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Tomingley Gold Project

Ecology Assessment

September 2011

Prepared by

OzArk Environmental & Heritage Management Pty Ltd

Specialist Consultant Studies Compendium

Volume 1, Part 4

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Tomingley Gold Project

Ecology Assessment

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EXECUTIVE SUMMARY

Background

OzArk Environmental & Heritage Management (OzArk) was engaged by R.W. Corkery & Co. Pty Limited (RWC) on behalf of Alkane Resources Ltd (Alkane) to undertake an Ecological Assessment (including a Section 5A assessment of significance for threatened species, populations and ecological communities) for the proposed Tomingley Gold Project (TGP). The TGP is being assessed under Part 3A of the *Environmental and Planning Assessment Act 1979* (EP&A Act).

Alkane proposes to develop the TGP, which would involve the establishment of mining operations on land to the south of the township of Tomingley (referred to as the Mine Site Study Area), a 46km water pipeline from the mine to Narromine (referred to as the Tomingley Narromine Water Pipeline [TNWP] Study Area), and a 20km electricity transmission line to bring power from Peak Hill (referred to as the Peak Hill Tomingley Electricity Transmission Line [PHTETL] Study Area) (**Figures 1** to **6**). Collectively these are referred to as the 'Project Site', when discussed individually they are referred to as (specific location name) 'Study Area'.

The aims of this assessment of the Project Site are to:

1. conduct a literature review and database search to identify all threatened biota known to occur or that could potentially occur within the Project Site;
2. 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 of the Environmental Planning and Assessment Act 1979 and Part 3, Division 1 of the Environmental Protection and Biodiversity Conservation Act 1999);
3. provide recommendations, to mitigate the effects of the proposed activities on threatened biota and their habitats; and
4. assess, both quantitatively (using the Biobanking Assessment Methodology) and qualitatively (using the nominated principles for assessing offset strategies of the relevant NSW and Commonwealth government agencies), a proposed biodiversity offset strategy for the TGP.

Vegetation

82.5% of the Mine Site Study Area has been historically cleared (approximately 677.5ha of the 820.8ha assessed). Approximately 101.7ha of the Mine Site Study Area retains parcels of a contiguous linear canopy of native vegetation associated with former 'paper'[1] roads, where the average width of the remnant is 50m and with a remnant canopy extending beyond the road easement where the ground is unsuitable for tilling, i.e. parcels of land associated with gilgai's. 124 species of flora were recorded during the assessment (**Appendix 5**) of which 66 (53.2%) were native and 58 (46.8%) were exotic (excluding commercially grown agricultural species). Approximately 21.6ha (maximum) or 13.9% of the 155.6ha of remnant native vegetation would be removed as a result of the proposed activities in the Mine Site Study Area.

[1] Road easements identified on planning documents but for which formal roads were never constructed.

The contiguous vegetation remnants to be removed include the following (**Figure 11**).

- 18.0ha of the Belah / Black Oak / Western Rosewood, Wilga Woodland (Benson 57). This represents 25.6% of the 70.3.ha of this community which occurs within the Mine Site Study Area in two main remnants. The remnant to be altered is associated with Waste Rock Emplacement 3 and an associated topsoil stockpile area on the eastern side of the Mine Site Study Area;
- 2.7ha of Inland Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams (Benson 76). This represents 7.3% of the 36.9ha of this community occurring in six main remnants within the Mine Site Study Area. This community is a component of a NSW Endangered Ecological Community.
- 0.9ha of Fuzzy Box – Inland Grey Box on alluvial brown soils (Benson 201). This represents 2.9% of the 30.6ha of this community occurring in five main remnants in the Mine Site Study Area. This community is a component of a NSW Endangered Ecological Community.

Impacts to isolated paddock trees would result in potential removal of up to 32 High Habitat Value (21 to the west and 11 to the east of the Newell Highway), 59 Medium Habitat Value (46 to the west and 13 to the east of the Newell Highway) and 385 Low Habitat Value (308 to the west and 77 to the east of the Newell Highway) within the Mine Site. Habitat values of the trees above were all associated with the size or abundance of tree hollows in eucalypt species (except in one instance where a Western Rosewood possessed several Grey-crowned Babbler roosting nests and one breeding nest [**Figure 12**]).

The majority of the proposed 21.1km x 30m PHTETL Study Area has been cleared. At a landscape level, the locality retains contiguous native vegetation only in linear sections associated within former paper roads where the average width of the remnant is 50m. Some of these areas would be intersected by the PHTETL and this is where the majority of tree removal would occur. The only other area outside of a paper road with a remnant canopy is within a myall community associated with a gilgai (unsuitable for tilling).

100 species of flora were recorded along the PHTETL, 62% (62 species) were exotic weeds and the remaining 38% (38) were native species (**Appendix 5**). Up to 185 trees could require removal (mainly where the PHTETL crosses existing transport corridors or paper roads within farm land). Of the 185 trees, 75 are from the one dense patch of bulloaks where the PHTETL enters the Mine Site. Details of trees to be removed have been provided below:

- 83 are inland grey box: 11 with High Habitat Values (HHV), 25 with Medium Habitat Values (MHV) and 47 with Low Habitat Values (LHV).
- 75 are bulloak, all with LHV.
- 20 are from a population of 100 myall, all with LHV.
- 11 are mature white cypress pines, all with LHV.
- Two are Bimble Box, one with MHV the other with LHV.
- Two are Fuzzy Box, one with HHV the other with LHV.
- Two are wilga, both with low HV.

95.5% of the TNWP Study Area retains a contiguous, linear canopy of native vegetation (approximately 52.2ha of the 54.6ha assessed in the 46km x 10m area surveyed). Vegetation in the transport corridor[2] occurs across the estimated 25m to 30m width both sides of the road. The areas calculated above do not reflect the existing area of occupancy of vegetation present on the road corridor only that within the TNWP Study Area which is estimated to be approximately 15% of the total size of the remnant. Native vegetation within the TNWP Study Area predominately occurs within the southbound lane of the Narromine-Tomingley Road (the area in which the TNWP would be placed). Other areas with substantive native vegetation include the southern transport corridor of Pinedene Road, the eastern corridor of Dappo Road and the west bound lane of the Mitchell Highway. The Main Western Railway Line easement, Bootles Road and the road into the "Woodlands", the site of the proposed borefield, are free of substantive native vegetation.

196 species of flora were recorded, 66.8% (131 species) were native and 33% (65 species) were exotic (**Appendix 5**). Seven main native vegetation communities were recorded; six of these are consistent with those described in *BioMetric*[3].

1. Inland Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams (Benson 76).
2. River Red Gum Riverine woodlands and forests (Benson 78).
3. Fuzzy Box – Inland Grey Box on alluvial brown soils (Benson 201).
4. Poplar Box - Belah woodland on clay alluvial plains (Benson 56).
5. Mugga Ironbark – Inland Grey Box – Cypress Pine tall woodland (Benson 217).
6. Cleared land – (not a *BioMetric* vegetation unit), comprising cleared land, i.e. heavily mechanically disturbed land, not 'grassland' or portions of other described vegetation communities with canopies removed.
7. Yellow Box – Blakely's Red Gum grassy woodland, comprising one remnant of 0.4ha along Dappo Road (0.8% of all vegetation recorded).

The majority of the TNWP (46km x 1m x 4m) would not affect trees with hollows as disturbance would be limited to a former impact footprint for a telecommunications cable. Unless a minor deviation occurs, a 1.3km remnant of Benson 76 would be impacted removing possibly 200 LHV inland grey box and 20 trees with MHV.

Terrestrial Endangered Ecological Communities

The following terrestrial Endangered Ecological Communities were identified as being affected by the TGP.

- NSW Inland Grey Box Woodland EEC.
- NSW Fuzzy Box on Alluvials EEC.
- NSW Myall Woodland EEC.
- Weeping Myall Woodlands EEC (Commonwealth listed community).

[2] The area from the existing agricultural fence line to the centreline of the road.
[3] *BioMetric* is the biodiversity module in the Native Vegetation Assessment Tool (NVAT) package that facilitates preparation of Property Vegetation Plans (PVPs) under the *NSW Native Vegetation Act 2003*.

Assessments of significance were conducted in accordance with the relevant NSW and/or Commonwealth legislation and concluded that there would not be a significant impact on any of these communities if the recommendations of this report are implemented and the actions maintained and monitored.

Aquatic Endangered Ecological Communities

There are nine locations where the PHTETL or TNWP would cross or be within the boundaries of named creeks in the assessed areas. All natural creeks and drainage lines of the Project Site may be considered as part of the '*Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River Endangered Ecological Community'*. The phrase 'may be considered' is used to reflect that Gundong Creek within the Mine Site is a man-made channel.

The assessment of significance (seven part test) concluded that provided the recommendations in this report are implemented and the actions maintained and monitored, there would be no significant impact to this Aquatic EEC.

Fauna

The fauna survey revealed that the Project Site supports a moderate diversity of native fauna. A total of 134 vertebrate fauna species (123 native and 11 introduced) were recorded comprising:

- 17 reptile species (no threatened species, one with local conservation concern);
- six frog species (no threatened species, two with local conservation concern);
- 86 bird species (including five listed as threatened under the NSW TSC Act, one listed as a threatened and migratory species under the Commonwealth EPBC Act, and seven species of local conservation concern); and
- 25 mammals (including three threatened and three species with local conservation concern under the NSW TSC Act).

Cumulatively, i.e. species recorded during the current assessment plus those previously recorded and identified on BioNet and the NSW Wildlife Atlas, 11 threatened and one EPBC migratory species have been recorded within the boundaries of the Project Site namely:

- *Pomatostomus temporalis temporalis* (eastern subspecies) - Grey-crowned Babbler listed as Vulnerable (V) under the *Threatened Species Conservation Act 1995* (TSC Act);
- *Chalinolobus pictatus* - Little Pied Bat, (V TSC Act);
- *Polytelis swainsonii* - Superb Parrot, (V TSC Act, V Environmental Protection Biodiversity Conservation Act 1999 (EPBC Act));
- *Phascolartos cinereus*- Koala, (V TSC Act);
- Miniopterus (schreibersii) orianae oceanensis - Eastern Bentwing Bat, (V TSC Act);
- *Climacteris picumnus* - Brown Treecreeper, (V TSC Act);
- *Merops ornatus* - Rainbow Bee-eater, (listed as a Migratory Species in the EPBC Act);

- *Hieraaetus morphnoides* - Little Eagle, (V TSC Act);
- *Circus assimilis* - Spotted Harrier, (V TSC Act);
- *Artamus leucorynchus* - White-breasted Woodswallow, (V TSC Act); and
- *Petroica phoenicea* - Flame Robin, (V TSC Act).

Assessments of Significance and / or 7 part tests were undertaken for the Grey-crowned Babbler, Little Pied Bat, Superb Parrot and Koala (which were all determined as 'affected' species) to properly characterise the threat to each species. Providing that the recommendations of this report are implemented and the actions maintained and monitored there would be no significant impact to these species. Further monitoring, including pre- and post- impact management of the Grey-crowned Babbler, threatened microbats and Fat-tailed Dunnart (a regionally significant species) have been recommended within the report.

Biodiversity Offset Strategy

On the basis that the TGP has avoided, mitigated but would result in unavoidable impacts on local biodiversity, the Proponent has committed to developing and implementing a Biodiversity Offset Strategy ("the TGP BOS").

Three policies were considered with respect to offsets in the TGP BOS.

1. The NSW Department of Environment, Climate Change and Water (DECCW) Interim Policy for Biodiversity Offsets for Part 3AProjects (November 2010).
2. The Commonwealth Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC) Draft Policy Statement: Use of environmental offsets under the EPBC Act 1999 (DSEWPaC Draft Policy Statement').
3. The DECCW Principles for the use of biodiversity offsets in NSW ('DECCW Offset Principles').

When considered against these three policies, it is concluded that the TGP BOS would provide for the following key outcomes.

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

Most significantly, consideration of the proposed TGP BOS through application of the BioBanking Methodology (BBAM) Biobanking calculator illustrates that the TGP BOS is consistent with the DECCW Interim policy on assessing and offsetting biodiversity impacts of Part 3A developments (Approved by Director General 30 November 2010) Tier 2 No Net Loss benchmark.

Impact Amelioration

The nature of the surveys and the high clearing rate of native vegetation in the Central West Catchment Management Area dictate that a precautionary approach should be taken. Considering the nature and extent of the TGP the following amelioration measures are recommended.

1. General land management amelioration measures, e.g. pest animal control and weed management strategy.
2. Amelioration measures to be undertaken prior to commencement of proposed activities, e.g. pre-clearance survey of the Grey-crowned Babblers nest in the eastern portion of the Mine Site and development of Administrative Controls[4] to inform workers.
3. Amelioration measures to be undertaken concurrently with the proposed activities, e.g. clearly marking areas to be cleared and developing Administrative Controls to define tracks and trails which would minimize impact on native vegetation, in conjunction with increasing the area or extent of native vegetation using indigenous species, rehabilitation of existing remnants and improving structural complexity.
4. Amelioration measures to be undertaken after the proposed activity has been completed, e.g. monitoring rehabilitation success and the TGP BOS of the Mine Site Study Area.

These measures if implemented would ensure that no 'significant effect' occurs 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.

Summary

Having given consideration to the ecology within the Project Site, it is concluded that the TGP would be:

- unlikely to significantly affect any of the listed threatened species, fauna populations or communities that if [the recommended amelioration measures are adopted, implemented and maintained];
- unlikely to augment or significantly contribute to any of the National or State listed key threatening processes;
- unlikely to significantly affect any Ramsar wetland or any ROKAMBA, CAMBA or JAMBA listed species;
- unlikely to significantly affect any of the creeks if adequate safeguards are adopted for water run-off from the Mine Site; and
- consistent with ESD principles with regard to fauna and would not adversely affect the local biodiversity (no issue of inter-generational or value added matters are relevant in this instance).

[4] May also be referred to as management procedures, protocols etc.

1 INTRODUCTION

1.1 PROJECT OVERVIEW

OzArk Environmental & Heritage Management (OzArk) was engaged by R.W. Corkery & Co. Pty Limited (RWC) on behalf of Alkane Resources Ltd (Alkane) to undertake an Ecological Assessment (including a Section 5A assessment of significance for threatened species, populations and ecological communities) for the proposed Tomingley Gold Project (TGP). The TGP is being assessed under Part 3A of the *Environmental and Planning Assessment Act 1979* (EP&A Act).

The TGP would involve the establishment of mining operations on land to the south of township of Tomingley (the Mine Site), a 46km water pipeline from the mine to Narromine (the Tomingley Narromine Water Pipeline [TNWP]), and a 20km electricity transmission line to bring power from Peak Hill (the Peak Hill Tomingley Electricity Transmission Line [PHTETL]) (**Figure 1**).

The proposed TGP activities within the three separate component areas are illustrated on **Figures 2** to **6** and described as follows.

- Establishment of infrastructure required for the Project, including a water supply pipeline, an underpass beneath the Newell Highway, and vegetated amenity bunds.
- Extraction of waste rock and ore material from four open cut areas, namely:
  - Caloma Open Cut (approximately 19ha);
  - Caloma Two Open Cut (indicative design approximately 9ha);
  - Wyoming Three Open Cut (approximately 10ha); and
  - Wyoming One Open Cut (approximately 19ha).
- Extraction of waste rock and ore material from the Wyoming One Underground.
- Construction of three waste rock emplacements covering a combined area of approximately 129ha.
- Construction and use of various haul roads, including an underpass under the Newell Highway, and a run-of-mine (ROM) pad.
- Construction and use of a processing plant and office area, incorporating a crushing and grinding circuit, a standard carbon-in-leach (CIL) processing plant, site offices, workshops, ablutions facilities, stores, car parking, and associated infrastructure.
- Construction and use of a residue storage facility (approximately 49ha).
- Construction and use of a transformer and electrical distribution network within the Mine Site (from the 20km of 66kV electricity transmission line from Peak Hill to the Mine Site to be constructed under separate approval).
- Construction and use of an approximately 46km water pipeline, from a licensed bore located approximately 7km to the east of Narromine, to the Mine Site.
- Relocation of existing items of infrastructure, including a 22kV power line which currently passes over the area of the Caloma and Caloma Two Open Cuts.

- Re-routing (node to node) of a 4.2km section of a Nextgen Network fibre optic cable (telecommunications line).
- Construction and use of ancillary infrastructure, including the Main Site Access Road and intersection with Tomingley West Road.
- Construction of soil stockpiles (for use in rehabilitation works).

Construction of the Eastern Surface Water Diversion Structure to divert surface water flows to the east of mining and waste rock emplacement activities. Additional surface water management structures would be constructed within the Project Site to control surface water flows within the Mine Site.

Construction and use of dewatering ponds to store water accumulating in and pumped from the open cuts.

Disturbance associated with the mining and associated activities would be progressively rehabilitated to create a geotechnically stable final landform, suitable for a final land use of nature conservation, agriculture, tourism and/or light industry.

It is noted that the design of the proposed Caloma Two Open Cut is an indicative design only, with additional drilling required to further define the mineralisation. As a result, the indicative design for the Caloma Two Open Cut presented (**Figure 2**) represents the maximum area that would be developed. The development of this maximum impact footprint has been taken into account in all other aspects of the Project, including the required capacity, layout and design of the waste rock emplacements and residue storage facility, and the life of the Project. Approval is sought for the proposed design, acknowledging that the final design of the open cut would be the same size or smaller than that displayed.

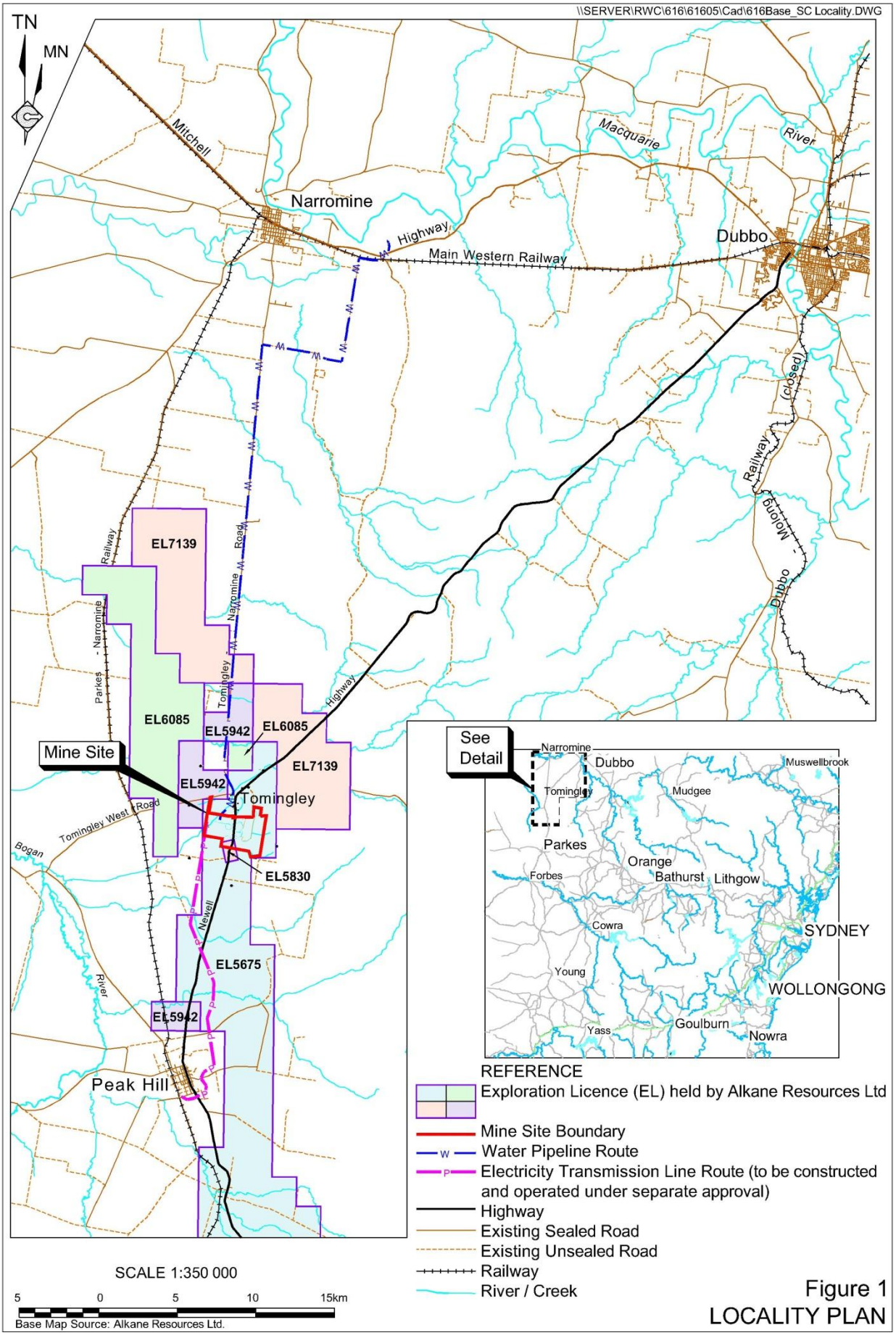
The life of the TGP would be approximately 8 to 10 years.

Full details of the Tomingley Gold Project are described in the Section 2 of the *Environmental Assessment*, prepared by R.W. Corkery & Co. Pty Limited.

1.2 PROJECT SCOPE AND OBJECTIVES

OzArk was engaged by RWC to undertake fauna and flora survey of the Project Site and assess the impacts of the TGP on local biodiversity. The purpose of the fauna and flora survey was to conduct baseline studies to determine the presence/absence of flora and fauna within the Project Site based upon desktop analysis and field surveys. More specifically the aims of the ecological 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;
- 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 EP&A Act; and
- provide recommendations, to mitigate the effects of the proposed activities on threatened biota and their habitats.


\\SERVER\RWC\616\61605\Cad\616Base_SC Locality.DWG
TN
MN
Mitchell
Macquarie
River
Narromine
Highway
Dubbo
Main Western Railway
(closed)
Railway
Molong - Dubbo
Railway
Narromine
Road
Parkes - Narromine
Tomingley
Highway
EL7139
EL6085
EL5942
EL6085
EL7139
EL5942
Mine Site
Tomingley
Tomingley West Road
Bogan
EL5830
Newell
River
EL5675
EL5942
Peak Hill
See Detail
Narromine
Dubbo
Muswellbrook
Tomingley
Mudgee
Parkes
Orange
Forbes
Bathurst
Lithgow
Cowra
SYDNEY
Young
WOLLONGONG
Yass
Goulburn
Nowra
REFERENCE
Exploration Licence (EL) held by Alkane Resources Ltd
Mine Site Boundary
W Water Pipeline Route
P Electricity Transmission Line Route (to be constructed and operated under separate approval)
Highway
Existing Sealed Road
Existing Unsealed Road
Railway
River / Creek
SCALE 1:350 000
5 0 5 10 15km
Base Map Source: Alkane Resources Ltd.
Figure 1
LOCALITY PLAN

