surrounding areas;
    d) Standard weather conditions, an estimation of the level of the supernatant liquid present on top of the tailings (as a total percentage of Tailings Storage Facility area) and the percentage of solids in discharged tailings for that day should be recorded;
    e) On subsequent routine observations, environmental staff should identify and record the fate of carcasses, either as removed by scavengers or subsequent entombment under tailings;
    f) If a carcase is encountered, photographs should be taken, if possible, of any new or unidentified carcass species to facilitate the confirmation of susceptible species; and
    g) Opportunistic observations of wildlife deaths should also be recorded.
6. Implement monitoring programs to evaluate the effects of cyanide use on wildlife by undertaking regular routine wildlife observations as follows.
    a) The frequency of monitoring by the mine environment personnel would be dependent on the cyanide concentrations at the point of discharge into the Tailings Storage Facility and the observed wildlife mortality:
        - At <50mg/L WAD, weekly routine observations are recommended. If wildlife mortality is recorded, then routine observations should be repeated for the following three days;
        - At >50mg/L WAD, daily routine observations are required;
        - If an opportunistic observation records a wildlife death, then routine monitoring of the Tailings Storage Facility is required at the same time the following day; and
        - Implement monitoring programs to evaluate the effects of cyanide use on wildlife by undertaking routine cyanide data collection of any wildlife deaths:

[6] Solution or the clear liquid that separates from the tailings slurry when the solid phase of the slurry settles at the bottom of the Tailings Storage Facility.

b) The field cyanide sampling should be performed in accordance with industry best practice; and

c) Free, total and WAD cyanide concentrations should be measured at the point of discharge into the tailings storage facility, at the return water decant tower and, if required, return water dams. All cyanide concentration sampling should be conducted on the same day.

7. Implement monitoring programs to evaluate the effects of cyanide use on wildlife by undertaking frequency of routine cyanide sampling:

   a) The frequency of cyanide sampling is a function of variation of cyanide concentration at discharge and wildlife mortality. Initially, weekly sampling is recommended;

   b) If review of cyanide concentration data indicates that either significant or minimal variation occurs, then the sampling frequency can be adjusted accordingly, using standard sampling design methods and the value of information;

   c) If multiple wildlife mortality event occurs (three deaths in one day), then cyanide sampling is required the same day; and

   d) Mill free cyanide concentrations data obtained from milling logbooks can be used to correlate with WAD cyanide concentration at discharge for each site.

9.5 BIODIVERSITY OFFSET STRATEGY

9.5.1 Introduction

The Proponent has committed to developing and implementing a Biodiversity Offset Strategy (BOS) for the Project Site on the basis that the Project would result in unavoidable impacts on local biodiversity. The Hera BOS has been developed in collaboration with Office of Environmental and Heritage, the Proponent and R.W. Corkery & Co. Pty Limited. The Hera BOS development considered the scale of the impacts proposed, the NSW and Commonwealth requirements for biodiversity offsets, as well as local factors such as land use, both current and future. The following key outcomes were central to the development of the BOS.

1. The Biodiversity Offset Strategy should aim to 'maintain or improve' biodiversity values.
2. The Biodiversity Offset Strategy should be enforceable, monitored and audited.
3. The Proponent should investigate conservation agreements as a means of securing 'long term security' for the proposed offset area.

In order to achieve the nominated key outcomes, the focus of the BOS is the protection, enhancement and long-term conservation of the existing remnant native vegetation within the Surface Facilities and surrounding lands. Particular focus has been given to enhancing and conserving those remnants of Poplar Box – Gum-barked Coolibah – White Cypress Pine shrubby woodland (Benson 103) occurring on and immediately surrounding the Project Site. **Table 19** summarises the disturbance to native vegetation. In summary collectively 71.9ha of Benson 103 would be affected with only very minor effects to Benson 174 (0.1ha) and previously cleared and now regenerating grassland / shrubland.

Table 19
Proposed Area of Disturbance Classified by Vegetation Community

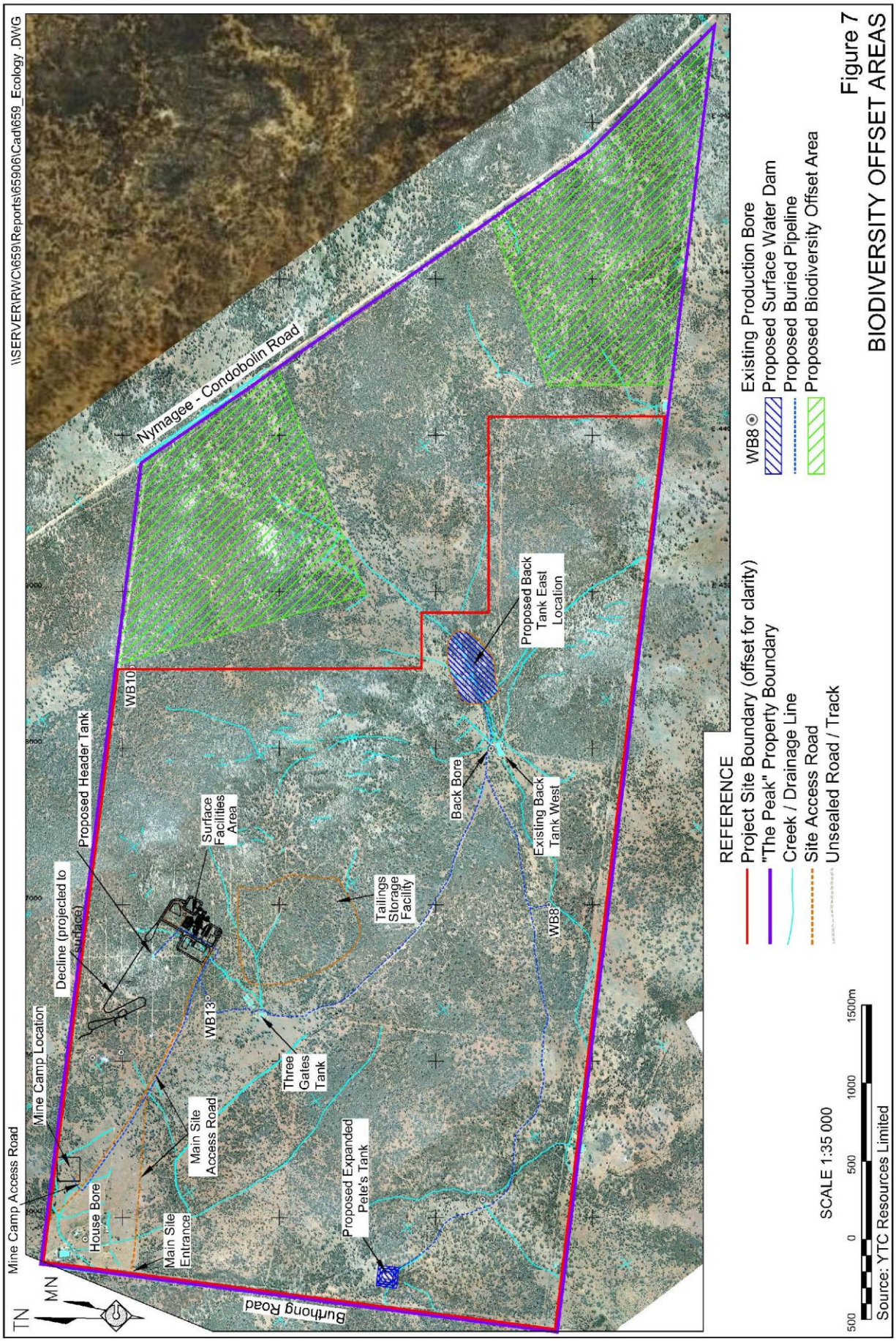
Vegetation Communities within The Project Site (ha)						
	Vegetation in Project Site		Vegetation Communities to be Disturbed			
Vegetation Community	Approximate (ha) of Project Site	Approximate proportion of Project Site %	Area (ha)	% of total vegetation community area	% of Project Site area	% of the Peak Property area
Benson 103	1146.88	74.84%	58.4	75.6%	3.8%	2.7%
Benson 103 - Bimble Box Dominated Area	119.63	7.81%	10.2	13.2%	0.7%	0.5%
Benson 103 - White Cypress Pine Dominated Area	50.94	3.32%	1.7	2.2%	0.1%	0.1%
Benson 103 - Eremophila & Hopbush Regrowth	15.17	0.99%	1.6	2.1%	0.1%	0.1%
Benson 174	84.84	5.54%	3.2	4.1%	0.2%	0.1%
Benson 180	70.06	4.57%	0.1	0.2%	0.0%	0.0%
Cleared Grassland / Shrubland / Disturbed	44.93	2.93%	2.1	2.7%	0.1%	0.1%
TOTAL	1532.5	100.0%	**77.3**	100.0%	5.0%	3.6%
Note: The extent and proportions of vegetation communities and cleared areas are based on GIS mapping techniques and as such are approximate figures only.						

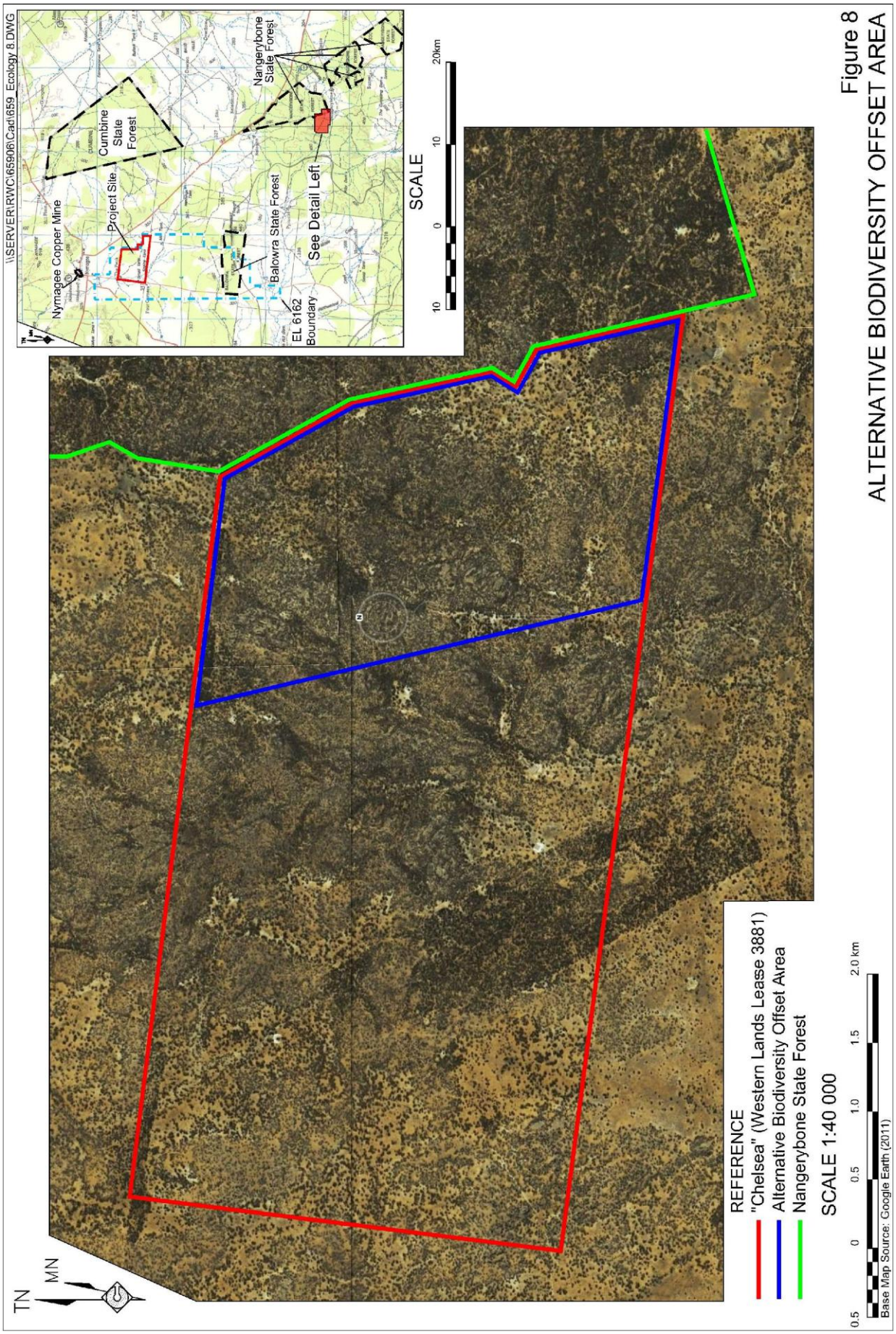
The Project's Biodiversity Offset Strategy is described in Section 2.17 of the *Environmental Assessment*. In summary, a Preferred Biodiversity Offset Area and an Alternative Biodiversity Offset Area are proposed (**Figure 7** and **8**).

The Preferred Biodiversity Offset Area is approximately 628ha in size and comprises the eastern section of "The Peak" property (**Figure 7**). Vegetation within the Preferred Biodiversity Offset Area may be classified as Benson 103 and has very similar habitat values as the areas of proposed disturbance. However, as indicated on **Figure 7**, the Preferred Biodiversity Offset Area is the subject of a Travelling Stock Reserve (TSR) 8792. The Proponent has been advised that the Preferred Biodiversity Offset Area may only be secured in perpetuity once a section of TSR 8792 has been cancelled. Negotiations in relation to cancelling the required section of TSR 8792 are ongoing. As a result, the Proponent has proposed an Alternative Biodiversity Offset Area.

The Alternative Biodiversity Offset Area is located approximately 28km to the southeast of the Project Site and is also 628ha in size (**Figure 8**). An inspection of the Alternative Biodiversity Offset Area indicated that the vegetation communities and habitat values of the Alternative Biodiversity Offset Area are very similar to those of the proposed areas of disturbance. In addition, the Alternative Biodiversity Offset Area is immediately adjacent to the Nangerybone State Forest and includes the following.

- Waterways, at least two of which are mapped as the headwaters to Nangerybone Creek. This creek as a substantive waterway in the locality (within 50km radius) and has a higher potential to provide habitat for the regions threatened biota and Aboriginal heritage evidence than the proposed areas of disturbance.


\\SERVER\RW\C\659\Reports\65906\Cad\659_Ecology .DWG
Nymagee - Condobolin Road
Burthong Road
Mine Camp Access Road
Mine Camp Location
Decline (projected to surface)
Proposed Header Tank
Surface Facilities Area
Tailings Storage Facility
Back Bore
Proposed Back Tank East Location
Existing Back Tank West
WB10
WB13
WB8
Three Gates Tank
Main Site Access Road
Main Site Entrance
House Bore
Proposed Expanded Pete's Tank
TN
MN
REFERENCE
Project Site Boundary (offset for clarity)
"The Peak" Property Boundary
Creek / Drainage Line
Site Access Road
Unsealed Road / Track
WB8 Existing Production Bore
Proposed Surface Water Dam
Proposed Buried Pipeline
Proposed Biodiversity Offset Area
SCALE 1:35 000
500 0 500 1000 1500m
Source: YTC Resources Limited
Figure 7
BIODIVERSITY OFFSET AREAS


\\SERVER\RWC\65906\Cad\659_Ecology 8.DWG
Nymagee Copper Mine
Project Site
Cumbine State Forest
Balowra State Forest
Nangerybone State Forest
See Detail Left
EL 6162 Boundary
SCALE
20km
10
0
10
Figure 8
ALTERNATIVE BIODIVERSITY OFFSET AREA
TN
MN
REFERENCE
"Chelsea" (Western Lands Lease 3881)
Alternative Biodiversity Offset Area
Nangerybone State Forest
SCALE 1:40 000
0.5 0 0.5 1.0 1.5 2.0 km
Base Map Source: Google Earth (2011)

- Rocky habitat which is a special natural feature with high values in BioBanking assessment.
- A known population of Kultarr (Endangered - TSC Act). This species was not recorded within the Project Site. As a result, the Alterative Offset Area would provide an additional benefit. Record of this species was provided by the landholder.
- A known population of Hooded Robins (Vulnerable - TSC Act). These will be affected at the Peak and the offset would secure habitat for a known population of this species. This species was recorded during an inspectopn of the site on 15 October 2011.
- A know population of Grey-crowned Babblers (Vulnerable - TSC Act). These may be affected by the Project and the Alternative Biodiversity Offset Area would secure habitat for a known population of this species. This species was recorded during an inspectopn of the site on 15 October 2011.
- A known breeding population of Superb Parrots (Vulnerable - TSC Act). Breeding habitat would not be affected by the activity Project. The Alternative Biodiversity Offset Area would secure breeding habitat for a known population of this species. Record of breeding activity of this species was provided by the landholder.
- The Alternative Biodiversity Offset Area would be likely to be used by any rare microbat is likely to occur in the vicinity.

OzArk will undertake an assessment using the BBAM methodology of both the Preferred and Alternative Biodiversity Offset Areas.

In accordance with the requirements of the Biobanking Assessment Methodology (BBAM), with the final BBAM assessment of both areas to be provided to the relevant government agencies as soon as it is available. At this stage the Proponent anticipates that either of the proposed Biodiversity Offset Areas would provide sufficient Biobanking credits to adequately compensate for the proposed areas of vegetation to be disturbed. In the event that additional credits are available, the Proponent intends to only retire those credits required for the Project. The remaining credits would be retained for a future offset, should they be required.

In general, it is noted that:

- remnant vegetation within the Project Site is in Moderate to Good Condition and is surrounded by hundreds of hectares of analogous vegetation, hence has a large patch size.
- The proposed Biodiversity Offset Strategy proposes to protect remnant areas of vegetation within the final BOA from degradation that would result from grazing and feral animals.

Important features of the Biodiversity Offset Strategy are as follows.

- Exclusion of stock and control of feral animals from the final Biodiversity Offset Area which will allow habitat complexity and diversity to increase.
- Protection includes thinning of woody weed species which will allow habitat complexity and diversity to increase.

- It is envisaged that if managed appropriately, either Biodiversity Offset Area would, in the long term, provide an environment where Kultarr, Antechinus, Dunnarts, birds and reptiles associated with ground layer habitat complexity would be frequently recorded.
- The most important aspect of revegetation is that it would reintroduce native grasses and understorey and foster regeneration of adjoining woodland remnants thus enhancing / returning ecosystem function, the genetic base and habitat complexity in these areas. Applying local knowledge, a high quality grassland layer is the rarest structural layer in the locality, and possibly within the wider Catchment Management Area.

9.5.2 Evaluation of Offsets

9.5.2.1 Introduction

The mechanism that OEH and DSEWPaC use to evaluate offset proposals against Environmental Assessment Requirements (EA) are as follows.

1. OEH *Interim Policy for Biodiversity Offsets for Part 3A Projects* (DECCW, 2010) (OEH Interim Part 3A Offset Policy).
2. DSEWPaC's *Draft Policy Statement: Use of environmental offset under the EPBC Act 1999* (DSEWPaC Draft Policy Statement).
3. OEH *Principles for the use of Biodiversity Offsets in NSW* (OEH Offset Principles).

The OEH and Department of Planning and Infrastructure (DoPI) require Proponents to present justification of their preferred option based on the above-mentioned requirements and:

> *'Whether or not the proposal, together with actions to avoid or mitigate or compensate to prevent unavoidable impacts will maintain or improve biodiversity values'.*

The quantum of offsetting requirements will be substantiated by completing an assessment of both the Preferred and Alternative Biodiversity Offset Areas (**Figure 7**) following the BioBanking Assessment Methodology and Credit Calculator Operation Manual (2009), hereafter the 'BBAM'.

As no red flag vegetation communities will be impacted by the Project it is likely that the proponent can achieve a Tier 1, 'Improve or Maintain' outcome (following document #1 above). As detailed assessment using BBAM has not been undertaken in the biodiversity offset area, a precautionary approach has been adopted in this report to reflect that the proposal would, at minimum, achieve Tier 2 'No Net Loss' outcome.

A targeted survey within the areas of proposed disturbance for threatened orchids, including the Cobar Greenhood Orchid, was undertaken on 15 October 2011 following soaking rain in ideal conditions to detect such species. None were observed and it is unlikely that any would remain undetected within the area searched. As a result, it is likely that a Tier 1 outcome will be achieved following the BBAM assessment. However, taking the precautionary approach, a Tier 2 outcome would be achieved as a minimum.

9.5.2.2 OEH Interim Part 3A Offset Policy

OEH (as the then Department of Environment, Climate Change and Water) issued an interim policy on assessing and offsetting biodiversity impacts of Part 3A developments (DECCW, 2010). This policy seeks to provide a consistent and transparent approach to impact assessment and offsetting for projects assessed under Part 3A of the EP&A Act. This policy also provides the basis for aligning NSW and Commonwealth assessment and offsetting processes by providing an assessment pathway that is likely to satisfy both NSW and Commonwealth requirements.

Under this policy, the Proponent is required to:

- describe, quantify and categorise the biodiversity values and impacts of a proposal;
- identify, for benchmarking purposes, the offsetting that would be required to meet the improve or maintain standard; and
- provide the information for calculating offsets under this policy.

Table 19 quantifies the impacts on each of the different vegetation communities identified within the Project Site. The Proponent will provide a BioBanking Development and BioBanking Site Report prior to determination of the application for Project approval. The report will be prepared in accordance BBAM, based on the impacts identified in **Table 19** and data collected in the impact footprint and the proposed offset area**.** BBAM generated report will determine whether the Hera BOS meets one of the following biodiversity outcomes.

- Improve or maintain. The benchmark offsets nominated by BBAM are achieved.
- No net loss. With the exception that 'red flag' areas, e.g. EECs or threatened flora, are not protected, the benchmark offsets nominated by BBAM are achieved. Note: 'red flag' areas, e.g. EECs or communities >70% cleared are not associated with Benson 103.
- Mitigated net loss. The nominated offset does achieve the benchmark nominated by BBAM, however, a lesser quantum is justified on the basis of other factors.

As noted earlier it's likely that Tier 1 outcome would be achieved but for precautionary purposes of this report the proponent can state that at minimum, a Tier 2 outcome would be achieved.

9.5.2.3 DSEWPaC Draft Policy Statement

There are three considerations associated with the DSEWPaC Draft Policy Statement:

- Consideration 1 – Consistency with DSEWPaC definition (**Table 20**);
- Consideration 2 – Types of environmental offsets; and
- Consideration 3 – Principle for the use of environmental offsets.