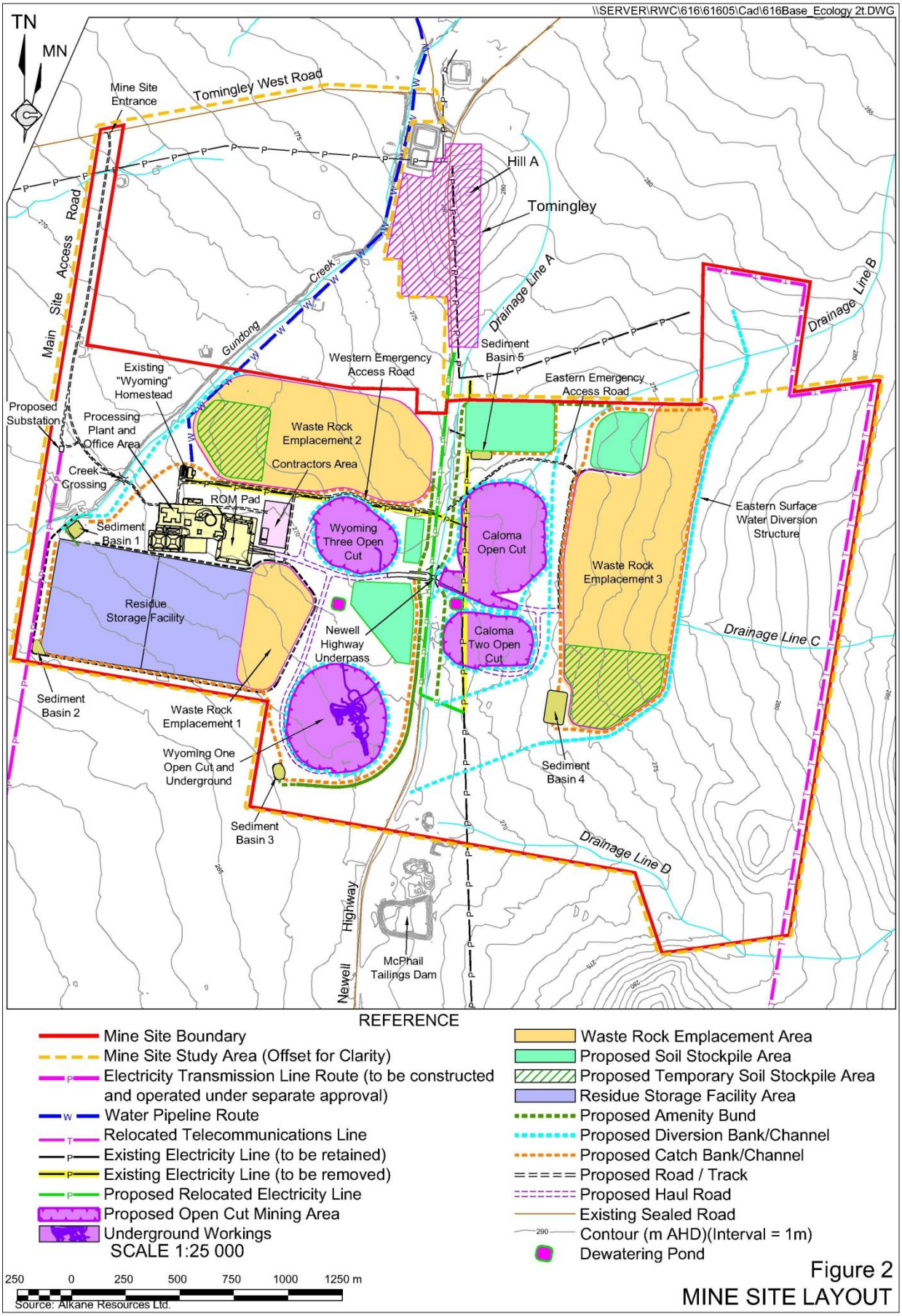


Figure 2
MINE SITE LAYOUT

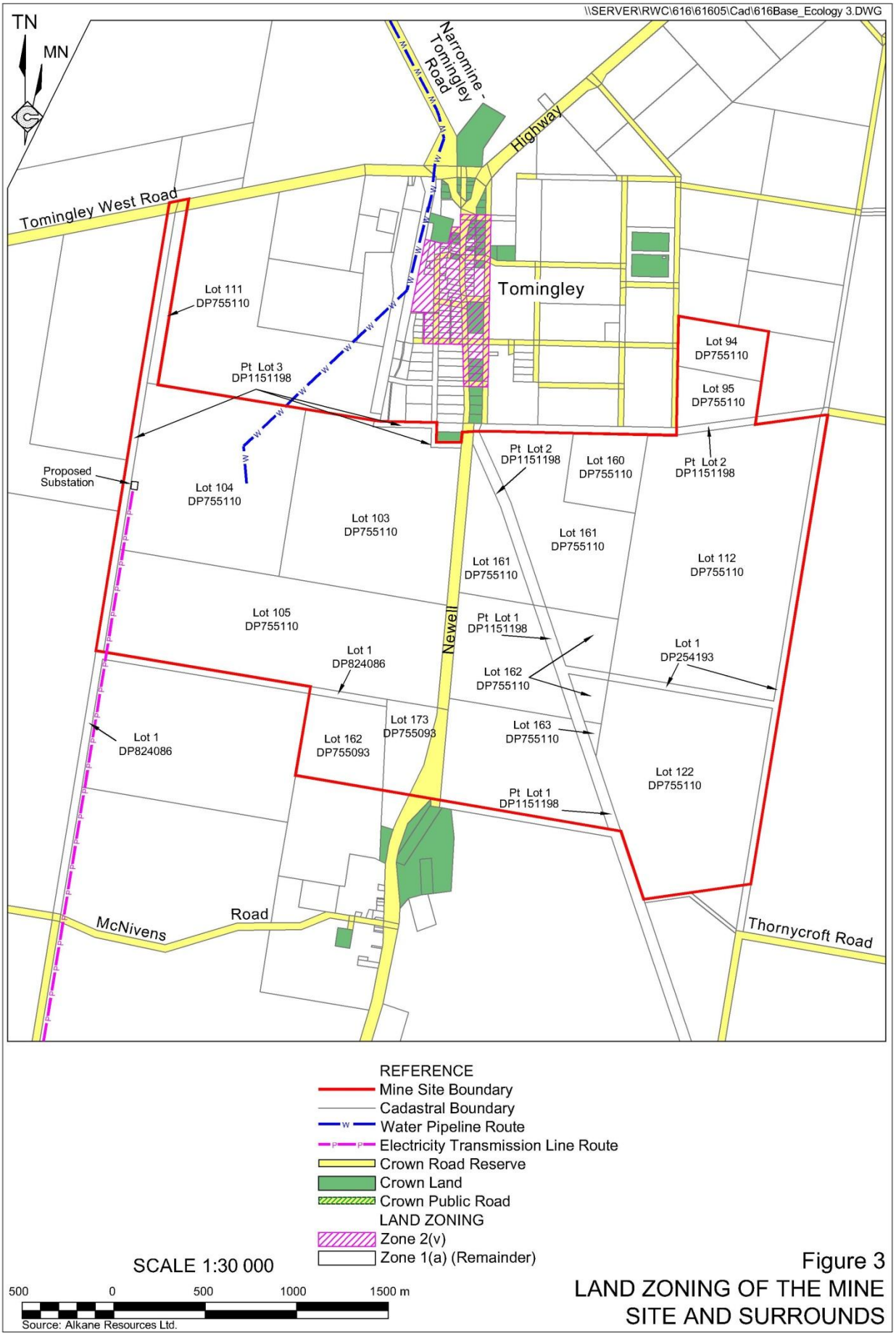


Figure 3
LAND ZONING OF THE MINE SITE AND SURROUNDS

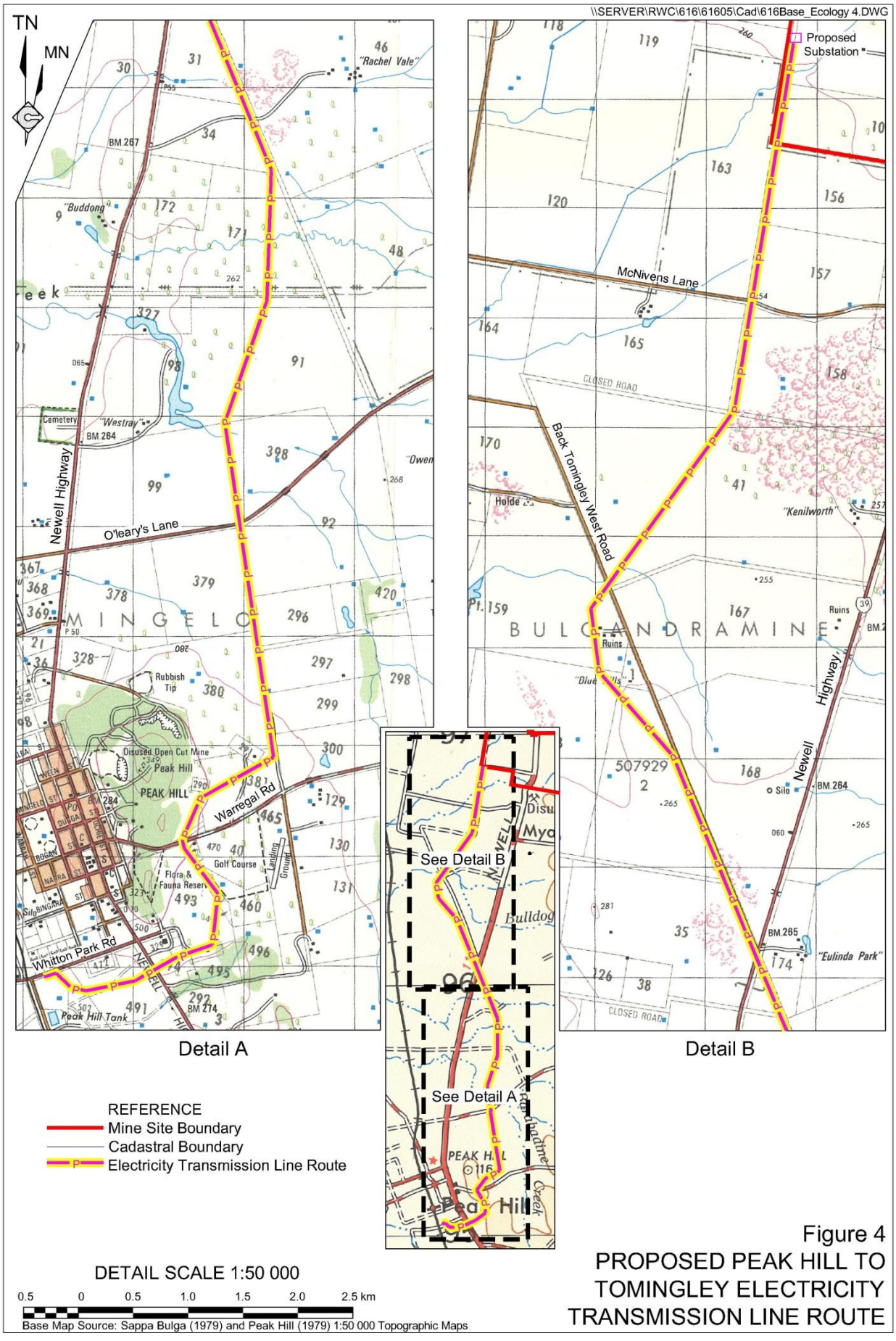


Figure 4
PROPOSED PEAK HILL TO TOMINGLEY ELECTRICITY TRANSMISSION LINE ROUTE

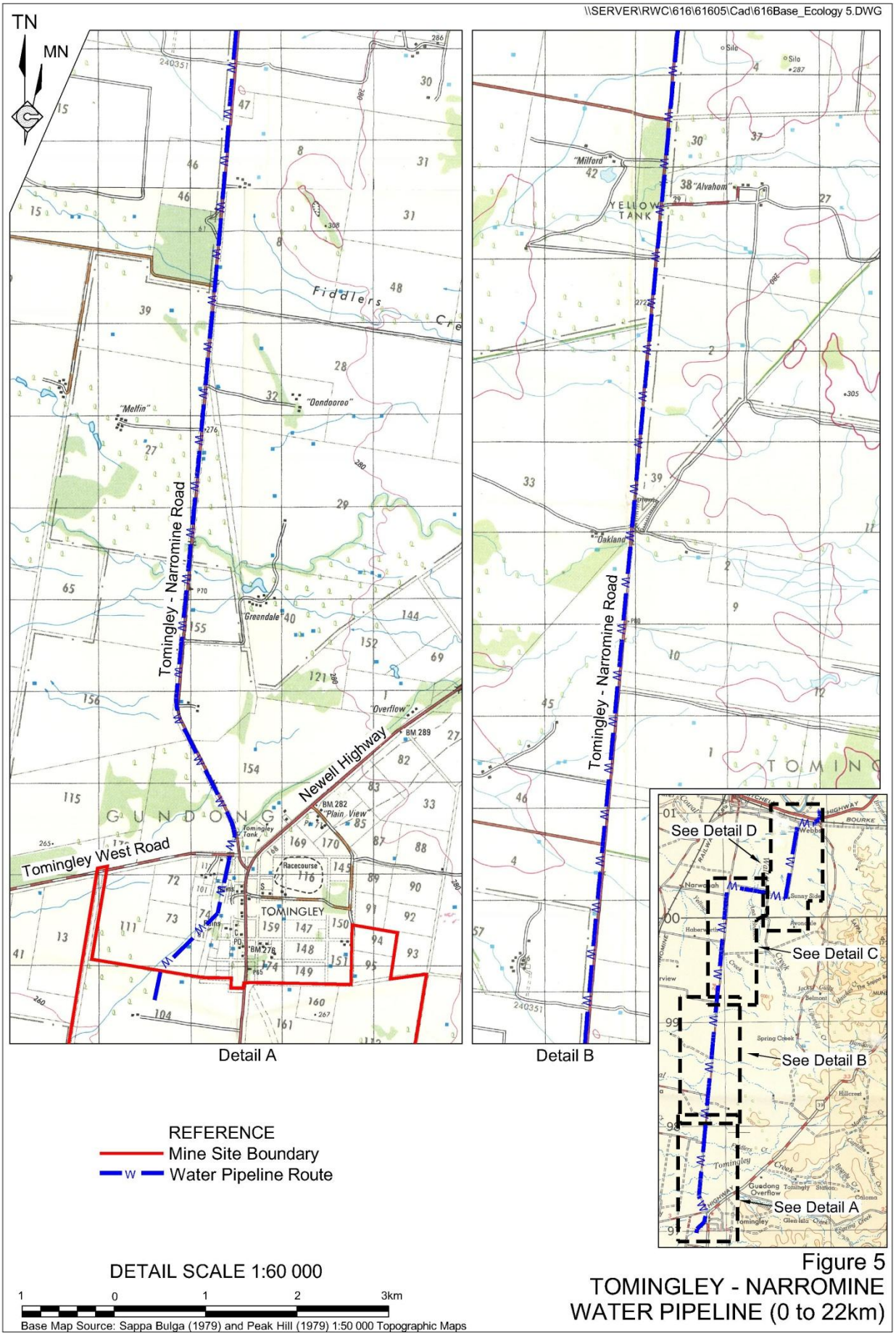


Figure 5
TOMINGLEY - NARROMINE
WATER PIPELINE (0 to 22km)

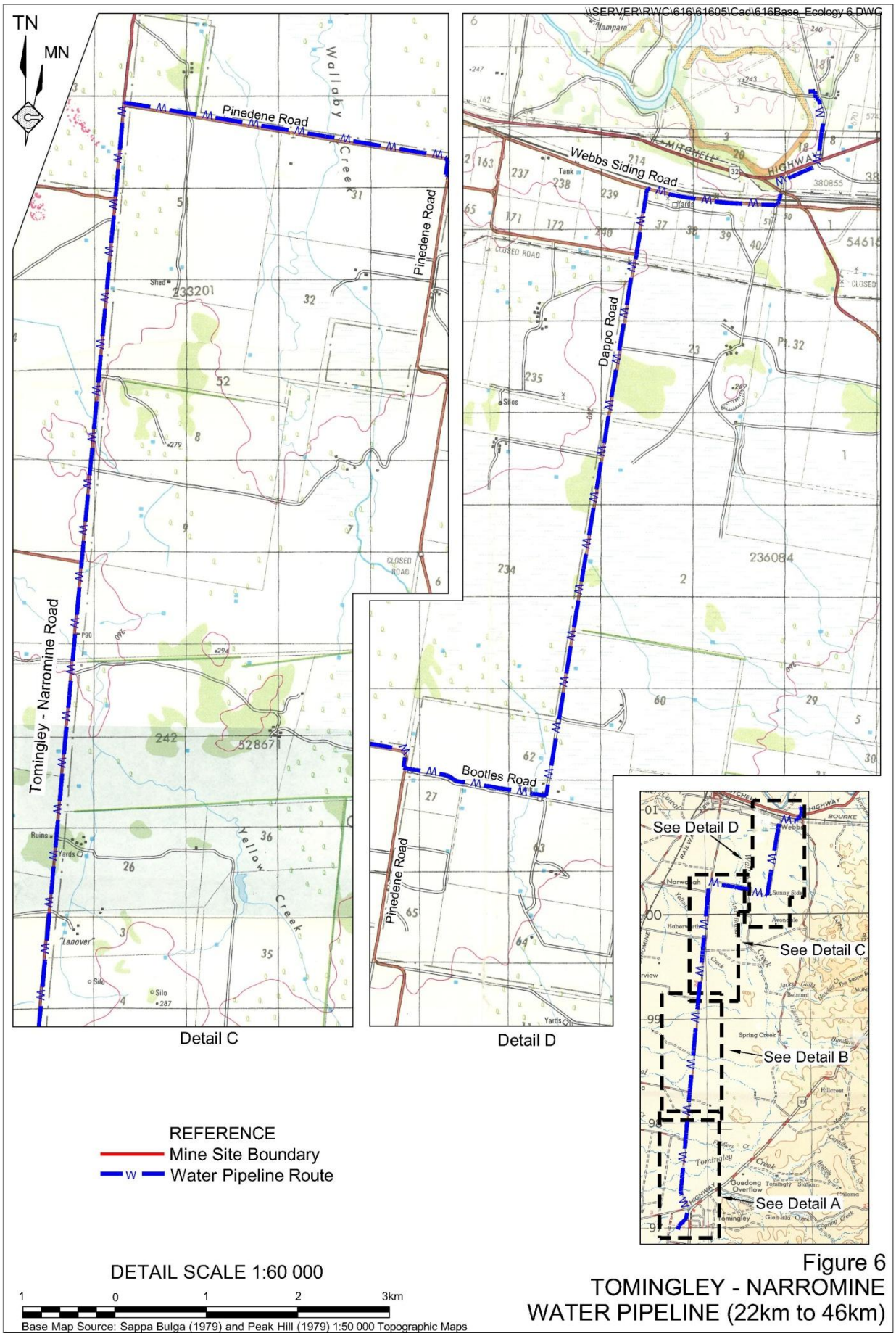


Figure 6
TOMINGLEY - NARROMINE
WATER PIPELINE (22km to 46km)

1.4 DEFINITIONS

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

Activity - has the same meaning as in the *Environmental Planning and Assessment Act 1979* (*EP&A Act)*, i.e. the nature of the proposed activity is described in Section 2. The EP&A definition refers to physical 'activity' in relation to land that is specified by a regulation to be a work for the purposes of the Act.

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 1995 or within the schedules of the EPBC Act 1999.*

Impact Footprint – An area within a given Study Area that would be mechanically destroyed, disturbed or altered to construct infrastructure associated with the activity.

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

Locality - means the area within a 50km radius of the Mine Site.

Local population - the population that occurs within a given study 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).

Region - means a biogeographical region that has been recognised and documented such as the Interim Biogeographical Regions of Australia (IBRA). The region which the study area falls within is the NSW South Western Slopes Bioregion (SWSB).

Paddock (n) – to accurately refer the reader to places within the Mine Site it has been broken into existing fenced 'paddocks' where n = the numbers shown on **Figure 7**.

Project Site - for the purposes of this report, all project components collectively would be referred to as the 'Project Site', while the three primary individual components would be referred to as follows:

1 Mine Site

This area consists of all mining processes and the associated infrastructure. The Mine Site Study Area, which is slightly larger than the Mine Site as defined for the TGP by the Proponent, covers approximately 820.8ha, straddling the Newell Highway south of Tomingley (**Figure 2**). Specifically the Mine Site Study Area would traverse nineteen (19) lots (**Figure 3)**, in addition to a road reserve associated with the Newell Highway. The Mine Site Study Area is comprised of approximately 408.5ha west of the Newel Highway and 412.3ha west of the Newell Highway.

2 Peak Hill to Tomingley Electricity Transmission Line (PHTETL)

This easement extends from Peak Hill Substation to Tomingley (east of Newell Highway and crossing to the west of Newell Highway midway to the Mine Site Study Area). The proposed PHTETL would require the creation of a 30m wide easement and would consist of 107 poles spaced at between 257m and 307m. Further details of pole positions can be found in **Appendix 5** which provides the aerials used in the field assessment and the GPS positions of poles also used in the field assessment. The PHTETL Study Area is approximately 21.1km in length and 30m wide and incorporates all areas of the proposed electricity transmission line (**Figure 4)**.

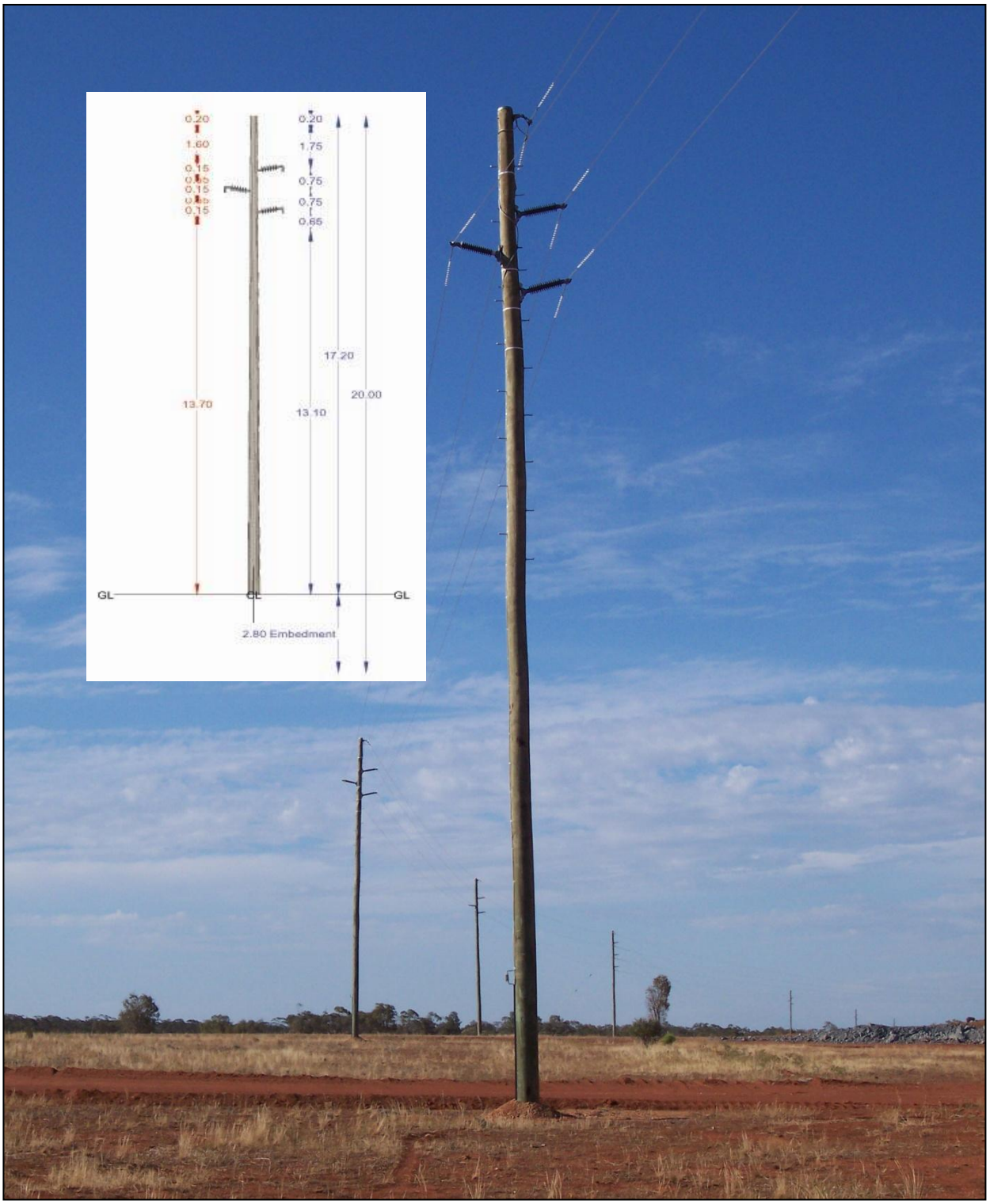


Figure 7 Example of a 66kV Electricity Transmission Line

3 Tomingley to Narromine Water Pipeline (TNWP)

The potential easement for the proposed water pipeline (**Figure 5, Appendix 3**) tracks a north-south direction from the "Woodlands" property east of Narromine, following the Narromine-Tomingley road fence-line and is expected to be approximately 46km long within road reserves associated with:

- the Mitchell Highway;
- Webb Sidings Road;
- Sunnyside Lane;
- Bootles Road;
- Pinedene Road;
- Narromine-Tomingley Road;
- Tomingley West Road;
- the easement for the Main Western Railway; and
- the private property "Woodlands" (**Appendix 1, Plates 52** and **53**).

The TNWP Study Area includes the entire width of the road corridor as the pipe alignment may be modified to avoid all large trees and substantive patches of vegetation. Only minor clearing would therefore be required.

Alkane would also construct and operate a water pipeline from the two groundwater bores located on the "Woodlands" property itself.

Paper road – either current or former crown lease land set aside as roads that were never built. These thin strips of land in the region are identified by retaining mature remnant native vegetation.

Study Area – the Project Site and any additional areas which are likely to be affected by the proposal, either directly or indirectly (NPWS 1996). The combined Project Site study area incorporates three main areas of investigation as detailed above within text individual component would be referred to as their acronym then "Study Area", i.e. Mine Site Study Area.

Threatened biota - means those threatened species, endangered populations or endangered ecological communities which are considered known or likely to occur in one or more study area.

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 1995* or within the Schedules of the EPBC Act 1999.

1.5 REPORT AUTHORSHIP

This assessment was undertaken by Phillip Cameron (BSc, Ass Dip App Sci, MECANSW) of OzArk under NSW Department of Primary Industries (DPI) Ethics Approval No 07/1601 & NSW Scientific Research License 11194.

The aforementioned personnel wrote this report. Dr Jodie Benton of OzArk reviewed and edited this report.

1.6 CONSTRAINTS

Results of such rapid assessments are limited. Not all animals and plants can be fully accounted for within any given study area. The potential for inaccuracy increases exponentially with the size of a study area. This report is based upon data acquired from recent and current surveys field and desk top assessments, however, it should be recognised that the data gathered is indicative of the environmental conditions of the study areas at the time the report was prepared. The presence of threatened species 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. Studies in the south and central western slopes of NSW have found that surveys conducted in late summer, autumn and early winter usually record less than 50% of plant species present (Burrows 2004). Whilst noted, the aforementioned issues are not noted as a serious concern.

Social dynamics and food availability may also influence a species occurrence. These factors were not tested for during this assessment. Ideally, surveys would be conducted over different seasons and during suitable climatic conditions but broadly speaking conditions encountered were ideal for the detection of most species and where weather was an issue (rain fell for a period during the survey of the TNWP Study Area, survey was abandoned and rescheduled). 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.

This report has reviewed State and National agency records centred on the Project Site to establish a predictive model concerning the likelihood of flora and fauna species to occur within the Study Area. Any failings of the database records have been mentioned within the appropriate sections of this report.

For the purpose of this report, the author believes that adequate assessment has been undertaken, however, acknowledges that the precautionary principle has been adopted where appropriate.

2 DESCRIPTION OF THE PROPOSED ACTIVITIES

Section 1.1 introduced the proposed activities of the TPG. The following provides a more detailed description of those activities within the three study areas which would have impact on the Project Site biota.

2.1 MINE SITE ACTIVITIES

2.1.1 General

The Mine Site Study Area would include the components listed in Section 1.1 of this report. These are all contained within the Mine Site Study Area boundary delineated by the yellow dotted line on **Figure 2**. Only ecological values within these specific locations would be impacted.

In essence the nature of impacts within the Mine Site Study Area is limited to minor vegetation clearing within an agricultural landscape and disturbance of soils to build infrastructure, i.e. impacts on ecological values would be limited to the immediate area of disturbance.

The residue storage facility (RSF) 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 residue (tailings) has potential to contain heavy metals, and cyanide. Residue would be stored in the RSF which would be designed to minimise the potential for leachate to escape.

2.1.2 Residue Storage Facility Design and Operation

2.1.2.1 Residue Storage Facility Design

Alkane estimate that over the life of the TGP, approximately 3 900 000m^3 of solid residue material would be produced. The proposed RSF has a capacity to store approximately 4 800 000m^3 of material.

The proposed RSF would comprise two cells collectively covering an area of approximately 42ha (**Figure 2**). The two cells would be constructed and operated concurrently. Each cell would comprise an outer embankment around the perimeter of the RSF, with a common embankment separating the two cells.

The floor of the RSF would be constructed using compacted clay excavated from the Mine Site to achieve a permeability of <1 x 10^{-9}m/s. The outer embankment would be constructed with an inner zone of low permeability material (<1 x 10^{-9}m/s) and an outer zone of more permeability material. A key trench would be excavated into in-situ low permeability clay or rock up to 2m deep and back filled with low permeability material.

The following provides the indicative design criteria for the outer embankment of the RSF.

- Crest elevation – 273m AHD.
- Crest width – 6m.
- Slope of outer face – 1:3 (V:H).
- Slope of inner face – 1:1.5 (V:H)
- Key trench – up to 2m deep, base 3m wide, side slopes = 2:1 (V:H).
- Maximum elevation of residue – 280.0m AHD.

Each cell would be equipped with a central decant tower accessed from the common embankment.

The RSF design and construction would maximise water recovery from the residue. High water recovery is desirable for the following reasons.

- Lower water content in the residue increases the stability and structural integrity of the RSF.
- The recovered water can be re-used in the mining process.
- Recovery of water from the residue reduces potential for leachate to escape from the RSF. A shallow water body has less potential to migrate into the underlying soils than a deeper water body.

The design and proposed operational procedures for the residue storage facility are outlined in the *'Residue Storage Facility - Design Report' (D.E. Cooper & Associates Pty Ltd, 2009).* Key design and operational features are as follows.

The floor would be constructed of native clay material that would be compacted to achieve a permeability of less than 1x10^{-9}m/s. The floor would slope towards a central decant tower. A 300mm thick layer of compacted clay would be formed around the decant towers, which is the lowest point of the RSF and where water that drains from the slurry would accumulate.

A drainage channel (referred to as the 'Upstream Filter') would be constructed at the base of the inside wall of the RSF. The upstream filter would be located directly beneath the residue inflow spigots to capture the drainage that occurs at the time of residue placement.

The central decant towers would be located at the lowest point of each cell. The towers would be fitted with a submersible pump that would be used to remove water from the RSF as quickly as possible. Decanted water would be re-used in ore processing.

Residue would be placed uniformly around the perimeter of the RSF via several slurry spigots. This placement procedure maximises the amount of exposed surface area and minimises the drainage profile. It also creates a gradient toward the centre of the residue storage facility which enhances drainage.

The geochemical characteristics of the residue material was assessed by Amdel Mineral Laboratories Pty Ltd to determine the net acid generation potential of the residue material. That testwork determined the following.

- Oxidised material within the Mine Site is non-acid forming.
- Sufficient amounts of acid neutralising minerals are present to ensure that the non-oxidised material would not be acid forming.
- The ore to be processed contains small amounts of naturally occurring arsenopyrite, a mineral composed of iron, arsenic and sulphur. Additional testing of the likely occurrence and behaviour of the arsenopyrite determined that "pools" of Arsenic forms, e.g. Fe/Ca-arsenates of complex and variable composition, within the residue should consolidate within the RSF to a tightly-compacted state and exhibit a very low hydraulic conductivity (GEC, 2011).

On the basis of this residue testing, the risk of detrimental groundwater contamination occurring is low. This low potential notwithstanding, the RSF would be constructed and operated in a manner which reduces potential for leachate to escape. Piezometers would be installed around the residue storage facility and monitored regularly to assess its integrity.

2.1.2.2 Chemicals to be Used in Tailings Processing

Cyanide concentrations below 50mg/L weak-acid-dissociable (WAD) are deemed safe to wildlife but are considered an interim benchmark for discharge into residue storage facilities. The activity would be consistent with these interim benchmarks.

2.2 PEAK HILL – TOMINGLEY ELECTRICITY TRANSMISSION LINE ACTIVITIES

Construction of the PHTETL would require removal of native vegetation across a 30m easement along its 21.1km length. An example of a completed 66kV (20m) pole, showing typical dimensions of an intermediate structure, is provided on **Figure 7,** (typically poles are in the range of 18.5 to 21m). **Figure 7** shows a strain structure in the foreground and intermediate structure in the background.

Constructing the PHTETL would involve the following activities.

- Construction of access. Typically gates are installed prior to commencement of construction, at all fence crossings along the route on the centreline (unless there is an existing gate within the corridor or close to it).
- Drainage Line Crossing. If there is a drainage feature crossing, deep creek or gully and no existing crossing within the corridor exists, then a temporary ford may be installed and then removed/restored once no longer required (unless the landholder wishes to retain it). If there is easy access to both sides of the crossing then a ford may be avoided.
- Vegetation clearing. This would occur within the 30m easement following Country Energy Procedure Vegetation Clearing Guidelines For New Power Lines CEP2010. Generally vegetation clearing is kept to a minimum with disturbance of ground cover only along access tracks and in the vicinity of each structure. Conductor stringing points may be located midspan and traffic may occur over full width of corridor. These points can in most cases be placed at preferred locations but would often be at major deviations in route and sometimes it is necessary (easier) to locate stringing equipment outside the corridor.
- Vehicle access. The heaviest vehicles used would depend on the types of poles to be installed. As all poles are likely to be timber, the heaviest vehicles would be semi-trailers to deliver poles along the route and a 6x4 or 6x6 crane/borer. No tracked vehicles are likely to be used.
- Foundation installation. Foundations would typically be in the order of 900mm diameter and 3m deep. Covers and marker tape would be placed over/around any holes left unattended or overnight to prevent stock or vehicle accidents.
- Height of typical pole above ground would be 17m.

Other details relating to the construction of the PHTETL are as follows.

- Essential Energy may or may not specify installation of termite / rot barrier to new timber poles in this area. If specified typical treatment would be Preschem Bioguard Bandage. See http://www.preschem.com/nbgfact.htm
- Slack stringing is likely to be acceptable for the PHTETL. In this case a truck with cable drums and or cable drum trailer is driven along the line route to pay out the conductor. Hence the need for reasonable access along the centreline of the route.
- Stringing points may be located anywhere within the corridor but can be reasonably negotiated to avoid sensitive areas if necessary.
- Following construction access tracks do not need to be maintained or retained unless there is no general access to a structure.
- Typically work in wet weather would be avoided, however, if it becomes necessary due to protracted wet weather, access is to be negotiated and restoration of any damage agreed upon prior to entry. Often in high traffic areas over cultivated land it is necessary to deep rip the access tracks to restore soil. This would be done on completion of construction and initial inspection period.

2.3 TOMINGLEY – NARROMINE WATER PIPELINE ACTIVITIES

The proposed pipeline, a 34mm OD poly would start inside the Mine Site Study Area but would be predominantly located on the eastern side of the road corridor from Tomingley to Narromine (MR89) (**Figures 5** and **6**). Approximately a quarter (8km) would be located along Pinedene Road, Bootles Road, Dappo Road, the Main Western railway Line easement, Mitchell Highway and within privately owned land on Woodland. Laying the pipe would require a disturbance area the width of a backhoe (c. 4m), to 1m deep along its 46km length. It is expected that the backhoe would 'push' vegetation to create the Impact Footprint in which the pipe would be laid and immediately covered over.

If the Proponent can avoid a 1.3km section inland grey box remnant on Dappo Road, no mature trees would be removed as part of this component of the TGP. The pipe is flexible and could be aligned to avoid all large trees and substantive patches of vegetation. Where clearing is unavoidable it would be minor as the proposed activity follows a previously disturbed area created for a Telstra cable along MR89. Where clearing occurs it would affect predominately young white cypress pines.

Direction drilling would occur over sensitive waterways i.e. named creeks that are both shown and named in **Appendix 3.** The Proponent has stated that impacts would not occur within 40m of the creeks centreline.

It has been assumed that the water pipeline installation activity would not require new access tracks that would fragment road side habitat (i.e. access would be from existing property entrances) and this type of activity remains unassessed. A suitably qualified weeds inspector would undertake pre, during and post impact weed inspections. Soil and sediment controls would be implemented prior, maintained during and removed only when appropriate following the completion of pipeline installation.

3 DESCRIPTION OF THE EXISTING ENVIRONMENT

3.1 GENERAL

The Project Site lies wholly within the Central West Catchment Management Authority (CMA) mainly within the South Western Slopes Bioregion (SWSB). The northern portion lies within the Bogan-Macquarie subregion, whilst the southern portion sits within the Lower Slopes subregion.

3.2 ENVIRONMENTAL SETTING

The Peak Hill area is situated in the physiographic region known as the central-west slopes of New South Wales. It is located just west of the border between the Upper Macquarie River and the Western Plains which is a transitional zone between the Great Dividing Range to the east and the plains of the Darling River to the west. In general the topography can be described as flat to the west and gently undulating to the east, a terrain which provides no physical barriers to movement across the landscape.

More specifically, the landscape surrounding the three study areas is flat and relatively low-lying. Elevations do not vary greatly from 260m Australian Height Datum AHD.

All creeks and waterways within the Project Site are clearly shown in **Appendices 1** to **4**.

- Gundong Creek traverses the northern portion of the Mine Site Study Area west of the Newell Hwy, flowing southwest and draining into the Bogan River. It is noteworthy that historically Gundong Creek terminated in Tomingley as a spring, but was diverted through channelling in the nineteenth century and it is this recent creek portion that traverses the Mine Site Study Area. A very minor 1st order (Strahler Stream Ordering) drainage feature traverses the eastern portion of the Mine Site Study Area.
- The PHTETL Study Area tracking north from Peak Hill intersects two named drainage lines, Burrabadine and Bulldog Creeks, as well as a couple of minor drainage features. Burrabadine Creek, an ephemeral headwater to the Bogan River, is located approximately 5km north of Peak Hill. From the PHTETL it flows west for 5km to join the Bogan River. This waterway has been extensively cleared and modified. Similarly, Bulldog Creek a further 5km north of Burrabadine Creek is ephemeral and cleared.
- The TNWP Study Area heading north from Tomingley would intersect several named creeks, Gundong, Tomingley, Fiddlers and Yellow Creeks, as well as Brady's Cowal and Wallaby Creek. These features tend to drain in a westerly direction at the end of the water pipeline, shifting to northwest towards Narromine. The northern most / terminating point of the water pipeline traverses floodplain associated with the Macquarie River. The named creeks have sparse native aquatic vegetation.

Climate statistics from the Peak Hill Post Office show the area experiences warm to very warm (hot) summers, with an average rainfall of 559mm, predominately occurring in summer. The average summer maximum temperature (calculated over 42 years of averages) is 32.3°C and maximum winter temperature 16.1°C (Bureau of Meteorology 2009).

The area of Tomingley is situated just west of the Yeoval granites in an area of undifferentiated quaternary alluvium comprising soil, clay, sand, silt and gravel. Pockets of Ordovician era metamorphosed rocks (such as slate, andesite and conglomerate) form a belt from Peak Hill through to Narromine, most of which is covered by soil. These formations have no formal name due to a lack of investigation (Holmes 1984: 7). Gold occurs in quartz reefs within the sub-surface slates of the Ordovician period. The soils in this area are primarily derived from the alluvium of the quaternary period.

The Mine Site is located near the northern end of a narrow belt of early Ordovician to early Silurian-aged submarine volcanic and shallow intrusive rocks of the Junee-Narromine Volcanic Belt within the Lachlan Fold Belt. Within the Mine Site, the basement geology is dominated by the late Ordovician to early Silurian Mingelo Volcanics (R.W Corkery 2009).

3.3 EXISTING LEVELS OF DISTURBANCE

3.3.1 Mine Site

Figure 8 provides the specific locations of paddocks within the Mine Site Study Area referred to throughout this section. The Mine Site Study Area has undergone considerable disturbance as a result of agricultural activities and historic mining exploration (**Appendix 1, Plates 1** to **4**). To varied extents the Mine Site has been cleared, logged, cultivated, grazed and had waterways / surface flows modified through dam construction (16 farm dams occur in the Mine

Site Study Area) and channel excavation. It has been subject to mining related activities, as well as road and building construction. An existing homestead, ancillary buildings and access roads (farm tracks) exist in the vicinity of the Wyoming Three Open Cut. Natural disturbance processes including erosion (accelerated by human activity) and bioturbation have also been active (**Appendix 1, Plates 2** and **5**). The dominant agricultural use of the area was, and remains, grazing (**Appendix 1, Plate 6**) and cropping, which involves ploughing or scarification (**Appendix 1, Plates 2, 3, 7** and **8**). Some areas have not been cultivated i.e. along fence lines where paper roads once or currently occur (**Appendix 1, Plates 4, 8** and **9**) or paddocks with soils unsuited for tilling (**Appendix 1, Plates 10** and **11**, Paddocks 9 and 13 respectively). Unmodified areas have higher levels of associated native species and hence greater potential for finding threatened species if present.

Several existing dams are scattered throughout the Mine Site Study Area (**Appendix 1, Plates 2** and **12** to **15**). Dams have the potential to provide habitat for the regions migratory wetland birds and to a lesser degree the regions threatened species of frog. To the south of the Mine Site Study Area adjacent to Paddock 14, is the old McPhail tailings dam of the former McPhail mining era. Remnants of prior mining activities is also scattered over the Mine Site Study Area (OzArk, 2011).

It is recorded that before European settlement Gundong Creek had no channel west of the Ten Mile Spring and water simply overflowed from the spring and spread across the landscape (through the Mine Site Study Area). The first man to apparently begin to channel the spring was Wah Sing, a market gardener. Wah Sing dug a channel from the spring head to the southwest through the Mine Site Study Area (Mewburn 1982: 11). The creek was again heavily modified when a government scheme widened, deepened and extended Wah Sing's previous work. Portions of the excavated channel (now called Gundong Creek) have eroded banks in the Mine Site Study Area (**Appendix 1, Plate 16**), ploughing and grazing have occurred right up to the creek banks (**Appendix 1, Plates 16** to **19**). Red gums (non-hollow bearing) have colonised the banks of the creek in some areas (**Appendix 1, Plate 19).**

3.3.2 Peak Hill – Tomingley Electricity Transmission Line

The easement for the PHTETL Study Area runs through agricultural land that has suffered similar disturbance to that of most other agricultural land in the region, i.e. through clearing, construction of infrastructure (electricity), dams, ploughing, timber felling, 'cleaning up', landscape wide changes to natural hydrology and continued heavy grazing. Cumulatively these have significantly reduced the potential for threatened species to remain. The proposed PHTETL alignment is mostly (c. 98%) clear of native vegetation. **Appendix 1** and **Appendix 2** (**Plates 21** to **23 and 32** to **33**) provide representative examples of the majority of the environments within the PHTETL Study Area.

Patches of remnant vegetation with proximity to the PHTETL are adjacent to fence lines, between paddocks on old / current paper roads and have been heavily grazed. These paper road remnants were infrequently encountered. Only one small patch of Myall Woodland was recorded along the length of the PHTETL Study Area (**Appendix 1, Plate 27**). Altered hydrology in combination with pressures from agricultural activities in this area increased the potential for this isolated Endangered / Critically Endangered Ecological Community to have poor long term viability[5].

[5] This community is noted by the DSEWPaC as occasionally being observed to drop all leaves and appears in 'poor condition'.

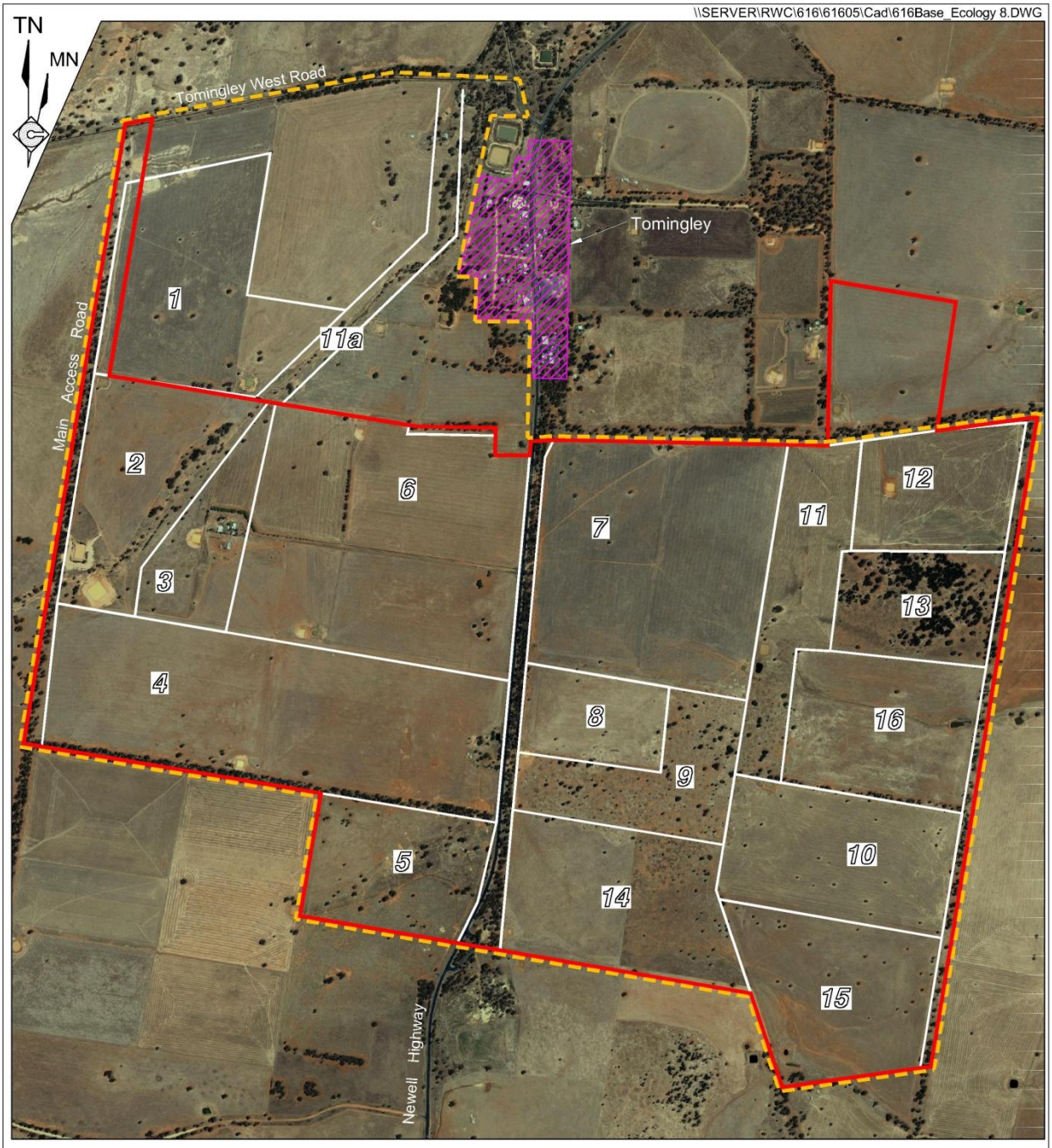


Figure 8
PADDOCK REFERENCES OF THE MINE SITE STUDY AREA

3.3.3 Tomingley – Narromine Water Pipeline

The majority of land comprising the TNWP Study Area consists of road reserves bordering private agricultural properties. A small portion of the TNWP Study Area corridor at the Narromine end falls on the private property "Woodlands", bordering the Macquarie River (this property is referred to as the 'end' of the pipeline). This portion of the water pipeline traverses the banks of heavily grazed palaeochannels of the Macquarie River (**Plate 53**). Along the rest of the water pipeline, disturbance has occurred through the development of roads, rail and agriculture (**Plates 45** to **51**). The alignment of Main Road 98 (Tomingley-Narromine Road) has also caused considerable disturbance (**Plates 38, 40** and **41**) as has the Telstra cable that the pipeline would follow for much of the route (**Plates 43** and **44**).

The Tomingley-Narromine Road corridor is home to some of the most substantial remnant vegetation within the Project Site (**Appendix 1, Plates 36** to **39, 45, 47** and **48**). The majority of the road corridor within the TNWP Study Area consists of mature trees, with only a few areas having been heavily cleared. Threatened birds, Koalas, microbats and plants have a relatively higher potential to be present within the undisturbed portions of the TNWP Study Area. Previous impacts from road construction and buried infrastructure cables (Telstra) means that this area has also suffered disturbance that would have impacted on the potential for threatened plants to occur. Although the majority of the TNWP Study Area is to be located along the eastern side of the Tomingley-Narromine Road, which is comprised of high quality remnant woodland, it would follow the disturbed Telstra easement for the majority of the route.

3.4 WILDLIFE CORRIDORS / PATCH SIZE OF VEGETATION

Within the locality (50km radius) of the Project Site it is estimated that 80% to 90% of all native vegetation on flat ground has been cleared (**Appendix 4, Image 1** and **Appendix 10**). The largest patch sizes of native vegetation left in the region occur on hills and mountains unsuitable for agriculture (Goobang NP is the most substantive remnant). The average size of a reasonable patch of native vegetation is the length and width of a road corridor, the best example of this being the Narromine-Tomingley Road, the Newell Highway corridor and smaller regional roads and paper roads.

The Narromine-Tomingley Road and various 'paper' roads within the Project Site form the basis of local wildlife corridors.

3.5 PRE-EUROPEAN SETTLEMENT VEGETATION

Prior to European occupation, the locality would have been consistent with the *Floodplains Transitional Woodlands* vegetative formation as described by Keith (2004), the majority of this has now been cleared and is used for dryland cropping (**Appendix 4**, **Images 1 & 2**).

Prior to clearing, tree species covering the landscape would have included *Eucalyptus microcarpa* (grey box) and *E. populnea* subsp. *bimbil* (Bimble Box) throughout, with *E. melliodora* (yellow box) and *E. conica* (Fuzzy Box) occurring in the damper and alluvial areas, and *E. camaldulensis* (river red gum) occurring on creek banks. Elevated red soiled gravel ridges supported *E. dwyeri* (Dwyer's red gum), whilst drier soils may support an occasional *Brachychiton populneus* (kurrajong), *Allocasuarina cristata* (Belah) or *Allocasuarina luehmannii* (bulloak) but mostly dominated by *Callitris glaucophylla* (white cypress pine) with localised dominations on red soils / light gravels near Narromine of *E. sideroxylon* (mugga ironbark). Grey cracking clays / gilgai's would have supported open grassy myall woodland communities.

3.6 AQUATIC HABITATS

There are nine locations where proposed infrastructure would cross or is within the boundaries of named creeks within the Project Site. These include Gundong Creek (Mine Site Study Area), Burrabadine Creek and Bulldog Creek (PHTETL Study Area) and Gundong, Tomingley, Fiddlers, Bradys Cowl, Yellow and Wallaby Creeks within the TNWP Study Area.

All natural creeks and drainage lines of the Project Site may be considered as part of the 'Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River Endangered Ecological Community'. The phrase 'may be considered' is used to reflect that Gundong Creek within the Project Site is a man-made channel.

The areas surrounding creeks or waterways were often disturbed by cattle treadage, eroded and invaded by moisture dependant exotic grasses and weeds **(Appendix 1, Plates 39, 41** and **42).**

4 BACKGROUND REVIEW

4.1 VEGETATION MAPPING / DESCRIPTIONS

Several vegetation surveys have attempted to classify vegetation in NSW. Beadle (1945) produced the first map of the vegetation of the NSW Western Plains. Beadle & Costin (1952) followed by Moore (1953) described the vegetation of the southern half of the NSW SWSB in a vegetation classification hierarchy. In a subsequent complementary paper, Moore discussed "disclimax" communities of the region in relation to proposed "original" vegetation. Biddiscombe (1952) discussed pasture compositions in the Trangie District.

More recently, a number of botanical surveys have been undertaken in the South West Slopes Bioregion (SWSB) and vegetation maps produced. In 1995 Sivertsen & Metcalfe mapped the vegetation within the Forbes and Condobolin 1:250,000 map sheet areas. Metcalfe and Sivertsen et al (2003) also mapped the vegetation in the Nymagee, Narromine and Dubbo area at a finer scale however the Project Site is too far away to allow extrapolation of this data. Bos & Lockwood (1996) provide a floristic classification based on plot sampling of State Forests and some other areas in the southern half of the Upper Slopes Sub-region of the bioregion between Forbes and Albury. Austin et al. (2000) modelled 77 floristic groups across environmental gradients in the central Lachlan River region using over 1000 records of canopy and perennial shrub species.

Thackaway & Cresswell (2000) originally mapped the vegetation of the SWSB.

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 and are more commonly referred to as vegetation communities. 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.

The Project Site primarily (~90%) occurs within the Floodplain Transition Woodlands vegetation formation. Approximately 5%, where elevated red gravel ridges occur, is more closely associated with Western Peneplain Woodlands, whilst the area surrounding Tomingley is mapped as Inland Floodplain Woodland by Keith (2004).

Vegetation communities within the Project Site were mapped by the Office of Environment and Heritage (OE&H) (as the then NPWS) in 2003 using high resolution aerial photography and limited field assessment. A review of this map shows that the Project Site is largely clear of substantive native vegetation, although remnants of four mapped communities have potential to be recorded.

- River Red Gum Forests and Woodlands occur in riparian corridors and floodplains on creek banks, channels, depressions, cowls and backplains, grey cracking clays and polygenetic alluvial soils. Likely species to be encountered consist of *Eucalyptus camaldulensis* (river red gum), *E. largiflorens* (black box), *river cooba* (*Acacia stenophylla*) and *A. salicina* (cooba).
- Poplar Box Woodlands occur on undulating land, flats and open depressions, red, red brown and yellow earths, grey, brown and red clays. Likely species to be encountered consist of *Eucalyptus populnea bimble* (bimbil / Bimble Box), *Callitris glaucophylla* (white cypress pine), *Allocasuarina luehmannii* (bulloak), *Alectryon oleifolius* (Western Rosewood), *Acacia colletioides* (pin bush) and *A. salicina* (cooba).
- 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).
- Belah and Poplar Box Woodlands occurring on undulating plains on flats and depressions, red earths, grey and brown clays. *Casuarina cristata* (Belah), *Allocasuarina luehmannii* (bulloak), *Eucalyptus populnea bimble* (Bimble Box) and *Acacia salicina* (cooba) are commonly recorded.

Mapping of vegetation occurred during the current assessment following the *BioMetric* methodology, the major difference / discrepancy to that predicted by the 1:25,000 vegetation sheet is that an inland grey box domination was determined along the TNWP, not poplar box as mapped (although it was a sub-dominant component in most instances).

4.2 PREVIOUS ECOLOGICAL ASSESSMENTS

The most relevant and comprehensive ecological survey was undertaken by Central West Environmental Services for the proposed tailings reprocessing operation in Tomingley in 1995. This area surveyed for this assessment is on the eastern side of the Newell Highway in EL5830 (**Figure 2**), falling just outside the TGP Project Site.

The 1995 fauna survey was undertaken in September with random searches and transects methods employed. It is not possible to ascertain if a targeted search for frogs was undertaken as no frogs were recorded during the assessment.

Two consecutive days of timed reptile searches between 1100 and 1600 hours, and spotlighting occurred at night occurred. Two skinks and one gecko were recorded with none of these were listed as threatened under the TSC or EPBC Acts.

25 species of birds were recorded. One of these, the Grey-crowned Babbler (*Pomatostomus temporalis temporalis*), is currently listed as threatened under the TSC Act. No birds currently listed as threatened or migratory under the EPBC Act were recorded. Methods used in 1995 report did not include targeted microbat assessment, thus no microbats were recorded.

Vegetation communities recorded were described as Western Grey Box (*Eucalyptus microcarpa)* and Fuzzy Box *(E. conica).* The distribution of these communities was not mapped, however, a review of the 1995 EIS shows that these are likely to be associated with the transport corridor of the Newell Highway, as the study area was historically cleared. No species of flora recorded were listed as threatened in NSW or nationally. One class 4 Noxious Weed, African box thorn, was recorded.

More recently, OzArk undertook an ecological assessment along the MR89 for proposed road widening works in August 2008. The MR89 study area extended 7m either side of the edge line of the road beginning at its' junction with the Newell Highway (H17), crossing Gundong and Tomingley Creeks and finishing approximately 4.5km from the H17 and MR89 junction where the road has already been upgraded to meet route standard.

Inland Grey Box Woodland, Fuzzy Box Woodland Endangered Ecological Communities and the Grey-crowned Babbler were recorded during the assessment.

Further afield, a large development of the local region is Northparkes Mine (NPM), situated west of Peak Hill close to the headwaters of the Bogan River and in a generally similar environment to that of the TGP Project Site. Assessment of this area commenced in 1986 with survey over the Goonumbla Mining Lease as it was then known.

Vegetation communities recorded at NPM (E48 Project) include the following (DoP 2009).

- Mature White Cypress Pines along with some Poplar Box and Grey Box. The understorey is almost entirely introduced weed species.
- White Box - White Cypress Pine Woodland, (considered analogous with Grassy White Box Woodlands, which are listed as an Endangered Ecological Community (EEC) under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999).

As this report was written in 2005 it would have not have identified either Inland Grey Box Woodland EEC or Myall Woodland EEC, which were both listed after this date. The aforementioned is the most dominant remnant vegetation type within the general environs.

Threatened species recorded in 2005 was limited to the Yellow-bellied Sheathtail-bat which is listed as vulnerable under the TSC Act. Notwithstanding, Grey-crowned Babblers are known (from personal observation) to occur in the general environs of North Parkes Mine.

Grey-crowned Babbler were recorded in the Mine Site and TNWP Study Areas, however the yellow-bellied sheath-tailed bat was not (see Section 5.4).

Proposed revegetation programs at NPM would ultimately expand the areas adjoining the existing and proposed mining operations and create more corridor linkages to assist fauna movements and enhance habitats.

Several studies have been undertaken in association with the Peak Hill Gold Mine: The most relevant of these to ecology include:

- Goldney, D. (1990). Flora and Fauna Study - Peak Hill Mine site.
- Goldney, D, (1993a). Flora and Fauna Study - Peak Hill Gold Project April 1993.

- Goldney, D, (1993b). Supplementary Flora and Fauna Report to the Peak Hill Gold.
- R.W. Corkery & Co. Pty Limited (1993). Associated Gold fields NL and Alkane Exploration NL EIS for the Peak Hill Gold Project.
- Sutherland, M.D. (1996 to 2008), Peak Hill Gold Mine Mining Annual Environmental Management Reports.

The most salient information from these projects is the species lists. Alkane has updated these lists (current to 2004) and has provided them to OzArk. A review of the list demonstrated the following:

- No species of threatened plants have been recorded on the Peak Hill Mine site, similar results occurred along the PHTETL Study Area.
- As yellow box and grey box has been recorded it is likely that Inland Grey Box Woodland EEC and Box-gum Woodland EEC or CEEC would be encountered in the Peak Hill area. Field assessment showed that the only likely areas for box-gum woodland to occur were around creeks which have been completely destroyed in the PHTETL Study Area.
- Swift parrot and painted honey-eaters have been recorded in the mine site, however, the NSW General Manager of Alkane has not in the 17 years he worked on the property observed these two species. These two species are considered as being unlikely to be recorded.
- Barking owl, and varied sittella are both listed as threatened in NSW and are likely to occur in the PHTETL Study Area where suitable habitat remains whilst the EPBC migratory species, the Rainbow Bee-eater, may also be recorded in disturbed environments in association with ironbark communities. The latter statement about the Rainbow Bee-eater proved to be correct along the TNWP Study Area where the species was observed feeding in amongst winter flowering ironbarks.

4.3 MINE TAILINGS AND EFFECTS ON WILDLIFE

The Commonwealth Governments National Industrial Chemicals Notification and Assessment Scheme (NICNAS) recently released guidelines on Sodium Cyanide (NICAS 2010) and along with 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.

The residue to be stored in the RSF would contain sodium cyanide, the reagent used to bind and leach the gold from the ore. Cyanide is a fast acting poison, and its toxicity is related to the types of cyanide complexes that are present. Cyanide in biota binds to iron, copper and sulfur-containing enzymes and proteins required for oxygen transportation to cells. 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).

Cyanide concentrations below 50mg/L WAD are deemed safe to wildlife but are considered an interim benchmark for discharge into tailings (residue) storage facilities (TSF'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 with concentrations of WAD>50mg/L. The TGP is unlikely to have a large body of free standing water as discharge would not be concentrated from one point (multiple holes within poly pipe along the floor of the TSF which would all drain to a central decant). The decant presents the main risk to wildlife as it is a free standing body of water.

Accidents with the treatment system are possible. In the locality, summer storms or high rainfall events have potential to occur which, in the event the RSF is not designed or constructed adequately, could cause the RSF to rupture sending a large pulse of tailings downstream. This could have devastating effects on both terrestrial and aquatic ecological communities. Mining accidents with this type of mine are rare occurrences in Australia, however, those that have occurred have resulted in adverse environmental and ecological effects, with the possibility of, as yet unquantified, long term impacts.

The RSF design and construction would maximise water recovery from the residue. High water recovery is desirable for the following reasons:

- lower water content in the residue increases the stability and structural integrity of the RSF;
- the recovered water can be re-used in the mining process; and
- recovery of water from the residue reduces potential for leachate to escape from the RSF (a shallow water body has less potential to migrate into the underlying soils than a deeper water body).

Information presented in the literature and NICNAS (2010) indicates that detoxification, habitat modification and denying wildlife access to TSFs have been used effectively to manage the risks of cyanide to wildlife. Donato et al. (2007) suggests, however, that hazing techniques have proven ineffective. Donato (1999) further suggests that monitoring of wildlife and the effect of exposure to tailings is inconsistent, with wildlife deaths likely to have been underestimated, and the composition of at-risk species (including threatened and protected species) not well documented.

Compliance with the above NICNAS guidelines and the Code requires design and implementation of robust monitoring programs for compliance. A paper by Johnson and Donato titled "*Avoidance of wildlife fatalities and hard lessons from the African Sahel"* provide succinct guidance notes for avoidance of wildlife fatalities, as listed below.

- Chemistry and toxicity of process solutions are complex, difficult to predict, and subject to change with time. Therefore, in addition to predicting and monitoring water quality, equal attention should be placed on deterring wildlife from interacting with process solutions.

- The design of water storage facilities and the nature of surroundings play an important role in determining how attractive they are as habitat to wildlife. Therefore, efforts should be made to reduce the appeal of water ponds (ideally in the design and construction phase) to reduce the number of species interacting with ponds as well as the frequency and duration of those interactions.
- Provide alternative sources of water to lure wildlife away from potentially toxic solutions.
- Conduct simple and routine wildlife monitoring to avoid recurrent or protracted episodes of wildlife fatalities and to monitor the effectiveness of mitigation measures.
- Wildlife fatalities can be significantly reduced or eliminated through risk management.

Despite lack of 'expert' status, the author has managed potential impacts to wildlife by a review of literature, implementation of knowledge of wildlife ecology and through details of tailings management provided by Alkane. These measures when combined will provide a thorough assessment of the risk posed by tailings, potential impacts and recommended safeguards and controls.

4.4 DATABASE SEARCHES

Copies of the OEH (TSC Act), Department of Primary Industries (DPI) and DSEWPaC (EPBC Act) threatened species database searches were conducted and have been provided as **Appendix 8**. A desktop search was conducted on the following databases to identify any potential issues (**Table 1**).

4.4.1 Flora

Eight species of threatened plants have been recorded in the Central West (Bogan-Macquarie) CMA with one record of the Pine Donkey Orchid in the Central West (Lower Slopes) CMA. Five threatened species of flora have been identified within the Narromine LGA and further seven threatened species of flora have been identified within the Parkes LGA (**Table 2**). Of these, Bluegrass (*Dichanthium setosum)* recorded in 1892, occurs at Backwater Cowl near Narromine (8km northwest of the TNWP Study Area) and two records of *Philotheca ericifolia* (no date of the record) have been recorded within 500m of the proposed PHTETL Study Area, approximately 1km north of Peak Hill (in Burrabadine Creek)**.** The most likely threatened pants to be encountered within the Project Site are *Tylophora linearis, Dichanthium setosum* and *Philotheca ericifolia*.

4.4.2 Fauna

4.4.2.1 Amphibians

Whilst there are no formal records of threatened amphibians in the Parkes (only predicted to occur) or Narromine (not even predicted to occur) LGAs, it should be noted that Sloane's Froglet (*Crinea sloanei*) a TSC listed Vulnerable species has been captured within the Genaren Hill Sanctuary (Narromine LGA) approximately 30km northwest of the Project Site. This species is also known to occur in the Harvey Ranges (Goobang National Park) in the Cabonne LGA approximately 30km east of the Project Site.

Table 1
Database Search Results for Ecological Issues

Name of database searched	Date of search	Type of search	Comment
Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC) Protected Matters (EPBC Act) Database; http://www.environment.gov.au/erin/ert/epbc/index.html	13.4.2011	Point search on the Project Site	4 EECs, 12 threatened species and 11 migratory birds.
Office of Environment and Heritage (OEH) Threatened Species online database; http://www.threatenedspecies.environment.nsw.gov.au/index.aspx	13.4.2011	Combined geographic and habitat search in Central West (Bogan-Macquarie) Catchment Management Area.	60 results returned. 5 EECs, 7 threatened plants, and 48 threatened animals.
NSW Wildlife Atlas online database 2011 http://wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/watlasSpecies.jsp	14.4.11	Previously recorded species in Central West (Bogan-Macquarie) Catchment Management Area, Central West (Lower Slopes) Catchment Management Area, Parkes LGA and Narromine LGA	8 threatened plants have been previously recorded in the CW (B-M) CMA. The most commonly recorded species is the Red Darling Pea (*Swainsona plagiotropis*) with hundreds of individual plants recorded. Other species include: *Cheilanthes sieberi subsp. Pseudovellea; Diuris tricolor; Prostanthera spinosa; Pterostylis cobarensis; Dichanthium setosum; Zieria granulata* and a historic record of *Swainsona recta*. Further species recorded outside the CW (Lower Slopes) CMA include one record of the Pine Donkey Orchid. Further threatened species of plant recorded in proximity to the Study Area include: *Tylophora linearis, Dichanthium setosum* and *Philotheca ericifolia*. 48 threatened animal species have been previously recorded in the CW (B-M) CMA. 23 threatened animal species have been previously recorded in the CW (LS) CMA.
NSW Legislation website: SEPP 44: Koala Habitat Protection http://www.legislation.nsw.gov.au/fragview/inforce/epi%2B5%2B1995%2Bcd%2B0%2BN?	17.2.2011	Schedule 1 Local Government Areas (Clauses 5 (1), 11 (1), 12, 15). Schedule 2: Feed Trees listed.	The Narromine and Parkes LGA are listed in Schedule 1 of SEPP 44 Koala Habitat Protection. Records of Koalas do exist in proximity to the Project Site (Trangie and Tomingley) and Bimble Box (*E. Populnea*) a listed 'feed tree' species is likely to exist in the Project Site, thus Koala habitat needs to be considered.
Narromine Shire Council Local Environment Plan 1991. Parkes Shire Council LEP 1990	17.2.2011	Shire Council	Nothing Applicable.
DPI Noxious Weeds List http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed/	13.4.2011	Narromine LGA Parkes LGA	90 listed noxious weeds. Any of these weeds have potential to occur depending on levels of disturbance, grazing pressure and season conditions.

Table 2
Threatened Plants Previously Recorded in the Narromine and Parkes LGA

Species	Common Name	Status	NSW Wildlife Atlas Records	LGA
Dichanthium setosum	Bluegrass	V TSC Act V EPBC Act	2	Narromine
Pomaderris queenslandica		E TSC Act	1	Narromine
Rulingia procumbens		V TSC Act V EPBC Act	1	Narromine
Swainsona recta	Mountain Swainsona Pea	E TSC Act E EPBC Act	1	Narromine
Tylophora linearis		V TSC Act E EPBC Act	8 16	Narromine Parkes
Austrostipa wakoolica	A spear-grass	E TSC Act E EPBC Act	4	Parkes
Eucalyptus camfieldii	Heart-leaved Stringybark	V TSC Act V EPBC Act	1	Parkes
Goodenia macbarronii	McBarron's Goodenia	V EPBC Act	3	Parkes
Philotheca ericifolia		V EPBC Act	6	Parkes
Swainsona sericea		V TSC Act	1	Parkes
Zieria ingramii	Keith's Zieria	E TSC Act E EPBC Act	2	Parkes
V = Vulnerable E = Endangered				

4.4.2.2 Reptiles

There are no formal records or predictions for threatened reptiles to occur in the Parkes or Narromine LGAs. It was presumed that habitat for the regionally significant Carpet Python (*Morelia spilota)* would occur in the Project Site, however, overall the potential for this species to occur is considered 'low'.

4.4.2.3 Birds

A search of NSW Wildlife Atlas was carried out on 8th of July 2010 (updated January 2011) and identified 22 threatened species of birds that have been identified within the Narromine LGA and 27 threatened species that have been identified within the Parkes LGA (**Table 3**).

The Superb Parrot, Grey-crowned Babbler and Brown Treecreeper are the most frequently recorded species. Furthermore, the Grey-crowned Babbler and Superb Parrot are more frequently recorded in disturbed areas (farm paddocks and road corridors) than the other species. With respect to the Project Site, Grey-crowned Babblers are known to occur within the transport corridor along TNWP Study Area, whilst the Brown Treecreeper has been recorded in dense vegetation along Gundong Creek, on the outskirts of Tomingley. The Superb Parrot has been recorded several times within paddock trees near the Project Site and once within the TNWP Study Area. The Flame Robin has been previously recorded very close to the boundaries of the Mine Site Study Area. OzArk re-recorded Grey-crowned Babbler just north of Tomingley Creek and sighted a Spotted Harrier within 500m north of Gundong Creek.