The following DSEWPaC listed items require consideration:

- Superb Parrot (*Polytelis swainsonii*) (EPBC Act) – sighted overflying the area.
- Cobar Greenhood Orchid (*Pterostylis cobarensis*) (EPBC Act), precautionary principle applied.

- Lobed Blue-grass (*Bothriochloa biloba*) (EPBC Act), recorded within the Project Site.

Consideration 1 – Consistency with DSEWPaC Definition

Biodiversity Offset Areas proposed for the Project are consistent with the DSEWPaC definition (**Table 20**).

Table 20
Consideration 1 – Consistency with DSEWPaC Definition

DSEWPaC definition of environmental offset	Comment	Consistency of Environmental Offset with DSEWPaC Definition for Matters of National Environmental Significance.
1 The Australian Government defines environmental offsets as 'actions taken outside a development site that compensate for the impacts of that development - including direct, indirect or consequential impacts'.	The Biodiversity Offset Areas are not within the Project Site.	As offsets are located outside the Project Site they are **consistent** with the DSEWPaC definition.
2 Environmental offsets are not intended to make proposals with unacceptable impacts acceptable. They are simply intended be provide another tool that can be used during project design, environmental assessment and implementation to achieve the principles of ecologically sustainable development.	The Project has avoided and mitigated impacts where possible and offset as a consequence.	In this instance the offset is **consistent** with the DSEWPaC definition.
3 Environmental offsets provide compensation for those impacts which cannot be adequately reduced through avoidance and mitigation. They should be distinguished from 'mitigation', which refers to the range of actions that can be undertaken to reduce the level of impacts of a development (typically undertaken on-site).	Proposed offsets, by definition are in addition to mitigation and avoidance.	In this instance the offset is **consistent** with the DSEWPaC definition.

Consideration 2 – Types of Environmental Offsets

Actions that can be considered as environmental offsets are generally categorised into direct and indirect offsets. Direct offsets are aimed at on-ground maintenance and improvement of habitat or landscape values. Indirect offsets are the range of other actions that improve knowledge, understanding and management leading to improved conservation outcomes.

All three direct offsets within the Project Site are consistent with DSEWPaC defined environmental offset aims while four out of five of the indirect offset aims are consistent with DSEWPaC definitions (**Table 21**).

Table 21
Consideration 2 – Types of Environmental Offsets Aims

CONSISTENCY	Project Site
Direct Offsets	
1 long-term protection of existing habitat – including through the acquisition and inclusion of land in the conservation estate, and covenanting arrangements on private land;	**Consistent.** Proponent will hold a perpetual Western Land Lease over the final Biodiversity Offset Area and the conditions of the lease would be modified to identify the permitted land uses within the final Biodiversity Offset Area. **Relevance** – Superb Parrot perching habitat, feeding area, Cobar Greenhood and Lobed Bluegrass predicted habitat would be protected.
2 restoration or rehabilitation of existing degraded habitat; or	**Consistent.** Relevance, the offset protects habitat that is predicted for these species.
3 re-establishing habitat.	**Consistent.** Re-establishment of as grassy layer for Lobed Bluegrass**.**
Indirect Offsets	
4 implementation of recovery plan actions – including surveys;	**Consistent**. There are no recovery plans for these species; however protection of predicted habitat is consistent.
5 contributions to relevant research or education programs;	**Inconsistent.** Formalised peer review research is not a component of the activity. Nonetheless the opportunity of use would encourage university honours research projects.
6 removal of threatening processes;	**Consistent**. Relevance. The offset and Biodiversity Management Plan would address many KTPs through destocking, weed control and feral animal control.
7 contributions to appropriate trust funds or banking schemes that can deliver direct offsets through a consolidation of funds and investment in priority areas; or	**Consistent.** The BOS will be assessed under the BBAM. This methodology was established under Part 7A of the *Threatened Species Conservation Act 1995* and is supported by the *Threatened Species Conservation (Biodiversity Banking) Regulation 2008*, BioBanking Assessment Methodology (the methodology) and Compliance Assurance Strategy.
8 on-going management activities such as monitoring, maintenance, preparation and implementation of management plans etc.	**Consistent.** The BOS will include a proposed Biodiversity Management Plan.

Consideration 3–Principle for the Use of Environmental Offsets

The Australian Government has identified eight principles for the use of environmental offsets under the EPBC Act (**Table 22**). These eight principles will be used to assess any proposed environmental offsets to ensure consistency, transparency and equity under the EPBC Act. The Hera BOS is consistent with all eight principles.

Table 22
Consideration 3 – Principle for the Use of Environmental Offsets

The Australian Government's position is that:	Consistency – Project Site
1. Environmental offsets should be targeted to the matter protected by the EPBC Act that is being impacted.	**Consistent.** Like for like habitat would be protected in the BOS Offset.
2. A flexible approach should be taken to the design and use of environmental offsets to achieve long-term and certain conservation outcomes which are cost effective for proponents.	**Consistent.** Relevance – The offset will be protected by modifications to the conditions of the relevant Western Lands Lease and relevant agreements in consultation with OEH. These protections will ensure long-term protection of the offsets.
3. Environmental offsets should deliver a real conservation outcome.	**Consistent.** Relevance – Habitat protection will offset losses to EPBC species.
4. Environmental offsets should be developed as a package of actions - which may include both direct and indirect offsets.	**Consistent.** Relevance – The BOS will provide both direct and indirect offsets, these will collectively benefit EPBC species.
5. Environmental offsets should, as a minimum, be commensurate with the magnitude of the impacts of the development and ideally deliver outcomes that are 'like for like'.	**Consistent.** Relevance – Adequacy of the Biodiversity Offset Strategy will be determined by the BBAM.
6. Environmental offsets should be located within the same general area as the development activity.	**Consistent.** Relevance – The Project Site is located immediately adjacent to the Preferred Biodiversity Offset Area and within 25km of the Alternative Biodiversity Offset Area.
7. Environmental offsets should be delivered in a timely manner and be long lasting.	**Consistent.** Relevance – Superb Parrot. The BOS would be implemented prior to ground disturbing activities and would be secured in perpetuity.
8. Environmental offsets should be enforceable, monitored and audited.	**Consistent.** Relevance – Superb Parrot. These requirements will be included in the statement of commitments for project approval.

9.5.2.4 OEH Offset Principles

Biota requiring offsetting will be managed through the BioBanking Assessment Methodology for the Project Site. OEH state that a biodiversity offset is one or more appropriate actions that are put in place to counterbalance specific impacts on biodiversity. Appropriate actions are long-term management activities to improve biodiversity conservation. This can include legal protection of land to ensure security of management actions and remove threats.

Assessment of the Hera BOS against the 13 OEH Offset Principles is provided in **Table 23**.

Table 23
OEH Offset Principles

Principle	Consideration	Consistency – Project Site
1 Impacts must be avoided first by using prevention and mitigation measures.	Offsets are then used to address remaining impacts. This may include modifying the proposal to avoid an area of biodiversity value or putting in place measures to prevent offsite impacts.	**Consistent.** The Project was designed to avoid remnant native vegetation where possible, i.e. infrastructure was placed in disturbed areas where possible. Vegetation conservation is likely to exceed the minimum requirements calculated by a BioBanking Credit Report. This assumption has been based upon desktop modelling however it is noted that the Credit Calculator Report will determine the nature and extent of the offset required. The BOS aims to meet at minimum the Tier 2 'no net loss' benchmark of the OEH Part 3A Interim Offsets Policy but is likely to meet Tier 1.
2 All regulatory requirements must be met.	Offsets cannot be used to satisfy approvals or assessments under other legislation, e.g. assessment requirements for Aboriginal heritage sites, pollution or other environmental impacts (unless specifically provided for by legislation or additional approvals).	**Consistent.** Assessment of the Project under Part 3A of the EP&A Act would ensure all regulatory requirements are met.
3 Offsets must never reward ongoing poor performance.	Offset schemes should not encourage landholders to deliberately degrade or mismanage offset area in order to increase the value from the offset.	**Consistent.** Project design demonstrates the Proponent's ability to avoid and mitigate and to exceed minimum offsets required.
4 Offsets will complement other government programs.	A range of tools is required to achieve the NSW Governments conservation objectives, including the establishment and management of new national parks, nature reserves, state conservation areas and regional parks and incentives for private landholders.	**Consistent.** The Proponent has stated that proposed offsets will be afforded long term protection though land tenure. Addressing KTPs will occur; the offset package is consistent with NSW government programmes.
5 Offsets must be underpinned by sound ecological principles.	They must: • include the consideration of structure, function and compositional elements of biodiversity, including threatened species • enhance biodiversity at a range of scales • consider the conservation status of ecological communities • ensure the long-term viability and functionality of biodiversity.	**Consistent.** The volume of requisite offsets will be identified by using the BBAM. The offsets would be managed through a Biodiversity Offset Management Plan thus ensuring long term viability of the proposal.

Table 23 (Cont'd)
OEH Offset Principles

Principle	Consideration	Consistency – Project Site
5 Offsets must be underpinned by sound ecological principles. (Cont'd)	Biodiversity management actions, such as enhancement of existing habitat and securing and managing land of conservation value for biodiversity, can be suitable offsets. Reconstruction of ecological communities involves high risks and uncertainties for biodiversity outcomes and is generally less preferable than other management strategies, such as enhancing existing habitat.	
6 Offsets should aim to result in a net improvement in biodiversity over time.	Enhancement of biodiversity in offset area should be equal to or greater than the loss in biodiversity from the impact site. Setting aside areas for biodiversity conservation without additional management or increased security is generally not sufficient to offset against the loss of biodiversity. Factors to consider include protection of existing biodiversity (removal of threats), time-lag effects, and the uncertainties and risks associated with actions such as revegetation. Offsets may include enhancing habitat, reconstructing habitat in strategic areas to link areas of conservation value, or increasing buffer zones around areas of conservation value and removal of threats by conservation agreements or reservation.	**Consistent.** All comments in the column above are relevant for this principle.
7 Offsets must be enduring - they must offset the impact of the development for the period that the impact occurs.	As impacts on biodiversity are likely to be permanent, the offset should also be permanent and secured by a conservation agreement or reservation and management for biodiversity. Where land is donated to a public authority or a private conservation organisation and managed as a biodiversity offset, it should be accompanied by resources for its management. Offsetting should only proceed if an appropriate legal mechanism or instrument is used to secure the required actions.	**Consistent (Land tenure and Biodiversity Management Plan).** Proposed offsets will be afforded long term protection though modifications to the conditions of the relevant Western Lands Lease and relevant agreements in consultation with OEH. These protections will ensure long-term protection of the offsets.

Table 23 (Cont'd)
OEH Offset Principles

Principle	Consideration	Consistency – Project Site
8 Offsets should be agreed prior to the impact occurring.	Offsets should minimise ecological risks from time-lags. The feasibility and in-principle agreements to the necessary offset actions should be demonstrated prior to the approval of the impact. Legal commitments to the offset actions should be entered into prior to the commencement of works under approval.	**Consistent.** A statement of commitments will include a requirement to implement the BOS prior to ground disturbing activities commencing, then audit the Hera BOS as documented in this report. OEH through the DoP will have input into this process.
9 Offsets must be quantifiable - the impacts and benefits must be reliably estimated.	Offsets should be based on quantitative assessment of the loss in biodiversity from the clearing or other development and the gain in biodiversity from the offset. The methodology must be based on the best available science, be reliable and used for calculating both the loss from the development and the gain from the offset. The methodology should include: • the area of impact • the types of ecological communities and habitat/species affected • connectivity with other areas of habitat/corridors • the condition of habitat • the conservation status and/or scarcity/rarity of ecological communities • management actions • level of security afforded to the offset site. The best available information/data should be used when assessing impacts of biodiversity loss and gains from offsets. Offsets will be of greater value where: • they protect land with high conservation significance • management actions have greater benefits for biodiversity • the offset area is not isolated or fragmented • the management for biodiversity is in perpetuity (e.g. secured through a conservation agreement). Management actions must be deliverable and enforceable.	**Consistent.** The requisite BioBanking Assessment will cite the Biobanking Credit Report completed in accordance with the OEH accepted BioBanking Assessment Methodology. Using this methodology, this report will provide for the nature and extent of the impact and the existing and proposed offsets as provided by the Proponent.

Table 23 (Cont'd)
OEH Offset Principles

Principle	Consideration	Consistency – Project Site
10 Offsets must be targeted.	They must offset impacts on the basis of like-for-like or better conservation outcome. Offsets should be targeted according to biodiversity priorities in the area, based on the conservation status of the ecological community, the presence of threatened species or their habitat, connectivity and the potential to enhance condition by management actions and the removal of threats. Only ecological communities that are equal or greater in conservation status to the type of ecological community lost can be used for offsets. One type of environmental benefit cannot be traded for another: for example, biodiversity offsets may also result in improvements in water quality or salinity but these benefits do not reduce the biodiversity offset requirements.	**Consistent.** The offsets will be consistent with BioBanking methods and OEH Interim Part 3A Offsets Policy.
11 Offsets must be located appropriately.	Wherever possible, offsets should be located in areas that have the same or similar ecological characteristics as the area affected by the development.	**Consistent.** Impacts would be offset in the immediate area east of the Project site boundary but within the "Peak" property (**Figure 7**).
12 Offsets must be supplementary.	They must be beyond existing requirements and not already funded under another scheme. Areas that have received incentive funds cannot be used for offsets. Existing protected areas on private land cannot be used for offsets unless additional security or management actions are implemented. Areas already managed by the government, such as national parks, flora reserves and public open space cannot be used as offsets.	**Consistent.** Proposed offsets are supplementary and not already funded or have been funded or considered previously for funding. The proposal will see implementation of a Biodiversity Offset Management Plan (management action). The Proponent would secure the Biodiversity Offset Strategy through a modification of the conditions associated with the Western Lands lease WLL2455 or WLL3881. Those conditions would not have an expiry date and would seek to ensure that the identified Biodiversity Offset Area is used for biodiversity-related purposes only in perpetuity.
13 Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.	Offsets must be audited to ensure that the actions have been carried out, and monitored to determine that the actions are leading to positive biodiversity outcomes.	**Consistent.** Assessment of this project under Part 3A of the EP&A Act and the OEH Interim Part 3A Offsets Policy ensures all conditions of consent requirements are met, i.e. ecological statement of commitment.

9.5.3 Effectiveness of Offsets

The Hera BOS provides for conservation and enhancement of one of two identified Biodiversity Offset Area's (see **Figures 7** and **8**). A Biodiversity Offset Management Plan would ensure invasive native scrub (woody weeds), weed control and feral animal control within the offset area. The Biodiversity Offset Strategy would also result in protection of 'like for like' canopy species as well as assisting in natural recovery of the ecosystem and the animals and plants that depend on it. This is particularly relevant to the local populations of threatened fauna dependant on a grassy ground layer. The offsets would see the ability of the population to increase (by provision of more volume and the quality of habitat through replacing structural complexity). The Proponent should be adopt the Kultarr as a flagship species for the BOS.

Attainment of a 'Tier 1 improve or maintain' or at minimum, 'Tier 2 No Net Loss' as per the *OEH Interim policy on assessing and offsetting biodiversity impacts of Part 3A developments* (Approved by Director General 30 November 2010) is therefore considered achievable as:

1. OEH offset requirements for threatened species will be achieved through habitat offsetting through the BioBanking Methodology;
2. no red flag species, populations or communities were identified in the Project Site however; targeted assessment following BBAM is required to retain this status for the BioBanking process;
3. OEH offset requirements for native vegetation (habitat) as the type, location and volume of offsets will be consistent with the 13 Offset Principles (**Table 23**); and
4. the Hera BOS will be consistent with the eight DSEWPaC principles for biodiversity offsets (**Table 22**).

10. ASSESSMENT OF IMPACTS

10.1 SELECTION OF 'AFFECTED' THREATENED BIOTA

Affected species are those that are likely to be affected by the proposed activities. To determine the 'affected species' a list of threatened species, populations communities, wetland and or migratory species was compiled from field assessment results, the literature review and database searches. Those species, communities or populations considered to have potential to be 'affected' by the activity are presented in **Table 24** and highlighted in blue. The table has been provided for the determining authority to review justification of decisions to undertake further assessment. All 7-part tests and Assessment of Significance can be found in **Appendix 2**. In summary, the Project is unlikely to cause local extinction or impact to any TSC Act or EPBC Act listed species.

The completed 7-part tests and / or Assessments of Significance for each 'affected' threatened species determined that a Species Impact Statement (SIS) and/or Referral to the Commonwealth Minister for the Environment are not required for the Project.

Table 24
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Acacia curranii	Curly-bark Wattle	V EPBC Act	**Habitat and ecology:** Grows in Acacia shrubland and mallee. Prefers acidic, skeletal soils in rocky habitats and occupies specialised habitats comprising rocky ridges and deeply weathered sandstone. Associated species in NSW populations include Eucalyptus dwyeri, E. populneus subsp. bimbil, E. intertexta, E. microcarpa, E. morrisii, Callitris glaucophylla, Acacia doratoxylon, A. havilandiorum, A. aneura and Eremophila spp. Flowers from August to September; no seedlings have been recorded from any site and attempts to germinate seeds after pre-sowing treatment have been largely unsuccessful. Regenerates from root suckers after fire, with fire disturbance also said to contribute to seedling establishment. Forms open to closed shrublands (sometimes with scattered emergent trees), with plants locally frequent to dominant in populations. Queensland populations are described as grove-forming and growing in dense pure stands. Populations with about 2500 plants over approximately 5 hectares have been recorded, as well as less than 10 plants within Nombinnie Nature Reserve; populations near Lake Cargelligo range from one to several thousand individuals; several hundred plants occur in the two patches at Gurulmundi.	**Yes**. Species or species habitat likely to occur within the Project Site. Mallee and ridge communities have already been highly disturbed in the Project Site which reduces the potential of recording this species, however a targeted search is still required. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Atriplex infrequens	A saltbush	V TSC Act	**Distribution** Confined to the NSW far western plains. Recorded rarely from sites in the north and with isolated collections from the Eubalong and Pooncarie areas in the south. **Habitat and ecology** • Atriplex infrequens is associated with broad drainage tracts, clay flats and possibly occasionally inundated habitats. Very little ecological information is available for this species so its critical habitat components can only be speculated as relatively undisturbed and ungrazed drainage lines and flats. • Flowering time has not been recorded, however seeding is recorded in December. • Population structure and disturbance regimes are not known**.**	**No.** Listed on the OEH database as likely to occur in the Western NRS CMA. Predicted habitat does not occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No Potential.
Austrostipa metatoris	A spear grass	E EPBC Act E TSC Act	**Habitat and ecology**. Flowers in response to rain. Grows in sandy areas of the Murray Valley; habitats include sandhills, sandridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils. Associated species include *Eucalyptus populnea, E. intertexta, Callitris glaucophylla, Casuarina cristata, Santalum acuminatum* and *Dodonaea viscosa*. It is not known if fire plays a role in the ecology of this species although most species of *Austrostipa* provide an abundance of highly flammable ephemeral fuel in periods following above-average rainfall. Recorded in populations as locally frequent or dominant only in scattered patches.	**Yes.** Listed by DSEWPaC as species or species habitat likely to occur within the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Austrostipa wakoolica	A spear grass	V EPBC Act V TSC Act	**Habitat and ecology** • Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise. • Associated species include *Callitris glaucophylla, Eucalyptus microcarpa, E. populnea, Austrostipa eremophila, A. drummondii, Austrodanthonia eriantha* and *Einadia nutans*. • Flowers from October to December, mainly in response to rain. • Seed dispersal is mainly by wind, rain and flood events; the awn and sharp point of the floret appear to be an adaptation for burying the seed into the soil; grass seed is traditionally believed to be viable for three to five years, so a long-lived seed bank is considered unlikely for this species. • Recorded as common in the Mairjimmy State Forest population.	**Yes.** OEH database predicts species is likely to occur in the Central West NRS CMA. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Antechinomys laniger	Kultarr	E TSC Act	**Distribution.** The Kultarr is a mouse-sized marsupial with very large ears, long delicate legs and a thin tail that is tipped with a dark tuft. Widespread across arid and semi-arid NSW but present in very low numbers. Records typically derive from captures by domestic cats or are collected after falling into steep-sided holes. Recent records have come primarily from the Cobar and Brewarrina region. The Kultarr has been recorded within 15 km of the Project Site. **Habitat and ecology**. It's a terrestrial insectivore that inhabits open country, especially claypans among Acacia woodlands. Nocturnal, sheltering by day in hollow logs or tree-stumps, beneath saltbush and spinifex tussocks, in deep cracks in the soil and in the burrows of other animals. Populations appear to fluctuate seasonally in response to environmental stresses, including declines following periods of drought and intensive flooding. (DECCW threatened species web page 2010).	**Yes.** Habitat likely to occur in the Project Site. Potential post survey: **Yes, not recorded, however, species is notoriously difficult to trap.**	7-part test of significance	Known to occur in analogous habitat near the Project Site. Not trapped during the survey period or previous CSUJC-EC 2006 study. Habitat may be suitable for this species to colonise post-rehabilitation.
Ardea alba	Great Egret	Migratory Species EPBC Act	The Great Egret is partially migratory, with northern hemisphere birds moving south from areas with colder winters. It breeds in colonies in trees close to large lakes with reed beds or other extensive wetlands. It builds a bulky stick nest.	**No.** Habitat for this species does not occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Ardea ibis	Cattle Egret	Migratory Species EPBC Act	The Cattle Egret occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. It has occasionally been seen in arid and semi-arid regions however this is extremely rare. High numbers have been observed in moist, low-lying poorly drained pastures with an abundance of high grass; it avoids low grass pastures. It has been recorded on earthen dam walls and ploughed fields. It is commonly associated with the habitats of farm animals, particularly cattle, but also pigs, sheep, horses and deer. The Cattle Egret is known to follow earth-moving machinery and has been located at rubbish tips. It uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora. They have sometimes been observed in swamps with tall emergent vegetation.	**No.** Habitat for this species does not occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.
Ardeotis australis	Australian Bustard	E TSC Act	**Distribution.** Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams. **Habitat** and ecology Breeds on bare ground on low sandy ridges or stony rises in ecotones between grassland and protective shrubland cover; roosts on ground among shrubs and long grasses or under trees. Forages on insects, young birds, lizards, mice, leaves, seeds and fruit. Dispersive, with irregular widespread movements over long distances; movements are thought to be in response to habitat and climatic conditions; known to converge on areas with high mice numbers and in recently burnt areas.	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Artesian Springs Ecological Community	Artesian Springs Ecological Community	E TSC Act Ecological Community	**Distribution.** Occurs at the edges of the Great Artesian Basin. Mostly found in Queensland and South Australia, however, a few occur in the Mulga Lands, Darling Riverine Plains and Cobar Peneplain Bioregions of New South Wales. **Habitat and ecology**. Flow rates, water depth, water temperature and chemistry vary within and between springs; this provides a variety of habitat types. Vegetation structure and floristics may be influenced by grazing pressure; the persistence of some species is dependent upon grazing by native herbivores to control competitors. Though further study is required, it is thought that fire may assist in maintaining or increasing flows from the vent and may help control the dominant plant species that out compete other plant species of conservation concern (e.g., Ericaulon carsonii).	**No.** Previous survey over the Project Site indicates that this EEC does not occur. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.
Bothriochloa biloba	Lobed Bluegrass	V EPBC Act	Lobed Blue-grass is known from the Darling Downs district in Queensland, south along the western slopes of the Great Dividing Range to North Star, Warialda, Bingara and Merriwa in NSW (Quinn et al., 1995; NSW Scientific Committee, 2004). It also occurs west to Dubbo and around the Hunter Valley (Quinn et al., 1995). This species occurs within the Hunter– Central Rivers, Central West, Namoi, Northern Rivers and Border Rivers–Gwydir (NSW) and Border Rivers Maranoa–Balonne and Condamine (Queensland) Natural Resource Management Regions. Lobed Blue-grass grows in cleared eucalypt forests and relict grassland, often dominated by Purple Wiregrass (Aristida ramosa), Red-leg Grass (Bothriochloa macra), Red Grass (B. decipiens), Queensland Bluegrass (Dichanthium sericeum) or Austrostipa aristiglumis (Bean, 1999). Dense stands of Lobed Blue-grass have been recorded in Windmill Grass (Chloris truncata) Grassland in the north-western slopes of NSW (Hunter, 2003). Lobed Blue-grass prefers heavier-textured soils such as brown or black clay soils (Quinn et al., 1995; Bean, 1999).	Potential to occur. Potential post survey: **Yes, species recorded.**	Assessment of Significance	Recorded population in the Project Site (outside project impacts). May be affected by increased traffic loading.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Botaurus poiciloptilus	Australasian Bittern	V TSC Act	**Distribution**. Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. **Habitat and ecology**. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleoacharis spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch.	**No.** Habitat for this species is unlikely to occur in the Project Site as no permanent freshwater wetlands exist. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.
Burhinus grallarius	Bush Stone-curlew	E TSC Act	**Distribution.** The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range. **Habitat and ecology**. Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch. Two eggs are laid in spring and early summer. Utilises open forests and savannah woodlands, sometimes dune scrub, savannah and mangrove fringes.	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Cacatua leadbeateri	Major Mitchell's Cockatoo	V TSC Act	**Distribution.** Found across the arid and semi-arid inland, from south-western Queensland south to north-west Victoria, through most of South Australia, north into the south-west Northern Territory and across to the west coast between Shark Bay and about Jurien. In NSW it is found regularly as far east as about Bourke and Griffith, and sporadically further east than that. **Habitat and ecology.** Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres.	**Yes.** Habitat for this species is likely to occur in the Project Site. Potential post survey: **Yes, species recorded.**	7-part test of significance	Recorded in the Project Site.
Calyptorhynchus banksii	Red-tailed Black-Cockatoo	V TSC Act E EPBC Act	The Red-tailed Black-Cockatoo is the most widespread of the Black-Cockatoos, ranging broadly across much of northern and western Australia as well as western Victoria. In NSW, one population occurs on the north-western slopes and plains but another small isolated population is found in the coastal north-east. **Habitat and ecology** Red-tailed Black-Cockatoos are found in a wide variety of habitats. In coastal north-east NSW they have been recorded in dry open forest and areas of mixed rainforest/eucalypt forest.	**Yes**. Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Calyptorhynchus lathami	Glossy Black-Cockatoo		**Distribution** The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. **Habitat and ecology** • Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (*Allocasuarina littoralis*), Forest She-oak (*A. torulosa*) or Drooping She-oak (*A. verticillata*) occur. • In the Riverina area, again usually associated with woodlands contain Drooping She-oak but also recorded in open woodlands dominated by Belah (*Casuarina cristata*). • Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill. • Dependent on large hollow-bearing eucalypts for nest sites. One or two eggs are laid between March and August.	**Yes**. Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Certhionyx variegatus	Pied Honeyeater	V TSC Act	**Distribution.** Widespread throughout acacia, mallee and spinifex scrubs of arid and semi-arid Australia. Occasionally occurs further east, on the slopes and plains and the Hunter Valley, typically during periods of drought. **Habitat and ecology**. Inhabits wattle shrub (primarily Mulga, *Acacia aneura*), mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering; feeds on nectar, predominantly from various species of emu-bushes (*Eremophila* spp.); also from mistletoes and various other shrubs (e.g. *Brachysema* spp. and *Grevillea* spp.); also eats saltbush fruit, berries, seed, flowers and insects. Highly nomadic, following the erratic flowering of shrubs; can be locally common at times. Constructs a relatively large cup-shaped nest, usually robust, although occasionally loose, constructed of grasses and fine twigs, bound with spider webs, in the fork of a shrub or tree up to 5 m above the ground.	**Yes.** Known to occur in Project Site. Habitat likely to occur in the Project Site. Potential post survey: **Yes, habitat for species still available.**	7-part test of significance	Known to occur in the Project Site (CSUJC-EC, 2006).