Table 3
Threatened Birds Previously Recorded in the Narromine and Parkes LGA

Species	Common Name	Status	NSW Wildlife Records	LGA
Anseranas semipalmata	Magpie Goose	V TSC	2	Narromine
Ardeotis australis	Australian Bustard	E TSC Act	4	Narromine
Artamus leucorynchus	White-breasted Woodswallow	V TSC Act	2 9	Narromine Parkes
Burhinus grallarius	Bush Stone-curlew	E TSC Act	4	Parkes
Cacatua leadbeateri	Major Mitchell's Cockatoo	V TSC Act	2	Parkes
Calyptorhynchus lathami	Glossy Black-Cockatoo	V TSC Act	3 7	Narromine Parkes
Circus assimilis	Spotted Harrier	V TSC Act	3 7	Narromine Parkes
Climacteris picumnus picumnus	Brown Treecreeper	V TSC Act	17 41	Narromine Parkes
Daphoenositta chrysoptera	Varied Sittella	V TSC Act	3 9	Narromine Parkes
Falco hypoleucos	Grey Falcon	V TSC Act	38	Parkes
Glossopsitta pusilla	Little Lorikeet	V TSC Act	24	Parkes
Grantiella picta	Painted Honeyeater	V TSC Act	4 1	Narromine Parkes
Grus rubicunda	Brolga	V TSC Act	7 2	Narromine Parkes
Hieraaetus morphnoides	Little Eagle	V TSC Act	6 7	Narromine Parkes
Lathamus discolor	Swift Parrot	E TSC Act E EPBC Act	1	Parkes
Leipoa ocellata	Malleefowl	E TSC Act V EPBC Act	1 1	Narromine Parkes
Limosa limosa	Black-tailed Godwit	V TSC Act	2	Parkes
Lophoictinia isura	Square-tailed Kite	V TSC Act	1	Parkes
Melanodryas cucullata	Hooded Robin	V TSC Act	1 8	Narromine Parkes
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V TSC Act	5	Parkes
Neophema pulchella	Turquoise Parrot	V TSC Act	3	Parkes
Ninox connivens	Barking Owl	V TSC Act	6 6	Narromine Parkes
Oxyura australis	Blue-billed Duck	V TSC Act	3	Narromine
Petroica phoenicea	Flame Robin	V TSC Act	1 2	Narromine Parkes
Polytelis swainsonii	Superb Parrot	V TSC Act V EPBC Act	34 119	Narromine Parkes
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V TSC Act	30 26	Narromine Parkes
Pyrrholaemus saggitatus	Speckled Warbler	V TSC Act	2 24	Narromine Parkes
Rostratula benghalensis australis	Painted Snipe (Australian subspecies)	E TSC Act V TSC Act	1	Narromine
Stagonopleura guttata	Diamond Firetail	V TSC Act	1 14	Narromine Parkes
Stictonetta naevosa	Freckled Duck	V TSC Act	8 5	Narromine Parkes
Tyto novaehollandiae	Masked Owl	V TSC Act	2	Narromine
Xanthomyza phrygia	Regent Honeyeater	E TSC Act E EPBC Act	4	Parkes

Of the Parkes LGA records, the majority of threatened species are in association with the Peak Hill Mine, the most substantive patch of healthy remnant vegetation in the immediate environs of Peak Hill. The Superb Parrot, Painted Honeyeater, Barking Owl and Speckled Warbler are all known to occur in or adjacent to the Mine Site. Within the general environs of Peak Hill, the Brown Treecreeper, Grey-crowned Babbler, Barking Owl, Varied Sittella and a Flame Robin have all been previously recorded.

4.4.2.4 Mammals

A search of NSW Wildlife Atlas was carried out on 8th of July 2010 (updated January 2011) returned five threatened species of mammals that have been identified within the Narromine LGA and six threatened species of mammals in the Parkes LGA (**Table 4**).

Table 4
Threatened Mammals Recorded in the Narromine and Parkes LGA

Species	Common Name	Status	NSW Wildlife Records	LGA
Phascolarctos cinereus	Koala	V TSC Act	4 5	Narromine Parkes
Petaurus norfolcensis	Squirrel Glider	V TSC Act	2	Narromine
Nyctophilus timoriensis	Eastern Long-eared Bat	V TSC Act V EPBC Act	4 2	Narromine Parkes
Chalinolobus picatus	Little Pied Bat	V TSC Act	10 2	Narromine Parkes
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V TSC Act	1	Narromine
Dasyurus maculatus	Spotted-tailed Quoll	V TSC Act V EPBC Act	3	Parkes
Cercartetus nanus	Eastern Pigmy-possum	V TSC Act	1	Parkes
Pteropus poliocephalus	Grey-headed Flying-fox	V TSC Act V EPBC Act	1	Parkes

Of these, the Koala has been recorded twice in close proximity to the Project Site, once adjacent to the TNWP Study Area approximately 5km south of Narromine and the other record is approximately 1km northeast of Tomingley along Gundong Creek. Within the Parkes LGA the Koala has been previously recorded at Trewilga, approximately 15km south of Peak Hill whilst the remaining threatened mammal species are found within the Goobang National Park.

4.4.3 NSW listed Endangered Ecological Communities

OEH predicts that seven Endangered Ecological Communities have potential to occur in the Central West (Lower Slopes & Bogan Macquarie) CMA:

- Artesian Springs Ecological Community (Central West [Bogan Macquarie and Lower Slopes] CMAs).
- Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions (Central West [Bogan Macquarie] CMAs).
- Coolibah-Black Box woodland of the northern riverine plains in the Darling Riverine Plains and Brigalow Belt South bioregions (Central West [Bogan Macquarie] CMAs).

- Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (Central West [Lower Slopes CMA).
- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions(Central West [Bogan Macquarie] CMAs).
- White Box Yellow Box Blakely's Red Gum Woodland (Central West [Lower Slopes CMA).

The DPI predict one Endangered Ecological Community has the potential to occur in the Central West (Lower Slopes & Bogan Macquarie) CMA:

- Aquatic ecological community in the natural drainage system of the lowland catchment of the Lower Darling River Endangered Ecological Community.

DSEWPaC predicts that four Endangered Ecological Communities have potential to occur in the search area covering the Project Site:

- Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia
- Weeping Myall Woodlands

4.4.4 Endangered Populations

There are no endangered populations listed within the OEH or EPBC online databases in the Narromine or Parkes LGAs.

4.4.5 Critical Habitats

There are no OEH or DSEWPaC habitats listed as ‘critical’ within the Parkes or the Narromine LGAs.

4.4.6 Endangered or Threatened Aquatic Species

There are no threatened aquatic flora species listed by DPI which have potential to be recorded in the Central West CMA.

With respect to aquatic fauna listed in the *Fisheries Management Act 1994* (FM Act), DPI has identified a number of threatened fish species listed under the FM Act and the EPBC Act that have been sampled in the CW-CMA or their historical range includes the locality.

- Silver perch (*Bidyanus bidyanus*) listed as vulnerable, schedule 5, FM Act.
- Trout cod (*Maccullochella macquariensis*) listed as endangered, schedule 4, FM Act.

- Purple-spotted gudgeon (*Mogurnda adspersa*) listed as endangered, schedule 4, FM Act.
- Freshwater catfish (tandanus tandanus) population listed as threatened, schedule 4, FM Act.
- Olive perchlet (*Ambassis agassizii*) western population listed as endangered, schedule 4, FM Act.
- River snail (*Notopala sublineata*) listed as endangered, schedule 4, FM Act.
- Murray cod (*Maccullichella peelii peelii*) listed as vulnerable, EPBC Act.

4.4.7 Threatened / Endangered Aquatic Populations & Critical Habitats

No habitats listed as critical or endangered populations are listed by DPI or the DSEWPaC for the area. Only the Olive Perchlet (*Ambassis agassizii*) western population is listed as endangered (schedule 4, FM Act).

It is unlikely that any of the waterways in the Project Site would provide habitat for this species, however, after inundation they may be used for the dispersal of individuals and breeding of young.

4.5 PREDICTIVE MODEL

The concepts of the modelling described below formed the basis of the methodology designed for the current assessment. These reflect the predominant patterns of threatened species distribution as elicited from prior survey work and from applying habitat preference for those species within a transport corridor.

Remnant patch size is the primary factor appearing to determine the location of threatened plants and animals in the region and to a lesser degree in disturbed habitats proximity to a permanent water supply. Predictive modelling for EECs in the region is fairly straight forward as it can be summarised as likely to be any native vegetation left in the valley floor and on the undulating hills. Thus, Fuzzy Box Woodland EEC is likely to occur along drainage lines, Grey Box Woodland EEC along low lying areas and Box-Gum Woodland EEC along higher undulating landforms within the Project Site.

Table 5 surmises the threatened species, communities and population predicted to occur in the Project Site.

5 FIELD SURVEY METHODS

5.1 INTRODUCTION

Flora and fauna of conservation significance including locally and regionally significant species were targeted during the surveys. **Table 7** provides a summary of the survey methods and effort employed to date for the three study areas (see also **Figure 9**). The field assessment for the TGP was undertaken as follows (opportunistic sightings not included). Weather details have been provided in context.

Table 5
Listed Species, Communities, Populations with the Potential to occur within the Project Site

Species		Classification	Data Source
Flora Species			
Queensland Bluegrass	*Dichanthium setosum*	TSC Act	Background database searches
	Philotheca ericifolia.	TSC Act	Background database searches
	Tylophora linearis	TSC Act EPBC Act	Background database searches
Fauna Species			
Barking Owl	*Ninox connivens*	TSC Act	Background database searches indicate potential.
Brown Treecreeper	*Climacteris picumnus picumnus*	TSC Act	Background database searches indicate potential.
Eastern Long-eared Bat	*Nyctophilus timoriensis*	TSC Act	Background database searches indicate potential.
Flame Robin	*Petroica phoenicea*	TSC Act	Background database searches indicate potential.
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	TSC Act	Background database searches indicate potential.
Koala	*Phascolarctos cinereus*	TSC Act	Background database searches indicate potential.
Little Pied Bat (eastern subspecies)	*Chalinolobus picatus*	TSC Act	Background database searches indicate potential.
Painted Honeyeater	*Grantiella picta*	TSC Act	Background database searches indicate potential.
Sloane's Froglet	*Crinia sloanei*	TSC Act	Background database searches indicate potential.
Speckled Warbler	*Chthonicola sagittate*	TSC Act	Background database searches indicate potential.
Spotted Harrier	*Circus assimilis*	TSC Act	Background database searches indicate potential.
Superb Parrot	*Polytelis swainsonii*	TSC Act	Background database searches indicate potential.
Varied Sittella	*Daphoenositta chrysoptera*	TSC Act	Background database searches indicate potential.
Ecological Communities			
Aquatic EEC	Aquatic ecological community in the natural drainage system of the lowland catchment of the Lower Darling River Endangered Ecological Community.	FM Act	Background database searches indicate potential.
Myall Woodland EEC	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes Bioregions EEC	TSC Act EPBC Act	Background database searches indicate potential.
Box Gum Woodland EEC	White Box Yellow Box Blakely's Red Gum Woodland	TSC Act EPBC Act	Background database searches indicate potential.
Inland Grey Box Woodland EEC	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	TSC Act EPBC Act	Background database searches indicate potential.
Fuzzy Box EEC	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	TSC Act	Background database searches indicate potential.
Populations			
None predicted to occur in the Study Area			

5.1.1 Mine Site

- AnaBat assessments, 3rd to 6th May 2009 – (autumn) cool and clear nights ranging from 18 to 15°C, stag watching on the 3rd of May.
- Cage trapping 29th May to 3rd June 2009 – (late autumn / early winter) cool and clear nights, warm clear days ranging from 20 to 10°C, overcast with no rain.
- Hair tubes 3rd to 13th May 2009 – (autumn) cool and clear nights ranging from 18 to 15°C.
- Diurnal and nocturnal surveys – 5th- to 7th August and 1st to 2nd September 2009 (late winter / early spring). Clear days and cool nights ranging from 22 to 15°C. These surveys were during a week where many birds were cleaning out nests in tree hollows and or building nests in trees – an excellent time for survey. Night of 5th of August had rapid cold snap. Further opportunistic observations were undertaken in October and December 2010 (focussing on Grey-crowned Babbler nesting patters in the area).

5.1.2 Peak Hill – Tomingley Electricity Transmission Line

- 26th of August 2009 – (late winter). Warm clear day to 15°C, many reptiles observed basking.

5.1.3 Tomingley – Narromine Water Pipeline

- 13th and 29th August 2008 – (winter) unrelated RTA project, assessment of transport corridor to 20m from road centreline (Parallel to TNWP Study Area only separated by 5m). Cool and raining on the 13th hence resurvey on 29th which was clear and warm approximately 22°C.
- 10th of May 2008 – (autumn) assessment of previous alignment (3/4 remain the same in the preferred alignment). Weather was slightly overcast but warm to 24°C.
- 1st and 2nd July 2009 – (winter) assessment of realignment option and spot checks over remaining length of corridor. Weather was slightly cool but sunny and warm to 20°C.
- Overall weather during the assessments was ideal for observing fauna and flora in a western region.

5.2 FLORA SURVEY METHODS AND EFFORT

5.2.1 Community Nomenclature, Vegetation Survey and Mapping

Benson *et al.* (2006) reviewed all previous published and much unpublished work 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 Project (NSWVCA), to classify the vegetation of NSW. The vegetation communities recognised by Benson *et al.* (2006) are expected to form the basis of a standard vegetation classification for the State. Accordingly, the Benson *et al.* (2006) classification has been adopted in this and the impact report for the vegetation of the Project Site (NSWVCA is referred to as the *BioMetric* database in this report).

Survey and mapping were conducted on foot using a hand held GIS Magellan Mobile Mapper. Shape files created were potted using commercially available GIS software.

Mapping of the TNWP was undertaken using both pedestrian assessment (approximately 70% of the TNWP Study Area) and by vehicle assessment. The trip meter in the vehicle was used as an aid to delineate start and finish points of vegetation communities.

5.2.2 Vegetation Health and Condition

Tree health was determined following guidelines used by NSW Forests (**Table 6**).

Table 6
Tree Health Index Guide

Canopy Stress Category	Description
0	Perfectly healthy: Full crown of normally developed leaves on the ends of fine branchlets. There may be dead branches below the green crown in younger trees.
1	Healthy: Leaves mostly on the ends of fine branchlets. Canopy may be slightly thin with some fine branchlets dead.
2	Stressed: Leaves distributes along fine branches. Some dead fine branches in the upper canopy. May have dead medium branches in the lower canopy; or crown of normally developed shoots on medium/large branches (representing recovery from category 3 or 4).
3	Highly stressed: Many dead fine branches some dead medium branches. Sparse crown of normally developed shoots, or moderately full crown mostly comprising epicormic shoots, on medium branches; or A moderately full crown of normally developed shoots on large branches (representing recovery from category 4).
4	Severely stressed: Medium branches mostly dead. Crown may comprise clumps of epicormic shoots on the large branches and bole.
5	Dead: Canopy recently dead. Tree still carries some dead fine branches and bark.

Notes:
- Where recovery from a higher stress category is apparent, note this in the comments.
- If discoloured/deformed/infected leaved are apparent in addition to other symptoms – classify it in a higher stress category.
- Normally developed shots are initiated periphery of the live crown and contain leaves of adult form and arrangement.
- Branchlets are soft and not woody up to 3mm diameter – branches are woody
- Fine medium and large branches are relative to the crown volume for age. Small to medium trees – 3 to 20 mm diameter, medium 20 to 50 / 75 mm, large > 50/75 mm.

Low-condition vegetation was determined following the OEH Biobanking Assessment Methodology (BBAM) (DECCW 2008) where vegetation in low condition is defined as follows.

1. Woody native vegetation with:
   - native over-storey percent foliage cover less than 25% of the lower value of the over-storey percent foliage cover benchmark for that vegetation type, and
     - less than 50% of groundcover vegetation is indigenous species, or
     - greater than 90% of groundcover vegetation is cleared.
2. Native grassland, wetland or herbfield where:
   - less than 50% of groundcover vegetation is indigenous species6, or
   - more than 90% of groundcover vegetation is cleared.

[6] Means less than 50% of the percent foliage cover of the groundcover vegetation consists of indigenous groundcover species, not less than 50% of the groundcover species are indigenous species. Groundcover vegetation is herbaceous vegetation including grasses, forbs, herbs and similar low-growing non-woody plants.

5.3 FAUNA SURVEY METHODS AND EFFORT

5.3.1 Habitat Values of Hollow Bearing Trees

All trees within the impact footprints of each study area were physically inspected. Trees in adjacent areas were also inspected, however, no formal mapping was undertaken as quantification for the purpose of this report is not essential. It must be noted that those habitat values recorded within each impact footprint are consistent with habitat values in the paper roads of the Project Site.

Each tree was visually inspected (with or without binoculars as required) with habitat values being recorded by the OzArk ecologist. Each tree inspected was given an arbitrary ecological habitat value as follows.

- High Habitat Value (HHV). An old growth tree with a 'rare' key habitat element that one or more of the regions threatened species could use, i.e. in the Narromine and Parkes LGA a tree with a large hollow suited for a large forest owl, western quoll or is known breeding habitat for a threatened species (note Superb Parrots do not breed this far north). This type of tree has the most difficult key habitat elements to naturally replace and may also have moderate and small hollows and / or decorating bark for other of the regions threatened species. In essence it is a tree that proves a range of hollows and or habitat types for the largest number of threatened species in that region.
- Moderate Habitat Value (MHV). An old tree with an 'infrequent' key habitat element that one and possibly (but less likely) more of the regions threatened species could use, i.e. in the Narromine and Parkes LGA it would be a tree with a moderate sized hollow(s) too small to be suitable for a large forest owl breeding habitat but is most likely used by galahs / rosella for breeding. With time, a tree with MHV would become a HHV tree.
- Low Habitat Value (LHV). A tree with a 'frequent' key habitat element that one and very rarely more of the regions threatened species could use, i.e. in the Narromine and Parkes LGA it would be a tree with small hollows that are suitable for tree roosting microbats and / or substantive volumes of decorating bark. This category also includes trees with negligible habitat value, i.e. a tree that is unlikely to provide key habitat elements for roosting or breeding for any of the regions threatened species.

The author is aware that the values noted above are subjective and do not take into account SEPP 44 trees, the tree being a component of and EEC / CEEC or habitat for commonly occurring species. The above criteria were developed purely to address impacts to those species listed in the OEH and DSEWPaC database search results.

The location of each tree with Low to High Habitat Values in the Mine Site Study Area was recorded on a hand held Magellan™ MobileMaper. The locations of trees assessed in the PHTETL Study Area are overlain on aerial imagery in **Appendix 2**. The Proponent states that hollow bearing or substantive trees would not be removed in the TNWP Study Area.

5.3.2 Identification and Observation

Where fauna could not be readily identified by experience or commercially available references, assistance was sought from OEH threatened species officers.

Bats calls were recorded using AnaBat and ZCaim mass storage device. All events were recorded prior to dusk with cessation of the recording approximately 9am each morning. Emphasis was placed upon targeting the Wyoming One Open Cut impact footprint within the Mine Site Study Area, an area with greatest connectivity and structural complexity to be affected by the TGP.

Professional analysis (though sub-consultancies from NSW ECA members) were undertaken as required, i.e. Ultrasonic bat call analysis and hair wafer analysis.

Details of survey effort, due to its complexity (involving three large study areas) and over a prolonged time has been presented in **Table 7,** the locations of survey activities within the Mine Site Study Area has been shown on **Figure 9**.

5.3.3 Survey of Aquatic Habitats

Aquatic habitats were assessed with visual inspection, often the waterways were dry and allowed full pedestrian assessment in the Impact Footprint.

Dams were walked (circumnavigated) with those considered as having higher potential to possess frogs revisited during nocturnal targeted assessments. Care was taken to look for signs of fish and or the endangered river snail.

Habitat value was assigned following DPI literature "*Why do fish need to cross the road?"* (Fairfull and Witheridge, 2003).

5.3.4 Consistency with OEH *Threatened Species Survey and Assessment* Guidelines

Where it was determined that potential for a threatened species to occur existed methods used during this assessment were consistent with the *Threatened Species Survey and Assessment: Guidelines for Developers and Activities – Working Draft (2004)* or the *Threatened species survey and assessment guidelines: field survey methods for fauna: Amphibians (2009),* hereafter referred to as 'the OEH guidelines'.

The OEH guidelines' (DEC 2004:30-34) state 'It is advised that where adequate surveys have not been conducted within the Study Area due to time limitations (you can also infer season timing etc), the precautionary principle would always be adopted. This involves assuming that threatened biodiversity which are likely to occur in the Study Area (based upon the presence of suitable habitat and recent records) inhabit the whole of the Study Area. The Assessment of Significance (7-part tests) would then be conducted on this basis'.

Any opposition to a development-related project would interpret 'adequate surveys' in many different ways. In reality, commercial ecology has its limitations due to time constraints, seasonality of animals and plants, weather patterns and a general lack of prolonged base line assessments in most study areas. 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. This statement is based upon the available habitat being regionally fragmented, having small relative patch sizes, being linear and located distant to permanent water in intensively grazed and cropped land. The combination of the aforementioned makes the Project Site 'unlikely habitat' for the majority of the regions threatened species.

Table 7
Survey Effort

Survey Method	Stratification Unit				Total survey effort
	Mine Site	**PHTETL**	**TNWP**	**Aquatic Assessment: Tanks/ dams / creeks drainage lines**	
Flora - (20 x 20m) quadrants	Only undertaken as 'spot checks' to align vegetation remnant with a BioMetric unit. In total, six undertaken.	Not required	Only undertaken as 'spot checks' to align vegetation remnant with a BioMetric unit. In total, three undertaken.	Not considered an appropriate method for these waterways.	9 quadrants. No new species added to existing lists.
Flora – (50 x 20m) quadrants	Due to the narrow width of remnant patches a 50 x20m quadrant was not possible.	As per Mine Site	As per Mine Site	As per Mine Site	N/A
Flora - (100 x 20m) traverses	Not undertaken	Not undertaken	Not undertaken	Not undertaken	N/A
Flora – random traverse	Preferred survey method due to sparse ground layer vegetation. All 143ha of mapped vegetation was assessed on foot by Random Meander Method (Cropper 1993) – all mapped areas shown on **Figure 9**.	Preferred survey method due to scarcity of ground vegetation. All 21.1km of the study area assessed on foot using Random Meander Method (Cropper 1993).	Preferred survey method. All of 'Woodlands', ARTC easement, Dappo Road, Bootles Road and Pinedene Road assessed (predominantly on foot) (8km). Rest of MR89 assessed using a combination of walking to record changes in vegetation communities (50% of Study Area) and undertaking targeted habitat searches for threatened species of plants where habitat values were present (50% of Study Area). A second ecologist working as an archaeological assistant walked the 50% of the Study Area given spot checks and was briefed to identify any threatened species of plants.	All drainage lines assessed on foot using Random Meander Method (Cropper 1993).	Total survey of Mine Site (4 full days). Total survey of PHTETL (1 day) Approximately 50% of TNWP thoroughly assessed on foot, the rest given targeted assessments and walked by a second ecologist with the aim of identifying any threatened species (2.5 days full time equivalent). All drainage lines completely assessed.

Table 7 Survey Effort (cont'd)

Survey Method	Stratification Unit				Total survey effort
	Mine Site	**PHTETL**	**TNWP**	**Aquatic Assessment: Tanks/ dams / creeks drainage lines**	
Fauna -Dedicated habitat, animal sign search	Opportunistic searches of suitable habitat were undertaken, i.e. when encountering piles of manmade bricks, or areas with good structural complexity etc. for reptiles. An estimated 3 searches per day of 30 mins each (12 events in total x 30 minutes per event).	Opportunistic searches of suitable habitat were undertaken when suitable areas were encountered. Predominately there was poor structural complexity with ETL thus no ecological niches to investigate. The only exception being around pole 45 which was given targeted assessment for approx 15 minutes.	Opportunistic searches of suitable habitat undertaken when encountered. An estimated 3 searches per day of 30 mins (7.5 events in total x 30 minutes).	All dams assessed during daylight (13 dams) (15 minutes each). 4 dams in Mine Site assessed at night (20 minutes each)	Mine Site: 6 hrs dedicated searches PHTETL: 15 minutes TNWP: 3.75 hours Waterways: 3hrs 25 mins for daylight assessments 1.5 hrs at night.
Fauna -Elliott trapping (25 traps per site)	No Elliot trapping undertaken due to mouse plague	No Elliot trapping undertaken due to nature of impacts.	No Elliot trapping undertaken.	No Elliot trapping undertaken.	No Elliot trapping undertaken.
Hair funnels / wafers	Four lines, 20 funnels, 10 days, rebaited twice (**Figure 9**). Line 1: E-W, n=1-5 In Benson 201 and 86. To be impacted by Wyoming One pit – **Figure 8**, Paddock 5. Line 2: W-E 6-10 Clarkes Block fence line -Drainage line/Gilgai (cracking grey clays) Benson 57 - **Figure 8**, Paddock 9. Line 3: E-W 11-15 Wyoming Homestead access track fence line – grassy beside cereal stubble (cleared of native veg trees many years ago) **Figure 8**, Paddock 4. Line 4: S-N 16-20 Gundong Creek Benson 76 & 78 **Figure 8**, Paddocks 1 & 3.	No hair wafers used.	No hair wafers used.	See comments for Line 4.	Mine Site 200 trap nights. PHTETL and TNWP = 0

Table 7 Survey Effort (cont'd)

Survey Method	Stratification Unit				Total survey effort
	Mine Site	**PHTETL**	**TNWP**	**Aquatic Assessment: Tanks/ dams / creeks drainage lines**	
Fauna -Wire cages - 3 small and 1 large	4 cages three consecutive nights (12 trap nights), targeted impact footprint in native vegetation (Benson 201 and 82) and woodland habitat near permanent water (**Figure 9**).	No cage trapping required.	No cage trapping required.	Remnant near permanent water targeted in Mine Site.	Mine Site, 12 trap nights.
Fauna -Nocturnal bird call playback (each session 30 min)	1 night, 2 sessions in Wyoming Deposit Impact Footprint, methods as per Debus *et al* 2005.				2 x 30 minute sessions in Mine Site.
Fauna -Spotlighting foot, 30 min 1ha search)	3 sites (1.5 hrs) in Benson 76, 201 and 78.	Not undertaken	Not undertaken	4 dams searched c. 2 hrs	Mine Site = 1.5hrs in woodland and 2 hrs farm dams.
Fauna -Car based spotlighting30 minutes for approx 1.5 km	3 night's approx 30 minutes (1.5hrs).	Not undertaken	Opportunistic – The author travels this road frequently	N/A	Mine Site = 3 night's approx 30 minutes (1.5hrs).
Fauna -Harp trapping	Not considered requisite unless *Nyctophilus sp* were detected.	Not undertaken. Mine Site Anabat results extrapolated into the Study Area.	Not undertaken. Mine Site Anabat results extrapolated into the Study Area	N/A	Not undertaken.
Fauna -Anabat Recording - 4 nights, all night	4 consecutive nights in Benson 201 and 86 transition in Wyoming Deposit Impact Footprint (**Figure 9**).	Not undertaken. Mine Site Anabat results extrapolated into the Study Area	Not undertaken. Mine Site Anabat results extrapolated into the Study Area	N/A	Mine Site = 4 full consecutive nights (capturing both dusk and dawn periods).
Fauna -Trip line – dam / watercourse	N/A	N/A	N/A	Not considered requisite.	0

Table 7 Survey Effort (cont'd)

Survey Method	Stratification Unit				Total survey effort
	Mine Site	PHTETL	TNWP	Aquatic Assessment: Tanks/ dams / creeks drainage lines	
Fauna -Diurnal herpetofauna	Opportunistic - see dedicated animal habitat / sign search above.	See Mine Site	See Mine Site	See Mine Site	Mine Site: 6 hrs dedicated searches PHTETL: 15 minutes TNWP: 3.75 hours Waterways: 3hrs 25 mins for daylight assessments 1.5 hrs at night.
Fauna -Pitfall traps	None employed. No habitat for threatened reptiles in Project Site. Targeted searches provided adequate results for the purposes of the assessment.	See Mine Site	See Mine Site	See Mine Site	0
Fauna -Nocturnal herpetofauna (foot based spotlighting for frog and reptiles)	See 'spotlighting on foot' above.	See Mine Site	See Mine Site	See Mine Site	Mine Site = 1.5hrs in woodland and 2 hrs farm dams.
Fauna -Diurnal Bird (10 min spot searches)	Opportunistic methods were employed in the field as the task was combined with mapping vegetation which took all day in field.	See Mine Site	See Mine Site	See Mine Site	Total survey of Mine Site (4 full days). Total survey of PHTETL (1 day) TNWP was given targeted assessments (2.5 days full time equivalent). All drainage line completely assessed.

NOTES:
- Stag watching was conducted as a precursor to spotlighting where suitable habitat was available, Impact Footprints were targeted.

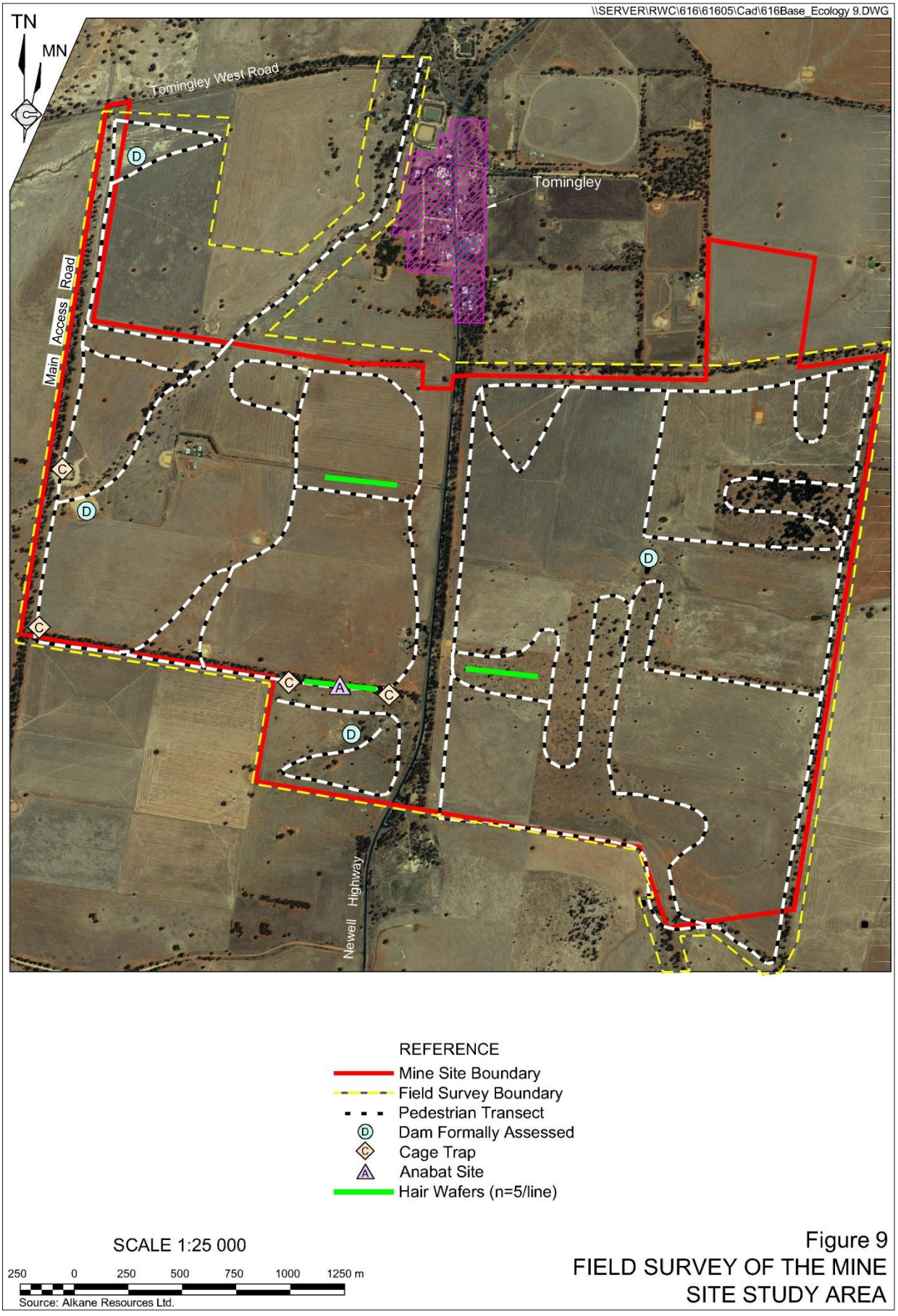


Figure 9
FIELD SURVEY OF THE MINE SITE STUDY AREA

- With respect to threatened ground dwelling animals, a combination of factors resulted in the consultant not undertaking Elliot trapping. The most significant being that striped faced dunnart is extremely unlikely to be recorded in the Project Site. Notwithstanding, the method employed was to deploy 20 hair wafers for 10 days (re-baited twice) and use the results to justify further assessment. Only house mice were recorded which were in plague proportions during the 2009 assessment. When a Fat-tailed Dunnart carcase was recorded within the Mine Site Study Area, weather conditions at the time were warm but likely to drop to freezing at night. This posed a risk of mortality for small animals. The consultant did not deploy Elliot traps for ethical reasons as there was a high chance that animals would die if temperatures dropped again. Additionally, it was considered that the important information was obtained, i.e. a local population was known to present and that further work would be a recommendation of the conditions of consent and as such not required for project determination.
- Threatened orchids were not in flower at the time of some portions of the assessment. The effect of this constraint was managed in the field by tying to identify areas of potential habitat for these species and returning to them when they were in flower (only applicable in the TNWP Study Area).

5.4 BIODIVERSITY OFFSET STRATEGY

The BioBanking Assessment Methodology (BBAM) and Compliance Assurance Strategy were followed. **Appendix 10** provides a copy of the credit calculator report as well as supporting information.

5.5 DETERMINATION OF 'AFFECTED SPECIES'

Affected species were considered as those that are likely to be affected by the proposed activity.

To identify these, a list of threatened species, populations communities, wetland and or migratory species was compiled from field assessment results, the literature review and database search. Those species known to occur, or not being observed but considered likely to occur in the Project Site were identified and given further consideration to determine those that would be detrimentally influenced by removal of habitat by the activity.

6 RESULTS / DISCUSSION

6.1 VEGETATION IN THE PROJECT SITE

6.1.1 Mine Site

81.0% of the Mine Site Study Area has been cleared (approximately 665.2ha of the 820.8ha assessed). Approximately 19.0% (or 155.6ha) of the Mine Site Study Area retains parcels of a contiguous linear canopy of native vegetation associated within former paper roads where the average width of the remnant is 50m. Other areas with a remnant canopy occurred on land unsuitable for tilling, i.e. parcels of land associated with gilgai's.

Inland Grey Box, Fuzzy Box, Belah, Western Rosewood, White Cypress Pine and Bimble Box, were the dominant canopy species. Ground cover diversity was characterised by past and present disturbance history (e.g. clearing then heavy grazing from sheep) and can be best described as depauperate having generally poor diversity and structural complexity and very low levels of natural recruitment.

Six main native vegetation communities consistent with those described in *BioMetric* were identified during the field surveys (see **Figure 10**).

- Community 1: Inland Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams ('Benson 76), 36.9ha in six main remnants. This community is a component of the NSW Inland Grey Box Woodland Endangered Ecological Community.
- Community 2: River Red Gum Riverine Woodland Forest (Benson 78), 12.9ha in five main remnants.
- Community 3: Fuzzy Box – Inland Grey Box on alluvial brown soils (Benson 201), 30.6ha in five main remnants. This community is a component of a Fuzzy Box on Alluvials Endangered Ecological Community.
- Community 4: Poplar Box – Belah Woodland on clay alluvial plains (Benson 56) 4.9ha in six main remnants.
- Community 5: Belah / Black Oak Western Rosewood, Wilga Woodland (Benson 57), 70.3ha in two main remnants.
- Community 6: Planted Mugga Ironbark 0.7ha in one main remnant.

Details of each of the *BioMetric* units noted above (which would be disturbed by the TGP) have been provided on **Tables 8** to **10** and are shown on **Figure 10**.

6.1.2 Peak Hill – Tomingley Electricity Transmission Line

The majority of the proposed 21.1km x 30m PHTETL Study Area has been cleared. At a landscape perspective, the locality retains contiguous native vegetation only in linear sections associated within paper roads where the average width of the remnant is 50m.

Some of these areas would be intersected by the PHTETL and this is where the majority of tree removal associated with this activity would occur. The only other area with a remnant canopy is myall associated with a gilgai (unsuitable for tilling).

Table 8
Details of Belah / Black Oak Western Rosewood, Wilga Woodland (Benson 57)[#]

Benson 57 (Belah)	Size of remnant (ha)	Dimension of remnant	**Location (Figure 6)**	**W or E of Newell Hwy**	**Size of modification (Impact) in ha**	**EEC**
No of contiguous remnants	2	N/A	N/A			N
Size of remnant 1	25.94	655 x 446m	Paddock 13	e	0	
Size of remnant 2	26.36	670 x 480m	Paddocks 9,10,11&14	e	16	
Total	**52.3**				**16 ha**	

Note [#]: Digital assessment of the aerial photography has subsequently identified that 70.3ha occurs within the Mine Site and 18.0ha would be impacted. The author has adopted these areas for the remainder of the report.

Table 9
Details of Inland Grey Box – Poplar Box – White Cypress Pine Tall Woodland on Red Loams (Benson 76)

Benson 82 (IGB)	Size of remnant (ha)	Dimension of remnant (approx)	Location	W or E of Newell Hwy	Size of modification (Impact) in ha	EEC
No of contiguous remnants	6	N/A	N/A			Y
Size of remnant 1	16.4	4,042 x 52m	Paddocks 1 to 5	e	1.98	
Size of remnant 2	1.3	470 x 40m	Paddock 2	e	0	
Size of remnant 3	0.61	330 x 20m	Paddock 2	e	0	
Size of remnant 4	1.2	380 x 35m	Paddock 12	w	0	
Size of remnant 5	3.4	997 x 45m	Paddocks 10 & 15	w	0	
Size of remnant 6	1.8	470 x 45m	Adjoining paddock 15	w	0	
Total	**24.71**				**1.98 ha**	

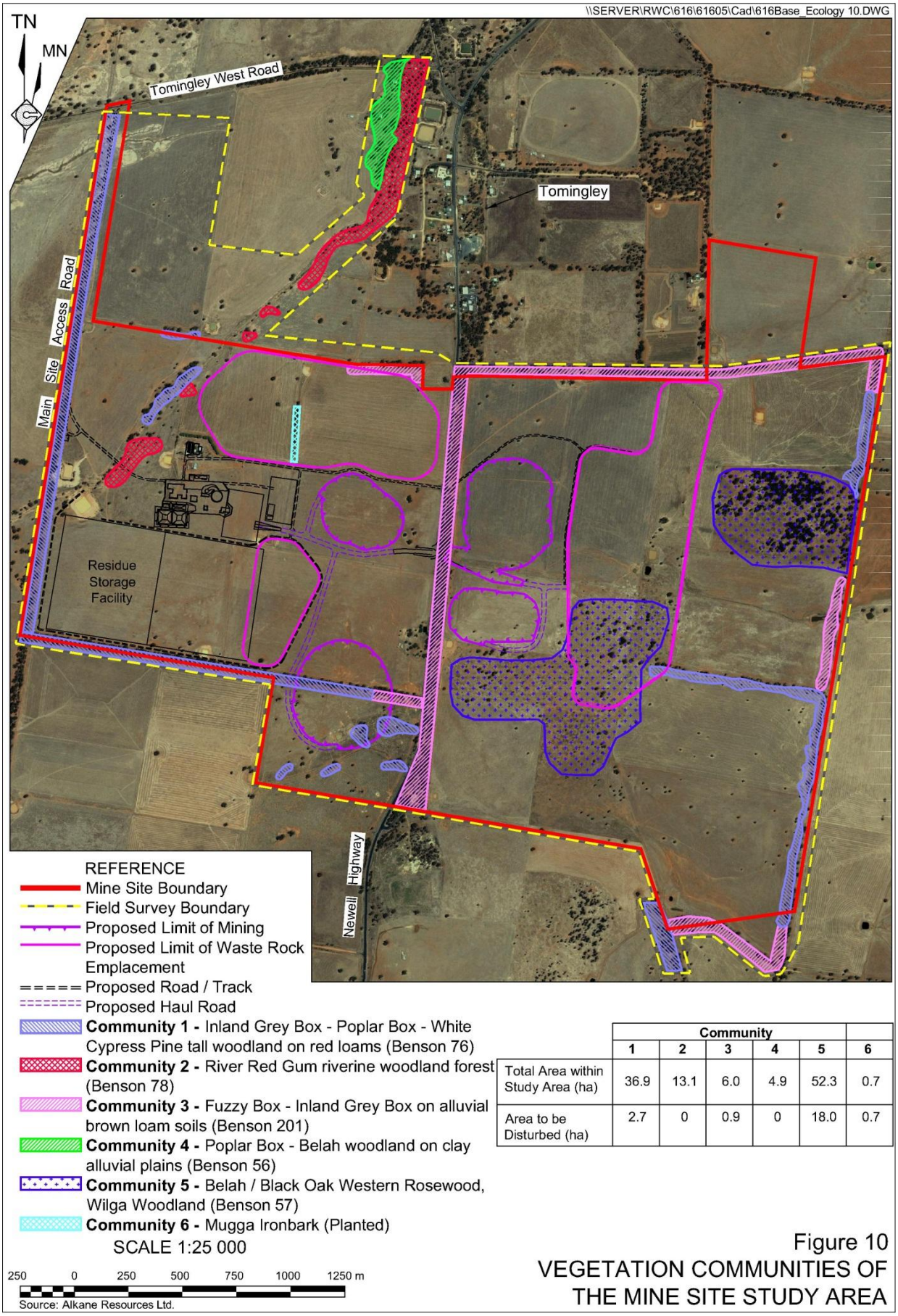
Note #: Digital assessment of the aerial photography has subsequently identified that 36.9ha occurs within the Mine Site and 2.7ha would be impacted. The author has adopted these areas for the remainder of the report.

Table 10
Details of Fuzzy Box – Inland Grey Box on Alluvial Brown Soils (Benson 201)#

Benson 201 (FB)	Size of remnant (ha)	Dimension of remnant	Location	W or E of Newell Hwy	Size of modification (Impact) in ha	EEC
No of contiguous remnants	5	N/A	N/A			Y
Size of remnant 1	1	25 x 45m	Paddock 5	e	1	
Size of remnant 2	1.8	375 x 50m	Paddock 6	e		
Size of remnant 3	24.8	4030 x 45m	Adjoining paddocks 7 to 9, 11, 12 and 14	w		
Size of remnant 4	2.7	515 x 45m	Paddock 12	w		
Size of remnant 5	3.5	900 x 45m	Paddocks 10 & 15	w		
Total	**33.8**				**1 ha**	

Note #: Digital assessment of the aerial photography has subsequently identified that 30.6ha occurs within the Mine Site and 0.9ha would be impacted. The author has adopted these areas for the remainder of the report.

Inland Grey Box, Fuzzy Box, Belah, Western Rosewood, White Cypress Pine and Bimble Box were the dominant tree species encountered. Ground cover is depauperate, mostly absent with poor diversity, structural complexity and very low levels of natural recruitment. Highly modified areas were characterised by higher diversity of introduced species, both intentional (agricultural and planted) and exotic weeds.



	Community					
	1	2	3	4	5	6
Total Area within Study Area (ha)	36.9	13.1	6.0	4.9	52.3	0.7
Area to be Disturbed (ha)	2.7	0	0.9	0	18.0	0.7

Figure 10
VEGETATION COMMUNITIES OF THE MINE SITE STUDY AREA

Individual trees are all that remains of four native vegetation communities consistent with those described in *BioMetric* were identified during the field surveys:

- Belah / Black Oak Western Rosewood, Wilga Woodland (Benson 57).
- Inland Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams (Benson 76). This community is a component of the NSW Inland Grey Box Woodland EEC.
- Fuzzy Box – Inland Grey Box on alluvial brown soils (Benson 201). This community is a component of the NSW Fuzzy Box Woodland on Alluvials EEC.
- Weeping Myall open woodland of the Riverina and NSW South Western Slopes Bioregions (Benson 26), a NSW and nationally listed Myall Woodlands EEC in NSW and nationally listed CEEC.

The best quality vegetation was associated with existing transport corridors and paper roads on farms, however, no understorey species remain.

6.1.3 Tomingley – Narromine Water Pipeline

Approximately 95.5% of the TNWP Study Area retains a canopy of contiguous, linear canopy of native vegetation (approximately 52.2ha of the 54.6ha assessed in the 46km x 10m area surveyed). Vegetation in both sides transport corridor is estimated to be 25 to 30m, therefore the volume of native vegetation from Tomingley to the Pinedene Road turnoff is approximately 25m (width both sides) multiplied by 38km (length both sides) x 2 (both sides of the road) or 190ha of extant native vegetation. If one was to include the volume of native vegetation within the remaining portion of the Study Area from Pinedene Road to ”Woodlands” (approximately an additional 15ha) the total volume of the remnant immediately adjacent to the

TNWP could be roughly estimated at 205ha. The TNWP Study Area is 10m wide and 46kim in length (4.6ha), roughly 2% of the total size of the remnant.

Native vegetation within the TNWP Study Area is predominantly found in the Narromine-Tomingley Road transport corridor on its southbound lane (the area in which the TNWP would be placed). Other areas with substantive native vegetating include the southern transport corridor of Pinedene Road and the eastern road corridor of Dappo Road and the west bound lane of the Mitchell Highway. The Australian Rail Track Corporation (ARTC) easement, Bootles Road and the road into Woodlands are free of substantive native vegetation.

Seven main native vegetation communities were recorded; six of these are consistent with those described in *BioMetric*.

- Inland Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams (Benson 76): comprising 28.6ha in 23 main remnants (52.7% of all vegetation recorded). This community is a component of the NSW Inland Grey Box Woodland EEC.
- River Red Gum Riverine woodlands and forests (Benson 78): comprising one main remnant of 7ha 12.4% of all vegetation recorded).

- Fuzzy Box – Inland Grey Box on alluvial brown soils (Benson 201): comprising 16 contiguous remnants of often very small / discrete patches that are always associated with creek crossings or minor drainage lines and damp areas (12.4% of all vegetation recorded). This community is a component of the NSW Fuzzy Box Woodland on Alluvials EEC.
- Poplar Box – Belah woodland on clay alluvial plains (Benson 56): comprising five main remnants totalling 6.7ha (12.3% of all vegetation recorded). Often a difficult community to separate from Benson 76 as both integrate regularly, however, occupies more frequently inundated areas than Benson 76.
- Mugga Ironbark – Inland Grey Box – pine tall woodland (Benson 217): comprising two main remnants totalling 2.7ha in the Study Area (4.9% of all vegetation recorded). Very distinct community occupying red hill comprised of gravels.
- Cleared land (not a BioMetric vegetation unit). Comprising cleared land, i.e. heavily mechanically disturbed, not 'grassland' or potions of tother described vegetation communities with canopies removed. Disturbed areas represented approximately 2.5ha, mostly in 'Woodlands', ARTC easement, Bootle Road and the terminal ends of the TNWP in the Mine Site Study Area (4.5% of all vegetation recorded).
- Yellow Box – Blakely's Red Gum grassy woodland[7]: comprising one remnant of 0.42ha along Dappo Road, very stressed at the time of the inspection (0.77% of all vegetation recorded). This community is a component of the NSW White Box, Yellow Box and Blakely's Red Gum EEC.

Details of each *BioMetric* unit and vegetation type noted above have been provided on **Table 11** and in **Appendix 3**, **Images 1** to **9**.

6.1.4 Health and Condition of Recorded Communities

The majority of trees assessed were either perfectly healthy or healthy (see **Table 6**). Notable exceptions were:

- the entire community of Yellow Box – Blakely's Red Gum grassy woodland along Dappo Road (**Appendix 3**, Image 8) which was 'highly stressed';
- a small community of Bimble Box along the PHTETL between Poles 57 to 59 that were 'severally stressed';
- a small community of 100 myall along the PHTETL between Poles 54 to 55 that were 'stressed', probably due to bag moth infestation; and
- a small area of inland grey box along the PHTETL between Poles 84 to 85 that were 'stressed'.
- The only area of native vegetation possibly eligible for listing as in 'Low Condition' is that within the 21.1km PHTETL which was approximately 90% cleared and of the 100 species of plants recorded 60% (60 species) were exotic weeds and the remaining 40% (40) were native species.

[7] This community was not described by Benson *et. al* and appears in BioMetric using its full name as presented in this report.

Table 11
Details of Vegetation Communities in the TNWP

Benson 76 (IGB)	Size of Remnant (ha)	Total Dimensions of Remnant	**Location**	**Notes**	**Size of Modification (Impact) (ha)**	**EEC**
No of contiguous remnants	23	all 10m width	Refer to **Appendix 3**			Y
Collective size of remnants	28.64	all 10m width	Refer to **Appendix 3**		0	
Total	**28.64**					
Benson 201 (FB)	Size of Remnant (ha)	Total Dimensions of Remnant	**Location**	**Notes**	**Size of Modification (Impact) (ha)**	**EEC**
No of contiguous remnants	16	all 10m width	Refer to **Appendix 3**			Y
Collective size of remnants	6.74	all 10m width	Refer to **Appendix 3**		0	
Total	**6.74**					
Benson 56 (PB)	Size of Remnant (ha)	Total Dimensions of Remnant	**Location**	**Notes**	**Size of Modification (Impact) (ha)**	**EEC**
No of contiguous remnants	5	all 10m width	Refer to **Appendix 3**			N
Collective size of remnants	6.69	all 10m width	Refer to **Appendix 3**	Includes 4ha in Mine Site	0	
Total	**6.69**					
Yellow Box - Blakelys Red Gum grassy woodland	Size of Remnant (ha)	Total Dimensions of Remnant	**Location**	**Notes**	**Size of Modification (Impact) (ha)**	**EEC**
No of contiguous remnants	1	all 10m width	Refer to **Appendix 3**			Y
Collective size of remnants	0.42	all 10m width	Refer to **Appendix 3**	Highly stressed	0	
Total	**0.42**					
Benson 78 (RRG)	Size of Remnant (ha)	Total Dimensions of Remnant	**Location**	**Notes**	**Size of Modification (Impact) (ha)**	**EEC**
No of contiguous remnants	1	all 10m width	Refer to **Appendix 3**			N
Collective size of remnants	7	all 10m width	Refer to **Appendix 3**		0	
Total	**7**					
Benson 217 (MIB)	Size of Remnant (ha)	Total Dimensions of Remnant	**Location**	**Notes**	**Size of Modification (Impact) (ha)**	**EEC**
No of contiguous remnants	2	all 10m width	Refer to **Appendix 3**			N
Collective size of remnants	2.66	all 10m width	Refer to **Appendix 3**		0	
Total	**2.66**					
Cleared	Size of Remnant (ha)	Total Dimensions of Remnant	**Location**	**Notes**	**Size of Modification (Impact) (ha)**	**EEC**
No of contiguous remnants		all 10m width	Refer to **Appendix 3**			N
Collective size of remnants	2.48	all 10m width	Refer to **Appendix 3**		0	
Total	**2.48**					

The rest of the mapped native vegetation is in 'Moderate' to 'Good' condition, however, it should be noted that ground and understory layers in the Mine Site Study Ares are extremely sparse (almost non-existent).

6.2 OBSERVED FLORA

6.2.1 Mine Site

124 species of flora were recorded during the assessment (**Appendix 5**) of which 66 (53.2%) were native and 58 (46.8%) were exotic (excluding commercially grown agricultural species).

Native species generally dominated the ground cover of native woodland and forested areas (albeit very sparsely) where thickets of African box thorn are absent. Highly modified areas were characterised by higher diversity of introduced species, both intentional (agricultural and planted) and exotic weeds.

The best quality and most diverse vegetation is outside the Mine Site Study Area within the Newell Highway transport corridor where grazing has been excluded for an extended period. A list of plants recorded in the Mine Site Study Area can be reviewed in **Appendix 5.**

Weeds declared as noxious included galvanised bur (*Bassia birchii*) and African box thorn (*Lycium ferocissimum*) both Class 4 noxious weeds. No plants listed as threatened were recorded.

No plants listed as threatened were recorded.

6.2.2 Peak Hill – Tomingley Electricity Transmission Line

100 species of flora were recorded along the PHTETL, 62% (62 species) were exotic weeds and the remaining 38% (38) were native species (**Appendix 5**). A total of 185 trees were recorded within the proposed easement mainly in association with areas where the PHTETL crosses existing transport corridors or paper roads. Of the 185 trees, 75 are from the one dense patch of bulloaks where the PHTETL enters the Mine Site. Details of each tree encountered within the PHTETL has been provided on **Table 12** and annotated on aerial imagery of the proposed ETL alignment in **Appendix 2, Images 1** to **12**.

Weeds declared as noxious included galvanised bur (*Bassia birchii*) and African box thorn (*Lycium ferocissimum*) and Bathurst burr (*Xanthium spinosum*), all Class 4 noxious weeds. No plants listed as threatened were recorded.

6.2.3 Tomingley – Narromine Water Pipeline

196 species of flora were recorded, 66.8% (131 species) were native and 33.2% (65 species) were exotic (**Appendix 5**). No plants listed as threatened were recorded.

Inland Grey Box, Fuzzy Box, Bimble Box, white cypress pine, mugga ironbark and Belah are the dominant canopy species. Ground cover diversity was characterised by past and present disturbance history (e.g. road infrastructure, occasional grazing and laying of a telecommunications cable in the assessed area) and can be best described as either having poor diversity and structural complexity (under thick areas of pine or Belah) and associated low levels of natural recruitment, to areas with moderate diversity and good structural integrity.

Table 12
Tree Species Recorded Within the PHTETL Study Area

Location Poles x to y	IGB	FB	BB	Myall	Wilga	WCPine	Bulloak	Kurrajong	HHV	MHV	LHV	Reference Appendix 2 Image x	Notes on tree health
9 to 10	1										1	3	
19 to 20					1						1	4	
23 to 24	1				1						2	5	IGB severerly stressed
31 to 33	5									2	3	6	
45 to 46	7								4	1	2	7	
54 to 55				20							20	8	Stressed
56 to 59	1		2				1			1	3	8	Severe stress
63 to 64	6									2	4	9	
70 to 71	2									1	1	9	
76 to 77	8									1	6	10	
76 to 77		1				1			1		2	10	
79 to 80		1				1		1			3	10	
80 to 81	2									2		11	
82	13									4	9	11	
83 to 84	9					9					9	11	
84 to 85	2										2	11	
86	8								5	2	1	11	
92	18								2	10	6	12	
92							74				74	12	
Totals	***83***	***2***	***2***	***20***	***2***	***11***	***75***	***1***	***12***	***26***	***149***		

Key:

IGB - Inland Grey Box, derived from Benson 76 FB – Fuzzy box, derived from either Benson 76 or Benson 201
Myall – Myall Woodlands EEC Wilga – Derived from Benson 57 Bulloak – Derived from Benson 76
WC Pine – White cypress pine, derived from Benson 76 Kurrajong – Derived from either Benson 76 or Benson 201
HHV – A tree with high habitat values i.e. very large hollows MHV – A tree with small, medium to moderate sized hollows
LHV – A tree with no obvious hollows

Only one area, the southern side of Pinedene Road, possessed representative levels of biodiversity (as compared to the *BioMetric* species list) but this was an extremely narrow (15m) remnant and invaded by blue heliotrope, a very difficult exotic weed to remove (**Appendix 1**, **Plate 45**). Native species generally dominated the ground cover of native woodland and forested areas. Highly modified areas were characterised by a higher diversity of introduced species and exotic weeds.

A list of plants recorded in these communities can be reviewed in **Appendix 5.**

Weeds declared as noxious included galvanised burr (*Bassia birchii*), African boxthorn (*Lycium ferocissimum*), Bathurst burr (*Xanthium spinosum*) and Nagoora burr (*Xanthium pungens*), all Class 4 noxious weeds.

6.3 FAUNA OF THE PROJECT SITE

6.3.1 Summary

The fauna survey revealed that the Project Site supports a moderate diversity of native fauna. A total of 134 vertebrate fauna species (123 native and 11 introduced) were recorded during survey and incidental observations comprising.

- 17 reptile species (no threatened species, one with local conservation concern);
- frog species (no threatened species, two with local conservation concern);
- 86 bird species (including five listed as threatened under the NSW TSC Act, one listed as a threatened and migratory species under the Commonwealth EPBC Act, and seven species of local conservation concern); and
- 25 mammals (including three threatened and three species with local conservation concern under the NSW TSC Act).

Appendix 6 provides a summary of all threatened fauna records within the Project Site. All microbats recorded in the Mine Site Study Area were presumed to have potential to be recorded throughout the Project Site. **Figures 11** and **12** show the locations of threatened species recorded or previously recorded (from BioNet results) in context of each study area. It is possible that some of these species, including threatened species and species of conservation concern, could use the subject site on occasions.

Species profiles detailing information on ecological requirements have been prepared for each threatened species (**Appendix 7**), have been annotated to justify decisions used to undertake Assessments of Significance at a NSW or National level.

All species recorded during this assessment have been previously recorded within the locality or region. The TNWP Study Area possessed 88.4% of all fauna biota observed, Mine Site Study Area 55.8% and the PHTETL Study Area 25.6%. Broadly, these figures represent the values of the quality, floral biodiversity, habitat complexity and patch sizes of vegetation over the Project Site.

6.3.2 Avifauna

6.3.2.1 All Bird Species Recorded

86 species (83 native and three introduced) were recorded within the Mine Site Study Area during seven days and three nights of observations (representing 55.8% of all birds recorded over the Project Site). The majority of species were observed during diurnal bird surveys.

In comparison to the PHTETL Study Area and the TNWP Study Area faunal distributions (recording 22 and 76 species respectively), the Mine Site Study Area is considered to have moderate bird diversity given the survey effort and timing of the survey. The most notable observation was a general lack and abundance of small birds within the Mine Site and PHTETL Study Areas. It was assumed that the narrow width of the linear remnants, lack of native understory and heavy grazing had impacted upon key habitat elements required for many of the smaller passerines to occur, whilst also opening them up for easy attack from predators.

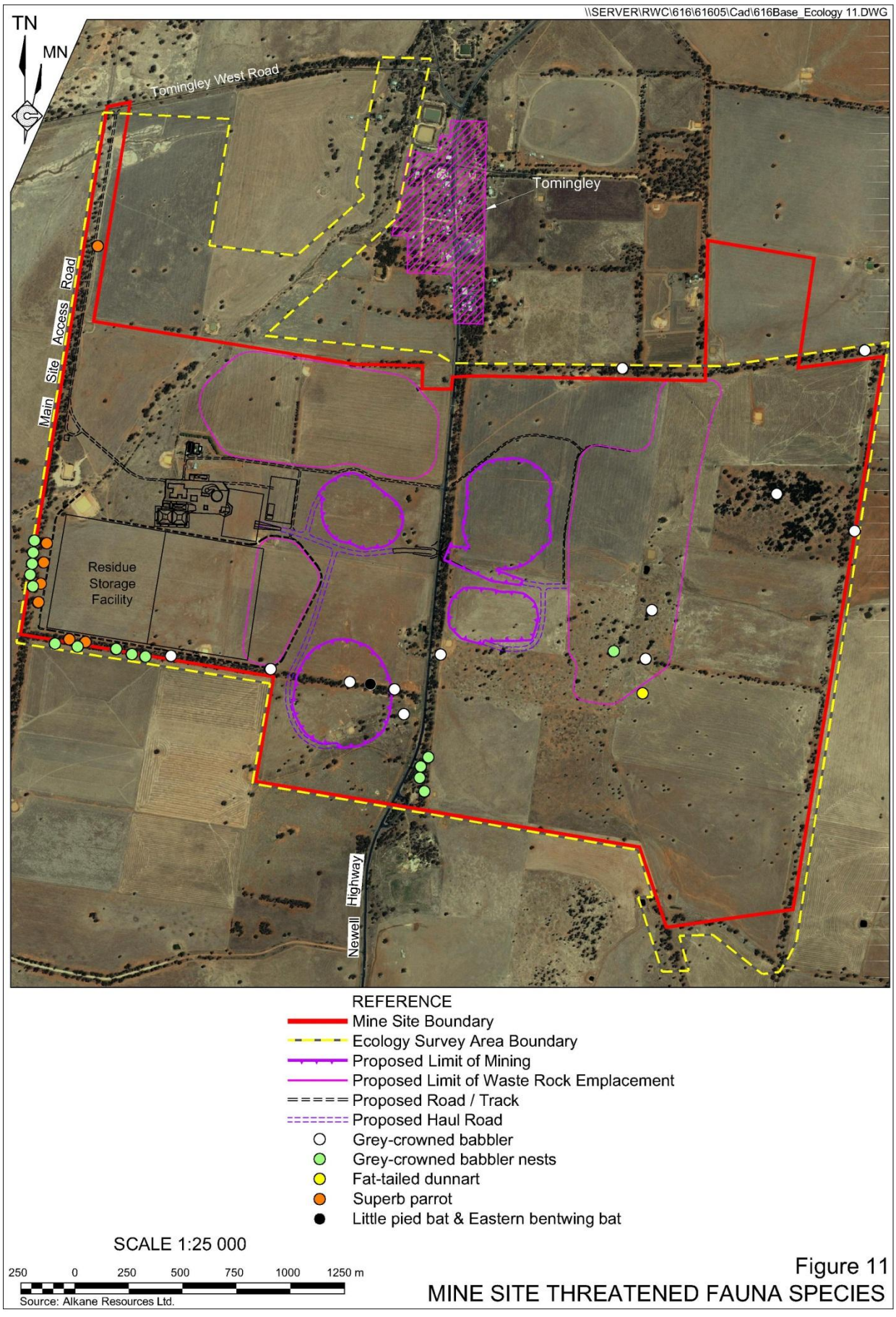


Figure 11
MINE SITE THREATENED FAUNA SPECIES

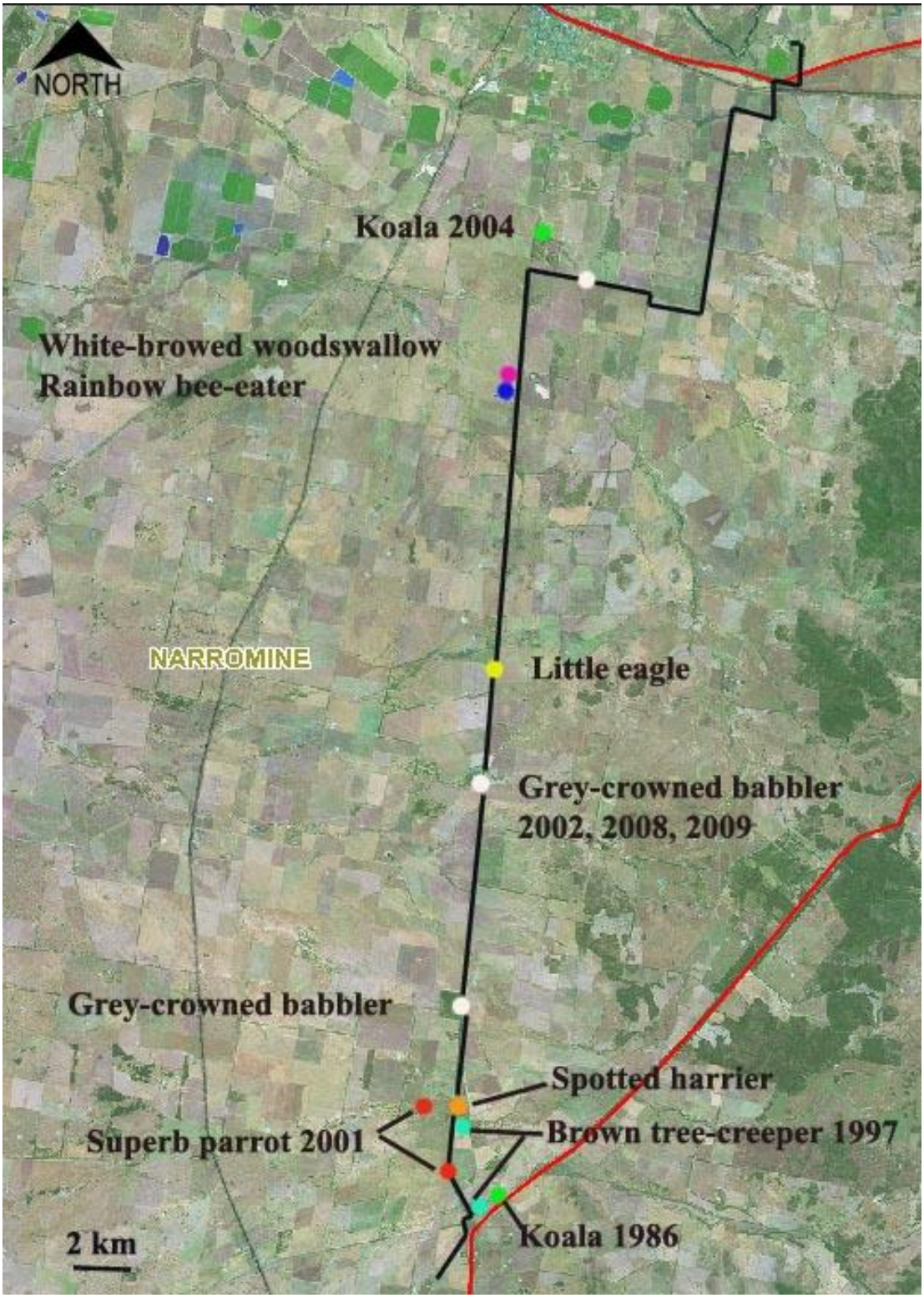


Figure 12 Locality Map of Threatened Species Recorded in the TNWP Study Area

The PHTETL Study Area recorded only 25.6% of birds within the Project Site and is considered to have a low bird diversity given the timing of the survey. Contributing factors may have included survey effort (only one day spent where the entire length was walked) but more likely it was the much degraded nature of native vegetation observed. Only the most common species associated with agricultural landscapes were recorded in the PHTETL Study Area.