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Chalinolobus picatus	Little Pied Bat	V TSC Act	**Distribution.** The Little-Pied Bat is found in inland Queensland and NSW (including Western Plains and slopes) extending slightly into South Australia and Victoria. **Habitat and ecology**. Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress-pine forest, mallee, Bimbil box. Roosts in caves, rocky outcrops, mine shafts, tunnels, tree hollows and buildings. Can tolerate high temperatures and dryness but need access to nearby open water. Feeds on moths and possibly other flying invertebrates.	**Yes.** Known to occur in Project Site. Habitat likely to occur in the Project Site. Potential post survey: **Yes, species recorded.**	7-part test of significance	• Recorded within the Impact Footprint. • Would be affected by direct and indirect habitat removal. • Would be affected by loss of water supply, potentially affected by tailings (if contaminated water or insects that utilize it are consumed). • Would be affected (positively) by proposed revegetation of Project Site. • Would be affected positively by increased standing water bodies associated with Pete's Tank and Back Tank. Would be affected positively by an increase in tree stags due to flooding in these areas. • Would be affected (positively) by proposed 'Biodiversity Offset Area' in which feral animal control and population monitoring will occur.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Circus assimilis	Spotted Harrier	V TSC Act	The Spotted Harrier *Circus assimilis* is a medium-sized (50-60 cm), slender bird of prey having an owl-like facial ruff that creates the appearance of a short, broad head, and long, bare yellow legs. The upperparts are blue-grey with dark barring, and the wingtips are black. The face, innerwing patch, and underparts are chestnut. The long tail is boldly banded, with a wedge-shaped tip. Juveniles are mottled and streaked ginger and brown, with prominent ginger shoulders, fawn rump and banded tail. The very similar Swamp Harrier is generally browner with a prominent white rump, a more rounded, less banded tail, and barred rather than solid black wingtips. The Square-tailed Kite has a pale face, short legs, and longer, boldly banded wingtips. The Spotted Harrier occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe (*e.g.* chenopods) (Marchant and Higgins 1993; Aumann 2001a). It is found mostly commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. The species builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months.	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **Yes, species recorded.**	7-part test of significance	• Sighted flying over and circling areas within the Project Site and adjacent property. Has potential to utilise any of the Project Site for feeding. • Key habitat elements are unlikely to be affected to cause decline in this species. • Rehabilitation of Surface Facilities Area is likely to increase levels of biodiversity and as such improve opportunities for this species. • Based upon the above, the spotted harrier is considered unlikely to be impacted by the activity.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Cinclosoma castanotus	Chestnut Quail-thrush	V TSC Act TSC Act	Throughout its distribution it occurs in a wide range of arid and semi-arid habitats; mainly in the low shrubs and undergrowth of mallee scrub, but also in Acacia scrubs, dry sclerophyll woodland, heath, and native pine. However, in NSW it seems to occur almost exclusively in mallee habitats, with understorey dominated by spinifex, chenopods or other shrubs including Acacia species. Only rarely, such as in Cocoparra NP, is it recorded in other types of woodland, and in these areas a dense understorey may be a prerequisite. Occupies vegetation with a wide range of fire histories, though appears to occur at highest densities in areas two to fifteen years post fire. There is some evidence from the Victorian mallee that if the interval between fires is too short (less than fifteen years) local declines may occur. These birds forage on the ground, often among spinifex clumps, on a wide range of invertebrates (including grasshoppers, bugs, beetles, flies, caterpillars and ants), seeds of both native and introduced species and, more rarely, fruits. Its nest is a depression in the ground lined with strips of bark, fine grass or sticks, placed near a mallee trunk, against a fallen branch, under a low bush or in a sparse tuft of grass. Almost always lays a clutch of two eggs.	**Yes.** Known to occur in Project Site. Habitat likely to occur in the Project Site. Potential post survey: **Yes, not recorded, however, habitat available for the species.**	7-part test of significance	Known to occur in the Project Site (CSUJC-EC, 2006).

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V TSC Act	**Distribution.** The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of *Climacteris picumnus victoriae* runs approximately through Wagga Wagga, Temora, Forbes, Dubbo and Inverell and along this line the subspecies intergrades with the arid zone subspecies of Brown Treecreeper *Climacteris picumnus picumnus*. The eastern subspecies lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys. The population density of this subspecies has been greatly reduced over much of its range, with major declines recorded in central NSW and the northern and southern tablelands. Declines have occurred in remnant vegetation fragments smaller than 300 hectares that have been isolated or fragmented for more than 50 years. **Habitat and ecology**. The species breeds in pairs or co-operatively in territories which range in size from 1.1 to 10.7 ha (mean = 4.4 ha). Each group is composed of a breeding pair with retained male offspring and, rarely, retained female offspring. Often in pairs or cooperatively breeding groups of two to five birds.	**Yes.** Known to occur in Project Site. Habitat likely to occur in the Project Site. Potential post survey: **Yes, species recorded**	7-part test of significance	Known to occur in the Project Site (CSUJC-EC, 2006).

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
			Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (Eucalyptus camaldulensis) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. Sedentary, considered to be resident in many locations throughout its range; present in all seasons or year-round at many sites; territorial year-round, though some birds may disperse locally after breeding. Gregarious and usually observed in pairs or small groups of eight to 12 birds; terrestrial and arboreal in about equal proportions; active, noisy and conspicuous while foraging on trunks and branches of trees and amongst fallen timber; spend much more time foraging on the ground and fallen logs than other treecreepers. When foraging in trees and on the ground, they peck and probe for insects, mostly ants, amongst the litter, tussocks and fallen timber, and along trunks and lateral branches; up to 80% of the diet is comprised of ants; other invertebrates (including spiders, insects larvae, moths, beetles, flies, hemipteran bugs, cockroaches, termites and lacewings) make up the remaining percentage; nectar from Mugga Ironbark (E. sideroxylon) and paperbarks, and sap from an unidentified eucalypt are also eaten, along with lizards and food scraps; young birds are fed ants, insect larvae, moths, craneflies, spiders and butterfly and moth larvae. Hollows in standing dead or live trees and tree stumps are essential for nesting.			

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Crinia sloanei	Sloane's Froglet	V TSC Act TSC Act	It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **No.**	None	Sloane's Froglet was not recorded in the Project Site during targeted surveys, suitable grassland habitat (periodically inundated) was not available in the Project Site.
Dasyurus maculatus	Spotted-tailed Quoll	V TSC Act	**Distribution.** The range of the Spotted-tailed Quoll has contracted considerably since European settlement. It is now found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Queensland. Only in Tasmania is it still considered common. **Habitat and ecology.** Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites. Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and may raid possum and glider dens and prey on roosting birds. Use 'latrine sites', often on flat rocks among boulder fields and rocky cliff-faces; these may be visited by a number of individuals; latrine sites can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits and insects; also eats carrion and takes domestic fowl. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares; usually traverse their ranges along densely vegetated creek lines. Average litter size is five; both sexes mature at about one year of age.	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Delma australis	Marble-faced Delma	V TSC Act TSC Act	In NSW, appears to be restricted to temperate mallee woodlands or spinifex grasslands but elsewhere is also found in chenopod shrublands, heathlands and buloke associated with mallee habitats or eucalypt lined watercourses. The species occupies areas with a sandy substrate but may also utilise cracking red loam soils, but has also recently been recorded in spinifex on rocky hillsides. Found in deep leaf litter, under rocks, logs, fallen timber or in grass clumps such as spinifex. They are considered to be terrestrial although they may climb into hummock grass and even sleep in the branches of small shrubs. They are generally active during the day but have been observed being active at night or round sunrise and sunset. They are active hunters and their main food consists of various types of insects and spiders. Lays two eggs in November or December which hatch after approximately 70 days.	**No.** Habitat for this species is unlikely to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Diuris tricolor	Pine Donkey Orchid	V TSC Act	**Distribution.** Sporadically distributed on the western slopes of NSW, extending from south of Narrandera all the way to the far north of NSW. Localities include the Condobolin-Nymagee road, Wattamondara towards Cowra, Cooyal, Adelong, Red Hill north of Narrandera, Coolamon, near Darlington Point, Eugowra, Girilambone, Dubbo, Muswellbrook, and several sites west of Wagga Wagga. **Habitat and ecology.** The Pine Donkey Orchid grows in sclerophyll forest among grass, often with native Cypress Pine (*Callitris spp.*). It is found in sandy soils, either on flats or small rises. Also recorded from a red earth soil in a Bimble Box community in western NSW. Usually recorded as common and locally frequent in populations, however only one or two plants have also been observed at sites. The species has been noted as growing in large colonies. Disturbance regimes are not known, although the species is usually recorded from disturbed habitats. Associated species include *Callitris glaucophylla, Eucalyptus populnea, Eucalyptus intertexta*, Ironbark and *Acacia* shrubland. The understorey is often grassy with herbaceous plants such as *Bulbine* species. Flowers from September to November or generally spring. The species is a tuberous, deciduous terrestrial orchid and the flowers have a pleasant, light sweet scent.	**Yes.** Habitat for this species likely to occur in the Project Site. Potential post survey: **Yes, habitat exists.**	7-part test of significance	A targeted survey for this species in ideal conditions for detection on 15 October 2011 did not identify it within the proposed areas of disturbance. Notwithstanding this, a 7-part test is provided in the event that extant individuals exist in the remainder of the Project Site.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Epthianura albifrons	White-fronted Chat	E TSC Act	The White-fronted Chat is found across the southern half of Australia, from southernmost Queensland to southern Tasmania, and across to Western Australia as far north as Carnarvon. Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 m above sea level. In NSW, it occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state. Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas. **Habitat and ecology** • Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground. • Have been observed breeding from late July through to early March, with 'open-cup' nests built in low vegetation. Nests in the Sydney region have also been seen in low isolated mangroves. Nests are usually built about 23 cm above the ground (but have been found up to 2.5 m above the ground). • Two to three eggs are laid in each clutch, and the complete nesting cycle from nest-building to independent young is approximately 50 days • Birds can breed at one year of age and are estimated to live for five years.	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, species not recorded.**	None	Not recorded. No potential.
Falco hypoleucos	Grey Falcon	V TSC Act	**Distribution**. Arid zone woodland and scrub. **Habitat and ecology.** It has been recorded along the Culgoa, Paroo, Darling and Murray Rivers on flat mainly treeless or lightly timbered plains with open, drier vegetation types or along the timbered drainage systems where it nests in tall trees near to or overhanging water.	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, species not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Grantiella picta	Painted Honeyeater	V TSC Act	**Distribution.** The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occur on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. **Habitat and ecology.** Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, species not recorded.**	None	Not recorded. No potential.
Grus rubicunda	Brolga	V TSC Act	**Distribution** Wetlands and farmland. Though Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged. **Habitat and ecology.** They feed using their heavy straight bill as a 'crowbar' to probe the ground or turn it over, primarily on sedge roots and tubers. They will also take large insects, crustaceans, molluscs and frogs. The famous Brolga 'dance' is apparently at least in part a courtship or bonding display where a pair or many pairs face each other, crouch down and stretch upwards, trumpet, leap and toss grass and sticks into the air. The nest comprises a platform of grasses and sticks, augmented with mud, on an island or in the water. Two eggs are laid from winter to autumn. (DEC threatened species website 2005).	**No.** Wetland habitat is not available in the Project Site. Potential post survey: **No, species not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Gallinago hardwickii	Latham's Snipe	Migratory Species EPBC Act	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. Latham's Snipe occurs in temperate and tropical regions of Australia. Its altitudinal range extends from sea-level (i.e. the coast) or possibly below. For example, there are records from near Lake Eyre to approximately 2000 m above sea-level. In Australia, Latham's Snipe occurs in a wide variety of permanent and ephemeral wetlands. They usually occur in open, freshwater wetlands that have some form of shelter (usually low and dense vegetation) nearby. They generally occupy flooded meadows, seasonal or semi-permanent swamps, or open waters, but various other freshwater habitats can be used including bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains. The structure and composition of the vegetation that occurs around these wetlands is not important in determining the suitability of habitat. As such, snipe may be found in a variety of vegetation types or communities including tussock grasslands with rushes, reeds and sedges, coastal and alpine heathlands, lignum or tea-tree scrub, button-grass plains, alpine herbfields and open forest. Latham's Snipe sometimes occur in habitats that have saline or brackish water, such as saltmarsh, mangrove creeks, around bays and beaches, and at tidal rivers.	**No.** Standing water bodies within the Project Site may create artificial habitat for this species, however species is unlikely to occur. Potential post survey: **No, species not recorded**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
			These habitats are most commonly used when the birds are on migration. They are regularly recorded in or around modified or artificial habitats including pasture, ploughed paddocks, irrigation channels and drainage ditches, ricefields, orchards, saltworks, and sewage and dairy farms. They can also occur in various sites close to humans or human activity (e.g. near roads, railways, airfields, commercial or industrial complexes).The foraging habitats of Latham's Snipe are characterized by areas of mud (either exposed or beneath a very shallow covering of water) and some form of cover (e.g. low, dense vegetation) The snipe roost on the ground near (or sometimes in) their foraging areas, usually in sites that provide some degree of shelter, e.g. beside or under clumps of vegetation, among dense tea-tree, in			
Hirundapus caudacutus	White-throated Needletail	Migratory Species EPBC Act	In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland . They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps. When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks. In coastal areas, they are sometimes seen flying over sandy beaches or mudflats, and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes. They are sometimes recorded above islands well out to sea.	**No**. Habitat for this species does not occur in the Project Site. Potential post survey: **No, species not recorded**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Hamirostra melanosternon	Black-breasted Buzzard	V TSC Act	**Distribution.** The Black-breasted Buzzard is found sparsely in areas of less than 500mm rainfall, from north-western NSW and north-eastern South Australia to the east coast at about Rockhampton, then across northern Australia south almost to Perth, avoiding only the Western Australian deserts. **Habitat and ecology.** Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands. Not a powerful hunter, despite its size, mostly taking reptiles, small mammals, birds, including nestlings, and carrion. Also specialises in feeding on large eggs, including those of emus, which it cracks on a rock. Breeds from August to October near water in a tall tree. The stick nest is large and flat and lined with green leaves. Normally two eggs are laid (DEC threatened species website 2005).	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, species not recorded**	None	Not recorded. No potential.
Haliaeetus leucogaster	White-bellied Sea-eagle	Migratory Species EPBC Act	The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, and the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats. The species is mostly recorded in coastal lowlands, but can occupy habitats up to 1590 m above sea level on the Northern Tablelands of NSW and up to 800 m above sea level in Tasmania and South Australia. Birds have been recorded at or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs, and saltmarsh and sewage ponds. They also occur at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves.	**No**. Habitat for this species does not occur in the Project Site. Potential post survey: **No, species not recorded**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
			Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas. Breeding has been recorded on the coast, at inland sites, and on offshore islands. Breeding territories are located close to water, and mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest (including rainforest), closed scrub or in remnant trees on cleared land. The White-bellied Sea-Eagle generally forages over large expanses of open water; this is particularly true of birds that occur in coastal environments close to the sea-shore, where they forage over in-shore waters. However, the White-bellied Sea-Eagle will also forage over open terrestrial habitats (such as grasslands). Birds may move to and congregate in favourable sites during drought or food shortage. There are no published sources that state that the White-bellied Sea-Eagle occurs in any threatened ecological communities. However, given the widespread distribution of the species, its ability to make long-distance movements, and the broad range of habitats that it may be recorded in or flying over, it is possible that the sea-eagle may occur in one or more of the threatened communities listed under the EPBC Act. The White-bellied Sea-Eagle is not known to associate with any other listed threatened species.			
Hieraaetus morphnoides	Little Eagle	V TSC Act TSC Act	Occupies open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	Habitat for this species has potential to occur in the Project Site.	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Inland grey box woodland EEC in the SW Slopes, Brigalow Belt South, Cobar Peneplain, and Riverina Bioregions – Gazetted April 2007.	Inland Grey Box Woodland	E TSC Act Ecological Community	Inland Grey Box Woodland occurs predominately within the Riverina and South West Slopes regions of NSW down to the Victorian border. It includes Albury to the east and may extend out west towards Hay. This community also extends across the slopes and plains in Central and Northern NSW up to the Queensland Border. This includes Yetman and Inverell in the North, Molong to the east of the Central Slopes and plains and out towards Nymagee to the west.	No. Previous survey of the Project Site indicates that this EEC does not occur.	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Leipoa ocellata	Malleefowl	E TSC Act	**Distribution.** Recorded mainly from the southern half of the western NSW, from the Pilliga forest, south-west to the Griffith and Wentworth districts, excluding the southern Riverina. Marked declines in both distribution and abundance have occurred throughout its range in the last 50 years; for example, in NSW they previously occurred east to Temora and north to around Cobar. Disjunct records occur at "Wallanburra" Station, 45 km south west of Bourke in Mulga/Bimble Box during 1991, Gongolgon in 1994, and Goulbourn River National Park in 1989; however the current status of these populations is unknown. Malleefowl will occupy areas within five years of fire; however they prefer older age classes. **Habitat and ecology**. Predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300-450 mm mean annual rainfall) areas. Less frequently found in other eucalypt woodlands (e.g., mixed Western Grey Box and Yellow Gum or Bimble Box, Ironbark-Callitris Pine, Callitris Pine, Mulga Acacia aneura, and Gidgee A. cambagei). Prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy, dense and variable shrub and herb layers. A pair may occupy a range of between 50 and 500 ha, overlapping with those of their neighbours. Mainly forage in open areas on seeds of acacias and other native shrubs (Cassia, Beyeria, Bossiaea), buds, flowers and fruits of herbs and various shrubs, insects (cockroaches, ants, soil invertebrates), and cereals if available. Incubate eggs in large mounds that contain considerable volumes of sandy soil. The litter within the mounds must be dampened for it to decompose and provide heat for incubation of eggs. (OEH threatened species web page 2010)	**Yes.** Habitat for this species has potential to occur in the Project Site. Known to occur in analogous habitat near the project Site. Potential post survey: **Yes. Although species not recorded it is known to occur in analogous habitat near the Project Site**.	None	As no nest sites were recorded in the Project Site, this species is considered to be un-affected by the Proposal and as such a 7-part test of significance is not required

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Limosa limosa	Black-tailed Godwit	V TSC Act	**Distribution.** The Black-tailed Godwit is a migratory wading bird that breeds in Mongolia and Eastern Siberia (Palaearctic) and flies to Australia for the southern summer, arriving in August and leaving in March. In NSW, it is most frequently recorded at Kooragang Island (Hunter River estuary), with occasional records elsewhere along the north and south coast, and inland. Records in western NSW indicate that a regular inland passage is used by the species, as it may occur around any of the large lakes in the western areas during summer, when the muddy shores are exposed. The species has been recorded within the Murray-Darling Basin, on the western slopes of the Northern Tablelands and in the far north-western corner of the state. **Habitat and ecology.** Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps. Individuals have been recorded in wet fields and sewerage treatment works. Forages for insects, crustaceans, molluscs, worms, larvae, spiders, fish eggs, frog eggs and tadpoles in soft mud or shallow water. Roosts and loafs on low banks of mud, sand and shell bars. Frequently recorded in mixed flocks with Bar-tailed Godwits.	**No.** Habitat for this species is unlikely to occur in the Project Site. Potential post survey: **No, species not recorded**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Lophoictinia isura	Square-tailed Kite	V TSC Act	**Distribution.** The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. **Habitat and ecology.** Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting ranges of more than 100km^2. Breeding is from July to February, with nest sites generally located along or near water-courses, in a fork or on large horizontal limbs.	**No.** Habitat for this species is unlikely to occur in the Project Site. Potential post survey: **No, species not recorded**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Macquaria austrslssica	Macquarie Perch	V TSC Act EPBC	The Macquarie Perch is a riverine, schooling species. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks. Spawning occurs just above riffles (shallow running water). Populations may survive in impoundments if able to access suitable spawning sites. Spawning sites used by the Macquarie Perch in the rivers flowing into Lake Eildon (between 1966–69) consisted of rubble substrate of small boulders, pebbles and gravel. Water depth was 0.2–0.9 m (usually 0.4–0.6 m) and water velocity was 0.3–0.6 m/s. There was also pool (usually 15–30 m long and at least 1.5 m deep) immediately upstream and fast-flowing broken water immediately downstream. Although this species can tolerate temperatures of < 9 °C (the temperature of the water at the bottom of Lake Eildon) they appear to require a temperature of at least 16.5 °C for spawning to occur. Newly hatched yolk sac larvae shelter amongst pebbles. In Seven Creeks, this species occurred in deep pools and riffles above falls where the substrate was gravel and boulders.	**No.** Habitat not likely to occur in the Survey Area. Potential post survey: **No, species not recorded**	None	Not recorded. No potential.
Maccullochella pelii peelii	Murray Cod	V TSC Act EPBC	The Murray Cod is found in a wide range of warm water habitats, from clear, rocky streams to slow-flowing turbid rivers and billabongs. Generally, they are found in waters up to 5 m deep and in sheltered areas with cover from rocks, timber or overhanging banks. The species is highly dependent on wood debris for habitat, using it to shelter from fast-flowing water.	**No.** Habitat not likely to occur in the Survey Area. Potential post survey: **No, species not recorded**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V TSC Act	**Distribution**. The Hooded Robin is common in few places, and rarely found on the coast. It is considered a sedentary species, but local seasonal movements are possible. The south-eastern form is found from Brisbane to Adelaide throughout much of inland NSW, with the exception of the north-west. The species is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. **Habitat and ecology**. The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1 m to 5 m above the ground. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. May breed any time between July and November, often rearing several broods. The nest is defended by both sexes with displays of injury-feigning, tumbling across the ground. A clutch of two to three is laid and incubated for fourteen days by the female. Two females often cooperate in brooding (DECCW threatened species web page 2010)	**Yes**. Known to occur in Project Site. Habitat likely to occur in the Project Site. Potential post survey: **Yes, species recorded.**	7-part test of significance	Recorded in the Project Site.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V TSC Act	**Distribution.** The subspecies is widespread, from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond River district. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions. **Habitat and ecology.** Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*Eucalyptus albens*), Grey Box (*Eucalyptus microcarpa*), Yellow Box (*Eucalyptus melliodora*) and Forest Red Gum (*Eucalyptus tereticornis*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks and tea-trees. A gregarious species usually seen in pairs and small groups of up to 12 birds. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 ha. Moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from flowers, and honeydew is gleaned from foliage. Breeds solitarily or co-operatively, with up to five or six adults, from June to December. The nest is placed high in the crown of a tree, in the uppermost lateral branches, hidden by foliage. It is a compact, suspended, cup-shaped nest. Two or three eggs are laid and both parents and occasionally helpers feed the young.	**Yes.** Known to occur in Project Site. Habitat likely to occur in the Project Site. Potential post survey: **Yes, habitat available, however, species not recorded.**	7-part test of significance of significance	Known to occur in the Project Site (CSUJC-EC, 2006).

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Merops ornatus	Rainbow Bee-eater	Migratory Species EPBC Act	In northern Australia, it often inhabits mangroves. The bee-eater has also been recorded in other vegetation types including heathland, sedge land, semi-evergreen mesophyll vine forest, and semi-deciduous vine thicket, and at the ecotone between open forest and closed monsoon forest. It also inhabits sand dune systems in coastal areas and at inland sites that are in close proximity to water, and has occasionally been recorded on beaches and coral cays. The Rainbow Bee-eater is also common in cleared and semi-cleared habitats. It occurs in farmland, orchards and vineyards, and is regularly recorded in other disturbed habitats including roadside vegetation and in quarries, mines or gravel pits, where they often breed. It has also been recorded in towns and suburbs and around homesteads. On migration, the Rainbow Bee-eater may also fly over the top of non-preferred habitats such as rainforest or treeless plains. The Rainbow Bee-eater has not been formally identified to occur in any threatened ecological communities. However, the widespread distribution of the bee-eater, and the variety of habitats that it has been recorded in, indicate that it could potentially occur in some of the threatened ecological communities listed under the *EPBC Act*.	**No.** Habitat for this species does not occur in the Project Site. Potential post survey: **No, species not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions	E TSC Act Endangered Ecological Community	**Distribution.** This EEC is known from parts of the Local Government Areas of Berrigan, Bland, Bogan, Carrathool, Conargo, Coolamon, Coonamble, Corowa, Forbes, Gilgandra, Griffith, Gwydir, Inverell, Jerilderee, Lachlan, Leeton, Lockhart, Moree Plains, Murray, Murrumbidgee, Narrabri, Narranderra, Narromine, Parkes, Urana, Wagga Wagga and Warren, and but may occur elsewhere in these bioregions.	**No.** Previous survey indicates that this EEC does not occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.
Monotaxis macrophylla	Large-leafed Monotaxis		**Distribution** Large-leaf Monotaxis is recorded from several highly disjunct populations in NSW: eastern edge of Deua NP (west of Moruya), Bemboka portion of South East Forests National Park, Cobar area (Hermitage Plains), the Tenterfield area, and Woodenbong (near the Queensland border). It is also in Queensland. A recent record from the eastern spur of the Nandewar Range is in the Namoi catchment. **Habitat and ecology** • The distribution and supposed rarity of *Monotaxis macrophylla* within NSW is related to the occurrence of fire. At least within NSW, the species has not been found in the absence of fire.	**Yes.** Potential habitat for this species may occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
			• There is a great diversity in the associated vegetation within NSW (less though in Queensland), encompassing coastal heath, arid shrubland, forests and montane heath from almost sea level to 1300 m altitude. • *Monotaxis macrophylla* displays the properties of a fire ephemeral species in many ways. Germination is stimulated by the passage of fire, individual plants have a short life span, a large biomass is produced in a short period of time, flowering occurs shortly after germination, and populations do not persist in the absence of fire. • Flowers in August. Plants have a short life span and do not seem to persist longer than six months. Plants germinate, attain heights of up to 50 cm and reach flowering stage within 2 to 3 months. • In only a few months after germination, the species was observed to produce a thick sward that dominated the community, yielding a very large biomass in a short time. Many hundreds of plants have been observed growing with *Muehlenbeckia costata* on recently burnt rock outcrops. Plants are recorded as common but localised in populations. In the northern NSW sites, *Monotaxis macrophylla* was locally abundant on outcrops especially where burnt. • Grows on rocky ridges and hillsides.			

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Neophema pulchella	Turquoise Parrot	V TSC Act	**Distribution.** The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. **Habitat and ecology.** Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Forages quietly and may be quite tolerant of disturbance. However, if flushed it will fly to a nearby tree and then return to the ground to browse as soon as the danger has passed. Nests in tree hollows, logs or posts, from August to December. It lays four or five white, rounded eggs on a nest of decayed wood dust.	**Yes.** Habitat for this species is unlikely to occur in the Project Site. Potential post survey: **Yes, species recorded.**	**None**	As breeding habitat for this species does not occur in the Project Site, this species is considered to be un-affected by the Proposal.
Ninox connivens	Barking Owl	V TSC Act	**Distribution.** The barking owl is distributed sparsely throughout temperate and semi-arid areas of mainland Australia, however is most abundant in the tropical north (Kavanagh 2002a). Most records for this species occur west of the Great Dividing Range (Kavanagh 2004). **Habitat and ecology.** Habitat for this species includes dry forests and woodlands (Kavanagh 2002a), often in association with hydrological features such as rivers and swamps (Taylor *et al.* 2002). Large hollows are required for breeding.	**Yes.** Breeding habitat for this species is unlikely to occur in the Project Site. Territory or feeding resources has a possibility of occurring the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Ningaui yvonneae	Southern Ningaui	V TSC Act	**Habitat and ecology.** • Shelters in spinifex clumps, beneath logs, and in dense vegetation, but may also dig its own burrows. • Nocturnal and preys on a wide range of arthropods and small lizards, which it captures amongst leaf litter. Can consume almost its own body weight in food in a single night. • A litter of 5 to 7 juveniles are weaned in late summer (February), though females appear to have the ability to have two litters a year. Most adults only live for approximately 14 months, and most disappear from the population in December. • Closely tied to vegetation with spinifex clumps (in NSW mainly associated with mallee woodlands), though occasionally recorded in other habitats. • Most movements are relatively localised, but males will regularly move more than 200 metres, particularly during the breeding season, and movements of up to 2 kilometres have been recorded.	**Yes.** Although no searches indicate this species, it is considered to have potential to have habitat in mallee and spinifex dominated areas. Unlikely to occur in the Project Site. Potential post survey: **No, not recorded, no suitable habitat available in the Project Site.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Nyctophilus timoriensis	Greater Long-eared Bat (south eastern form)	V TSC Act	**Distribution.** The Greater Long-eared Bat is found across much of inland southern Australia and north-eastern Tasmania. It reaches the coast in subtropical Queensland and from the Eyre Peninsula to north of Perth. **Habitat and ecology.** Generally associated with the semi-arid woodlands and mallee. Roosts in tree hollows, crevices, and under loose bark. Slow flying agile bat, utilising the understorey to hunt non-flying prey - especially caterpillars and beetles - and will even hunt on the ground. Mating takes place in autumn with one or two young born in late spring to early summer.	**Yes.** Habitat for this species is likely occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Oxyura australis	Blue-billed Duck	V TSC Act	**Distribution.** The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas. **Habitat and ecology.** The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached. Blue-billed Ducks will feed by day far from the shore, particularly if dense cover is available in the central parts of the wetland. They feed on the bottom of swamps eating seeds, buds, stems, leaves, fruit and small aquatic insects such as the larvae of midges, caddisflies and dragonflies. Blue-billed Ducks are partly migratory, with short-distance movements between breeding swamps and over-wintering lakes with some long-distance dispersal to breed during spring and early summer. Blue-billed Ducks usually nest solitarily in Cumbungi over deep water between September and February. They will also nest in trampled vegetation in Lignum, sedges or Spike-rushes, where a bowl-shaped nest is constructed. The most common clutch size is five or six. Males take no part in nest-building or incubation. Young birds disperse in April-May from their breeding swamps in inland NSW to non-breeding areas on the Murray River system and coastal lakes (DEC threatened species website 2005).	**No**. Standing water bodies within the Project Site may create artificial habitat for this species, however species is unlikely to occur. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Onychogalea fraenata	Bridled Nailtail Wallaby	E4 TSC Act E EPBC Act	The bridled nailtail wallaby lives in semi-arid areas where dense acacia shrubland and grassy woodland meet. At the time of European settlement this was a common species with a distribution reaching the west of the Great Dividing Range, north to Charters Towers in Queensland, south to north-western Victoria, and possibly extending west to eastern South Australia. The bridled nailtail wallaby now survives in a small percentage of the area it once inhabited. For over 30 years they were believed to be extinct as there had been no confirmed sightings of individuals since 1937. Then, in 1973, the species was 're-discovered' by a fencing contractor, who after reading an article about Australia's extinct species in a magazine, reported that there was a population of bridled nailtail wallabies on a property in central Queensland near the town of Dingo. This was confirmed by researchers from the Queensland Parks and Wildlife Service and the property eventually became Taunton National Park (Scientific). Current population estimates for Taunton National Park (Scientific), including neighbouring properties, are approximately 200 wallabies.	**No.** Presumed extinct. This species is unlikely to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Petrogale penicillata	Brush-tailed Rock-wallaby	E1 TSC Act V EPBC Act	**Distribution** The range of the Brush-tailed Rock-wallaby extends from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. However the distribution of the species across its original range has declined significantly in the west and south and has become more fragmented. In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. **Habitat and ecology** • Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. • Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. • Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night. • Highly territorial and have strong site fidelity with an average home range size of about 15 ha. • Live in family groups of 2 to 5 adults and usually one or two juvenile and sub-adult individuals. • Dominant males associate and breed with up to four females. • Breeding is likely to be continuous, at least in the southern populations, with no apparent seasonal trends in births.	**No.** Habitat for this species is likely occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Pachycephala inornata	Gilbert's Whistler	V TSC Act	**Distribution** The Gilbert's Whistler is sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, from the western slopes of NSW (south from the Warrumbungles) to almost the Western Australian coast. The species was once distributed almost continuously across the southern mallee of NSW. There are now only three separate populations left in NSW. Most of the eastern population occurs in an area enclosed by a line joining Gilgandra to Cobar, then south to Narrandera, east to Wagga Wagga, north to Wellington and back to Gilgandra. The species is also recorded along the Murray River Valley between Mathoura and Wentworth. There is a restricted population in the Scotia mallee area north of Wentworth. The Gilbert's Whistler occurs in ranges, plains and foothills in arid and semi-arid timbered habitats. In NSW it occurs mostly in mallee shrubland, but also in box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests. Within the mallee the species is often found in association with an understorey of spinifex and low shrubs including acacias, hakeas, sennas and grevilleas. In woodland habitats, the understorey comprises dense patches of shrubs.	Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
			Habitat and ecology The Gilbert's Whistler forages on or near the ground in shrub thickets and in tops of small trees. Its food consists mainly of spiders and insects such as caterpillars, beetles and ants. Occasionally, seeds and fruits are eaten. The young are fed insects. Breeding takes place from August to November. Patches of dense understorey shrubs associated with mallee or woodland are essential for territorial pairs to breed. Aggregations of nesting pairs are sometimes recorded. At Cowra three pairs nested in a 25 ha area. Nests are built 2 m above the ground in the fork of dense foliage of prickly plants such as acacias. The nest is either a lined cup or sometimes birds use the old nests of other species, particularly disused babblers' nests. Two or three eggs, occasionally four, are laid. The pair holds and defends the territory all year round. Whistlers do not make any regular large-scale movements, though young disperse after fledging.			
Petaurus norfolcensis	Squirrel Glider	V TSC Act	**Distribution** The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. **Habitat and ecology** • Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. • Prefers mixed species stands with a shrub or Acacia midstorey. • Live in family groups of a single adult male one or more adult females and offspring. • Require abundant tree hollows for refuge and nest sites. • Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.	Habitat for this species is unlikely to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Petroica phoenicea	Flame Robin	V TSC Act	**Distribution** The Flame Robin is endemic to SE Australia, and ranges from near the Queensland border to SE South Australia and also in Tasmania. In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. It is likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands. **Habitat and ecology** • Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. • Prefers clearings or areas with open understoreys. • The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. • Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. • In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). • Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. • In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. • In winter, occasionally seen in heathland or other shrublands in coastal areas.	Habitat for this species is unlikely to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
			• Birds forage from low perches, from which they sally or pounce onto small invertebrates which they take from the ground or off tree trunks, logs and other coarse woody debris. • Flying insects are often taken in the air and sometimes gleans for invertebrates from foliage and bark. • In their autumn and winter habitats, birds often sally from fence-posts or thistles and other prominent perches in open habitats. • Occur singly, in pairs, or in flocks of up to 40 birds or more; in the non-breeding season they will join up with other insectivorous birds in mixed feeding flocks. • Breeds in spring to late summer. • Nests are often near the ground and are built in sheltered sites, such as shallow cavities in trees, stumps or banks. • Builds an open cup nest made of plant materials and spider webs. Eggs are oval in shape and are pale bluish- or greenish-white and marked with brownish blotches; clutch size is three of four eggs.			

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Phascogale tapoatafa	Brush-tailed Phascogale	V TSC Act	**Distribution** The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. **Habitat and ecology** • Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. • Also inhabit heath, swamps, rainforest and wet sclerophyll forest. • Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater.. • Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates. • Females have exclusive territories of approximately 20 - 60 ha, while males have overlapping territories of up to 100 ha. • Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span. • Mating occurs May - July; males die soon after the mating season whereas females can live for up to three years but generally only produce one litter.	Habitat for this species is unlikely to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Phascolarctos cinereus	Koala	V TSC Act	**Distribution** The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the western region. It was historically abundant on the south coast of NSW, but now occurs in sparse and possibly disjunct populations. Koalas are also known from several sites on the southern tablelands. **Habitat and ecology** Spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year. Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night.	Although feed trees for this species are likely to occur in the Project Site Koalas are unlikely to occur in the Project Site. Potential post survey: **No, not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Polytelis swainsonii	Superb Parrot	V TSC Act V EPBC Act	**Distribution.** The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. It is estimated that there are less than 5000 breeding pairs left in the wild. **Habitat and ecology.** 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 Blakelys 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 10 km 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.	**Yes.** Known to occur in Project Site. Habitat likely to occur in the Project Site. Potential post survey: **Yes, species recorded.**	7-part test of significance & Assessment of significance.	• Known to occur in the Project Site. • Perching habitat, possibly temporary feeding habitat would be affected by direct habitat removal. • Would be affected by loss of water supply, potentially affected by tailings (if contaminated water is consumed). • Would be affected positively by increased standing water bodies associated with Pete's Tank and Back Tank. • Would be affected (positively) by proposed revegetation of Surface Facilities Area. • Would be affected (positively) by proposed 'Biodiversity Offset Area' in which feral animal control and population monitoring will occur.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V TSC Act	**Distribution**. The Grey-crowned Babbler is found throughout large parts of northern Australia and in south-eastern Australia. In NSW, the eastern sub-species occur on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Hay. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands. **Habitat and ecology.** Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Birds are generally unable to cross large open areas. Live in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen birds. All members of the family group remain close to each other when foraging. A soft 'chuck' call is made by all birds as a way of keeping in contact with other group members. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses. Build and maintain several conspicuous, dome-shaped stick nests about the size of a football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts, although they may be built in the outermost leaves of low branches of large eucalypts. Nests are maintained year round, and old nests are often dismantled to build new ones. Breed between July and February. Usually two to three eggs are laid and incubated by the female.	**Yes.** Known to occur in Project Site. Habitat likely to occur in the Project Site. Potential post survey: **Yes, species recorded.**	7-part test of significance	• Recorded within the Project Site. • Would be affected by direct habitat removal. • Would be affected by loss of water supply, potentially affected by tailings (if contaminated water is consumed). • Would be affected positively by increased standing water bodies associated with Pete's Tank and Back Tank. • Would be affected (positively) by proposed revegetation of Project Site. • Would be affected (positively) by proposed 'Biodiversity Offset Area' in which feral animal control and population monitoring will occur.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
			During incubation, the adult male and several helpers in the group may feed the female as she sits on the nest. Young birds are fed by all other members of the group. Territories range from one to fifty hectares (usually around ten hectares) and are defended all year. Territorial disputes with neighbouring groups are frequent and may last up to several hours, with much calling, chasing and occasional fighting (DECCW threatened species web page 2010).			
Pterostylis cobarensis	Greenhood Orchid	V TSC Act	**Distribution.** Known chiefly from the Nyngan-Cobar-Bourke district in the far western plains of New South Wales. Recorded districts include Narrabri, Nyngan, Cobar, Nymagee, Mt Gundabooka, Mt Grenfel and Mutawintji National Park. There are also records from the Darling Downs district of Queensland. **Habitat and ecology.** The group includes some of the most drought tolerant orchids in Australia. Survival strategies include the large tuberoids which store moisture, the overlapping rosette leaves which trap moisture and direct it to the root zone, and the tendency to grow in sites of litter accumulation and near rocks where run-off is concentrated. *Pterostylis cobarensis* occurs as frequent to abundant plants sometimes occasional) in usually very localised populations. Pollinated by the males of small gnats which are attracted to the flower by some pseudosexual perfume. Habitats are eucalypt woodlands, open mallee or *Callitris* shrublands on low stony ridges and slopes in skeletal sandy-loam soils. Associated species include *Eucalyptus morrisii, E. viridis, E. intertexta, E. vicina, Callitris glaucophylla, Geijera parviflora, Casuarina cristata, Acacia doratoxylon, Senna* spp. and *Eremophila* spp. Flowers from September to November. Vegetative reproduction is not common in this group of Greenhoods, but some species may form more than one dropper annually. Plants are deciduous and die back to the large, underground tubers after seed release. New rosettes are produced following soaking autumn and winter rains.	**Yes.** Habitat likely to occur in the Project Site. Potential post survey: **Yes, habitat available at the Project Site.**	7-part test of significance & Assessment of significance.	A targeted survey for this species in ideal conditions for detection on 15 October 2011 did not identify it within the proposed areas of disturbance. Notwithstanding this, a 7-part test is provided in the event that extant individuals exist in the remainder of the Project Site.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Pyrrholaemus sagittatus	Speckled Warbler	V TSC Act	**Distribution.** The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100ha survive. **Habitat and ecology.** The Speckled Warbler lives in a wide range of eucalypt 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. A side entrance allows the bird to walk directly inside. A clutch of 3-4 eggs is laid, between August and January, and both parents feed the nestlings. The eggs are a glossy red-brown, giving rise to the unusual folk names 'Blood Tit' and 'Chocolatebird'. Some cooperative breeding occurs. The species may act as host to the Black-eared Cuckoo. Speckled Warblers often join mixed species feeding flocks in winter, with other species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills.	**Yes.** Known to occur in Project Site. Habitat likely to occur in the Project Site. Potential post survey: **Yes, species recorded.**	7-part test of significance	Known to occur in the Project Site (CSUJC-EC, 2006).