The TNWP Study Area is considered to have a high bird diversity given the survey effort and timing (88.4% of all birds were recorded). Contributing factors are that five days of observation occurred (over several related and unrelated projects) and that multiple day and night opportunistic observation could occur given it's located on a road regularly used by the project ecologist, therefore observations derived from nocturnal observations and more particularly road kill played a substantive part in the diversity of species recorded. The road corridor possessed the best quality and most structurally complex habitat and as such these results are unsurprising.

Generally, bird species recorded within the Project Site were characteristic of the assemblages found in similar habitat types in the locality.

6.3.2.2 Threatened Bird Species Recorded

Two species listed as threatened under the NSW TSC Act 1995 (Grey-crowned Babbler and Superb Parrot) and one listed under the EPBC Act 1999 (Rainbow Bee-eater) were recorded during the surveys.

A further three species recorded are listed as having 'preliminary determinations as threatened' in the NSW TSC Act as of May 2009 (Little Eagle, Spotted Harrier and White-browed woodswallow).

Table 13 provides the locations of each sighting record whilst **Appendix 7** provides a detailed species profiles. Further discussions for Superb Parrot and Grey-crowned Babbler have been provided following **Table 13**.

Superb Parrots are highly mobile, fast-flying and their distribution and movements within its range (approximately 81,000 km^2) are poorly understood at the macroscale (Manning *et. al* 2007). This species is one of the two most frequently recorded threatened species in the Narromine LGA. Regular seasonal movements are documented, but distinguishing between dispersal and migration has not been possible and as a result the Superb Parrot has been variously described as resident, dispersive, migratory, partly migratory, nomadic or partly nomadic (see Manning *et. al* 2007). OzArk considers the species as both resident and vagrant given they have a core habitat area during breeding season with vagrant tendencies following feeding resources for the rest of the year. The core breeding habitat does not extend north of Molong NSW.

Table 13
Table of Threatened Species Locations

Species	Level of threat	GDA Zone 55 E	GDA Zone 55 N	Project Site	*BioMetric* community	Comment
Grey-crowned babbler	V (TSC)	615706 616193 616201 616644 616629 615872 614652 614271 614260 613939 613356 613308 614172 615337 618328	6393625 6393625 6394349 6395098 6395076 6394980 6393749 6393496 6393594 6393614 6393705 6393710 6399550 6412854 6424766	Mine Site (East) Mine Site (E) Mine Site (E) Mine Site (E) Mine Site (E) Mine Site (E) N Hwy (E) Mine Site (West) Mine Site (W) Mine Site (W) Mine Site (W) Mine Site (W) TNWP TNWP TNWP	Benson 57 Benson 57 Benson 57 Benson 57 Benson 201 Benson 201 Benson 201 Benson 201 Benson 201 Benson 76 Benson 76 Benson 76 Benson 76 Benson 56 Benson 201	Family #1? Family #1? Family #1? Family #1? Family #1? Family #1? Family #1? Family #2? Family #2? Family #2? Family #2? Family #2? 2002, 2008, and 2009. Two juveniles were seen in this area and it was noted that the 66kV ETL would not affect the nests.
Grey-crowned babbler	V (TSC)	615522	6393753	Mine Site (E)	Benson 57	Family #2? Roosting and breeding nests in the one western rose wood. Approximately eight nests. Further investigation in 2010 showed that the same family has four nests in the Newell Highway road reserve at the Tomingley Truck Rest Area (coordinates not provided).
Superb Parrot	V (TSC,EPBC)	612775 613026	6393748 6395798	Mine Site (W) Mine Site (W)	Benson 76 Benson 76	60 individuals resting One pair resting
Rainbow Bee-eater	Migratory (EPBC)	616044	6421259	TNWP	Benson 217	Perching in ironbark
Little Eagle	Preliminary Determination (TSC)	615076	6409610	TNWP	Benson 76	Overfly study area
Spotted Harrier	Preliminary Determination (TSC)	614172	6399550	TNWP	Benson 76	On agricultural fence line
White-browed woodswallow	Preliminary Determination (TSC)	616044	6421259	TNWP	Benson 217	Feeding in flowering ironbark (winter flowering)
Little Pied Bat & Common bentwing bat	V (TSC)	613997	6393598	Mine Site (W)	Benson 201 & Benson 76	

This broad statement (above) is derived from Manning *et. al* (2007) who describes movements and numbers as fluctuating in response to localized resource abundance, such as flowering intensity, and climatic fluctuations. These fluctuations in relation to patchy resources suggest that climate and plant productivity may influence the distribution of the species. Nix (1976) demonstrated that the breeding seasons and seasonal movements of Australian birds were closely coupled with seasonal pulses in plant growth, which in turn are driven by the physical environment in general and climate in particular. With respect to the Project Site this means that there would be times/years when trees present would flower but this would not occur during winter.

Superb Parrots exemplifies many of the challenges associated with research on wide-ranging organisms which live 'off-reserve'. One challenge is that most land they occur on is privately owned or often in road corridors and that landscape use by the parrot does not always conform to traditional schematic and categorical landscape/fragmentation models. Manning *et. al* (2006) found the species scattered at varying densities throughout the agricultural landscapes of the South-West Slopes, much of which was privately owned. It responded to site-level variables and the surrounding landscape context.

A synthesis of the 2006 research showed that overall, the Superb Parrot favoured lower elevation sites which were dominated by scattered, open woodlands, where Blakely's red gum was a significant component. Application of this factor to the Project Site essentially sees no impact to preferred breeding habitat. Mean plant productivity within 2km, levels of woody tree cover within 3km and (with caveats) length of roads within 3km had a major effect on site-level response, indicating conditions in the surrounding local landscape are important to the Superb Parrot (Manning *et. al* 2006).

The importance of open tree cover and amounts of Blakely's red gum were identified by Manning *et. al* (2006) as matter for concern, due to a general lack of tree regeneration and the particular susceptibility of Blakely's red gum to dieback. Scattered trees in an agricultural matrix are important to the Superb Parrot as the species views these landscapes as a continuum of usable habitat. Strategies for restoration of larger habitat remnants to benefit this species would include regeneration of trees in scattered patterns in the wider landscape and Blakely's red gum would be part of any strategy, along with other key species such as mugga ironbark, white box and golden wattle. With respect to the Project Site, it would be an appropriate opportunity to re-establish Blakely's red gum and the other species noted in areas either side of the man-made portion of Gundong Creek to achieve a 'maintain or improve' outcome for this species.

This 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 road corridors, steep gullies and un-arable hill tops are the only areas where white box and mugga ironbark (considered to be the critical key feeding resource as its winter flowering) remains. Application to the Project Site has shown that there would be no impact to naturally occurring remnants of this resource. Impact will occur to approximately 15 planted (at the side of a track) mugga ironbark in the Mine Site Study Area. Removing the planted components of this community would consequently make little difference to the volume of this regional feeding resource.

With respect to the Grey-crowned Babblers, this species was frequently recorded in all remnant vegetation from the Mine Site Study Area north (excluding the PHTETL Study Area). The species does however occur south of Peak Hill as recent work at Trewilga (10km south of Peak Hill) detected one family with at least two roosting nests in similar environs along the Newell Highway corridor. This species is one of the two most frequently recorded threatened species in the Narromine and Parkes LGAs. Within the Mine Site Study Area it was considered that two families of eight to ten individuals. Possibly one family east of the Newell Highway and the other west of the Newell Highway but this could not be determined by the end of the field assessment. Despite trying to track the families' movements, time became an issue. The assumption is based upon each family being followed only staying either east or west of the highway for the 30 to 45 minutes they were followed and incidental observation of them throughout the survey period. By January 2011 it was concluded that ten nests were recorded in the south-western portion of the Mine Site Study Area and at least two juveniles were observed in the area (note these nests were not within the PHTETL alignment) and a further four nests, thought to be used by Family #2 on the eastern portion of the Mine Site Study Area were recorded in Fuzzy Box EEC in the Newell Highway corridor Tomingley Truck Rest Area.

Further, the Proponent has adopted this bird as a 'flagship species' and will undertake monitoring of the local population to measure the opportunities or constraints associated with remnant vegetation protection and proposed revegetation.

This species builds both brood and roost nests (Dow and King 1984). Only one nest of the five to ten constructed would be used for breeding and this would often be slightly larger than the roost nests. Within a babblers territory (1 to 50ha) the nests would be clustered within a fairly small area (within 50m of each other) as seen in the western portion of the Mine Site Study Area and the Truck Rest Area. In more open areas, personal observation has seen all nine nests in the eastern portion of the Mine Site Study Area in the same rosewood tree.

Impacts of the TGP would remove habitat, including one nest tree (an isolated rosewood with nine nests), currently utilised by the Grey-crowned Babbler. A review of ecological requirements as posted on the OEH threatened species website has been provided below.

- 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. 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.
- It is noted that the white-throated treecreeper was recorded surrounding Gundong Creek during the current assessment, however, BioNet states Brown Treecreeper, a threatened species, has been previously recorded in this location, the author suspects the 'patch' size of vegetation may not be sufficient to support the threatened species.

Additional threatened species have been recorded in the region from previous studies. As a result of this field investigation and preliminary research it has been found that it would be unlikely that any additional threatened bird would be recorded in the Mine Site or the PHTETL Study Area, however, greater potential for occurrence is provided in the TNWP Study Area.

6.3.2.3 Birds of Conservation Concern

Seven bird species of conservation concern (White-throated Treecreeper, Western Gerygone, Noisy Friarbird, Jacky Winter, Crested Shrike-tit, Rufous Whistler, Restless Flycatcher (Reid 1999 and 2000 and local knowledge]) not listed under the TSC Act 1995 were recorded within the Project Site (**Appendix 6**). These species 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 (e.g. declining woodland birds as per Robinson 1994; Reid 1999 and 2000) with listed threatened species and provide us with an indication of the habitat quality and hence potential habitat for threatened species with similar habitat requirements. All of these birds were recorded in the TNWP Study Area thus strengthening the assumption that the regions transport corridors are important wildlife corridors.

6.3.3 Ground Dwelling and Arboreal Mammals

The surveys revealed the presence of 25 mammal species within the Project Site (17 native and 8 introduced species) including:

- fourteen ground mammals;
- three arboreal mammals; and
- eight microchiroptean bat species.

Within the Mine Site Study Area pedestrian surveys on the 6th of August 2009 recorded a dead female fat-tailed dunnart, a species of conservation concern within the Central West CMA.

This individual, as well as hundreds of dead house mice and a dead rat, appeared to have been affected by a stochastic event, most likely the warm week prior to survey that had encouraged the animals to feed further from shelter when a sudden weather change on the night of the August 5 resulted in a rapid decline in temperature in an environment with high levels of background moisture which froze. This event, resulting in mass die-offs, has been seen by the author to occasionally affect mammals as large as wallabies and kangaroos and has now been recognised as a 1 in 8 year occurrence at that time of the year.

A combination of poor body condition due to season (late winter) versus high energy demands placed upon the animal with a large surface area from the sudden change in weather, resulted in a metabolic demand similar to that experienced by domestic stock with pregnancy toxaemia. Despite prolonged searching through the crops and gilgai areas, only the one individual dunnart was recorded. Hair funnels were laid across the Mine Site property (including the gilgai area) for 200 trap nights, however, only house mouse hair was recovered.

Fat-tailed dunnarts have been captured in sparse grasslands, open shrublands and farmlands where there is considerable bare land. The impact of unimproved farming has been positive for this species as the type of habitat created is suitable to its requirements, but intensive agriculture is seen as a negative factor for the species (generalisation is consistent with where the species was recorded within the Mine Site).

Fat-tailed dunnarts breed from July to February, with the young in the pouch from July to April (Morton 1978b). Gestation is 13 days and the young remain in the pouch for 70 days, with litter size on average 7.5 with a 33% infant death rate. They generally have two litters per year with females not breeding for the first year. The average life span of the females is 18 months and males 15 months. Diet includes insects such as beetles, spider larvae, small reptiles, and amphibians. This dunnart stores fat reserves in their carrot-shaped tail for times of food shortage. The species recovered from the Mine Site did not have a 'fat tail' (confirming it was under food reserve stress) and as such a second expert opinion was sought from OEH in Dubbo to achieve a positive identification[8]. Habitat for this species would be impacted by the proposed Top Soil Dump and Waste Rock Emplacement 3 (approximately 16 of 49ha).

Brushtailed possums were recorded along the TNWP and within the Mine Site. Sightings within the Narromine-Tomingley Road corridor are not surprising as many good quality hollows and a moderate diversity of flora with structural complexity are present. It was, however surprising to record a brushtailed possum within the Mine Site, although this individual was seen in the Newell Highway corridor where better quality vegetation (and garbage bins associated with the truck stop) occurs. The presence of sugar gliders has been assumed from road kill observed by the author several years ago along the Narromine-Tomingley Road.

The eastern grey kangaroo was observed throughout the Project Site, an unsurprising result and wallabies and wallaroos were only observed where understory vegetation remained (TNWP Study Area). Although the short beaked echidna is a reasonably common species it was only observed in the TNWP Study Area.

Tracks and scats of the fox and to a lesser extent the cat were frequently recorded within the Project Site in all habitat types. Rabbits and hares were most commonly recorded in cleared areas dominated by grassland. The feral goat (presumed they were feral) were recorded between the Peak Hill Gold Mine and the Newell Highway, and signs of feral pigs were present along the PHTETL Study Area.

The house mouse was the most common mammal encountered and was in plague proportions throughout the entire time of the assessment.

6.3.4 Microchiropteran Bats

Microchiropteran bats comprised 32% of the mammal species recorded during the survey (8 of 25).

Harp trapping was not employed and Anabat surveys over four consecutive nights revealed the presence of eight bat species in the Mine Site Study Area including two threatened species (Little Pied Bat *Chalinolobus pictatus* (confident identification of one pass) and Eastern Bentwing Bat *Miniopterus screibersii* (probable identification of four passes)). Details of the types and frequency of bats recorded in the Mine Site Study Area are provided on **Table 14**.

Professional Anabat call analysis was undertaken by LesRyk Environmental Consultants. The equipment was set up prior to dusk and calls downloaded mid-morning in an attempt to capture the greatest species diversity.

[8] Thanks to **Dr Jenni Garden** Conservation Assessment Officer (Fauna Ecologist), Information and Assessment Section, Environment Protection Regulation Group (North West), Department of Environment, Climate Change & Water.

Table 14
Bats Recorded via Anabat in the Mine Site Study Area May 2009

Survey Location	Common Name	Scientific Name	Call Confidence	No. of Passes
3rd and 4th May	Chocolate Wattled Bat	*Chalinolobus morio*	P	1
	# Little Pied Bat	*Chalinolobus picatus*	C	1
	# Eastern Bentwing Bat	*Miniopterus* (*schreibersii*) *orianae oceanensis*	P	4
	Little Forest Bat	*Vespadelus vulturnus*	C	18
			P	28
5th May	Gould's Wattled Bat	*Chalinolobus gouldii*	C	11
			P	1
	Little Broadnosed Bat	*Scotorepens greyii*	C	4
	Little Forest Bat	*Vespadelus vulturnus*	C	28
			P	9
6th May	Gould's Wattled Bat	*Chalinolobus gouldii*	C	3
			P	10
	# Little Pied Bat	*Chalinolobus picatus*	C	1
	Little Forest Bat	*Vespadelus vulturnus*	C	3
			P	3
	Southern Freetail Bat	*Mormopterus* sp. 4	P	2
	White-striped Freetail Bat	*Austronomus australis*	C	2

Note # - indicates species listed under the NSW *Threatened Species Conservation Act 1995*.

Note:
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 would 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 would 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.

Some of those calls of Little Forest Bat (*Vespadelus vulturnus*) identified with a confidence level of possible could be confused with Eastern Bentwing Bat (*Miniopterus* (*schreibersii*) *orianae oceanensis*) and Southern Forest Bat (*Vespadelus regulus*). More so on the 3rd and 4th of May recordings.

A review of ecological requirements as posted on the OEH threatened species website has been provided below for Little Pied Bat.

- Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress-pine forest, mallee, bimbil box;
- Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings;
- Can tolerate high temperatures and dryness but need access to nearby open water; and
- Feeds on moths and possibly other flying invertebrates.

A review of ecological requirements as posted on the OEH threatened species website has been provided for Eastern Bentwing Bat.

- Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.
- Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.
- Maternity caves have very specific temperature and humidity regimes.
- At other times of the year, populations disperse within a 300km range of maternity caves.
- Cold caves are used for hibernation in southern Australia.
- Breeding or roosting colonies can number from 100 to 150,000 individuals.
- Hunt in forested areas, catching moths and other flying insects above the tree tops.

6.3.5 Reptiles and Amphibians

Information collected on the distribution of reptiles and frogs in the Peak Hill and Narromine LGAs is limited.

This assessment recorded a total of 17 species of reptile and six species of amphibian. When considering the degree of habitat removal and the locality which had just been de-listed as drought declared, these results were higher than expected. As, per other fauna biota of the Project Site, the study area with the largest patch size of remnant vegetation, highest levels of floral diversity and the greatest structural diversity supported the highest levels of reptile diversity (the TNWP Study Area).

Two species were included in the current assessment results as a result of landholder/mine worker interviews (green tree frog, red-bellied black snake) and six were included in the current assessment as a result of being observed as road kill along the Narromine-Tomingley Road (blue-bellied black snake, yellow-faced whip snake, eastern blue tongue lizard, shingle backed lizard).

Museum records from BioNet within the locality demonstrate a paucity of previous surveys indicating only blue-belly black snake, bearded dragon and brown snake recorded in this area. The best example of a reptile recorded during the assessment, a large lace monitor, can be seen in **Appendix 1**, **Plate 26**.

The red-bellied black snake is regarded as a locally significant species. This species is believed to have declined over much of the CW-CMA. Threats to this species include the removal of hollow logs and fallen timber, removal of leaf litter and predation by introduced predators. Very little habitat left in the Project Site is consistent with suitable habitat requirements for this species and it appears to be restricted to Gundong Creek where it intersects large dams with permanent water.

No species of frogs were recorded in the PHTETL Study Area, possibly reflecting the high levels of disturbance to any habitats suitable for these species or that probably the least amount of survey time was spent in this area. Frogs were generally recorded surrounding farm dams on the Mine Site Study Area or were identified by their calls in both the Mine Site and TNWP Study Areas. Changes in hydrology as well as habitat degradation are believed to have resulted in low diversities of frogs being recorded.

6.4 HABITAT TYPES WITHIN THE PROJECT SITE

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. Five main habitat types were identified within the Project Site that is likely to be altered (impacted or enhanced) by the TGP, namely.

- Temperate grassy woodlands, Including contiguous remnants of :
  - Benson 76 (IGB);
  - Benson 201 (FB);
  - Benson 78 (RRG);
  - Benson 217 (MIB); and
  - Yellow Box – Blakely's Red Gum grassy woodland.
- Belah / Black Oak Western Rosewood, Wilga Woodland (Benson 57) (Gilgai paddocks).
- Isolated paddock trees.
- Cleared grasslands and agricultural paddocks.
- Tanks (earth dams, drainage lines and creeks.

These habitats provide a range of resources that fauna and flora in the locality can utilise. **Table 15** provides further description of habitat types. Habitat values described for temperate grassy woodlands are derived from by Lindenmayer *et al*. (2005).

6.4.1 Habitat Values of Trees within the Impact Footprint

6.4.1.1 Mine Site

In total 32 HHV (21 west and 11 east of the Newell Highway), 59 MHV (46 west and 13 east of the Newell Highway) and 385 LHV (308 west and 77 east of the Newell Highway) were recorded within the Mine Site Impact Footprint.

Habitat values were all associated with the size and abundance of tree hollows in eucalypt species, except in one instance where a Western Rosewood was recognised as being HHV as it possessed several Grey-crowned Babbler roosting nests and one breeding nest (**Figure 11**, **Appendix 9, Image 2**).

There are four main areas requiring further discussion within the Impact Footprint east of the Newell Highway. Locality maps are presented in **Appendix 9** and impacts are discussed individually in the following sections:

Table 15
Summary of Key Characteristics of Major Biota Habitats Occurring in the Project Site

Habitat Type	Features	Species associations
Temperate grassy woodlands, Includes contiguous remnants of : • Benson 76 (IGB) • Benson 201 (FB) • Benson 78 (RRG) • Benson 217 (MIB) • Yellow Box – Blakely's Red Gum grassy woodland	**The canopy** ○ Enormous numbers of insects especially beetles (80% of all insects are beetles), native bees and wasps are strongly associated with woodland canopies. The same is true for isolated paddock trees. Limited research available suggests that the diversity of insects in woodland canopies may rival that within rainforests. ○ Trunks and bark provides microhabitat for insects and spiders from different species of those found in the crown of the tree. ○ 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. ○ 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. ○ 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. ○ 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. ○ 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.	**Mine Site** • Grazing and patch size (shape) unlikely to provide any areas likely to support threatened species of plants. • Communities mostly represented by canopy species that were above the height of grazing prior to European settlement i.e. no understorey (other than African box thorn) and sparse ground layer species. • Newell Highway corridor provided a biologically diverse and structurally complex representation of Benson 201. • Surprisingly poor diversity with woodland remnants of small avifauna and reptiles. • Canopy provides an important wildlife corridor for migratory / nomadic species but is summer flowering (except for a row of planted mugga ironbark which is winter flowering). • An important resource for hollow dependant species. Bimble box between 10 to 20% of canopy = SEPP 44 Schedule 2 species. • Box trees have sparse volumes of bark for larger animals but insects appear to be abundant. Reasonable quantity and quality of leaf litter and dead and down timber (10 to 15%). • Suspect linear nature of remnants and lack of general understorey (other than African boxthorn) and ground layers gave advantage to raptor species. • There are no areas of natural rocky outcrops and few areas left with natural soil cracks. **PHTETL** • As above for flora but subject to more severe grazing – ground almost completely bare. Where native plants occurred they were as individuals. • Waterways mostly dominated by thick layers of exotic grasses. Several areas of 'stressed or severely stressed' trees noted. • Similar poor diversity small avifauna and reptiles in contiguous woodland remnants. Canopy provides an important wildlife corridor for migratory / nomadic species but is summer flowering. • An important resource for hollow dependant species. Bimble box between approximately 10 % of canopy = SEPP 44 Schedule 2 species. • All other comments as per Mine Site are relevant. Dead and down timber absent unless in paper roads where it's estimated to be less than 5%.

Table 15 (cont'd)
Summary of Key Characteristics of Major Biota Habitats Occurring in the Project Site

Habitat Type	Features	Species associations
	The bark ○ Different trees produce different sorts and volumes of bark and different age classes of the same species produce different densities (thicker and deeper). The type of bark on the tree heavily influences the types of animals that would utilise it however the general rule of thumb is that the more habitat complexity the more species (including epiphytic plants) that would utilise it; ○ Predominately invertebrates use bark habitat however, geckos and arboreal skinks would shelter under bark. Several vertebrates such as the brown tree creeper and the crested shrike tit forage within bark; and ○ Bark protects the tree from fire, the thicker the bark the better insulated it is and as such the higher probability it would have to regenerate after fire. **Dead trees** ○ Standing dead trees would more often contain hollows that are used by cavity dependant species, particularly microbats and gliders. Large dead trees even in isolation (paddock trees) are well known to support Superb Parrot breeding hollows; and ○ The territories of some birds such as the Flame Robin significantly overlap in areas with large numbers of dead trees and stumps. **The understorey** ○ The understorey is critical for the existence of other plants and animals; it provides feeding, resting and roosting sites for many species of animals. It also demonstrates the strong relationship of the presence of understorey and the health of the canopy; ○ Many species of animals would shelter from heavy rain, extremes of temperature and from predators within understorey plants; ○ The understorey plays an important role in fixing nitrogen which contributes to the productivity of the ecosystem. ○ As a feeding location they are critical for hooded robins, speckled warblers and species of robin. Other dependant species feed on the flowers / leaves and the insects they attract (bats, possums, gliders, honeyeaters and insectivorous birds) or the seeds they produce (parrots). The sap or gum is eaten by possums and gliders. Other species of animals i.e. cockatoos would tear apart the branches to retrieve grubs whilst browning mammals (swamp wallabies) would feed from the leaves; ○ Migratory species of birds i.e. the swift parrot would utilise winter flowering species such as golden wattle; and ○ Understorey plants are a niche nesting and resting habitat for many species of small birds such as the grey fan tail, fairy wrens, finches and robins. The majority of these species prefer mosaics densities of understoreys where in the denser areas they can find refuge from predators. **The ground layer** ○ The ground layer comprises logs, fallen branches, leaf litter, piles of rocks, natural cracks, soil and ground cover plants;	**TNWP** • Impact Footprint along Narromine-Tomingley Road previously cleared for Telstra cable but a healthy ground layer and understorey have recolonised in places. • Excellent ground layers along Pinedene Road (no previous impacts), low levels of ground layer diversity along Dappo Road, Bootles Road highly disturbed and ARTC easement is comprised of derived grassland. • Along Tomingley to Narromine Road and to a lesser degree Pinedene Road reasonable patch size and low levels of grazing provide opportunities for a number of threatened species of plants under the tree canopy (adjacent to the impact footprint). • Good levels of biodiversity, highest % of native species to weed species in all Project Areas assessed. • Many sheltering opportunities for birds. • Similar habitat values re: hollows, tree canopy as per Mine Site however, Bimble Box can be up to 30% of canopy species in places along Tomingley to Narromine Road and is generally present in all areas at varying abundances = Potential Koala Habitat (combined with previous records within the transport corridor). Good diversity of small birds and reptiles along the transport corridor. Dead and down timber and leaf litter variable – best described as discretely good (10%) but extremely limited in distribution (possibly in six to seven places of 200x 30m each).

Table 15 (cont'd)
Summary of Key Characteristics of Major Biota Habitats Occurring in the Project Site

Habitat Type	Features	Species associations
	○ 20% of all animals rely on dead wood in falling logs or standing trees. When these key habitat elements are removed species such as the diamond firetail finch, common dunnart and yellow footed antechinus would suffer significant population declines; ○ Logs and fallen branches / trees provide nesting and foraging sites for terrestrial species such as reptiles, amphibians, echidnas and 'marsupial mice'. Many of these feed on the insects which feed upon the decaying wood; ○ Plant species richness is often higher around fallen timber than away from it, this is because seeds passed by birds whilst perching would germinate in the moist leaf litter and soil which accumulates below; ○ Large numbers of invertebrates are associated with the soil around logs, these animals free up the soil, improve fertility, aerate the soil and boost paddock productivity; ○ 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. **Surface rocks and boulders** ○ In addition to fallen dead and down timber rocks play an important habitat element for certain species. Cunningham's skink is a better known example. Many species of geckos are recorded under slabs of rocks while crack in boulders also provide habitat for small terrestrial 'marsupial mice', reptiles and amphibians. **Soil cracks and invertebrate burrows** ○ Soil cracks provide shelter for amphibians, reptiles, small mammals and a wide range of insects. Legless lizards use insect burrows for sheltering, unfortunately these habitats have largely been removed in ploughed agricultural landscapes. \ **Native grasses, orchids and forbs** ○ The level of plant diversity in woodland ground layers can be substantive i.e. over 60 species have been recorded from small sampling quadrants in white box / yellow box woodlands. Many of these plants have local, state or national conservation significance. The ground layer also hosts a suite of other animals with legislative protection such as diamond firetail finch, bush stone curlew and several species of rare reptiles; ○ The function of the ground layer is directly linked to the canopy and the understorey thus the density of trees or shrubs or alternately when one layer is compromised the productivity of all would be affected. Within white box / yellow box woodlands it is suspected that trees would suppress dominate grasses i.e. kangaroo grass through competition for moisture. In areas with a denser canopy secondary dominant species of forbs, orchids or grasses would provide higher levels of species richness than within a monoculture.	

Table 15 (cont'd)
Summary of Key Characteristics of Major Biota Habitats Occurring in the Project Site

Habitat Type	Features	Species associations
Benson 57 (Gilgai paddocks)	As per above	• Belah provide seeds for parrots and shelter for many species of bird. • No hollow bearing trees or understorey species present, ground layer almost depleted. • Valuable for the regionally significant Fat-tailed Dunnart and threatened and declining woodland bird habitat. • Grey crowned babbler family roosting and breeding nests recorded in this community both in the eastern and western side of the Mine Site Study Area with all eight nests in the one Western Rosewood tree on the eastern side. • Approximately 5% dead and down timber, soil cracks in grey cracking clays an important habitat feature for small ground dwelling species. • Gilgai's would provide important temporary areas of high biological diversity during and immediately after inundation.
Isolated paddock trees	○ Canopy trees do not have to be in large stands to be valuable, approximately one quarter of all woodland is comprised of paddock trees; ○ Many species of birds and bats utilise isolated paddock trees. In the South Western Slopes of NSW over 40 species of birds were recorded using isolated paddock trees, microbats would commonly occupy isolated trees; ○ Isolated trees provide a stepping stone to other woodland remnants; ○ Paddock trees are also the most important seed source for regeneration in cleared landscapes.	• All the Project Areas possessed isolated paddock trees. • All trees to be impacted were assessed as having High, Medium or Low Habitat Values. • An explanation of what this means in terms of impacts to fauna has been provided in Section 3.5.1
Cleared grasslands and agricultural paddocks	Foraging areas for native birds and common larger reptiles.	• The Fat-tailed Dunnart recorded on site was recovered in this community where it had (presumably) been foraging. • Many domestic mice and an occasional rat were also found within these environments. • High abundance of snakes and birds of prey harvesting the mouse population.
Tanks (earth dams, drainage lines and creeks	Drought refuges, sources of water, natural creeks are part of Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River Endangered Ecological Community Gundong Creek in the Project Area is a man-made channel and technically not part of this EEC.	• Concentrated areas of higher faunal diversity. • Important habitat for frogs (the only place where this faunal group was recorded)

Proposed RSF Location, Paddock 2 (Figure 8 and Appendix 4, Image 3)

Aerial Imagery provided by the Proponent as well as that shown on the NSW Department of Lands (DoL) SixViewer, shows approximately 30 isolated paddock trees within the Impact Footprint. These trees were no longer present in this area at the time of the site inspection.

Appendix 9, Image 2 provides a representation of remaining trees within 20m to 30m of the proposed northern bund of the RSF. Trees in the paper road west of the access track shown have not been represented. It is unlikely these would be cleared but have been included in the tally below as a precaution.

Details of habitat values of trees within this Impact Footprint have been provided below:

- inland grey box - 1 with Medium Habitat Values (MHV) and 4 with Low Habitat Values (LHV).
- Bimble Box - 1 with HHV and 4 with MHV.
- mature white cypress pines, all with LHV.
- 1 Fuzzy Box with MHV.
- 1 river red gum with LHV.