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Pyrrholaemus brunneus	Redthroat	Conservation status in NSW: V TSC Act	**Distribution** Endemic to southern mainland Australia in all States and the NT, the Redthroat is a sedentary species with no known large-scale seasonal movements. In NSW, the species is confined to the far west of the state, with populations known from four main areas, though the species is probably under-recorded due to its shy habits and low observer numbers within its distribution. A population exists in the Bulloo Overflow to the east of Tibooburra, with occasional records further to the west in Sturt NP. There are records from around Broken Hill extending at least as far north as Mutawintji NP. The two areas in the south west of NSW is in chenopod shrublands (particularly Old Man Saltbush) to the north of Penarie, 25 kilometres north of Balranald and around the Great Darling Anabranch (particularly around Nearie Lake NR) to the north of Wentworth. Scattered records are known from other locations, such as around Lake Victoria and near Oxley, so further survey may reveal greater numbers in NSW. **Habitat and ecology** • This species is usually solitary or in pairs and males can be very vocal and frequently mimic the calls of other birds. However, it is generally a shy and unobtrusive species, feeding quietly on the ground or in low shrubs, and flying rapidly between shrubs when disturbed, making observation difficult.	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, species not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
			• In NSW the species has been recorded mainly in chenopod shrublands including Old Man Saltbush, Black Bluebush and Dillon Bush shrublands. Around Broken Hill it appears to be associated with the dense vegetation, particularly Acacias, found in drainage lines that run from the rocky hills. In other locations it is known from Canegrass and Lignum swamps and depressions, particularly on floodplains. • In other parts of its range, the Redthroat mainly inhabits acacia (particularly Mulga) and chenopod shrublands, often along watercourses or drainage lines. At this point of time it is not known from Mulga woodlands in NSW. More rarely it is also known to occur in mallee with a diverse heath shrub layer (SA/Victoria), taller semi-arid woodlands (WA), heathlands dominated by banksia and tea tree (Victoria) and shrublands with a White Cypress Pine overstorey (SA). • Breeds in late winter to spring and builds a bulky dome-shaped nest with a side entrance from coarse strips of bark, grass and feathers. The nest is located in shrubs or small trees up to one metre above the ground and usually contains two to four eggs. Their diet consists of a wide variety of terrestrial invertebrates (beetles, ants, termites, earwigs, grasshoppers, bugs, caterpillars, butterflies, moths, wasps and spiders) and grass seeds gathered from the ground and amongst low foliage.			

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Rostratula benghalensis	Painted Snipe	E TSC Act	**Distribution.** In NSW, this species has been recorded at the Paroo wetlands, Lake Cowell, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin. **Habitat and ecology.** 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**. Habitat for this species does not occur in the Project Site. Standing water bodies within the Project Site may create artificial habitat for this species, however species is unlikely to occur. Potential post survey: **No, species not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V TSC Act	**Distribution.** The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. **Habitat and ecology**. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.	**Yes**. Habitat for this species likely to occur in the Project Site. Potential post survey: **Yes, species recorded.**	7-part test of significance & Assessment of significance.	• Recorded a number of times within the Impact Footprint. • Would be affected by direct and indirect habitat removal. • Would be affected by loss of water supply, potentially affected by tailings (if contaminated water or insects that utilize it are consumed). • Would be affected (positively) by proposed revegetation of Project Site. • Would be affected positively by increased standing water bodies associated with Pete's Tank and Back Tank. Would be affected positively by an increase in tree stags due to flooding in these areas. • Would be affected (positively) by proposed 'Biodiversity Offset Area' in which feral animal control and population monitoring will occur.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Sminthopsis macroura	Stripe-faced Dunnart	V TSC Act	**Distribution.** Throughout much of inland central and northern Australia, extending into central and northern NSW, western Queensland, Northern Territory, South Australia and Western Australia. They are rare on the NSW Central West Slopes and North West Slopes with the most easterly records of recent times located around Dubbo, Coonabarabran, Warialda and Ashford. **Habitat and ecology.** Native dry grasslands and low dry shrublands, often along drainage lines. During periods of hot weather they shelter in cracks in the soil, in grass tussocks or under rocks and logs.	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, species not recorded.**	None	Not recorded. No potential.
Stagonopleura guttata	Diamond Firetail	V TSC Act	**Distribution**. The diamond firetail is a sedentary finch species which has a recorded habitat of open grassy woodland, mallee and forest, usually in the vicinity of watercourses, wooded urban fringes and smaller town outskirts. **Habitat and ecology**. This species may opportunistically use the woodland galleries The diamond firetail requires regular visits to watering sites during feeding activities.	**Yes**. Known to occur in Project Site. Habitat for this species is likely to occur in the Project Site. Potential post survey: **Yes, species recorded.**	• 7-part test of significance	Recorded in the Project Site.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Stictonetta naevosa	Freckled Duck	V TSC Act	**Distribution**. The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. **Habitat and ecology.** Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Generally rest in dense cover during the day, usually in deep water. Feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates. Nesting usually occurs between October and December but can take place at other times when conditions are favourable. Nests are usually located in dense vegetation at or near water level (DEC threatened species website 2005).	**No**. Standing water bodies within the Project Site may create artificial habitat for this species, however species is unlikely to occur. Potential post survey: **No, species not recorded**.	None	Not recorded. No potential.
Tiliqua occipitalis	Western Blue-tongued Lizard	Vulnerable	**Habitat and ecology** • Diurnally forages for insects, snails, native vegetation and carrion. • Inhabits plains, swales, ranges and sometimes dunes of loamy or clayey/sandy soils vegetated by woodlands, especially mallee, shrublands (including chenopods), heaths or hummock grasslands. Preferred vegetation type appears to be mixed mallee/Triodia communities. • Terrestrial, and known to utilise rabbit warrens for shelter.	**Yes.** Habitat for this species has potential to occur in the Project Site. Potential post survey: **No, species not recorded**.	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
Tyto novaehollandiae	Masked Owl	Vulnerable	**Distribution.** Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. **Habitat and ecology**. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	**Yes**. Potential to occur in the Project Site. Breeding habitat unlikely as no major watercourses transect the Project Site Potential post survey: **No, species not recorded.**	None	Not recorded. No potential.
Rulingia Procumbens	Rulingia Procumbens	V TSC Act V EPBC Act	**Distribution** Endemic to NSW, mainly confined to the Dubbo Mendooran -Gilgandra region, but also in the Pilliga and Nymagee areas. **Habitat and ecology** • Grows in sandy sites, often along roadsides. • Recorded in *Eucalyptus dealbata* and *Eucalyptus sideroxylon* communities, *Melaleuca uncinata* scrub, under mallee eucalypts with a *Calytrix tetragona* understorey, and in a recently burnt Ironbark and *Callitris* area. Also in *Eucalyptus fibrosa* subsp. *nubila, Eucalyptus dealbata, Eucalyptus albens* and *Callitris glaucophylla* woodlands north of Dubbo. • Other associated species include *Acacia triptera, Callitris endlicheri, Eucalyptus melliodora, Allocasuarina diminuta, Philotheca salsolifolia, Xanthorrhoea* species, *Exocarpos cupressiformis, Leptospermum parvifolium* and *Kunzea parvifolia*. • Fruiting period is summer to autumn. Flowers from August to December.	**Yes**. Habitat for this species likely exists in the Project Site. Potential post survey: **No, species not recorded.**	None	Not recorded. No potential.

Table 24 (Cont'd)
Threatened Species Known or with Potential to Occur

Scientific Name	Common Name	Level of Threat	Habitat requirements (as per OEH and DSEWPaC websites)	Potential for this species to occur in the Project Site.	Type of Assessment Required	Reason
			• Appears to produce seed which persists for some time in the seed bank. Large numbers of seedlings have been observed germinating after fire at sites where the species was not apparent above ground before the fires. Clusters of individuals may be clonal. • The species is often found as a pioneer species of disturbed habitats. It has been recorded colonising disturbed areas such as roadsides, the edges of quarries and gravel stockpiles and a recently cleared easement under power lines. Has been recorded in populations of 50+ individuals of various ages, 28 plants on the western side of the road and 58 plants on the sunnier eastern side. Populations may comprise a single cohort of individuals, or have a multi-aged structure where some individuals appear to be old with thickened runners.			
Swainsona serecia	Silky Swainson-pea	V TSC Act	**Distribution** Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. **Habitat and ecology** • Found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro. • Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes. • Sometimes found in association with cypress-pines *Callitris* spp. • Habitat on plains unknown. • Regenerates from seed after fire.	**Yes**. Habitat for this species is unlikely to occur in the Project Site. Potential post survey: **No, species not recorded**.	None	Not recorded. No potential.

10.2 IMPACT ASSESSMENT – TSC ACT – LISTED SPECIES

Assessments of significance (7-Tests) can be found in **Appendix 3**. The Proposal is unlikely to cause local extinction or impact to any TSC Act listed species.

10.3 IMPACT ASSESSMENT – MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The EPBC Act requires that the following matters of National Environmental Significance (NES) be considered (**Table 25**).

Table 25
Compliance with Commonwealth EPBC Act requirements.

EPBC Act Factors	Impact
Any environmental impact on World Heritage property?	Nil. There would be no impacts on any World Heritage properties as a result of the Project.
Any environmental impact on National Heritage places?	Nil. There would be no impacts on any National Heritage places as a result of the Project.
Any environmental impact on wetlands of international importance?	Nil There would be no impacts on any wetlands of International importance as a result of the Project.
Any environmental impact on Commonwealth listed threatened species or ecological communities?	There would be no environmental impacts on any Commonwealth listed threatened species or ecological communities as a result of the Project. *Bothriochloa biloba* does occur within the Project Site, however, will not be impacted upon by the Project.
Any environmental impact on Commonwealth listed migratory species?	Yes. The superb Parrot is known to utilise resources within the Project Site.
Does any part of the Project involve nuclear action?	No. The Project will not involve any nuclear action.
Any environmental impact on a Commonwealth Marine area?	No. There are no Commonwealth Marine areas located in the vicinity of the Project.
Any impact on Commonwealth Land?	No. The Project would no impact upon any Commonwealth Land.

Assessments of significance can be found in **Appendix 3**. The Project is unlikely to cause local extinction or impact to any EPBC Act listed species.

11. CONCLUSIONS

Having given consideration to the ecology within the Project Site, it is apparent that the Project is:

- unlikely to significantly affect any of the listed threatened species, fauna populations or communities if amelioration measures as recommended are adopted, implemented and maintained;
- unlikely to increase or significantly contribute to any of the National or State listed key threatening processes, if amelioration measures as recommended are adopted, implemented and maintained as well as the appropriate safeguards regarding the control of potential vertebrate pests and exotic weeds are effectively applied;
- unlikely to significantly affect any Ramsar wetland or any CAMBA[7], JAMBA[8] or ROKAMBA[9] listed species;
- unlikely to significantly affect any of the creeks if adequate safeguards are adopted for water run-off from the site; and
- consistent with ecologically sustainable development principles with regard to fauna and would not adversely affect the local biodiversity and no issue of inter-generational or value added matters are relevant in this instance.

This ecological assessment provides a true and fair review of the Project in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment from Project-related activities.

Heidi Kolkert

Ecologist & Project Officer
OzArk Environmental & Heritage Management Pty Limited.
Date: 10.6.2011

[7] Japan-Australia Migratory Bird Agreement (JAMBA).

[8] China-Australia Migratory Bird Agreement (CAMBA).

[9] Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

12. DIRECTOR GENERAL REQUIREMENTS

Table 26
Director General Requirements and other Government Agency Requirements for Ecology Assessment

Government Agency	Paraphrased Requirement	Relevant Section(s)
GENERAL		
DoP	• **Biodiversity** – including:	Section 4 and 6
	– accurate estimates of any vegetation disturbance associated with the Project;	Sections 8.2 and Table 13
	– impacts on threatened species or populations or their habitats, endangered ecological communities, groundwater dependent ecosystems and native vegetation generally;	Section 10 and Table 22
	– a detailed description of the measures that would be implemented to maintain or improve the regional biodiversity values in the medium to long term.	Section 8.2 to 8.4
ECOLOGY AND BIODIVERSITY VALUES		
DECCW 3/11/10	1. The EA must follow the "Draft Guidelines for Threatened Species Assessment'. These guidelines deal specifically with applications under Part 3A of the EP&A Action:	Section 5.0
	a) A field survey should be conducted and documented in accordance with the guidelines.	Section 5.1
	b) Likely impacts on threatened species and their habitat need to be assessed, evaluated and reported on. The EA should specifically report on the considerations listed in Step 3 of the draft guidelines.	Section 8
	c) The EA must describe the actions that will be taken to avoid impacts, or to mitigate unavoidable impacts of the project on threatened species and their habitat. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.	Sections 9.1 to 9.4
	d) Step 4 of the draft guidelines requires that where measures to avoid or mitigate are not possible, offset strategies need to be considered.	Section 9.5
	e) The EA must clearly state whether it meets each of the key thresholds set out in Step 5 of the draft guidelines.	Section 10
	The EA needs to address the potential impact on native vegetation; specifically:	Sections 8.2 to 8.4
	1. The hectares of native vegetation that will have to be cleared to accommodate all infrastructures.	Sections 8.2 to 8.4
	2. Full floristics of the vegetation types that will need to be cleared.	Section 6.1 and Appendix 2
	3. A description and map of the dominate vegetation types must be provided. Vegetation types mapped should be assigned to corresponding vegetation types included in the Biometric tool vegetation database. These are available from: http://www.enviroment.nsw.gov.au/resources/nature/Biometric_Vegetation_Type_CMA.xls	Figure 6

Table 26 (Cont'd)
Director General Requirements and other Government Agency Requirements for Ecology Assessment

Government Agency	Paraphrased Requirement	Relevant Section(s)
DECCW 3/11/10 (Cont'd)	4. The extent of native vegetation on the site which may be remnant vegetation, protection re-growth or non-protected re-growth as defined by the Native Vegetation Act 2003.	Figure 6
	5. The general requirements of the Native Vegetation Act 2003, especially in relation to Vulnerable Land. Regarding the biodiversity impacts, where the EA finds that a loss of native vegetation will occur as a result of the proposal and biodiversity impacts cannot be avoided or mitigated against, an acceptable biodiversity offset will be an important component of the Project. The Biodiversity Offset strategy should address the data collection requirements set out in Attachment E and meets the guiding principles of Attachment F. Provision of the offset strategy will allow DECCW to make an assessment as to whether biodiversity values are maintained or improved. (The NSW Biobanking Scheme is one method that allows for the assessment of all biodiversity values, which are defined by the Threatened Species Conservation Act 1995 as the composition, structure and function of ecosystems, and including (but not limited to) threatened species, threatened populations and threatened ecological communities and their habitats). The proposal should aim to meet an 'improve or maintain' outcome, which requires the use of the methodology to: Assess impacts upon threatened species and biodiversity; Determine offset requirements; and Identify high conservation value areas and design the proposal accordingly. It is recommended that the proponent address the data requirements of the Biometric and Threatened Species tool methodology (PVP tools) as one means of determining a maintain or improve outcome for a biodiversity offset. The EA must assess potential impacts on any adjoining conservation reserves and conservation reserves in vicinity of the site, including DECCW Estate. This should be assessed in the context of the DECCW guideline *"Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water (DECCW, 2010).*	Section 9.5

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APPENDICES

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Appendix 1

Plates

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(Note: A colour copy of this Appendix is available on the Project CD)

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	**Plate 1**: View southwest from 'Peak' hill over Project Site. The homestead is in the background of the picture. Picture shows classic vegetation type of the region, Benson 103. Grey/green coloured trees are White Cypress Pine and green coloured trees are Bimble Box. The lack of ground cover and woody debris is evident by the patches of red earth.
	**Plate 2**: View southeast from 'Peak' hill over Project Site. Picture shows classic vegetation type of the region, Benson 103. Green Mallee is in the left foreground of the picture on the rocky outcrop.

	**Plate 3**: View north northwest from 'Peak' hill near decline. Ground cover is dominated by chenopod species and has been heavily grazed by feral goats. In the background behind the White Cypress Pine is a mixed mallee vegetation community (Benson 174).
	**Plate 4**: View of vegetation around Trap Line 2 within Back Tank West.

	**Plate 5**: View of cleared drill pad area in Project Site. Mixed Bimble Box / White Cypress Pine / Red Box vegetation (Benson 103)
	**Plate 6**: View of dense Bimble Box vegetation (Benson 103) along Trap Line 4 within the augmentation area at Pete's Tank). This vegetation is dominant through the natural drainage line along the southern portion of the property

	**Plate 7**: View north from Back Tank West. Male Hooded Robin in tree.
	**Plate 8**: View northeast from Back Tank West Evidence of historic ringbarking is particularly evident in this section of the Project Site. Several hollow bearing stags provide habitat for threatened species. Ground cover is sparse.

	**Plate 9**: View of pitfall traps within Impact Footprint. Several White Cypress Pine stags are evident in the picture.
	**Plate 10**: View of pitfall traps within Impact Footprint. Several White Cypress Pine stags are evident in the picture.

	**Plate 11**: High habitat value Red Box (*E. Intertexta*) stag. This tree has several small hollows and three medium hollows.
	**Plate 12**: Red Box (E. Intertexta) stag within Bimble Box / White Cypress Pine dominated vegetation.

	**Plate 13**: View of mixed mallee community (Benson 174) southeast from the homestead along an access road to Pete's Tank
	**Plate 14**: Crucifix Toad *(Notaden bennettii)* found on the ground in a cleared and disturbed area. This burrowing frog emerges after heavy rain to breed in temporary ponds.

	**Plate 15**: View northwest of the homestead onto the adjacent dam outside project impacts. This area and further north was where the highest diversity of birds was recorded including threatened species such as Major Mitchell Cockatoos, Diamond Firetails, White-browed Woodswallows, Turquoise Parrots, Hooded Robins and Lobed Blue-grass. In the foreground of this picture in the shadow is a spotted bowerbird collecting bower objects.
	**Plate 16**: View east northeast from the homestead onto the 'Peak' in the background. *Eremophila sp*. colonise the previously cleared / disturbed areas. The drill core storage area is a common perching and feeding site for Hooded Robins (TSC Act). As many as 5 males and numerous females were observed at this point during various noisy activities.
	**Plate 17**: Mallee Ringneck Parrot (*Barnardius barnardi)* feeding around the homestead. This species was noted perching and feeding throughout all vegetation types and within each Impact Footprint within the Project Site.