Proposed RSF, Waste Rock Emplacement 1, Wyoming One and Two, Tunnel Under Newell Highway and Topsoil Dump Wyoming, Paddock 4 and Lower Portion of Paddock 6 (Figure 8 and Appendix 4, Image 3)

There are few trees remaining in these cropped areas. **Appendix 9 Image 3**, provides a representation of remaining trees within Paddock 4 and the lower half of Paddock 6. It's unlikely that trees shown in the bottom right hand corner of this image provided would be affected by the proposed TGP activities. Exotic trees associated with McPhail are not shown. Details of the habitat values of trees within the likely Impact Footprint are provided below.

- 17 mature white cypress pines, all with LHV.
- 8 inland grey box - 4 with MHV and 4 with LHV.
- Bimble Box - 2 with MHV and 2 with LHV.
- Fuzzy Box - 2 with MHV and 1 with LHV.
- 2 Belah with LHV.

Proposed Waste Rock Emplacement 2 and Future Tourist Lookout, Upper Portion of Paddock 6 (Figure 8 and Appendix 4, Image 3)

One 1.8ha (375m x 50m) linear remnant of Benson 201 and one 250m row of planted mugga ironbark are the only contiguous vegetation remnants within this area. There are seven isolated trees remaining in cropped areas.

Appendix 9 Image 4, provides a representation of remaining trees within Paddock 4 and the lower half of Paddock 6, **Appendix 9 Image 5**, provides detail of trees within the remnant. It's unlikely that trees shown within the contiguous remnant would be affected by the proposed activities, but they have been included in the tally below as a precautionary measure.

Details of habitat values of trees in this Impact Footprint have been provided below.

- 44 Fuzzy Box - 1 with HHV, 7 with MHV and 36 with LHV.

- 25 Bimble Box - 1 with HHV, 3 with MHV and 21 with LHV.
- 22 inland grey box - 3 with HHV, 7 with MHV and 17 with LHV.
- 15 (approx) are planted mugga ironbark all with LHV.
- 11 mature white cypress pines, all with LHV; and
- bulloak with LHV.

Proposed Wyoming One Pit and Earth Bund, Paddock 5 (Figure 8 and Appendix 4, Image 3)

Approximately 3.0ha of contiguous vegetation remnant occurs within this area. 2.0ha (462m x 45m) of this linear remnant is Benson 76, the remaining 1.0ha (225m x45m) is Benson 201.

There are 51 isolated trees remaining in cropped areas. **Appendix 9 Image 6**, provides a representation of remaining trees within Paddock 5 within the limits of the proposed earth bund. It has been assumed that all the habitat values associated with these trees have potential to be removed and have therefore been included in the tally. The stars shown on this image show where Grey-crowned Babblers and threatened species of microbats were recorded.

Detail of the habitat values of trees with potential to be removed within the contiguous remnant are provided below.

- 95 inland grey box - 9 with HHV, 25 with MHV and 61 with LHV.
- 50 white cypress pines, all with LHV.
- 46 Fuzzy Box - 6 with HHV, 15 with MHV and 25 with LHV.
- 16 bulloak with LHV.
- Bimble Box - all with LHV.

There are three main Impact Footprints west of the Newell Highway. These areas are presented and discussed individually below.

Proposed Caloma Open Cuts (One and Two), western portion of Paddock 7 (Figure 8)

Only two mature white cypress pines, both with LHV occur in this area.

Proposed Waste Rock Emplacement 3 (40ha), Caloma Topsoil Dump and Earth Bund, Figure 8, Eastern Portions of Paddocks 7 to 9, Mid Portion of Paddock 10, Northwest Corner of Paddock 10 (Figure 8)

Approximately 49ha of the one contiguous vegetation remnant of Benson 57 occurs within this area (roughly 970m x 780m at their longest points) (**Appendix 4**, **Image 4**). Approximately 16ha of this occurs within the Impact Footprint **(Appendix 9, Image 7)**. One Western rosewood tree with nine Grey-crowned Babbler nests was recorded. Western rosewoods and warrior bush were not mapped in the area. It is assumed that all vegetation shown has potential to be removed. Details of habitat values of trees with potential to be removed within the contiguous remnant are provided below.

- 39 Belah with LHV.
- 38 inland grey box - 10 with HHV, 13 with MHV and 15 with LHV.

- white cypress pines, all with LHV.
- Approximately 20 Western Rosewood (not mapped) - 1 with HHV (eight Grey-crowned Babblers nests including 1 breeding nest in “Topsoil Dump”).

6.4.1.2 Peak Hill – Tomingley Electricity Transmission Line

Habitat values of trees within the PHTETL Study Area Impact Footprint have been shown in **Appendix 2**. Details are provided below.

- 83 inland grey box, 11 with HHV, 25 with MHV, 47 with LHV.
- 75 bulloak, all with LHV.
- 20 from a population of 100 myall, all with LHV.
- 11 mature white cypress pines, all with LHV.
- 2 Bimble Box, one with MHV the other with LHV.
- 2 Fuzzy Box, one with HHV the other with LHV.
- 2 wilga, both with LHV.

6.4.1.3 Tomingley – Narromine Water Pipeline

The majority of the TNWP Study Area would not affect trees with hollows, with any clearing likely to be of regrowth. If a minor deviation occurs (as shown in **Appendix 3, Image 9**), it would avoid a 1.3km remnant of Benson 76 with 200 LHV inland grey box including 20 trees with MHV.

6.4.2 Wildlife Corridors

Ground dwelling animals within the Critical Weight Range would have very limited safe opportunities for dispersal in the Project Site and locality. The levels of existing disturbance combined with the thin, linear nature of the remnants reduce the potential for these areas to provide safe refuge for many species of animals. Koalas have potential to use the Tomingley to Narromine road corridor (10% to 15% Bimble Box) which on a broader level forms the basis for all wildlife corridors left in the locality.

Vagrant, migratory and nomadic birds have been observed utilising road corridors in the locality for feeding and resting. The Superb Parrot is a frequent visitor in the locality and nearly all sightings are from road corridors.

6.4.3 Location and Nature of Aquatic Habitats in the Project Site

6.4.3.1 Habitat Value of Project Site Waterways

There are nine locations where component activities would cross or are within the boundaries of named creeks within the Project Site.

Mine Site Study Area

Gundong Creek, an ephemeral creek, flows west for 10km to join the Bogan River. Approximately 2km of this is a modified drainage line that flows through the northwestern corner of the Mine Site Study Area (west of the Newell Highway). This creek within the Project Site is man-made, the banks of this waterway are currently eroding but natural colonisation by river red gums is ongoing. There are no pools, ponds or aquatic habitat features within the Project Site. This creek possesses 'unlikely fish habitat' (Class 4 Waterway).

16 earth tanks (dams) are located throughout the study area and are fed by natural and modified drainage lines throughout the property (**Appendix 1, Plates 2, 4, 5, 12** to **19**). Dams and drainage lines do not possess aquatic or semi-aquatic vegetation other than an odd sedge or rush.

Peak Hill – Tomingley Electricity Transmission Line Study Area

Only two earth tanks (dams) are located along this study area. Burrabadine Creek crosses between poles 39 and 40 (**Appendix 2**, **Image 6** and **7**) and Bulldog Creek crosses between poles 72 and 73. Burrabadine Creek, an ephemeral headwater to the Bogan River, is located approximately 5km north of Peak Hill. From the PHTETL it flows west for 5km to join the Bogan River. Only a 30m wide and approximately 60m long portion of this waterway is within the PHTETL Study Area. The field assessment clearly showed that all habitats in this area are destroyed and beyond natural recovery under current land use. This creek has 'unlikely fish habitat' (Class 4 Waterways).

Similarly, Bulldog Creek, a further 5km north of Burrabadine Creek is ephemeral, cleared and is 'unlikely fish habitat' (Class 4 Waterway).

Tomingley – Narromine Water Pipeline Study Area

Creeks and drainage lines in the TNWP Study Area were degraded, however, retain terrestrial components, usually canopy and understory species along the Tomingley to Narromine Road and generally components of native ground layer species except where more permanent water occurred, where it was dominated by the exotic grass paspalum. All creek and drainage line crossings are shown in **Appendix 3**, **Images 1** to **9**.

The named creeks have sparse to moderate native aquatic vegetation. Class 2 waterway classifications are appropriate in these areas, which mean that there is 'moderate fish habitat'. In this instance it is recognised that for the majority of time the waterways do not provide opportunities for native fish species, however, after inundation they may potentially be used for the dispersal of individuals and breeding of young.

All other unnamed waterways do not possess habitat likely to support native fish population in times of inundation, being all Class 4 waterways, ie. unlikely fish habitat.

6.4.3.2 Aquatic Endangered Ecological Communities

All natural creeks and drainage lines in the Project Site may be considered as part of the 'Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River Endangered Ecological Community'. The phrase 'may be considered' is used to reflect that Gundong Creek within the Project Site is a man-made channel.

This community includes 21 native fish species and hundreds of native invertebrate species, many of which have not been comprehensively studied.

The Darling River aquatic ecological community occurs in a lowland riverine environment characterised by meandering channels and a variety of habitats that form an integral part of the river system, including deep channels and pools, wetlands, gravel beds and flood plains. This complex river morphology provides a multitude of habitats that play a critical role in the life cycles of the species comprising the community.

In their natural state, many of the water-bodies in this area are characterised by variable and unpredictable patterns of high and low flows. This variability in environmental conditions has led to adaptations in native aquatic flora and fauna. For example, many fish species rely on the seasonal flow pattern for successful reproduction.

6.5 CRITICAL HABITAT AND ENDANGERED / CRITICALLY ENDANGERED POPULATIONS

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

7 POTENTIAL IMPACTS OF THE TOMINGLEY GOLD PROJECT

7.1 EXISTING IMPACTS

Existing levels of disturbance have been detailed in Section 3.2.3. The biggest existing impact to fauna in the Project Site is trauma from vehicles, i.e. roadkill. This threat to wildlife is a consistent high level background risk. Having knowledge of the locality, it is the author's opinion that this would remain the greatest risk to wildlife in the Project Site, particularly along the Narromine-Tomingley Road where a great diversity and high numbers of birds and reptiles are commonly found dead.

The Project Site flora has been extensively disturbed as a result of the impacts caused by agricultural activities, exploration activities and mining operations. These activities have contributed directly to the reduction in quality and fragmentation of habitat.

Previous activities have contributed to a range of continual disturbances such as increased edge effects and weed infestation. The degree of weed infestation was proven to be related to the extent of agricultural disturbance when comparing study areas within the Project Site.

All previous activities have negatively affected native flora and fauna.

The Proponent would address the management of feral animals within the Mine Site Study Area as introduced predators have already had a detrimental impact upon the native wildlife of the area, particularly reptile, bird and ground dwelling mammal species. Predation by the European red fox and feral cat are both listed as key threatening processes under the Commonwealth EPBC Act 1999 and the NSW TSC Act 1995, with threat abatement plans prepared under guidelines set by each Act (Environment Australia 1999; NSW NPWS 2001a).

An appropriate pest control program would be adopted by the Proponent and implemented in conjunction with monitoring that would ensure that the TGP would not significantly affect any of the threatened biota and other native fauna of the Mine Site Study Area.

Further reduction and fragmentation of vegetation and associated habitat of the Project Site by the proposed activities may further decrease the ecological value of the area, although this impact is considered to be minimal and would be offset by proposed revegetation.

7.2 EXPECTED IMPACTS OF THE TGP

7.2.1 Introduction

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

1. Direct.
2. Indirect / operational.
3. Decommissioning related impacts.

The following section discusses these in the context of terrestrial environments and impacts associated with the RSF. Specific consideration has been given to DPI (NSW Fisheries) guidelines (Section 6.7) as the information required to be assessed needs to be presented in a specific template.

7.2.2 Direct (Construction) Impacts

The following considerations are in part adapted from the Environment Institute of Australia and New Zealand Ecology Group (EIANZ) Ecological Impact Assessment Draft June 2009 guidelines. These serve to identify 'typical' impacts associated with mining and development of infrastructure. **Table 16** provides a summary of the 'typical' impacts likely to be associated with the TGP. Additional detail has been provided in Sections 7.2.2.1 to 7.2.2.3.

7.2.2.1 Mine Site

Approximately 21.6ha (maximum) or 13.9% of the 155.6ha of remaining native vegetation of the Mine Site Study Area would be removed as a result of the TGP. The impacts to contiguous vegetation remnants have been detailed below.

- 18.0ha of the Belah / Black Oak / Western Rosewood, Wilga Woodland (Benson 57). This represents 25.6% of the 70.3.ha of this community which occurs within the Mine Site Study Area in two main remnants. The remnant to be altered is associated with Waste Rock Emplacement 3 and an associated topsoil stockpile area on the eastern side of the Mine Site Study Area;
- 2.7ha of Inland Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams (Benson 76). This represents 7.3% of the 36.9ha of this community occurring in six main remnants within the Mine Site Study Area. This community is a component of a NSW Endangered Ecological Community.
- 0.9ha of Fuzzy Box – Inland Grey Box on alluvial brown soils (Benson 201). This represents 2.9% of the 30.6ha of this community occurring in five main remnants in the Mine Site Study Area. This community is a component of a NSW Endangered Ecological Community.

Impacts to isolated paddock trees would result in the removal of up to 32 HHV (21 west and 11 east of the Newell Highway), 59 MHV (46 west and 13 east of the Newell Highway) and 385 LHV (308 west and 77 east of the Newell Highway) from the Mine Site Impact Footprint. Habitat values of the trees above were all associated with the size of abundance of tree hollows in eucalypt species except in one instance where a Western Rosewood was recognized as being HHV as it possessed several Grey-crowned Babbler roosting nests and one breeding nest (**Appendix 9, Image 7**).

Table 16
Expected Impacts of the Activity

	Applicability		
Construction Impacts	**Mine Site Study Area**	**PHTETL Study Area**	**TNWP Study Area**
Vegetation clearing.	Yes. Extent and empirical nature of impacts known (see **Figure 2**).	Yes. Extent and empirical nature of impacts known (see **Figure 4**).	Yes. Detail of requirements provided in Section 2.3.
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.	Yes. Detail of requirements provided in Section 2.2.	Yes. Detail of requirements provided in Section 2.3.
Temporary storage areas (aggregate piles) and permanent storage areas (stockpile locations, sheds etc).	Yes. Extent and empirical nature of impacts known (see **Figure 2**).	Yes. Extent and empirical nature of impacts known (see **Figure 4**).	Possible.
Temporary and permanent works compounds.	Yes. Extent and empirical nature of impacts known (see **Figure 2**).	Yes. Extent and empirical nature of impacts known (see **Figure 4**).	No.
Pre-fabrication areas and set down points.	As above	As above	Yes. Detail of requirements provided in Section 2.3.
Removal and site clean up of temporary compounds, site offices, set down points and storage areas.	Yes. Extent and empirical nature of impacts known (see **Figure 2**).	Temporary compounds are not required.	Temporary compounds are not required.
Demolition operations.	Not required.	Not required.	Not required.
Removal and disruption of surface soils.	Yes. Extent and empirical nature of impacts known (see **Figure 2**).	Yes. Extent and empirical nature of impacts known (see **Figure 4**).	Yes. Detail of requirements provided in Section 2.3.
Environmental incidences (i.e. dust, noise, vibration, spills).	Other environmental specialists addressing these issues.	Other environmental specialists addressing these issues.	Other environmental specialists addressing these issues.
Provision of services and utilities (power lines, lighting, internal road networks, communications, water supply, drainage, sewage).	Yes. Extent and empirical nature of impacts known (see **Figure 2**).	PHTETL is a service provision required for the Mine Site.	TNWP is a service provision required for the Mine Site.
Fires.	No fires are required.	No fires are required.	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 4**).	Yes. Extent and empirical nature of impacts known (see **Figure 4**).	Not required.
Blasting (mineral extraction).	Yes. Extent and empirical nature of impacts known (see **Figure 2**).	Not required.	Not required.

7.2.2.2 Peak Hill – Tomingley Electricity Transmission Line

The PHTETL is predominately cleared and only isolated paddock trees or areas where the PHTETL intersects paper roads would be affected. Due to the scale of landscape clearing impacts would be limited paper roads and existing transport corridors where they intersect the line. Inland Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams (Benson 76) a component of the NSW Inland Grey Box Woodland EEC would be affected. A small population of 100 Weeping Myall open woodland of the Riverina and NSW South Western Slopes Bioregions (Benson 26), a NSW and nationally listed EEC and CEEC respectively, is located within the proposed Impact Footprint.

Due to the nature of the impacts, vegetation removal for this Study Area vegetation removal has been assessed as 'individual trees' which is the most common type of impact, rather than being aligned to the number of hectares in remnant communities.

Trees to be removed within the PHTETL Study Area have been shown in **Appendix 2**. Details of trees to be removed have been provided below.

- 83 inland grey box, 11 HHV, 25 MHV and 47 LHV.
- 75 bulloak, all with LHV.
- 20 from a population of 100 myall, all with LHV.
- 11 mature white cypress pines, all with LHV.
- Two Bimble Box, one with MHV the other with LHV.
- Two Fuzzy Box, one with HHV the other with LHV.
- Two wilga, both with low HV.

7.2.2.3 Tomingley – Narromine Water Pipeline

The majority of the TNWP Impact Footprint (46km x 1m x 4m) would not affect trees with hollows. As the pipe is flexible its alignment could be altered to avoid substantive vegetation where required. Impacts would largely be limited to regrowth within a former disturbance footprint from a telecommunications cable. If a minor deviation can occur (as shown in **Appendix 3** Image 9), a 1.3km remnant of Benson 76 could be avoided and save an additional 200 LHV inland grey box and 20 trees with MHV.

7.2.3 Indirect (Operational) Impacts

7.2.3.1 Typical Operational Impacts

Indirect impacts are those that would occur after construction of infrastructure associated with each activity within the Project Site. A summary of the indirect (operational) impacts typical of open cut mining operations such as the TGP is provided by **Table 17**.

Section 7.2.3.2 and 7.2.3.3 consider the indirect impacts of the operating RSF, which poses a risk to local biodiversity not 'typical' of mining activities, and rehabilitation and revegetation activities, which may have a positive impact on local biodiversity values.

7.2.3.2 Rehabilitation

Proposed Revegetation within the Mine Site

Section 2.14 of the *Environmental Assessment* provides a detailed summary of the proposed rehabilitation of the Mine Site. This includes a detailed description of rehabilitation objectives, domains, and methods, as well as a conceptual illustration of final landform and land use.

Table 17
Indirect (Operational) Impacts

Indirect / Operational Impact	Affect and application to the Project Site	Applicability		
		Mine Site Study Area	PHTETL Study Area	TNWP Study Area
Implementation of landscape design / mitigation / offsets	Rehabilitation at face value is positive however if undertaken incorrectly it may alter vegetation communities / site hydrology or place other at risk through competition and or direct impacts (planting trees within native grassland).	Yes. Landscape Strategies Australia (Williams 2009) has written 'A Report on Proposed Revegetation of Tomingley Gold Mine for Alkane Resources Ltd'. Further detail provided below.	Yes. Voluntary rehabilitation within the Peak Hill Gold Mine can be reviewed as possible offsets for this project. Further detail provided below.	No. If impacts can avoid clearing of substantive trees then the Impact Footprint would recolonise with native species as seen in association with the Telstra cable and more regionally with the general effects of the AGL gas pipeline.
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 Mine Site Study Area and as such this aspect of the TGP is likely to increase population of said animals during the life of the TGP.	No artificial lighting is associated with this activity.	No artificial lighting is associated with this activity.
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 by The Impax Group (2009). It is not considered likely that any general changes would affect native biota.	No changes in site hydrology are expected.	No changes in site hydrology are expected.
Changes in Hydrology (Tailings dams)	Tailings dams contain the ends of the gold-making process where a mixture of ore, water, and chemicals including sodium cyanide used to leach out the metals. The chemical is soluble and can kill if ingested in high concentrations. Other non-ingestion related risks are associated with spills, seepage or flooding of the tailings dams (direct, indirect or environmental breach of containment).	Yes. Extent and empirical nature of impacts known (see **Figure 2**).	No	No

Table 17 (cont'd)
Indirect (Operational) Impacts

Indirect / Operational Impact	Affect and application to the Project Site	Applicability		
		Mine Site Study Area	PHTETL Study Area	TNWP Study Area
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. See Section 7 for more detail.	No	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 EEC's.	Yes. See Section 7 for more detail.	Yes. See Section 7 for more detail.	Yes. See Section 7 for more detail.
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 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 POEO Act requirements.	No.	No.
Disease	Health status of vegetation may change if proposed works or operation of the TGP introduces a disease or change the environment such that flow on effects affects it.	Unlikely to be a realistic consideration although it is possible that if Blakely's red gums were re-introduced into the property along Gundong Creek then it may be subject to 'die back'.	No.	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.	No.	No.
Trauma to fauna	Considered to be the greatest operational threat to fauna in the Project Site. Vehicle trauma on the regions roads, particularly along the Tomingley to Narromine 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 or the Newell Highway would increase the potential for trauma to wildlife.	Yes. Risks to fauna for Mine Site related traffic can be controlled through Administrative Controls (conditions of employment to abide by speed limits and OHS reporting of breeches).	No.	No.

Existing Revegetation within the Peak Hill Gold Mine

This section detailing the Peak Hill Gold Mine has been included as the Proponent had been advised by OEH that existing rehabilitation works at this site may be considered as an offset for this proposal.

The Peak Hill Gold Mine lease area is 199.2ha and to date Alkane has effectively completed rehabilitation across all but approximately 20ha. No further physical works are required within this area. The only indirect impacts associated with this area would be truck movements to bring in removed components of vegetation that would be strategically placed to increase habitat complexity within regenerating areas.

7.2.3.3 Residue Storage Facility

Residue storage facilities or tailings dams contain a mixture of ore, water, and chemicals including sodium cyanide used to leach out the metals. Cyanide is a fast acting poison, and its toxicity is related to the types of cyanide complexes that are present. Cyanide in biota binds to iron, copper and sulfur-containing enzymes and proteins required for oxygen transportation to cells. Cyanide concentrations below 50mg/L weak-acid-dissociable (WAD) are deemed safe to wildlife but are considered an interim benchmark for discharge into the RSF for the TGP. The main WAD cyanide complexes in gold mine tailings are stable in the tailings storage facilities environment but can release cyanide ions under varying environmental conditions including ingestion and absorption by wildlife (Donato *et al*. 2007).

There is no commercially available alternative technology for the extraction of gold from the ore type of the TGP at the present time.

Risk to wildlife is derived from animals, particularly wetland birds or wildlife dependant on the local source of water for drinking, utilising tailings dams with concentrations of WAD > 50 mg/L. The TGP is unlikely to have a large body of free standing water as discharge would not be concentrated from one point (multiple holes within poly pipe along the floor of the residue storage facility which would all drain into a slurry and filter down into a collection reservoir). The collection reservoir, a small area (dimensions unknown, possibly 1ha) is the risk to wildlife as it is a free standing body of water.

Few guidelines and information are available to manage the risks of cyanide to wildlife, although prevention of access to tailings, detoxification, habitat modification and denying wildlife access have been used effectively. Hazing techniques have proven ineffective (Donato *et al*. 2007).

Accidents with the treatment system are possible, in the locality, summer storms or high rainfall events have potential to occur. These could cause tailings dams to break or cause flooding, sending a large pulse of residue downstream, which could have devastating effects on both terrestrial and aquatic ecological communities. Mining accidents with this type of mine are rare occurrences in Australia; however, those that have occurred have resulted in adverse environmental and ecological effects, with the possibility of, as yet unquantified, long term impacts.

7.2.4 Decommissioning Impacts

Impacts associate with decommissioning can be summarised as.

- Removal of contaminated water or soil.

- Removal or demolition of disused structures that may have been colonised i.e. by roosting animals.
- Removal of infrastructure (roads, power lines) including 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.
- One off environmental accidents and incidences.

7.3 IMPACTS ON FISH COMMUNITIES AND AQUATIC HABITATS

7.3.1 Introduction

This section has been written following the guidelines in "*Why do Fish Need to Cross the Road? Fish Passage requirements for Waterway Crossings"* (Fairfull and Witheridge 2003).

This section does not easily assimilate with most ecological assessment report structures, however, it is requisite to include it in as its own section as assistance to the DPI assessing officer.

7.3.2 Importance of the Waterway and its Associated Fish and Fish Habitat

The TGP would require trenching within 40m of the any creek centreline within the study areas. All named creeks (Gundong, Tomingley, Fiddlers, Bradys Cowl, Yellow and Wallaby Creeks) would be under-bored.

There are nine locations where proposed infrastructure would cross or be within the boundaries of named creeks in the assessed areas (see Section 5.6.3). All natural creeks and drainage lines in the Project Site may be considered as part of the 'Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River Endangered Ecological Community*'*. The phrase 'may be considered' is used to reflect that Gundong Creek within the Project Site is a man-made channel.

7.3.3 Habitat Compensation

Under NSW Fisheries Policy and Guidelines for Aquatic Habitat Management and Fish Conservation 1999 a 2:1 habitat compensation policy for any fish habitat losses associated with development exists. As all named creeks would be micro-bored using a setback point 40m from the centreline of the creek, there would be no impact to terrestrial vegetation which could be considered as 'fish habitat'.

7.3.4 Blockages to Fish Passage

The TGP would not affect fish passage during its construction or operation.

7.3.5 Significance of Impacts of the Development on Threatened Species Listed Under the *Fisheries Management Act 1994* and the EPBC Act 1999

It is unlikely that any of the threatened species of fish identified by OEH or DSEWPaC would be directly or operationally impacted by the TGP if requirements of the POEO Act and stringent soil and sediment controls are implemented during construction and its operation.

The TGP would impact *Aquatic ecological community in the natural drainage system of the lowland catchment of the Lower Darling River Endangered Ecological Community*. Given that impacts would be discrete (micro-boring under named creeks and trenching through unnamed waterways), it is unlikely that the TGP would affect waterway morphology or the multitude of habitats that play a critical role in the life cycles of the species comprising the community.

7.3.6 Predictions Regarding the Type and Extent of Impact on Fish, Fish Habitat and Fish Passage

7.3.6.1 Algal Bloom During Operation of the RSF

It is unlikely that algal bloom would occur in the collection reservoir of the tailings dam / RSF (potentially affecting invertebrates noted as part of the Aquatic EEC that have potential to colonise this habitat type) as water levels would be kept deliberately low by pumping. Pumping would not allow water to 'stagnate' or be subject to elevated water temperatures.

7.3.6.2 Vegetation Removal and Site Rehabilitation

The nature and extent of vegetation removal has been documented in Section 4.2. There would be no impacts to vegetation within 40m of centreline of any named creek, impacts to vegetation surrounding un-named waterways would be limited to ground covers that is mostly dominated by *Paspalum*, an exotic grass.

7.3.6.3 Potential Impacts to Surface Water and Groundwater Flows as a Result of the Activity

Specialist assessment has been undertaken by The Impax Group (2009). The assessing authority should reference this report. The ecologist's interpretation of this report is that ground water or surface quality would not be impacted.

It is unlikely that operational issues resulting from the TGP would affect surface or groundwater.

7.3.7 Map of all Waterways and Drainage Lines on the Project Site, Indicating Connectivity and Direction of Flow Both pre and post Construction.

Appendices 1 to **3** provide the location of each waterway in the Project Site. All waterways flow west into the Bogan River (approximately 5km west of the Mine Site). The direction of water flow within each drainage line would not change as a result of the TGP.

7.3.8 Licences and Permits

As the TGP is being assessed under Part 3A of the EP&A Act, the Proponent would not need to obtain a permit to engage in a dredging and reclamation activity (section 199, Part 7, Div 3 of the *FM* Act 1994). Blockage of fish passage as defined is unlikely to occur.

7.3.9 Recreational Fishing Activities

Recreational fishing is not undertaken near or within the Project Site.

7.4 EXACERBATION OF KEY THREATENING PROCESSES

The OEH list of Key Threatening Processes (KTP) was reviewed (last search date: April 2011, http://www.environment.nsw.gov.au/threatenedspecies/KeyThreateningProcessesByDoctype.htm).

Fifteen KTPs are active within the Project Site, of these three, clearing of native vegetation, loss of hollow-bearing trees and removal of dead wood and dead trees would be exacerbated by the TGP (**Table 18**). The nature and extent of the proposed impacts have been discussed in the preceding sections.

8 RECOMMENDED IMPACT AMELIORATION MEASURES

8.1 AMELIORATION MEASURES FOR GENERAL LAND MANAGEMENT

The nature of the surveys and the high clearing rate of native vegetation in the Central West CMA dictate that a precautionary approach should be taken. Considering the nature and extent of the proposed activity, amelioration measures should include the following.

1. General land management amelioration measures (e.g. pest animal control and weed management strategy).
2. Amelioration measures to be undertaken prior to commencement of proposed activity e.g. pre-clearance survey of the Grey-crowned Babblers nest in the eastern portion of the Mine Site and development of Administrative Controls such as development of policies, procedures or inductions to inform workers.
3. Amelioration measures to be undertaken during the proposed activity (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).
4. Amelioration measures to be undertaken after the proposed activity has been completed (e.g. monitoring of the Mine Site Study Area).

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.

Table 18
Relevance of Key Threatening Processes

Key Threatening Process	KTP Active Prior to this Proposal?	Will the TGP Exacerbate KTP?	Will the Proposed Offsets 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	No	No	No
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*)	No	No	No
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
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**	No	**Yes**, (rehabilitation)
Invasion of the yellow crazy ant (*Anoplolepis gracilipes* (Fr. Smith)) into NSW	No	No	No
Loss of hollow-bearing trees	**Yes**	**Yes**	**Yes**, (rehabilitation – long term)
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**, (pest control programme)
Predation by the feral cat (*Felis catus*)	**Yes**	No	**Yes**, (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**, (rehabilitation)

8.2 AMELIORATION MEASURES TO BE UNDERTAKEN PRIOR TO COMMENCEMENT OF PROPOSED ACTIVITY

Recommendations provided in Section 8.2.1 to 8.2.4 are numbered per section for ease of identification.

8.2.1 General Management of Impacts to Existing Biota

Alkane would consider development of a Land Management Plan (LMP) for the Mine Site Study Area. A LMP would identify and manage existing and rehabilitated native vegetation and habitat within the Mine Site Study Area, with particular reference to threatened biota, and providing certainty for a designated period of time. A LMP 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 Alkane 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 LMP should include, but not be limited to the following.

- Pest animal and plant control (feral cat, dog, fox, invasive native species i.e. noisy minor / black kite and noxious weeds).
- Development of offsets where by 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).

It is unlikely that a LMP or equivalent management plan could be fully implemented prior to the commencement of the TGP, 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 Mine Site Study Area.

The following text provides an outline of the various strategies and programs which could be developed as part of the LMP.

Pest Animal Strategy

A pest animal strategy would be developed by targeting the introduced fox, rabbit, hare and feral cat. The main outcome of this strategy would be a management plan aimed at implementing on ground works to control these pest species. The strategy and subsequent management plan would be developed in conjunction with relevant strategies documented by OE&H, NSW Livestock Health and Pest Authority, CW-CMA and neighbouring properties.

Weed Control Program

A weed control program implemented for the Mine Site Study Area would 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 three study areas. Planting fast growing indigenous native grasses (but not monoculture forming) to minimise potential weed invasion would protect exposed areas and has been recommended in the revegetation plan (Williams 2009). Treatment of African boxthorn, a class 4 noxious weed, would be delayed until the habitat can established for small birds i.e. until wattles used in the revegetation programme are established.

Grazing Strategy

Grazing is a useful tool for weed control and fire suppression. Given that the Mine Site has been under some form of grazing since European settlement, grazing as a management tool should be considered where it would not could cause management issues and conflict with exploration / mining activities.

Grazing should be restricted or prevented altogether within existing remnants and during plant establishment (as per Williams 2009) 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.

8.2.2 Management of Impacts to Threatened Fauna and Communities

Fauna surveys in the Project Site have positively identified threatened species with key habitat elements within the proposed Impact Footprint, limited preclearance using an appropriately qualified and experienced ecologist survey is requisite.