Appendix 2

Fauna and Flora Species Recorded in the Project Site

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Fauna Species recorded in the Project Site

Family	Scientific Name	Common Name	Conservation Status	Benson 103	Benson 174	Benson 180	Cleared / Disturbed
Amphibia	*Litoria peronii*	Peron's Tree Frog					X
	Notaden bennettii	Crucifix Frog					X
	Litoria latopalmata	Broad Palmed Frog					X
Aves	*Acanthiza apicalis*	Inland Thornbill		X		X	X
	Acanthagenys rufogularis	Spiny Cheeked Honeyeater			X		
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill		X	X	X	X
	Acanthiza nana	Yellow Thornbill		X	X		X
	Acanthiza reguloides	Buff-rumped Thornbill		X	X		X
	Acanthiza uropygialis	Chestnut-rumped Thornbill		X	X		X
	Aphelocephala leucopsis	Southern Whiteface	CC	X			X
	Gerygone fusca	Western Gerygone		X	X	X	X
	Cincloramphus cruralis	Brown Songlarks					X
	Smicrornis brevirostris	Weebill		X	X	X	X
	Aquila audax	Wedge-tailed Eagle					X
	Circus assimilis	Spotted Harrier	TSC Act				X
	Dacelo novaeguineae	Laughing Kookaburra		X	X	X	X
	Chenonetta jubata	Australian Wood Duck		X			
	Artamus cinereus	Black-faced Woodswallow					X
	Artamus cyanopterus	Dusky Woodswallow	CC	X			X
	Artamus leucorynchus	White-breasted Woodswallow		X			X
	Artamus superciliosus	White-Browed Woodswallow	Preliminary Determination (TSC) Act	X X			X
	Cracticus nigrogularis	Pied Butcherbird		X			X
	Cracticus tibicen	Australian Magpie		X		X	X
	Cracticus torquatus	Grey Butcherbird					X
	Cacatua leadbeateri	Major Mitchell's Cockatoo	TSC Act				X
	Cacatua sanguinea	Little Corella					X
	Eolophus roseicapillus	Galah		X			X
	Nymphicus hollandicus	Cockatiel					X
	Coracina novaehollandiae	Black-faced Cuckoo-shrike		X			X
	Lalage sueurii	White-winged Triller		X	X		X
	Dromaius novaehollandiae	Emu		X			
	Ocyphaps lophotes	Crested Pigeon		X	X	X	X
	Phaps chalcoptera	Common Bronzewing					X
	Corcorax melanorhamphos	White-winged Chough		X	X	X	X
	Struthidea cinerea	Apostlebird		X	X	X	X
	Corvus coronoides	Australian Raven		X			X
	Stagonopleura guttata	Diamond Firetail	TSC Act				X
	Hirundo neoxena	Welcome Swallow					X

Family	Scientific Name	Common Name	Conservation Status	Benson 103	Benson 174	Benson 180	Cleared / Disturbed
	Petrochelidon ariel	Fairy Martin					X
	Malurus cyaneus	Superb Fairy-wren		X	X	X	X
	Malurus splendens	Splendid Fairy-wren		X			X
	Cincloramphus cruralis	Brown Songlark		X			
	Cincloramphus mathewsi	Rufous Songlark		X		X	
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater				X	
	Anthus richardi	Richards Pipit				X	
	Entomyzon cyanotis	Blue-faced Honeyeater		X	X		
	Lichenostomus leucotis	White-eared Honeyeater		X	X	X	X
	Lichenostomus ornatus	Yellow-plumed Honeyeater		X		X	X
	Lichenostomus penicillatus	White-plumed Honeyeater		X	X	X	X
	Lichenostomus virescens	Singing Honeyeater				X	
	Manorina flavigula	Yellow-throated Miner		X		X	X
	Manorina melanocephala	Noisy Miner		X	X	X	X
	Plectorhyncha lanceolata	Striped Honeyeater				X	
	Purnella albifrons	White-fronted Honeyeater		X		X	
	Grallina cyanoleuca	Magpie-lark		X			X
	Myiagra inquieta	Restless Flycatcher	CC		X		X
	Anthus novaeseelandiae	Australian Pipit		X			
	Colluricincla harmonica	Grey Shrike-thrush		X		X	
	Oreoica gutturalis	Crested Bellbird	CC	X			
	Pachycephala rufiventris	Rufous Whistler	CC	X			
	Pardalotus striatus	Striated Pardalote		X			
	*Passer domesticus**	House Sparrow					X
	Eopsaltria australis	Eastern Yellow Robin	CC	X	X	X	X
	Melanodryas cucullata	Hooded Robin	TSC Act	X			X
	Microeca fascinans	Jacky Winter	CC				X
	Petroica goodenovii	Red-capped Robin	CC	X	X	X	X
	Podargus strigoides	Tawny Frogmouth		X			
	Pomatostomus superciliosus	White-browed Babbler	CC	X	X		X
	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	TSC Act	X	X	X	X
	Pomatostomus ruficeps	Chestnut-crowned Babbler		X			
	Barnardius zonarius barnardi	Mallee Ringneck		X		X	X
	Melopsittacus undulatus	Budgerigar					X
	Neophema pulchella	Turquoise Parrot	TSC Act				X
	Northiella haematogaster	Blue Bonnet				X	X
	Platycercus eximius	Eastern Rosella	CC	X	X	X	X
	Psephotus haematonotus	Red-rumped Parrot		X	X	X	X
	Psephotus varius	Mulga Parrot		X			X
	Ptilonorhynchus maculatus	Spotted Bowerbird	CC				X

Family	Scientific Name	Common Name	Conservation Status	Benson 103	Benson 174	Benson 180	Cleared / Disturbed
	Rhipidura albiscapa	Grey Fantail		X	X	X	X
	Rhipidura leucophrys	Willie Wagtail		X	X	X	X
	Philemon corniculatus	Noisy Friarbird	CC			X	
Mammalia	*Capra hircus**	Goat		X		X	
	*Vulpes vulpes**	Fox		X			
	*Felis catus**	Cat		X			X
	*Oryctolagus cuniculus**	Rabbit		X		X	X
	Macropus giganteus	Eastern Grey Kangaroo		X	X		
	Macropus robustus	Common Wallaroo	CC	X		X	
	*Sus scrofa**	Pig		X			
	Chalinolobus picatus	Little Pied Bat	TSC Act				
	Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	TSC Act				
	Chalinolobus morio	Chocolate Wattled Bat					
	Mormopterus sp. 3 / 4	Freetail Bat					
	Chalinolobus gouldii	Gould's Wattled Bat					
	Mormopterus sp. 3	Inland Freetail Bat					
	Scotorepens greyii	Little Broadnosed Bat					
	Vespadelus vulturnus	Little Forest Bat					
	Mormopterus sp. 4	Southern Freetail Bat					
	Austronomus australis	White-striped Freetail Bat					
Reptilia	*Cryptoblepharus carnabyi*	Three striped Skink					X
	Ctenotus atlas	Southern Mallee Ctenotus			X		
	Tiliqua rugosa	Shingle-back	CC	X			
	Morethia boulengeri	Tree Skink				X	
	Varanus varius	Lace Monitor		X			

Key:
CC= Conservation concern as identified by Reid 1999.
TSC Act = Listed as a threatened species within the schedules of the NSW TSC Act.
EPBC Act = Listed as a threatened species within the schedules of the EPBC Act.

AnaBat Results from the Project Site10.

Survey Location	*Common Name*	*Scientific Name*	Call Confidence *	No. of Passes
Back Tank West (25th April 2010)	# Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	P	1
	Gould's Wattled Bat	*Chalinolobus gouldii*	C	2
			P	1
			Po	1
	Chocolate Wattled Bat	*Chalinolobus morio*	P	1
	White-striped Freetail Bat	*Austronomus australis*	C	5
	Southern Freetail Bat	*Mormopterus sp. 4*	C	3
			P	4
Old Mine Shaft (26th April 2010)	Gould's Wattled Bat	*Chalinolobus gouldii*	P	1
	Chocolate Wattled Bat	*Chalinolobus morio*	C	1
			P	5
			Po	1
	# Little Pied Bat	*Chalinolobus picatus*	C	11
			P	5
	Little Broadnosed Bat	*Scotorepens greyii*	C	1
	Little Forest Bat	*Vespadelus vulturnus*	C	6
			P	2
	White-striped Freetail Bat	*Austronomus australis*	C	4
	Southern Freetail Bat	*Mormopterus sp. 4*	C	14
	Freetail Bat	*Mormopterus sp. 3 / 4*	C	1
Tailings Storage Facility (27th April 2010)	# Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	C	6
	Chocolate Wattled Bat	*Chalinolobus morio*	P	1
	Little Broadnosed Bat	*Scotorepens greyii*	C	1
	Little Forest Bat	*Vespadelus vulturnus*	C	2
			P	2
	White-striped Freetail Bat	*Austronomus australis*	C	1
Pete's Tank (28th April 2010)	# Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	C	4
	Gould's Wattled Bat	*Chalinolobus gouldii*	C	183
			P	20
	# Little Pied Bat	*Chalinolobus picatus*	C	6
	Little Forest Bat	*Vespadelus vulturnus*	C	10
			P	2
	White-striped Freetail Bat	*Austronomus australis*	C	20
	Inland Freetail Bat	*Mormopterus sp. 3*	P	1
	Southern Freetail Bat	*Mormopterus sp. 4*	C	15
			P	12

[10] In relation to the analysis of those microchiropteran calls obtained, it is noted that some insectivorous bat species have distinctive echolocation calls that are unlikely to be confused with those of other species. Other bat species overlap in both call frequency and structure making identification problematic in some cases. The degree of confidence attached to call identifications will depend on the quality of the recordings as well as the activity of the bat at the time of recording and its direction of flight. In some instances a particular species may be identified with confidence, while at other times its identification will be less certain. For this report, echolocation call identifications have been assigned to three categories with regard to certainty of identification. These are:

*C - Confident Identification. Small possibility of confusion of calls with those of other bat species.

P - Probable Identification. Some possibility of confusion of calls with those of other bat species.

Po - Possible Identification. Likely to be confused with calls with those of other bat species.

Site Flora Species Recorded in the Project Site **General**

Trees / Overstorey

Gum-barked Coolibah (*Eucalyptus intertexta*), Bimble Box (*Eucalyptus populnea subsp. Bimbil*), Green Mallee (*Eucalyptus viridis*), Red Mallee (*Eucalyptus socialis*), Grey Mallee (*Eucalyptus morrisii*), White Mallee, (*Eucalyptus Dumosa*), Red Mallee (*oleosa subsp. Oleosa*), Dwyer's Red Gum (*Eucalyptus dwyeri*), Pepper Tree (*Schinus areira**), Wild Orange (*Capparis mitchellii*), White Cypress (*Pine Callitris glaucophylla*), Wilga (*Geijera parviflora*), Wonga Vine (*Pandorea pandorana subsp. pandorana* 'inland form'), Box Mistletoe (*Amyema miquelii*), kurrajong (*Brachychiton populneus*).

Shrubs

Sticky Wallaby Bush (*Beyeria viscosa*) Wallaby Bush (*Bertya cunninghamii*),Western Golden Wattle (*Acacia decora*) Ironwood (*Acacia excelsa subsp. Excels*) Hooked Needlewood (*Hakea tephrosperma*), Punty Bush (*Cassia eremophila*), Emubush (*Eremophila longifolia*) Budda (*Eremophila mitchellii*) Turpentine bush (*Eremophila sturtii*), Turkey Bush (*Eremophila deserti*) Wedge leaf hopbush (*Dodonaea viscosa subsp. Cuneata*), Bush Mallee Pea (Eutaxia microphylla*), Silver Cassia (Senna form taxon 'artemisioides', Cactus Pea (Bossiaea walker)*

Chenopodiaceae

Black Cottonbush (*Maireana declavens, Suaeda sp*.), Eastern Cotton Bush (*Maireana microphylla*), Wingless Fissure-weed (*Maireana enchylaenoides*), Chenopodium sp., Black Crumbweed (*Chenopodium melanocarpan*), Small crumbweed (*Chenopodium pumilio*), Small Leaf Goosefoot (*Chenopodium pseudomicrophyllum*) Mallee Goosefoot (*Chenopodium desertorum subsp. Annidiophyllum*), Crested Goosefoot (*Chenopodium cristatum*), Nitre Goosefoot (*Chenopodium nitrariaceum),* Fat Hen (*Chenopodium album*),* Black Rolypoly (*Sclerolaena muricata*), Grey Copper Burr (*Sclerolaena diacantha*), Pop Saltbush (*Atriplex spongiosa*), Climbing slatbush (*Einadia nutans*), Climbing Saltbush (Einadia nutans subsp. Nutans), Ruby Saltbush (*Enchylaena tomentosa*), Mallee Saltbush (*Atriplex stipitata*) Climbing slatbush (*Einadia nutans*), Berry Salt Bush (*Einadia hastate*).

Herbs and Groundcover

Lesser Joyweed (*Alternanthera denticulate*), Rock Fern (*Cheilanthes sieberi subsp. Sieberi*), Rock Fern (*Cheilanthes austrotenuifolia*), Wild Sage (*Salvia Verbenacea),* Native Pennyroyal (*Mentha satureioides*) White Horehound (*Marrubium vulgare*)* Rough Mint-bush (*Prostanthera denticulate*), Green Flowered Mintbush (*Prostanthera leichbardtii*), Indian Weed (Sigesbeckia orientalis subsp. orientalis), Australian cranesbill (*Geranium solanderi*), Native Geranium (Geranium solanderi var. Solanderi), Geranium (*pelagonian sp*), Corrugated Sida (*Sida corrugata*), Ridge Sida (*Sida Cunninghamii*), Hairy Side (*Sida trichopoda)* Native Storkesbill (Pelargonium austral), Fan Flower (Scaevola spinescens), Kidney weed (*Dichondra repens*), Silver Tails (*Ptilotus obovatus var. Obovatus*), Small Purple Fox Tails (*Ptilotus leucocomus*), Hill Goodenia (Goodenia havilandii), Slender-violet Bush (Hybanthus monopetalus), Felted Nightshade (*Solanum coactifiliferum*), Black-berry Nightshade (*Solanum nigrum*),* Spiny Potato Bush (*solanum ferocissimum**), Narrawa Burr (*Solamum cinereum*),* Slender Carrot (*Cyclospermum leptophyllum*),* Onion Weed (*Asphodelus fistulosus**), Varigated Thistle (Silybum marianum*) Pattersons Curse (Echium plantagineum*) Smooth Mustard (Sisymbrium erysimoides*), Paddy melon (*Cucumis myriocarpus subsp. leptodermis*),* Stone Crop (Crassula spp.*), Caustic Weed (*Chamaesyce drummondii*), Annual verbine (*Cullen cinereum*), Spotted Burr Medic (*Medicago arabica*),* Clover (Trifolium spp.*), Violet twinleaf (*Zygophyllum iodocarpum*), Lesser Swinecress (*Coronopus didymus*), stinking pennywort (*Hydrocotyle laxiflora*), Oxalis sp. (*Oxalis perennans*) Annual verbine (*Cullen cinereum)* Common Onion orchid (*Microtis unifolia*), Hairy Caustic Weed (*C. Australis*), Variable Groundsel (*Senecio lautus*),* Sand cress (*pachmitus cardaminoiders*), Sneeze Weed (Centipeda cunninghamii), Desert Sneeze Weed (*Centipeda thespidiodes*), lepidium sp., Variable Daisy (*Brachyscome ciliaris var. ciliaris*), Everlasting Daisy (*Xerochrysum bracteatum*), Large Headed Daisy (*Brachyscome diversifolia*), Hard headed daisy (*Brachyscome lineariloba*) Spreading Daisy (*Brachyscome smithwhitei*), Purple Burr Daisy (*Calotis cuneifolia*), Yellow Burr Daisy (*Calotis lappulacea*), Common Everlasting (*Chrysocephalum apiculatum*), Golden Everlasting (*Xerochrysum bracteatum*), Tall BlueBell (*Wahlenbergia stricta subsp. Alterna*), Annual Bluebell (*Wahlenbergia gracilenta*), small purselane (*Calandrinia eremaea*) Long flowered tobacco bush (*Nicotiana megalosiphon subsp. Megalosiphon*), Rice Flower (*Pimelea microcephala subsp. Microcephala*), Swamp Dock (*Rumex brownie*), Variegated Thistle *(Silybum marianum*),* Pheasants Eye *(Adonis sp.*).*

Grasses / Sedges

Speargrass (*Austrostipa scabra subsp. scabra*), Curly Windmill Grass (*Enteropogon acicularis*), Bunch Wiregrass (*Aristida Behriana*), Bunched Kerosene Grass (Aristida contorta), No.9 wiregrass (*Aristida jerichoensis*), Purple Wiregrass (*Aristida ramosa*), Wallaby Grass (*Austrodanthonia bipartite*), Wallaby Grass (*Austrodanthonia setacea),* Foxtail Speargrass (*Austrostipa densiflora*), Purple Lovegrass (*Eragrostis lacunaria*), Windmill Grass (*Chloris truncata*), Lobed Bluegrass (*Bothriochloa biloba*), Knob Sedge (*Carex inversa*), *Paspalidium sp.*, Dirty Dora (*Cyperus difformis*), Cotton Panic (*Digitaria brownie*), *Digitaria spp*.

Fungus

Geastrum pectinatum (puffball fungus) *Pisolithus* spp.

Noxious Weeds

Bathurst Burr (*Xanthium spinosum*), Galvanised Burr (*Sclerolaena birchii*).

Hill Site- Vegetation Plot 1

Vegetation Plot 1

The Hill Site is characterised by Benson 180, with an overstorey of Green Mallee (*Eucalyptus viridis*), Dwyer's Red Gum (*Eucalyptus dwyeri*), Wild Orange (*Capparis mitchellii*), White Cypress Pine *(Callitris glaucophylla*), Wilga (Geijera parviflora), Wonga Vine (*Pandorea pandorana subsp.* pandorana 'inland form'), kurrajong (*Brachychiton populneus)* and a Chenopodiaceae, herb and forb undercover. Down slope from the rocky outcrop, Western Golden Wattle (*Acacia decora*), Emubush (*Eremophila longifolia*), Budda (*Eremophila mitchellii*) and Turpentine bush (*Eremophila sturtii*) intergrade with a mixed mallee community (Benson 174). Species recorded in the vegetation plot include:

Black Cottonbush (*Maireana declavens, Suaeda sp.),* Eastern Cotton Bush (*Maireana microphylla*), Wingless Fissure-weed (*Maireana enchylaenoides*), Chenopodium sp., Black Crumbweed (*Chenopodium melanocarpan*), Small crumbweed (*Chenopodium pumilio*), Small Leaf Goosefoot (*Chenopodium pseudomicrophyllum*), Black Rolypoly (*Sclerolaena muricata*), Grey Copper Burr (Sclerolaena diacantha), Climbing Saltbush (*Einadia nutans subsp. Nutans*),

Australian cranesbill (*Geranium solanderi*), Native Geranium (*Geranium solanderi var. Solanderi*), Corrugated Sida (*Sida corrugata*), White Horehound (Marrubium vulgare*), Silver Tails (*Ptilotus obovatus var. Obovatus*), Hill Goodenia (*Goodenia havilandii*), Spreading Daisy (*Brachyscome smithwhitei*), Sneeze Weed (*Centipeda cunninghamii*), Oxalis sp. (*Oxalis perennans*), Kidney weed (*Dichondra repens*), Silver Tails (*Ptilotus obovatus var. Obovatus*), Purple Burr Daisy (*Calotis cuneifolia*), Yellow Burr Daisy (*Calotis lappulacea*), Annual verbine (*Cullen cinereum*).

Back Tank West- Vegetation Plot 2-3

Vegetation around the small dam area is consistent with Benson 103 with a dominant canopy of Bimble Box, some White Cypress Pine and Red Box. Vegetation recorded in the vegetation plot includes:

Vegetation Plot 2 (along drainage line)

Sheppard's purse (Capsella bursa-pastoris*), Hill Goodenia (Goodenia havilandii), Blackberry Nightshade, Black Rolypoly (*Sclerolaena muricata*), Grey Copper Burr (Sclerolaena diacantha), Dirty Dora (*Cyperus difformis*)., Knob Sedge (*Carex inversa*), Yellow Burr Daisy (*Calotis lappulacea*), Hibiscus sp, Small crumbweed (*Chenopodium pumilio*), Bent Pidgeon Grass *(Setaria geniculata*), Lesser Joy Weed (*Alternanthera denticulate)*, *Dirty Dora (Cyperus difformif)* Small Leaf Goosefoot (Chenopodium pseudomicrophyllum), Kidney weed (*Dichondra repens*), Eastern Cotton Bush (*Maireana microphylla*), Gall Weed (*zygophyllum apiculatum*), Spotted Burr Medic (*Medicago arabica*),* Ruby Saltbush (*Enchylaena tomentose*), Felted Nightshade (*Solanum coactifiliferum*), Stinking pennywort (*Hydrocotyle laxiflora)* and Annual verbine (*Cullen cinereum*).

Vegetation Plot 3 (slope)

White Cypress Pine *(Callitris glaucophylla*), Small crumbweed (*Chenopodium pumilio*), *Austrostipa densiflora*, Speargrass (*Austrostipa scabra subsp. scabra*), Brush Wire Grass (*Aristida Beheriana*), Old Man Weed (*Centipeda cunninghamii),* Desert Sneeze Weed *(Centipeda thespidiodes), lepidium sp,* Pheasants Eye *(Adonis sp.),* Pop Saltbush (*Atriplex spongiosa*), Climbing Saltbush (*Einadia nutans subsp. Nutans*), Ruby Saltbush (*Enchylaena tomentose*).

Pete's Tank- Vegetation Plot 4

Vegetation around the small dam area is consistent with Benson 103 with a dominant canopy of Bimble Box, some White Cypress Pine and Red Box. Vegetation recorded in the vegetation plot includes:

White Cypress Pine *(Callitris glaucophylla*),Bimble Box (*Eucalyptus populnea subsp. Bimbil*), Black Cottonbush (*Maireana declavens, Suaeda sp*.), Eastern Cotton Bush (*Maireana microphylla*), Speargrass (*Austrostipa scabra subsp. scabra*), Variable Daisy (*Brachyscome ciliaris*), Large Headed Daisy (*Brachyscome diversifolia*), Austrodanthonia setacea, Curly Windmill Grass (Enteropogon acicularis), Brush Wire Grass (*Aristida Behriana*), No. 9 Wire Grass (*Aristida jerichoensis*), lesser joy weed (*Cyperus difformif),* Budda (*Eremophila mitchellii*), Climbing Saltbush (*Einadia nutans subsp. Nutans*), Ruby Saltbush (*Enchylaena tomentose*), Australian cranesbill, (*Geranium solanderi*), *Cactus Pea (Bossiaea walker),* Cotton Panic (*Digitaria brownie*),Swamp Dock (Rumex brownie), Yellow Rice-flower (*Pimelea flava).*

Tailings Storage Facility-Vegetation Plot 5

Vegetation around the Tailings Storage Facility area is consistent with Benson 103 with a co-dominant canopy of Bimble Box and White Cypress Pine. Vegetation recorded in the vegetation plot includes:

Brush Wire Grass (*Aristida Beheriana*), Bunched Kerosene Grass *(Aristida contorta*), Variable Daisy (*Brachy diversifolia*), Australian Bindiweed, Silver Tail (*Ptilotus obovatus var. Obovatus*)

Purple Lovegrass (Eragrostis lacunaria), paspalidium species, *sida corrugata*, Turpentine bush (*Eremophila sturtii),* Black Crumbweed (*Chenopodium melanocarpan*), Small crumbweed (*Chenopodium pumilio*), Small Leaf Goosefoot (*Chenopodium pseudomicrophyllum*),Grey Copper Burr (*Sclerolaena diacantha*), Pop Saltbush (Atriplex spongiosa) Climbing Saltbush (*Einadia nutans subsp. Nutans*), Rock Fern (*Cheilanthes sieberi subsp. Sieberi*), Purple Burr Daisy (*Calotis cuneifolia*) White Cypress Pine, Speargrass (*Austrostipa scabra subsp. scabra*), Wallaby grass (*Austrodanthonia setacea*).

Appendix 3

7 Part tests and Assessments of Significance

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Table A3.1
7 part-tests: Parrots

	Major Mitchell Cockatoo (*Cacatua leadbeateri)* (V) TSC Act	**Superb Parrot (*Polytelis swainsonii*), (V) TSC Act**	**Turquoise Parrot (*Neophema pulchella*) (V) TSC Act**
a) in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.	Local population: Known to occur in the Project Site and general locality. One pair sighted joined by a third individual around the homestead feeding and drinking from the adjacent dam. Many hollows suitable for breeding in the Project Site. Ecological requirements for this species are documented in **Table 24** is considered assumed knowledge for the information provided in the following 7 part test. Clearing of c. 68ha of woodland within the Project Site is unlikely to affect the life cycle of the species such that a viable local population is likely to be placed at risk of extinction. Unsustainable feral goat grazing within the locality has the greatest potential to affect the species. If a population were present unmanaged grazing may have the potential to compromise the survival of a local population however, as noted this is unlikely.	Local population: Small groups known to utilise resources in the Project Site during winter migration. Recorded by CSU-JC 2006 and is still likely to occur within the Project Site. The activity does not have the ability to disrupt the life cycle of the species such that a local population will be placed at risk of extinction due to the extensive suitable habitat in the locality.	Local population: Recorded in the Project Site and general locality. One pair sighted joined by a third individual around the homestead feeding and drinking from the adjacent dam. Direct impacts associated the Project is unlikely to affect the life cycle of the species such that a viable local population is likely to be placed at risk of extinction. If the herbaceous layer was in better shape and was more diverse then the species may utilise the numerous tree hollows for breeding, at present however this is unlikely.
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 is likely to be placed at risk of extinction.	Not relevant	Not relevant	Not relevant

Table A3.1 (Cont'd)
7 part-tests: Parrots

	Major Mitchell Cockatoo (*Cacatua leadbeateri)* (V) TSC Act	**Superb Parrot (*Polytelis swainsonii*), (V) TSC Act**	**Turquoise Parrot (*Neophema pulchella*) (V) TSC Act**
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 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 relevant	Not relevant	Not relevant

Table A3.1 (Cont'd)
7 part-tests: Parrots

	Major Mitchell Cockatoo (*Cacatua leadbeateri)* (V) TSC Act	**Superb Parrot (*Polytelis swainsonii*), (V) TSC Act**	**Turquoise Parrot (*Neophema pulchella*) (V) TSC Act**
d) in relation to 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.	extent = c. 68ha of habitat will be impacted. Offsets and amelioration is aimed at increasing feeding resources of the parrot and breeding hollows. Fragmentation and / or isolation of potential habitat as a result of the action will continue. The habitat to be removed is one of the best represented habitat types in the Western CMA. The importance of the habitat to be removed lies purely with the provision of food for the species. The abundance of tree hollows and the potential to increase the number of trees hollows at the freshwater dams will have a positive impact on this species. This species is able to withstand the type of fragmentation proposed by the quarry extension however removal of the grassy layer through overgrazing has the potential to will isolate the woodland remnant from the available food source thus placing more pressure on the species to find food at further distances from adequate shelter. Removal of 68 ha of woodland in the Project Site will not compromise the long-term survival of the species. Whilst the proposed development would clear some trees within the Project Site, mallee areas upslope within Benson 180 and down slope (Benson174) of the Impact Footprint and Benson 103 would remain and provide a movement corridor for the woodland birds to traverse safely between the adjacent properties.	Refer to comments (left) re: extent of area to be removed. It is unknown how many trees in what particular location may be affected by the proposal therefore it is difficult to quantity the actual reduction in the number hollows that are (or potentially are) utilised at the site. Fragmentation and / or isolation of potential habitat as a result of the action will continue. **Figure 5**. The importance of the habitat to be removed lies predominately with the provision of suitable breeding hollows that are only associated with old growth eucalypts. The proposed works has the potential disrupt the availability of hollows and quality of the environment such that it will affect the long-term survival of the superb parrot in the locality. Whilst the proposed development would clear some trees within the Project Site, mallee areas upslope within Benson 180 and down slope (Benson174) of the Impact Footprint and Benson 103 would remain and provide a movement corridor for the woodland birds to traverse safely between the adjacent properties.	Refer to comments (left).
e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).	Critical habitat for this species has not been declared and at present there are no habitats listed as critical in the locality.	Critical habitat for the superb parrot has not been declared and at present there are no habitats listed as critical in the locality.	Critical habitat for the turquoise parrot has not been declared and at present there are no habitats listed as critical in the locality.

Table A3.1 (Cont'd)
7 part-tests: Parrots

	Major Mitchell Cockatoo (*Cacatua leadbeateri)* (V) TSC Act	**Superb Parrot (*Polytelis swainsonii*), (V) TSC Act**	**Turquoise Parrot (*Neophema pulchella*) (V) TSC Act**
f) whether the actions proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	A recovery plan or threat abatement plan for this species has not been written.	A recovery plan or threat abatement plan for the superb parrot has not been written.	A recovery plan or threat abatement plan for the turquoise parrot has not been written.
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.	Schedule 4 of the TSC Act currently lists 34 key threatening processes. KTPs such as: Clearing of native vegetation, loss of hollow bearing trees, removing dead trees, Competition and habitat degradation by feral goats (Capra hircus), Clearing of native vegetation, Predation by the European red fox (*Vulpes vulpes*), Bushrock removal and Predation by the feral cat (*Felis catus*), have or currently are occurring with Project Site. The Project will improve the current status of the majority of KTPs, through mitigation/ amelioration or offsets.	See background comments (left) re: Schedule 3 of the TSC Act.	See background comments (left) re: Schedule 3 of the TSC Act.
Conclusion	The project would be unlikely to cause impact to a locally occurring population of this species such that it is placed at risk of local extinction. When the impacts are known then these areas should be reassessed specifically to see if suitable hollows are available to determine the need for further study or a Species Impact Statement.	Superb Parrots are known to occur in the Project Site. A large percentage of trees located in the assessed area possessed hollows suitable for this species however, the locality is not utilised as a breeding and chick rearing location. The Proposal will not have a significant impact on a local population and a Species Impact Statement is not required.	The proposal is not likely to have a significant impact on a population of turquoise parrots within the local area and a Species Impact Statement is not required.

Table A3.2
7 part-tests: Diamond Firetail, Black-chinned Honeyeater and Pied Honeyeater

	Diamond Firetail (*Stagonopleura guttata*) (V) TSC Act	**Black-chinned Honeyeater (*Melithreptus gularis*) (V) TSC Act**	**Pied Honeyeater (*Certhionyx variegatus*) (V) TSC Act**
in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.	Local population: known to occur in the Project Site and general locality. One pair sighted on the access road adjacent to the homestead. This species has potential to utilise resources within the Impact Footprint however, impacts from grazing by sheep much reduce the probability. Thus the open grassy area next to the homestead and dam would be preferred. The ecological requirements for this species are documented in **Table 24**. It is considered assumed knowledge for the information provided in the following 7 part test. Clearing of c. 68 ha of woodland within the Project Site is unlikely to affect the life cycle of the species such that a viable local population is likely to be placed at risk of extinction. Unsustainable feral goat grazing within the locality has the greatest potential to affect the species. If a population were present unmanaged grazing may have the potential to compromise the survival of a local population however, as noted this is unlikely.	Local population: known to occur in the Project Site and general locality. Previously recorded in the Project Site by CSU-JC (2006) All comments in the first dot point concerning the regent honeyeater are applicable for this species. Removal of 68ha of breeding habitat for the black chinned honeyeater has the potential to impact the species negatively but not place a local population at risk of extinction unless remnant sizes of stands of trees are reduced to less that 5ha each. Revegetation, offsets and amelioration will enhance habitat for this species. Only a proportion of a locally occurring food source would be removed and as such the activity would not cause a viable local population to go extinct.	Local population: known to occur in the Project Site and general locality. Previously recorded in the Project Site by CSU-JC (2006) All comments in the left hand column are applicable for this species.
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 is likely to be placed at risk of extinction.	Not relevant	Not relevant	Not relevant

Table A3.2 (Cont'd)
7 part-tests: Diamond Firetail, Black-chinned Honeyeater and Pied Honeyeater

	Diamond Firetail (*Stagonopleura guttata*) (V) TSC Act	**Black-chinned Honeyeater (*Melithreptus gularis*) (V) TSC Act**	**Pied Honeyeater (*Certhionyx variegatus*) (V) TSC Act**
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 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 relevant	Not relevant	Not relevant

Table A3.2 (Cont'd)
7 part-tests: Diamond Firetail, Black-chinned Honeyeater and Pied Honeyeater

	Diamond Firetail (*Stagonopleura guttata*) (V) TSC Act	**Black-chinned Honeyeater (*Melithreptus gularis*) (V) TSC Act**	**Pied Honeyeater (*Certhionyx variegatus*) (V) TSC Act**
d) in relation to 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.**	*Extent* = c. 68ha of habitat will be impacted. Offsets and amelioration is aimed at increasing feeding resources of the parrot and breeding hollows. *Fragmentation* and / or *isolation* of potential habitat as a result of the action will continue. Whilst the proposed development would clear some trees within the Project Site, mallee areas upslope within Benson 180 and down slope (Benson174) of the Impact Footprint and Benson 103 would remain and provide a movement corridor for the woodland birds to traverse safely between the adjacent properties. The importance of the habitat to be removed lies purely with the provision of food for the species. The abundance of tree hollows and the potential to increase the number of trees hollows at the freshwater dams will have a positive impact on this species. This species is able to withstand the type of fragmentation proposed by the Project. The removal of the grassy layer through overgrazing has already isolated the woodland remnant from the available food source thus placing more pressure on the species to find food at further distances from adequate shelter. YTC Resources will improve grazing conditions within the Project Site. Removal of 68ha of woodland in the Project Site will not compromise the *long-term survival* of the species.	Refer to all comments (left).	Refer to comments (left) re: <u>*extent*</u> of area to be removed. Long -*term survival* of the species is reliant on flowering resources such as Eremophila sp, and grevilleas. Eremophila species occur in the Project Site however will not be impacted by the proposal.
e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).	Critical habitat for this species has not been declared and at present there are no habitats listed as critical in the locality.	Critical habitat for this species has not been declared and at present there are no habitats listed as critical in the locality.	Critical habitat for this species has not been declared and at present there are no habitats listed as critical in the locality.

Table A3.2 (Cont'd)
7 part-tests: Diamond Firetail, Black-chinned Honeyeater and Pied Honeyeater

	Diamond Firetail (*Stagonopleura guttata*) (V) TSC Act	**Black-chinned Honeyeater (*Melithreptus gularis*) (V) TSC Act**	**Pied Honeyeater (*Certhionyx variegatus*) (V) TSC Act**
f) whether the actions proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	A recovery plan or threat abatement plan for this species has not been written.	A recovery plan or threat abatement plan for this species has not been written.	A recovery plan or threat abatement plan for this species has not been written.
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.	Schedule 4 of the TSC Act currently lists 34 key threatening processes. KTPs such as: Clearing of native vegetation, loss of hollow bearing trees, removing dead trees, Competition and habitat degradation by feral goats (Capra hircus), Clearing of native vegetation, Predation by the European red fox (*Vulpes vulpes*), Bushrock removal and Predation by the feral cat (*Felis catus*), have or currently are occurring with Project Site. The Project will improve the current status of the majority of KTPs, through mitigation/ amelioration or offsets.	See background comments (left) re: Schedule 3 of the TSC Act.	See background comments (left) re: Schedule 3 of the TSC Act.
Conclusion	The diamond firetail finch was observed within the Project Site, outside project impacts. The proposal is not likely to have a significant impact on a population within the local area and a Species Impact Statement is not required.	Removal of 68ha of woodland is an accumulated threat to the species however in this instance it would not be detrimental to a locally occurring population. A Species Impact Statement is not warranted.	Removal of 68ha of woodland is an accumulated threat to the species however in this instance it would not be detrimental to a locally occurring population. A Species Impact Statement is not warranted.

Table A3.3
7 part-tests: Hooded Robin, Speckled Warbler, Brown Treecreeper, Chestnut quail-thrush and Grey-crowned Babbler

	Hooded Robin	Speckled Warbler and Brown Treecreeper	Chestnut Quail-thrush	Grey-crowned Babbler *Pomatostomus temporalis temporalis* (eastern subspecies);
a) in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.	Definition of 'local population': Numerous family groups throughout the Project Site. Extent of habitat use within the Project Site: All remnant native vegetation in the Project Site, would also feed in derived grass communities.	Definition of 'local population': Known families to occur within the Project Site. Previously recorded by CSU-JC (2006).	Definition of 'local population': Known families to occur within the Project Site. Previously recorded by CSU-JC (2006).	Definition of 'local population': Numerous family groups throughout the Project Site. Extent of habitat use within the Project Site: All remnant native vegetation in the Project Site, would also feed in derived grass communities. Type of modification affecting this species is as follows: Removal of 68 ha of mostly Benson 103. Native vegetation (foraging habitat) would be removed however planned revegetation aims to improve the area of extent of remnant vegetation by planting 55ha in total. Native grasses and shrubs that are missing from the Project Site would be re-introduced. This report recommends that timber from cleared vegetation is used within the revegetated areas to create habitat complexity. The above measures, combined with feral animal and weed control, would be beneficial to this family in the medium to long term and it is likely that the area would support a higher population density of the species. Mitigation measures have been recommended aimed at having no mortalities associated with encouraging these birds to relocate. It is considered to be a low risk, however monitoring of population changes and dynamics over the life of the mine has been recommended such that up to date information can be used to manage the local population. Although outside the breeding season, no fledglings or nests were noted. Given the above, it is unlikely that a local population within the Project Site would be impacted by the Project such that it placed the population at risk of local extinction.

Table A3.3 (Cont'd)
7 part-tests: Hooded Robin, Speckled Warbler, Brown Treecreeper, Chestnut quail-thrush and Grey-crowned Babbler

	Hooded Robin	**Speckled Warbler and Brown Treecreeper**	**Chestnut Quail-thrush**	**Grey-crowned Babbler *Pomatostomus temporalis temporalis* (eastern subspecies);**
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 is likely to be placed at risk of extinction.	Not relevant	Not relevant	Not relevant	Not relevant
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 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 relevant	Not relevant	Not relevant	Not relevant
d) in relation to 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.	Details of vegetation removal have already been provided. Revegetation is aimed at increasing habitat complexity. Whilst the proposed development would clear some trees within the Project Site, mallee areas upslope within Benson 180 and down slope (Benson174) of the Impact Footprint and Benson 103 would remain and provide a movement corridor for the woodland birds to traverse safely between the adjacent properties. Any component of an EEC / habitat / resource for this species is important. The most important items to be impacted are the tree with the roosting and breeding nest.	Details of vegetation removal have already been provided. Revegetation is aimed at increasing habitat complexity. Complex shrubby habitat is particularly important to this species. Native ground cover will be improved as a result of the revegetation, offsets, rehabilitation and grazing strategy to be implemented by YTC Resources.	Details of vegetation removal have already been provided. Revegetation is aimed at increasing habitat complexity. Native ground cover is particularly important to this species. Native ground cover will be improved as a result of the revegetation, offsets, rehabilitation and grazing strategy to be implemented by YTC Resources.	Details of vegetation removal have already been provided. Revegetation is aimed at increasing habitat complexity. Any component of an EEC / habitat / resource for this species is important. The most important items to be impacted are the tree with the roosting and breeding nest.

Table A3.3 (Cont'd)
7 part-tests: Hooded Robin, Speckled Warbler, Brown Treecreeper, Chestnut quail-thrush and Grey-crowned Babbler

	Hooded Robin	**Speckled Warbler and Brown Treecreeper**	**Chestnut Quail-thrush**	**Grey-crowned Babbler *Pomatostomus temporalis temporalis* (eastern subspecies);**
e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).	Critical habitat does not occur in the locality.	As per left hand column	As per left hand column	As per left hand column
f) whether the actions proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	There are no recovery or threat abatement plans for this species.	As per left hand column	As per left hand column	As per left hand column
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.	Schedule 4 of the TSC Act currently lists 34 key threatening processes. KTPs such as: Clearing of native vegetation, loss of hollow bearing trees, removing dead trees, Competition and habitat degradation by feral goats (Capra hircus), Clearing of native vegetation, Predation by the European red fox (*Vulpes vulpes*), Bushrock removal and Predation by the feral cat (*Felis catus*), have or currently are occurring with Project Site. The Project will improve the current status of the majority of KTPs, through mitigation/ amelioration or offsets.	As per left hand column	As per left hand column	As per left hand column
Conclusion	The Project would remove potential roosting and breeding trees within core breeding habitat for this species. Recommendations in this report would ensure that no animals are harmed by the Project. The Hooded Robin has shown resilience to prior land disturbance in the Project Site and has colonised all habitat types recorded. It's possible that the Project would reduce the extent of a feeding resource within the Project Area however it is not considered that it would cause a significant impact to the local population.	The Project would remove potential roosting and breeding trees within core breeding habitat for these two species. Recommendations in this report would ensure that no animals are harmed by the Project. It is possible that the Project would reduce the extent of a feeding resource within the Project Area however it is not considered that it would cause a significant impact to the local population.	The Project would remove potential roosting and breeding trees within core breeding habitat for this species. Recommendations in this report would ensure that no animals are harmed by the Project. It is possible that the Project would reduce the extent of a feeding resource within the Project Area however it is not considered that it would cause a significant impact to the local population.	The Project would remove potential roosting and breeding trees within core breeding habitat for this species. Recommendations in this report would ensure that no animals are harmed by the Project. It is possible that the Project would reduce the extent of a feeding resource within the Project Area however it is not considered that it would cause a significant impact to the local population.

Table A3.4
7 part-tests: Kultarr, Little Pied Bat and Yellow-bellied Sheathtail Bat

	Kultarr (*Antechinomys laniger*) (E) TSC Act	**Little Pied Bat V TSC Act**	**Yellow-bellied Sheathtail bat (*Saccolaimus flaviventris*)**
In the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.	Local population: For the purposes of this report a local population refers to the above mentioned species being historically recorded in analogous habitat close by to the Project Site. This species has not been recorded within the Project Site during the intensive 2006 trapping programme or during the OzArk 2010 trapping programme.	Local population: Positively identified by Anabat. Locations have been provided on **Figure 4**. GPS coordinates of the record is provided in **Table 10**. A local population being placed at risk of extinction is unlikely due to the large amount of surrounding analogous habitat adjoining the Project Sites. There are few risks associated with managing any extant population of this species. Risk would be reduced with the implementation of the Administrative Controls. Due to the discrete nature of the impacts to suitable habitat trees it is unlikely that a local population within the Project Site would be impacted such that it would placed at risk of local extinction.	As per left hand column.
In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the extent of the ecological community such that its occurrence is likely to be placed at risk of extinction.	Not relevant	Not relevant	Not relevant
In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: is likely to have an adverse effect on the extent of the ecological community such that its occurrence is likely to be placed at risk of extinction, or 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 relevant	Not relevant	Not relevant

Table A3.4 (Cont'd)
7 part-tests: Kultarr, Little Pied Bat and Yellow-bellied Sheathtail Bat

	Kultarr (*Antechinomys laniger*) (E) TSC Act	**Little Pied Bat V TSC Act**	**Yellow-bellied Sheathtail bat (*Saccolaimus flaviventris*)**
In relation to habitat of a threatened species, population or ecological community: the extent to which habitat is likely to be removed or modified as a result of the action proposed, and 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 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.	Approximately 68ha of habitat will be impacted. It is unlikely that the Administration Project Site would provide quality habitat for the species and it is thought that the cleared grassy area near the homestead may provide the only suitable habitat. All native vegetation provides important habitat. Whilst the proposed development would clear some trees within the Project Site, mallee areas upslope within Benson 180 and down slope (Benson174) of the Impact Footprint and Benson 103 would remain and provide a movement corridor to traverse safely between the adjacent properties. Habitat values as a result of Project amelioration / offsets and revegetation will result in an improvement of habitat complexity / ground woody debris of the original pre-Project state of the property. The over abundance of hollow bearing trees within the Project Site are avoided by Project Impacts.	Details of vegetation removal have been provided previously. As per left hand column.	As per left hand column.
Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).	Critical habitat for this species has not been declared.	As per left hand column..	As per left hand column.
Whether the actions proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	A recovery plan exists for this species. There is no threat abatement plan. The essence of the recovery plan is that very little is known about the species and that where animals are known to occur habitat should be protected and the population should be studied.	There are no recovery or threat abatement plans for this species. The Action Plan for Australian Bats (Environment Australia 1999)	As per left hand column.
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.	Schedule 4 of the TSC Act currently lists 34 key threatening processes. KTPs such as: Clearing of native vegetation, loss of hollow bearing trees, removing dead trees, Competition and habitat degradation by feral goats (Capra hircus), Clearing of native vegetation, Predation by the European red fox (*Vulpes vulpes*), Bushrock removal and Predation by the feral cat (*Felis catus*), have or currently are occurring with Project Site. The Project will improve the current status of the majority of KTPs, through mitigation/ amelioration or offsets.	As per left hand column.	As per left hand column.

Table A3.4 (Cont'd)
7 part-tests: Kultarr, Little Pied Bat and Yellow-bellied Sheathtail Bat

	Kultarr (*Antechinomys laniger*) (E) TSC Act	**Little Pied Bat V TSC Act**	**Yellow-bellied Sheathtail bat (*Saccolaimus flaviventris*)**
Conclusion	This species was not observed during the current and previous (CSU-JC 2006) targeted assessment. It is known from four historical records in the locality. The Project aims to improve habitat required of this species to utilise the Project Site. The Project is unlikely to cause impact to any extant locally occurring population of this species such that it will be placed at risk of local extinction. A SIS is not warranted. Further work is recommended to determine the nature and possible extent of any population, post rehabilitation /offset implementation of the Project Site.	The Project would remove trees that have potential roosting habitat for this species. However, due to previous disturbances there is an overabundance of dead tree stags and hollows bearing trees in the Project Site (outside of Project Impacts). Recommendations in this report would ensure that risk associated with removing the trees would be low for the species. It's possible that the Project would reduce the extent of a feeding resource within the Project Site; however, it is not considered that it would cause a significant impact to the local population.	The Project would remove trees that have potential roosting habitat for this species. However, due to previous disturbances there is an overabundance of dead tree stags and hollows bearing trees in the Project Site (outside of Project Impacts). Recommendations in this report would ensure that risk associated with removing the trees would be low for the species. It's possible that the Project would reduce the extent of a feeding resource within the Project Site, however, it is not considered that it would cause a significant impact to the local population.

Table A3.5
7 part-tests: Spotted Harrier and Cobar Greenhood Orchid

	Spotted Harrier ***Circus assimilis*** **V TSC Act**	**Cobar Greenhood Orchid** ***Pterostylis cobarensis*** **V TSC Act**	**Pine Donkey Orchid** ***Diuris Tricolor*** **V TSC Act**
In the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.	Local population: This species was recorded flying over the Project Site.	Key habitat elements are available in the Project Site, however, a targeted assessment on 15 October 2011 in ideal conditions for detection did not identify the species within the proposed areas of disturbance.	As per for the Cobar Greenhood Orchid
In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the extent of the ecological community such that its occurrence is likely to be placed at risk of extinction.	Not relevant	Not relevant.	Not relevant.
In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: is likely to have an adverse effect on the extent of the ecological community such that its occurrence is likely to be placed at risk of extinction, or 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 relevant	Habitat values as a result of Project amelioration / offsets and revegetation will result in reduced grazing and be an improvement of the original pre-Project environmental state of the property.	As per for the Cobar Greenhood Orchid
In relation to habitat of a threatened species, population or ecological community: the extent to which habitat is likely to be removed or modified as a result of the action proposed, and 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 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.	Approximately 68ha of habitat will be impacted. It is unlikely that the Administration Project Site would provide quality habitat for the species and it is thought that the cleared grassy area near the homestead may provide the only suitable habitat. All native vegetation provides important habitat. Whilst the proposed development would clear some trees within the Project Site, mallee areas upslope within Benson 180 and down slope (Benson174) of the Impact Footprint and Benson 103 would remain and provide a movement corridor for the woodland birds to traverse safely between the adjacent properties. Habitat values as a result of Project amelioration / offsets and revegetation will result in an improvement of habitat complexity / ground woody debris of the original pre-Project state of the property. The over abundance of hollow bearing trees within the Project Site are avoided by Project Impacts.	The Cobar Greenhood Orchid can occur in all habitat types found within the Project Site. Impacts will only occur to c. 89 ha of Benson 103 which will still occur over the majority of the property.	As per for the Cobar Greenhood Orchid

Table A3.5 (Cont'd)
7 part-tests: Spotted Harrier and Cobar Greenhood Orchid

	Spotted Harrier ***Circus assimilis*** **V TSC Act**	**Cobar Greenhood Orchid** ***Pterostylis cobarensis*** **V TSC Act**	**Pine Donkey Orchid** ***Diuris Tricolor*** **V TSC Act**
Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).	Critical habitat for this species has not been declared.	Not relevant	
Whether the actions proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	There is no recovery plan for this species.	There is no recovery plan for this species. Quality habitat for this species in the Project Site is unknown until further survey.	As per for the Cobar Greenhood Orchid
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.	KTPs such as: Clearing of native vegetation, loss of hollow bearing trees, removing dead trees, Competition and habitat degradation by feral goats (Capra hircus), Clearing of native vegetation, Predation by the European red fox (*Vulpes vulpes*), Bushrock removal and Predation by the feral cat (*Felis catus*), have or currently are occurring with Project Site. The Project will improve the current status of the majority of KTPs, through mitigation/ amelioration or offsets.	Weeds have already colonised much of the ground surfaces due to uncontrolled feral goat grazing. Project will improve the grazing strategy of the property. KTP's as per left hand column.	As per for the Cobar Greenhood Orchid
Conclusion	The Project aims to improve habitat required of this species to utilise the Project Site. The Project is unlikely to cause impact to any extant locally occurring population of this species such that it will be placed at risk of local extinction. A SIS is not warranted. Further work is recommended to determine the nature and possible extent of any population, post rehabilitation /offset implementation of the Project Site.	It is unlikely that Project would interfere with the natural recovery of this species. A targeted survey for this species in ideal conditions for detection on 15 October 2011 did not identify it within the proposed areas of disturbance. In addition, the Project aims to improve habitat required of this species to utilise the Project Site. As a result the Project is unlikely to cause impact to any extant locally occurring population of this species such that it will be placed at risk of local extinction. A SIS is not warranted. Further work is recommended to determine the nature and possible extent of any population, post rehabilitation /offset implementation of the Project Site.	As per for the Cobar Greenhood Orchid

Table A3.6
DSEWPaC Assessment of significance for Superb Parrot, Cobar Greenhood Orchid and Lobed Blue Grass

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 would:	**Superb Parrot (Polytelis swainsonii) (V) EPBC Act**	**Cobar Greenhood Orchid Pterostylis cobarensis (V) EPBC Act**	**Lobed Blue-grass Bothriochloa biloba) EPBC Act**
lead to a long-term decrease in the size of a important population, or	The Cobar Peneplain is an important winter migration refuge for the Superb Parrot. Nymagee and the project Site has an important population that transiently follows flowering resources Breeding does not occur in Project Site. Providing that recommendations in this report are followed there would be no long term decrease in the population.	The project would not result in a long-term decrease in an extant population.	Project will not directly impact the population of **Bothriochloa biloba**. It has been able to colonise the previously cleared and disturbed areas near the homestead.
reduce the area of occupancy of an important population, or	It is considered unlikely that Project would reduce the area of occupancy for this important population.	Unknown until further survey.	It is considered unlikely that Project would reduce the area of occupancy for this important population. Project impacts do not occur within the recorded population.
fragment the existing important population11 into two or more populations, or	The Project would not fragment the existing population, as the population consists of vagrant and transitory individuals.	Habitat values as a result of Project amelioration / offsets and revegetation will result in reduced grazing and be an improvement of the original pre-Project environmental state of the property.	The Project would not fragment the existing population.

[11] An *important* population is a population 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.

Table A3.6 (Cont'd)
DSEWPaC Assessment of significance for Superb Parrot, Cobar Greenhood Orchid and Lobed Blue Grass

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 would:	**Superb Parrot (Polytelis swainsonii) (V) EPBC Act**	**Cobar Greenhood Orchid Pterostylis cobarensis (V) EPBC Act**	**Lobed Blue-grass Bothriochloa biloba) EPBC Act**
adversely affect habitat critical[12] to the survival of a species, or	The Project would not remove breeding habitat for this species.	The Cobar Greenhood Orchid can occur in all habitat types found within the Project Site. Impacts will only occur to Benson 103 which will still occur over the majority of the property.	Habitat has been made available for this species via previous land clearing. The Project would not adversely affect the survival of this species.
disrupt the breeding cycle of a population, or	The Project would not disrupt the breeding cycle for this species.	Not relevant.	Not relevant.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or	The Project is unlikely to destroy or reduce the quality of habitat available for the species. Through amelioration and offsets, more foraging habitat suitable for this species will be made available within the Project Site.	All habitat within the Project Site is suitable for this species. However, a targeted survey for this species in ideal conditions for detection on 15 October 2011 did not identify it within the proposed areas of disturbance. As a result, the Project would not result in a decline of an extant population.	The population of *Bothriochloa biloba* is at least 3km from project impacts. No modification to its current habitat will occur.
result in invasive species that are harmful to a vulnerable species becoming established in the species habitat, or	Weeds have already colonised much of the ground surfaces due to uncontrolled feral goat grazing. Fragmentation of the existing remnant is unlikely to increase the probability of invasion by the European blackbird, starlings and noisy minors.	Weeds have already colonised much of the ground surfaces due to uncontrolled feral goat grazing. Project will improve the grazing strategy of the property.	Weeds have already colonised much of the ground surfaces due to uncontrolled feral goat grazing. Project will improve the grazing strategy of the property
interferes substantially with the recovery of the species.	It is unlikely that Project would interfere with the natural recovery of this species.	It is unlikely that Project would interfere with the natural recovery of this species.	It is unlikely that Project would interfere with the natural recovery of this species.
Conclusion	It is unlikely that this species would be significantly impacted by the Project. Referral to the Commonwealth Minister of the Environment is not required.	It is unlikely that this species would be significantly impacted by the Project. Referral to the Commonwealth Minister of the Environment is not required.	It is unlikely that this species would be significantly impacted by the Project. Referral to the Commonwealth Minister of the Environment is not required.

[12] Habitat critical to the survival of a species refers to:

habitat identified in a recovery plan for the species as habitat critical for those species or communities; and/or

i) habitat listed on the Register of Critical Habitat maintained by the Minister under the Act; and/or
ii) areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal;

- for succession;

- to maintain genetic diversity and long term evolutionary development; or

- for the reintroduction of populations or recovery of the species.

Appendix 4

OEH (Threatened Species)

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Your search returned **40** results. You searched for the following information:

- geographic region: **Western > Nymagee-Rankins Springs**
- vegetation type: **all**
- type: **all**

Scientific Name	Common Name	Level of Threat
Atriplex infrequens	A saltbush	Vulnerable
Artesian Springs Ecological Community	Artesian Springs Ecological Community	Endangered Ecological Community
Botaurus poiciloptilus	Australasian Bittern	Endangered
Ardeotis australis	Australian Bustard	Endangered
Ninox connivens	Barking Owl	Vulnerable
Hamirostra melanosternon	Black-breasted Buzzard	Vulnerable
Limosa limosa	Black-tailed Godwit	Vulnerable
Oxyura australis	Blue-billed Duck	Vulnerable
Grus rubicunda	Brolga	Vulnerable
Burhinus grallarius	Bush Stone-curlew	Endangered
Stagonopleura guttata	Diamond Firetail	Vulnerable
Stictonetta naevosa	Freckled Duck	Vulnerable
Pachycephala inornata	Gilbert's Whistler	Vulnerable
Nyctophilus timoriensis (South-eastern form)	Greater Long-eared Bat	Vulnerable
Pterostylis cobarensis	Greenhood Orchid	Vulnerable
Falco hypoleucos	Grey Falcon	Endangered
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Vulnerable
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Vulnerable
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Endangered Ecological Community
Phascolarctos cinereus	Koala	Vulnerable
Antechinomys laniger	Kultarr	Endangered
Chalinolobus picatus	Little Pied Bat	Vulnerable
Cacatua leadbeateri	Major Mitchell's Cockatoo	Vulnerable
Leipoa ocellata	Malleefowl	Endangered
Delma australis	Marble-faced Delma	Endangered
Tyto novaehollandiae	Masked Owl	Vulnerable
Grantiella picta	Painted Honeyeater	Vulnerable
Rostratula benghalensis australis	Painted Snipe (Australian subspecies)	Endangered
Certhionyx variegatus	Pied Honeyeater	Vulnerable
Diuris tricolor	Pine Donkey Orchid	Vulnerable
Pyrrholaemus brunneus	Redthroat	Vulnerable
Rulingia procumbens	*Rulingia procumbens*	Vulnerable

Scientific Name	Common Name	Level of Threat
Crinia sloanei	Sloane's Froglet	Vulnerable
Pyrrholaemus saggitatus	Speckled Warbler	Vulnerable
Circus assimilis	Spotted Harrier	Vulnerable
Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable
Sminthopsis macroura	Stripe-faced Dunnart	Vulnerable
Polytelis swainsonii	Superb Parrot	Vulnerable
Tiliqua occipitalis	Western Blue-tongued Lizard	Vulnerable
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable

Your search returned **44** results. You searched for the following information:

- geographic region: **Central West > Nymagee-Rankins Springs**
- vegetation type: **all**
- type: **all**

Scientific Name	Common Name	Level of Threat
Austrostipa wakoolica	A spear-grass	Endangered
Botaurus poiciloptilus	Australasian Bittern	Endangered
Ninox connivens	Barking Owl	Vulnerable
Hamirostra melanosternon	Black-breasted Buzzard	Vulnerable
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Vulnerable
Limosa limosa	Black-tailed Godwit	Vulnerable
Oxyura australis	Blue-billed Duck	Vulnerable
Grus rubicunda	Brolga	Vulnerable
Phascogale tapoatafa	Brush-tailed Phascogale	Vulnerable
Burhinus grallarius	Bush Stone-curlew	Endangered
Stagonopleura guttata	Diamond Firetail	Vulnerable
Petroica phoenicea	Flame Robin	Vulnerable
Stictonetta naevosa	Freckled Duck	Vulnerable
Pachycephala inornata	Gilbert's Whistler	Vulnerable
Calyptorhynchus lathami	Glossy Black-cockatoo	Vulnerable
Nyctophilus timoriensis (South-eastern form)	Greater Long-eared Bat	Vulnerable
Pterostylis cobarensis	Greenhood Orchid	Vulnerable
Falco hypoleucos	Grey Falcon	Endangered
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Vulnerable
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Vulnerable
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar	Endangered Ecological Community

Scientific Name	Common Name	Level of Threat
Brigalow Belt South Bioregions	and Brigalow Belt South Bioregions	
Phascolarctos cinereus	Koala	Vulnerable
Antechinomys laniger	Kultarr	Endangered
Monotaxis macrophylla	Large-leafed Monotaxis	Endangered
Hieraaetus morphnoides	Little Eagle	Vulnerable
Chalinolobus picatus	Little Pied Bat	Vulnerable
Cacatua leadbeateri	Major Mitchell's Cockatoo	Vulnerable
Leipoa ocellata	Malleefowl	Endangered
Tyto novaehollandiae	Masked Owl	Vulnerable
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Endangered Ecological Community
Grantiella picta	Painted Honeyeater	Vulnerable
Rostratula benghalensis australis	Painted Snipe (Australian subspecies)	Endangered
Certhionyx variegatus	Pied Honeyeater	Vulnerable
Diuris tricolor	Pine Donkey Orchid	Vulnerable
Crinia sloanei	Sloane's Froglet	Vulnerable
Pyrrholaemus saggitatus	Speckled Warbler	Vulnerable
Circus assimilis	Spotted Harrier	Vulnerable
Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable
Lophoictinia isura	Square-tailed Kite	Vulnerable
Petaurus norfolcensis	Squirrel Glider	Vulnerable
Sminthopsis macroura	Stripe-faced Dunnart	Vulnerable
Polytelis swainsonii	Superb Parrot	Vulnerable
Neophema pulchella	Turquoise Parrot	Vulnerable
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable

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Appendix 5
DSEWPaC Predicted Threatened Species

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Australian Government
Department of Sustainability, Environment, Water, Population and Communities

EPBC Act Protected Matters Report: Coordinates

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.environment.gov.au/epbc/assessmentsapprovals/index.html

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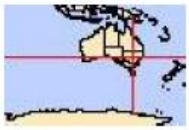

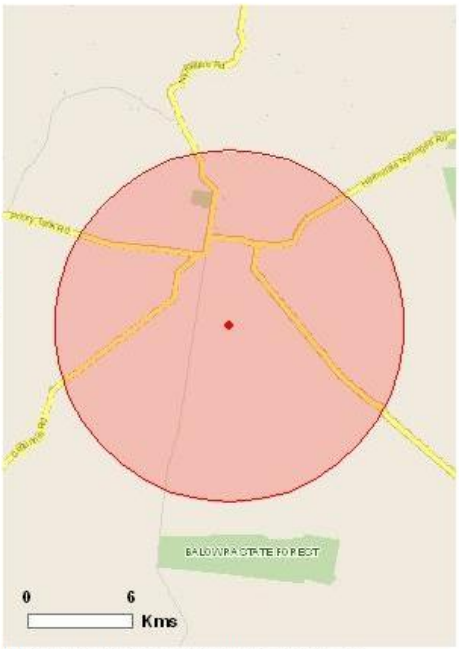

Coordinates
Buffer: 10.0Km

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance (Ramsar Wetlands):	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Threatened Ecological Communitites:	2
Threatened Species:	8
Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage/index.html

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.au/epbc/permits/index.html.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	8
Whales and Other Cetaceans:	None

Critical Habitats:	None
Commonwealth Reserves:	None

Report Summary for Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	None
State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	6
Nationally Important Wetlands:	None

Details

Matters of National Environmental Significance

Threatened Ecological Communities **[Resource Information]**

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community may occur within area
Weeping Myall Woodlands	Endangered	Community may occur within area

Threatened Species **[Resource Information]**

Name	Status	Type of Presence
BIRDS		
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Vulnerable	Species or species habitat may occur within area
FISH		
Maccullochella peelii peelii Murray Cod, Cod, Goodoo [68443]	Vulnerable	Species or species habitat may occur within area
MAMMALS		
Nyctophilus timoriensis (South-eastern form) Greater Long-eared Bat, South-eastern Long-eared Bat [66888]	Vulnerable	Species or species habitat may occur within area

PLANTS		
Acacia curranii Curly-bark Wattle [3908]	Vulnerable	Species or species habitat likely to occur within area
Austrostipa metatoris [66704]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis cobarensis Cobar Greenhood Orchid [12993]	Vulnerable	Species or species habitat likely to occur within area

Migratory Species **[Resource Information]**

Name	Status	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe [889]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands **[Resource Information]**

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land - Australian Telecommunications Commission

Listed Marine Species **[Resource Information]**

Name	Status	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe [889]		Species or species habitat may occur within area

Extra Information

Invasive Species		**[Resource Information]**

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Mammals		
Capra hircus Goat [2]		Species or species habitat may occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Plants		
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat may occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat may occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-32.11027 146.3263

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria

-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Department of Sustainability, Environment, Water, Population and Communities
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111 ABN

| Australian Government |

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Appendix 6
Declared Noxious Weeds (Cobar LGA)

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Weed	Class	Legal requirements
African boxthorn [Lycium ferocissimum]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority
African feathergrass [Pennisetum macrourum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
African turnipweed [Sisymbrium runcinatum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
African turnipweed [Sisymbrium thellungii]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Alligator weed [Alternanthera philoxeroides]	2	Whole of NSW except the local control authorities listed as control class 3 The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Anchored water hyacinth [Eichhornia azurea]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Annual ragweed [Ambrosia artemisiifolia]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Arrowhead [Sagittaria montevidensis]	4	The plant may not be sold, propagated or knowingly distributed. This is an All of NSW declaration
Artichoke thistle [Cynara cardunculus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Athel pine [Tamarix aphylla]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Bathurst/Noogoora/Hunter/South American/Californian/cockle burr [Xanthium species]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority
Bear-skin fescue [Festuca gautieri]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Black knapweed [Centaurea nigra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration

Blackberry [Rubus fruticosus aggregate species] except cultivars Black satin, Chehalem, Chester Thornless, Dirksen Thornless, Loch Ness, Murrindindi, Silvan, Smoothstem, Thornfree	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Blue heliotrope [Heliotropium amplexicaule]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority
Bridal creeper [Asparagus asparagoides]	4	The plant may not be sold, propagated or knowingly distributed. This is an All of NSW declaration
Broomrapes [Orobanche species] Includes all Orobanche species except the native O. cernua variety australiana and O. minor	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Burr ragweed [Ambrosia confertiflora]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cabomba [All Cabomba species except C. furcata]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cayenne snakeweed [Stachytarpheta cayennensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Chilean needle grass [Nassella neesiana]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed
Chinese violet [Asystasia gangetica subspecies micrantha]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Clockweed [Gaura parviflora]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Columbus grass [Sorghum x almum]	3	The plant must be fully and continuously suppressed and destroyed
Corn sowthistle [Sonchus arvensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration

Dodder [Cuscuta species] Includes All Cuscuta species except the native species C. australis, C. tasmanica and C. victoriana	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
East Indian hygrophila [Hygrophila polysperma]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Espartillo [Amelichloa brachychaeta, Amelichloa caudata]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Eurasian water milfoil [Myriophyllum spicatum]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Fine-bristled burr grass [Cenchrus brownii]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Fountain grass [Pennisetum setaceum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Gallon's curse [Cenchrus biflorus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Galvanised burr [Sclerolaena birchii]	4	The plant must be controlled where it impacts on normal agricultural practices including cropping and pasture management
Glaucous starthistle [Carthamus glaucus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Golden dodder [Cuscuta campestris]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority
Golden thistle [Scolymus hispanicus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Green cestrum [Cestrum parqui]	3	The plant must be fully and continuously suppressed and destroyed
Harrisia cactus [Harrisia species]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration

Hawkweed [Hieracium species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Horsetail [Equisetum species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Hymenachne [Hymenachne amplexicaulis]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Johnson grass [Sorghum halepense]	3	The plant must be fully and continuously suppressed and destroyed
Karoo thorn [Acacia karroo]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Kochia [Bassia scoparia] except Bassia scoparia subspecies trichophylla	1	except B.scoparia subspecies trichophylla The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Lagarosiphon [Lagarosiphon major]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Lantana [Lantana species]	4	The plant may not be sold or knowingly distributed. This is an All of NSW declaration
Leafy elodea [Egeria densa]	4	The plant may not be sold, propagated or knowingly distributed. This is an All of NSW declaration
Lippia [Phyla canescens]	4	The plant must not be sold, propagated or knowingly distributed by any person other than a person involved in hay or lucerne production. The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority. This is an All of NSW declaration
Long-leaf willow primrose [Ludwigia longifolia]	4	Whole of NSW except the local control authorities listed as control class 3 or 4 The plant may not be sold, propagated or knowingly distributed. This is an All of NSW declaration
Mesquite [Prosopis species]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Mexican feather grass [Nassella tenuissima]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration

Mexican poppy [Argemone mexicana]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Miconia [Miconia species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Mimosa [Mimosa pigra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Mossman River grass [Cenchrus echinatus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Noogoora burr [Xanthium species]		See Bathurst/Noogoora/Hunter/South American/Californian/cockle burr
Parkinsonia [Parkinsonia aculeata]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Parthenium weed [Parthenium hysterophorus]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Pond apple [Annona glabra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Prickly acacia [Acacia nilotica]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Prickly pear [Cylindropuntia species]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Prickly pear [Opuntia species except O. ficus-indica]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Red rice [Oryza rufipogon]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Rhus tree [Toxicodendron succedaneum]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority This is an All of NSW declaration

Rubbervine [Cryptostegia grandiflora]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Sagittaria [Sagittaria platyphylla]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Salvinia [Salvinia molesta]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Senegal tea plant [Gymnocoronis spilanthoides]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Serrated tussock [Nassella trichotoma]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed
Siam weed [Chromolaena odorata]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Smooth-stemmed turnip [Brassica barrelieri subspecies oxyrrhina]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Soldier thistle [Picnomon acarna]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Spiny burrgrass [Cenchrus incertus]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed
Spiny burrgrass [Cenchrus longispinus]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed
Spotted knapweed [Centaurea stoebe subspecies micranthos]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Texas blueweed [Helianthus ciliaris]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration

Tropical soda apple [Solanum viarum]	2	All of NSW except the local control authorities listed as a class 3 noxious weed The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water caltrop [Trapa species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water hyacinth [Eichhornia crassipes]	2	Whole of NSW except the local control authorities listed as control class 3 or 4 The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water lettuce [Pistia stratiotes]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water soldier [Stratiotes aloides]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Willows [Salix species] Includes all Salix species except S. babylonica, S. x reichardtii, S. x calodendron	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Witchweed [Striga species] Striga species except the native Striga parviflora	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Yellow burrhead [Limnocharis flava]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Yellow nutgrass [Cyperus esculentus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration

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