Specifics of actions required prior to the work occurring are provided below.

1. Management of increasing an existing risk: The greatest risk to threatened and regionally significant fauna is vehicle trauma. Adopt a similar system as RioTinto Northparkes Mine where a reporting system is in place resulting in disciplinary action for employees breaking the legal speed limit to and from work. This OHS 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 i.e. inductions, policies and procedures.

2. It is not considered a possibility that Grey-crowned Babblers would nest in habitats associated with the PHTETL Study Area, no further consideration of this species is required in this area.

3. Management of a future risk: Grey-crowned Babbler are known from at least three locations (three family groups) within the Tomingley-Narromine Road corridor (**Figure 12**). No nests were observed during the assessment in which full pedestrian assessment involving a qualified ecologist (either as an ecologist or working as an archaeological assistant). To manage risk of new, unobserved nests being impacted through clearing of undergrowth associated with the TNWP, Administrative Controls are required:

   3.1 All staff, particularly the machine operator would, prior to commencement of soil surface disturbance, receive an induction.

   3.2 The induction would inform the operator about the species and a laminated OEH species profiles fact sheet with information about the babbler on one side and photographs of a 'typical' babbler dome shaped nest on the other side would be supplied (OzArk can supply photographs).

   3.3 The induction would clearly state that the fact sheet would remain in each vehicle and must be presented upon request. If a suspected nest in encountered the Alkane Manager or (appointed staff) would be immediately informed and the issue resolved as required.

4. Management of an existing risk: Grey-crowned Babbler are known within the Mine Site Study Area (one rosewood with nine nests on the eastern side of the Newell Highway and ten nests are in the south western corner on the western side). It is suspected that at least two families may occur, one east of the Newell Highway the other to the west (possibly two families are on the western side):

   4.1 The family on the eastern side utilises a Western Rosewood tree as both roosting and more importantly breeding habitat, however in 2010 an additional nesting site was recorded in the Newell Highway corridor which made the known number of breeding sites for this family to two. The tree in the Mine Site Study Area (east) is located within the Top Soil Dump Area and adjacent to Waste Rock Emplacement 3. The location of the tree is shown on **Appendix 9 Image 7** and GPS coordinates are presented on **Table 13.**

   4.2 This tree would be immediately protected using high visibility fencing ensuring a 25m buffer. Administrative Controls as per the above would also be adopted for contractors and staff.

   4.3 If possible, implement Engineering Controls[9] and re-locate this impact to avoid this tree allowing for a 50m buffer. This would not ensure a guaranteed conservation outcome as the family group has potential to relocate if there is an increase to the background levels of operational disturbance (noise, movement etc).

[9] A built or constructed solution.

4.4 If the Proponent cannot to avoid this High Habitat Value tree then a suitably qualified and experienced ecologist would be engaged to remove the nests prior to clearing. Clearing of the tree would not occur during breeding season (between July to February). The ecologist, prior to undertaking any work, would obtain a copy of Kathryn Lambers honours thesis (OzArk has an electronic version of the draft) prior to future works. This would ensure that any future management of a known breeding population would occur with the knowledge of the most recent ecological information. (Note: there are only circa eight to ten scientific papers written for this species – all are dated, most from the 70s and 80s).

4.5 Similarly, to protect nesting sites on the western portion of the Mine Site Study Area Administrative Controls would be implemented requiring that no impact to native vegetation would occur.

5. To reduce risk of impact to tree dependant microbats, clearing of substantive trees would be scheduled between April to September. Administrative Control would see the induction include a requirement that strictly no one is to handle any species of bat would they be encountered during tree clearing. Bats have potential to carry zoonoses (a disease that animals carry which can affect humans).

8.2.3 Amelioration Measures to be Undertaken During the Proposed Activity

During operations the following amelioration measures should be undertaken.

1. Areas to be cleared would be clearly marked to ensure no accidental clearing occurs. Administrative Controls would include inducting employees regarding the nature and extent of required clearing 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 would occur, any breeches of conditions of consent would be immediately reported.
2. Any infrastructure and machinery required for the proposed activities would be positioned to avoid retained native vegetation e.g. adjacent vegetation outside designated clearing areas but remain within areas assessed in the report.
3. Impacts to the Myall Woodland EEC / CEEC between Poles 54 and 55 should be avoided. Avoidance may include increasing the height of the poles to span remnant vegetation and undertaking scalloped clearing (removing the upper portions of the plant and leaving lower portions intact). Prior to clearing collect seed, should be collected from the myall and used for planting at the Peak Hill Gold Mine where myall is naturally regenerating. When material is removed from the location (branches etc) also transfer to the Peak Hill Gold Mine. It is suspected that the population in the PHTETL has, in the long term, potential to become locally extinct irrespective of the proposed activity and this measure would ensure transfer of genetic material to an area that is managed for conservation.

4. Vegetation clearing within the PHTETL Study Areas should be undertaken in accordance with *Country Energy Procedure Vegetation Clearing Guidelines For New Power Lines CEP2010.*
5. Within the Project Site the contractors should check all trees for the presence of birds or nestlings and arboreal mammals before felling or pushing then start tree removal immediately after visual inspection.
6. When a large tree (with hollows) requires clearing, it is advisable to gradually nudge it at intermittent intervals so that any animal occupying a habitat tree has the chance of vacating the area after the initial disturbance period (tap it with the dozer, wait five minutes, repeat, then repeat).
7. Where clearing of native vegetation is unavoidable within the Mine Site and PHTETL Study Areas, salvage tree trunks, major limbs and if possible minor branches. These would be relocated into inter-row areas destined for revegetation as per Williams (2009) or into existing offset areas at the Peak Hill Gold Mine. This activity would create habitat with structural complexity and encourage many species including robins into the revegetated areas. Dead and down timber is a critical habitat component but is largely absent in the locality. Timber should not be stacked to provide harbouring vegetation for rabbits, it would be evenly scattered. Signs should be erected stating the value of the timber for wildlife and that no fire wood collection is permitted.
8. 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 sites, especially in regards to invasion of drainage lines and dams.
9. Drainage and runoff should be controlled in such a way as that no foreign substrates or materials leave the site.
10. Sediment and erosion control structures, which conform with the relevant guidelines, should be installed.
11. Exposed surface soil should be stabilised as soon as possible to avoid potential erosion (by mulching, covering or replanting with native species).

Although Gundong Creek in the Project Site is not technically part of the Aquatic EEC the following precautions would be adopted in the Mine Site Study Area, as well as in the areas surrounding unnamed drainage channels in the TNWP Study Area and both named creeks in the PHTETL Study Areas to minimise risk[10].

1. The proposed activities should be planned so that the amount of in-stream work is kept to a minimum.
2. Where possible, in-stream work should occur as a single event.
3. Where possible, restrict in-stream work to low flow periods.
4. Limit machinery access to a single point on one bank.
5. Limit distance between machinery access point and work site.
6. Adhere to timing restrictions.

[10] recommendations are an adaptation of those generally required by DPI [NSW Fisheries]

7. Minimize flow constriction.
8. Use in-stream pad built of washed gravel where in-stream equipment activity would generate excess sediment.
9. Keep access to the site as narrow as possible within the constraints of safety and construction requirements.
10. Limit removal of vegetation to the width of access.
11. Clear vegetation from unstable or erodible banks by hand, avoiding the use of heavy machinery.
12. Develop sediment control plans and install sediment control measures before starting work.
13. Inspect sediment control measures regularly and make necessary repairs immediately after damage has been discovered.
14. Stockpile topsoil removed from the access outside of the active floodplain and use measures such as silt fences and holding ponds to prevent stockpile runoff from entering the watercourse.
15. Minimize the length of time that unstable erodible soils are exposed.
16. Direct runoff containing sediment away from the stream into a vegetated area.
17. Construct suitably sized settling ponds to precipitate suspended sediment before water is discharged into the watercourse.
18. Stabilize erodible soils as soon as practical by seeding, spreading mulch or installing erosion control blankets.
19. Allow at least four weeks of growing season when using seeding to stabilize erodible soils.
20. Machinery would arrive on site in a clean, washed condition, free of fluid leaks.
21. Install stabilized entrances at vehicle and machinery access points.
22. Limit the amount and duration of in-stream work with heavy machinery. Work from the banks where possible.
23. Refuel machinery at locations well removed from the watercourse (maintain a minimum 100m separation).
24. Wash and service vehicles and machinery at locations well removed from the watercourse.
25. Work on in-stream pads composed of washed gravel to minimize sediment entrainment.
26. Use bio-friendly hydraulic fluids in equipment operating in or adjacent to watercourse.
27. Store fuel, lubricants, hydraulic fluid and other potentially toxic materials at locations well removed from the watercourse.
28. Isolate storage areas so that spilled fluids cannot enter the watercourse.
29. Prepare a spill contingency plan.

30. Report all spills.
31. Use appropriate measures to prevent material from entering watercourse when painting, cleaning or resurfacing superstructures.
32. Begin site cleanup as soon as construction has been completed.
33. Remove all waste material from the active floodplain.
34. Re-contour, stabilize and revegetate disturbed areas to suit original conditions.
35. Remove all temporary facilities and structures.
36. Stabilize all slopes leading directly to the watercourse.
37. Seed exposed slopes immediately if there are at least four weeks remaining in the growing season. If this is not possible, slopes would be revegetated immediately in the next growing season.

8.2.4 Amelioration Measures to be Undertaken After Completion of Proposed Activity

Recommendations have been provided below and numbered for ease of identification.

1. Rehabilitation of the Mine Site and TNWP Study Areas 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. It is not recommended that any further consideration within the PHTETL is required as it's located in agricultural land that Alkane would not be able to manage rehabilitation within.
2. Appropriate offsets should be implemented to ensure "no net loss" of native vegetation and habitat is the outcome. Net loss offsets can include existing retained native vegetation areas within the Mine Site Study Area and Peak Hill Gold Mine, and positive land management practices (e.g. implementation of a weed and feral animal control program and a LMP).
3. The Grey-crowned Babbler, microbat and Fat-tailed Dunnart populations would be monitored to ensure recovery of local populations are successful.
   - Annual formal surveys of the Grey-crowned Babbler should target detection of breeding locations that when located could be monitored can to gauge breeding success. Relevant (standard) ecological information should be captured so as to allow for comparisons from year to year of any changes in habitat usage and population trends.
   - Annual bat monitoring should occur (three consecutive nights per event) to establish any trend in population increase since commissioning the activity.
   - Annual formal surveys of the Fat-tailed Dunnart should aim to establish a population census and gather information that would be used to manage this species within the Mine Site. Relevant (standard) ecological information should be captured so as to allow for comparisons from year to year of any changes in habitat usage and population trends.

Residue storage facilities have 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 Principles of the International Cyanide Management Code (ICMI 2002). For each Principle, the Code specifies Standards of Practice to identify performance goals and objectives that must be met to comply with the Code. Four of the Principles (and corresponding Standards of Practice) are directly relevant to the TGP as follows.

    - **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.
    - **Emergency Response**: Protect communities and the environment through development of emergency response strategies and capabilities.
        - Prepare detailed emergency response plans for potential cyanide effects.
        - Develop procedures for internal and external emergency notification and reporting.
    - **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.
        - Train appropriate personnel to operate according to systems and procedures that protect the environment.
    - **Dialogue**: Engage in public consultation and disclosure.
        - Make available operational and environmental information regarding cyanide available to stakeholders.
        - 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.

1 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 RSF as follows:

1.1 If possible make water within the RSF hyper-saline, this would prevent animals from drinking it.

1.2 Prevent terrestrial animals from accessing the tailings dam / residue storage facility / evaporation ponds with fencing using a combination of a large (tall > 1.8 m) chain mesh fence (to exclude large mammals) with a fine mesh skirt at its base (to exclude small mammals and reptiles).

1.3 Exclude access to tailings water with bird netting similar to that used in orchids.

1.4 Provide alternative waterholes. In this instance habitat restoration of the site may include expansion of the two artificial dams immediately north of the proposed RSF along the man-made channel referred to in this report as Gundong Creek. Very little ground surface disturbing works would be required in this area – merely extension of the dams surface area and provision of habitat complexity (variable depths and widths of the dam floor, addition of logs etc and instillation of a valve to raise or lower water level for the benefit of biota). An appropriate species list species list known to be commercially available and have success in the locality would include:

1.4.1 Reed bed plantings – *Phragmities australis, Bolboschoenus cadwelii, Baumea articulate, Schoenoplectus validus, Schoenoplectus murticans, Alisma plantago-aquatica, Triglochin procerum*; and

1.4.2 Edge plants – *Philydrum lanuginosum, Juncus astatus, Carex fascicularis, C. appressa and Cyperus exaltatus.*

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

2 Deterrents on the dams and ponds would be considered:

2.1 Hydrogen guns (non-lethal deterrents) may be considered to ‘scare’ any populations of birds from the RSF. These guns are best used only infrequently as birds quickly become accustomed when regularly used.

2.2 Use of a rotating spot light on a random sequence may be used as a deterrent at night. Spotlight would be set of a floating platform (able to rise and fall with the water level). The objective is to scare away birds using the water at night (mainly ducks). Aim is to ensure light would not affect Newell Highway traffic or neighbouring properties (beam set to edge of water on bank), not have regular intervals (so that animals would become accustomed) and not to encourage other animals (insects) to become dependent on it.

2.3 Wildlife ladders should be incorporated into the design to facilitate escape, where an animal falls into the tailings slurry.

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

3.1 Mine environment personnel should be trained to collect routine wildlife and cyanide concentration data from the Mine Site (daily inspections, targeted inspections i.e. when Superb Parrots are migrating, utilisation of specialist equipment such as Anabat gear).

3.2 Information captured should be through standardised methods. The methodologies employed may include, but not be limited to, using optical aids such as telescopes at the tailings dams and use of reference material to ensure accurate identification of wildlife. Specified techniques and equipment should be used for cyanide sampling.

3.3 Information captured should be recorded on purpose built spreadsheet or database templates.

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

4 Implement monitoring programs to evaluate the effects of cyanide use on wildlife by undertaking routine wildlife utilisation and mortality observations:

4.1 Mine environment personnel should be trained to conduct the wildlife observations survey within three hours of sunrise.

4.2 Total observation time is expected to be 30 minutes on regular shaped tailings dams.

4.3 The survey counts should identify all wildlife visitations and mortality associated with tailings dams.

4.4 Habitat utilisation should be recorded as either supernatant[11], bare ground (dam walls), wet slurry, aerial (above the tailings), dry tails or feeding on carcasses.

4.5 Standard weather conditions, an estimation of the extent of the supernatant on top of the tailings (as a total percentage of tailings dam area) and the percentage of solids in discharged tailings for that day should be recorded.

4.6 On subsequent routine observations, environmental staff should identify and record the fate of carcasses, either as removed by scavengers or subsequent entombment under tailings.

4.7 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.

4.8 Opportunistic observations of wildlife deaths should also be recorded.

[11] Precipitation is the formation of a solid in a solution during a chemical reaction. When the reaction occurs, the solid formed is called the precipitate, and the liquid remaining above the solid is called the supernate.

5 Implement monitoring programs to evaluate the effects of cyanide use on wildlife by undertaking frequency of routine wildlife observations:

5.1 Frequency of observation required by environment mine personnel is a function of cyanide concentrations at discharge into the tailings dam and wildlife mortality:

- At <50 ppm WAD, routine observations are recommended weekly. If wildlife mortality is recorded, then routine observations should be repeated for the next three days.
- At >50 ppm WAD, routine observations are required daily.
- If an opportunistic observation records a wildlife death, then routine monitoring of the tailings dam is required the same and following day.

6 Implement monitoring programs to evaluate the effects of cyanide use on wildlife by undertaking frequency of routine cyanide data collection:

6.1 The field cyanide sampling technique should be performed in accordance with best practise.

6.2 Free, total and WAD cyanide concentrations should be measured at discharge into the tailings facilities, 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:

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

7.2 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 value of information.

7.3 If a multiple wildlife mortality event occurs (three deaths in one day), then cyanide sampling is required the same day.

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

8.3 TOMINGLEY GOLD PROJECT BIODIVERSITY OFFSET STRATEGY

8.3.1 Description of the TGP BOS

On the basis that the TGP would result in unavoidable impacts on local biodiversity, the Proponent has committed to developing and implementing a Biodiversity Offset Strategy.

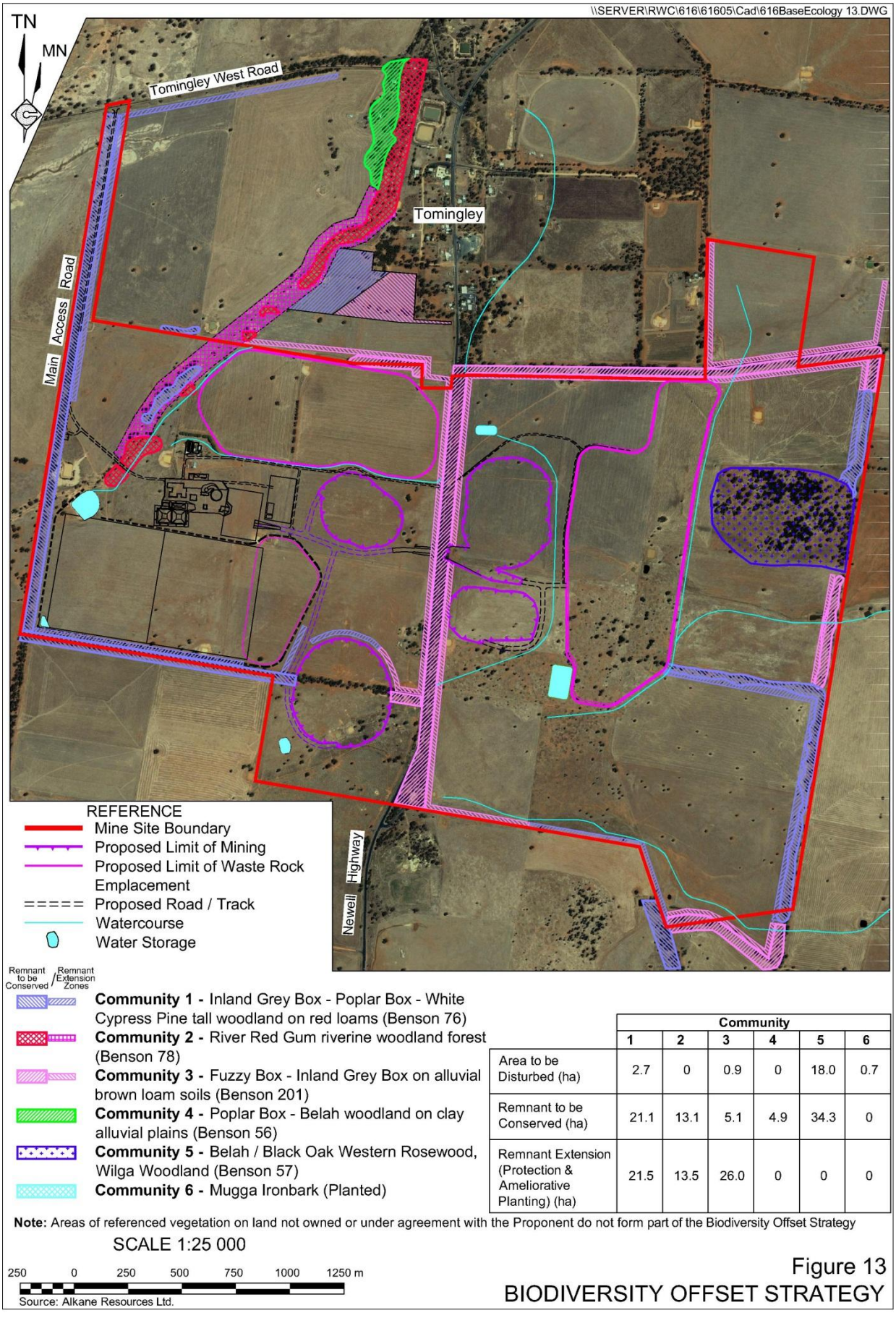
The TGP BOS is applicable to the Mine Site, TNWP and PHTETL. While, technically the PHTETL could be excised from the TGP BOS as it is being assessed separately from the Mine Site and TWMP components of the TGP (under Part 5 of the EP&A Act) which are being assessed under the Part 3A of the EP&A Act), the Proponent has undertaken due diligence for requisite offsets of the PHTETL within the TGP BOS.

The TGP BOS has been developed in collaboration with the Proponent and R.W. Corkery & Co. Pty Limited (environmental consultancy preparing the *Environmental Assessment* for the TGP). The development of the TGP BOS 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 TGP 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 offsets.

In order to achieve the nominated key outcomes, the focus of the TGP BOS is the protection, enhancement and long-term conservation of the existing remnant native vegetation on the Mine Site and surrounding lands. Particular focus has been given to enhancing and conserving those remnants of Inland Grey Box EEC and Fuzzy Box EEC occurring on and immediately surrounding the Mine Site. **Figure 13** illustrates the critical features of the proposed TGP BOS which can be summarised as follows.

- Approximately 21.1ha of remnant Inland Grey Box EEC in Moderate to Good Condition would be protected and conserved. Planting of 21.5ha of land immediately adjoining the remnant patches (Inland Grey Box EEC {Benson 76} in Low Condition would occur. In total 42.6ha of Inland Grey Box EEC with all structural layers would be protected within the Mine Site. Pre-mining (under farming) saw 24.7ha without substantive grassy or shrub layers.
  - Remnant vegetation is predominantly thin strips of vegetation along road reserves and isolated patches along drainage lines within farmed paddocks (remnant patch width does not exceed 30m).
  - The TGP BOS proposes to protect these remnant areas from degradation that could result from competing land uses, e.g. grazing. Where remnant vegetation is present and in Low Condition, the extant remnants will be enhanced by supplementary seeding and/or planting. The TGP BOS also provides for the extension of these remnant areas of Inland Grey Box EEC as follows.



	Community					
	1	2	3	4	5	6
Area to be Disturbed (ha)	2.7	0	0.9	0	18.0	0.7
Remnant to be Conserved (ha)	21.1	13.1	5.1	4.9	34.3	0
Remnant Extension (Protection & Ameliorative Planting) (ha)	21.5	13.5	26.0	0	0	0

Note: Areas of referenced vegetation on land not owned or under agreement with the Proponent do not form part of the Biodiversity Offset Strategy

Figure 13
BIODIVERSITY OFFSET STRATEGY

- The remnant that is aligned along the Main Site Access Road and along the western and southern boundary of the Mine Site would be extended (on to the Mine Site) by 20m (resultant width of the patch would be no narrower than 50m). The extended remnant area would be surveyed, marked and fenced as required. Initially, natural remediation and revegetation would be encouraged, however, supplementary seeding and tree planting would be undertaken as required.
- This same 20m extension (on to the Mine Site), survey, fencing and supplementary revegetation would also be implemented where strips of Inland Grey Box EEC occur on the western section of the Mine Site. As noted above the width of the remnant would not be smaller than 50m.
- Habitat corridors would be created through the extension of the existing native vegetation remnants around Wyoming One open Cut and along the southern boundary on the western section of the Mine Site. These 20m strips would be surveyed, protected from competing land use (by fencing if necessary) and enhanced by supplementary seeding and/or tree planting as required.
- Planting of vegetation indicative of the Inland Grey Box EEC would be undertaken on land bounded to the north and east by Tomingley village, to the west by Gundong Creek and to the south by an existing strip of Fuzzy Box EEC vegetation. As noted earlier where Low Condition remnants are located adjacent to a Moderate to Good remnant the aim of habitat restoration is to achieve widths no less than 50m.

- In total 21.5ha of Inland Grey Box EEC remnant extension and enhancement is proposed by the TGP BOS.
- Approximately 5.1ha of remnant Fuzzy Box EEC in Moderate to Good condition would be protected and conserved as described above for the Inland Grey Box EEC remnants (this includes remnants contained within the Newell Highway easement but excludes the small southern-most remnant which occurs on land not under the control of the Proponent). Planting of 26.0ha of land immediately adjoining the remnant partches (Fuzzy Box EEC {Benson 201} in Low Conditon would occur. In total 31.1ha of Fuzzy Box EEC with all structural layers would be protected within the Mine Site. Pre-mining (under farming) saw 6.0ha without substantive grassy or shrub layers. The TGP BOS also provides for the extension of these remnant areas of Fuzzy Box EEC as follows.
  - The remnants aligned along the Newell Highway, around the boundary of the western section of the Mine Site and onto the eastern section of the Mine Site in the vicinity of Wyoming One Open Cut would be extended by 20m (remnant width would be in the order of 60m). The extended remnant area would be surveyed, protected and enhanced as described for the Inland Grey Box EEC remnants.
  - An additional 20m wide strip of Fuzzy Box EEC would be established on the eastern and southern boundaries of Lots 94 and 95, DP755110, extending to the east and then north (achieving remnant width of no narrower than 50m). This would be surveyed, protected and enhanced as described for the Inland Grey Box EEC remnants.

  - Planting of vegetation indicative of the Fuzzy Box EEC would also be undertaken on land bounded to the north and east by Tomingley village, to the west by Gundong Creek and to the south by an existing strip of Fuzzy Box EEC vegetation (achieving remnant width of no narrower than 50m).

- In total 26.0ha of Fuzzy Box EEC remnant extension and enhancement is proposed by the TGP BOS.
- Approximately 13.1ha of River Red Gum riverine woodland forest, occurring along Gundong Creek, would be protected and conserved as described above for the Inland Grey Box and Fuzzy Box EEC remnants. The TGP also provides for the extension of this remnant area as follows.
  - A 50m wide area would be protected either side of the creek channel. This would be surveyed, marked (and fenced as necessary) and protected from competing land uses.
  - Initially, natural remediation and revegetation would be encouraged, however, supplementary seeding and tree planting would be undertaken as required.
- In total 13.5ha of River Red Gum riverine woodland forest remnant extension and enhancement is proposed by the TGP BOS.
- Approximately 4.9ha of Poplar Box – Belah woodland on clay alluvial plains and 25.5ha of Belah / Black Oak Western Rosewood Wilga woodland would be conserved on and immediately surrounding the Mine Site.
- 17.15ha of Belah/Blackoak – Western Rosewood – Wilga woodland of central NSW (Benson 57) in Moderate to Good Condition and 17.15ha of Benson 57 in Low Condition would be protected and enhanced by natural recovery. This is the only community to undergo net loss as a result of the activity.
- The sediment basins and drainage lines established for the Project would be retained and revegetated incorporating native vegetation such as rushes, sedges, grasses and trees common to watercourses and storage areas.
- The proposed final land uses of the Mine Site are also an important component of the TGP BOS. As identified on Figure 2.18 of the Environmental Assessment, significant areas have been allocated as '*Native Vegetation Establishment and Protection*' within the final landform. Remaining areas are identified as being returned to '*Sustainable Agriculture*'.

Table 19 provides a summary of the impact and proposed offsets for each vegetation community identified on the Mine Site.

Important features of the TGP BOS vegetation enhancement are as follows noted below.

- Revegetation aims to increase the areas of occupancy of existing remnants (i.e. make thin linear strips wider, 50m where an existing remnant occurs and 20 to 30m where new areas will be retired from farming). These linear remnants will not be grazed by sheep or cattle which will allow habitat complexity and diversity to increase.
- Revegetation aims to repair fragmentation between existing remnants.

Table 19
Details of Impacts and Offsets of Native Vegetation[#]

	Inland Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams (Benson 76) EEC	River Red Gum riverine woodland forest (Benson 78)	Fuzzy Box – Inland Grey Box on alluvial brown loam soils (Benson 201) EEC	Poplar Box – Belah woodland on clay alluvial plains (Benson 56)	Belah Black Oak Western Rosewood Wilga Woodland (Benson 57)	Planted Mugga Iron barks[#]	Total ha (Mine Site)
Total Area within Study Area (ha)	24.7	13.1	6.0	4.9	52.3	0.7	96.8
Area to be Disturbed	3.6	0	0.9	0	18.0	0.7	23.2*
Remnant Conservation and Enhancement	21.1	13.1	5.1	4.9	34.3	0	76.3
Remnant Extension (and Enhancement)	21.5	13.5	26.0	0	0	0	61
Total Offset (Remnant Conservation + Enhancement)	42.6	26.7	31.1	4.9	34.3	0	139.6

Note [#]: The areas included vary slightly from those used in the Biobanking Credit Report (**Appendix 10**) as these were based on earlier area calculations. Importantly, the areas of impact used to generate minimum area requirements in the BioBanking Credit Report (**Appendix 10**) exceed those in **Table 19** and throughout the report. Therefore conclusions drawn from assessment of the TGP BOS against the Biobanking Credit Report remain valid.
Note #: Planted Mugga Ironbark not included in calculation

- Revegetation includes species from both Inland Grey Box Woodland EEC (2.7ha to be removed in the Mine Site) and Fuzzy Box on Alluvials EEC (0.9ha to be removed in the Mine Site);
- Species associated with Belah / Black Oak Western Rosewood, Wilga Woodland (Benson 57) (18.0ha to be removed) would also be used selectively within the species mix. These remnants would be managed through natural recovery, weed control, grazing management and feral animal control.
- The species mix would include River Red Gum along Gundong Creek and Bimble Box throughout, this would increase the potential area of occupancy for Koalas in the locality.
- It is envisaged that if managed correctly, the 61.0ha ha of enhanced and additional vegetation would at minimum (100 years from now) replace twice the numbers of trees lost associated with the TGP.
- 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 locaility, possibly the Central West CMA.

8.3.2 Evaluation of Offsets

8.3.2.1 Relevant Policy

There are three policies that need consideration with respect to offsets:

1. OEH Interim Policy for Biodiversity Offsets for Part 3AProjects (November 2010) (OEH Interim Part 3A Offset Policy;
2. DSEWPaC 's Draft Policy Statement: Use of environmental offsets under the EPBC Act 1999 (DSEWPaC Draft Policy Statement'); and
3. OE&H[12] Principles for the use of biodiversity offsets in NSW ('DECCW Offset Principles').

8.3.2.2 OEH Interim Part 3A Offset Policy

OEH (as the then Department of Environment, Climate Change and Water) recently 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 on the Mine Site. **Appendix 10** provides a BioBanking Credit Report, prepared in accordance with BBAM, based on the impacts identified in **Table 19** which calculates the minimum offset requirements for each vegetation community impacted. Comparing the minimum offset requirement calculated in **Appendix 10**, and the proposed offsets of nominated in **Table 19**, the TGP BOS has been considered to determine whether it 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
- 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.

Table 20 provides the output generated by the Biobanking Credit Report (**Appendix 10**).

[12] Formerly DECCW.

Table 20
BioBanking Calculated Offset Requirements for Impact Vegetation

Vegetation Community	Impact Site				BioBanking Site			
	Area Disturbed	Credits Required	Min Area	Red Flag	Area	Credits Created	Patch size	Maintain or Improve?
Community 1 (Benson 76)	(Moderate to Good Condition) 3.6ha[1]	113	5ha	Yes	Moderate to Good (Extant) 21.1ha	226	5-25ha	Yes Improve. Credits: n= 482 credits generated – 113 required = 369 surplus. Patch size falls within minimum area required.
					Low Condition (reveg) 21.5	256	5-25ha	
Community 2 (Benson 78)	(Moderate to Good Condition) 0	0	-	Yes	Moderate to Good (Extant) 13.1ha	137	5-25ha	Yes Improve. Net increase.
					Low Condition (reveg) 13.5	149	0-5ha	
Community 3 (Benson 201)	(Moderate to Good Condition) 0.9ha	30	5ha	Yes	Moderate to Good (Extant) 5.1ha	58	0-5ha	Yes Improve. Credits: n= 314 credits generated – 30 required = 284 surplus. Patch size falls within minimum area required.
					Low Condition (reveg) 26ha	256	5-25ha	
Community 4 (Benson 56)	(Moderate to Good Condition) 0	0	-	No	Moderate to Good (Extant) 4.9ha	42	0-5ha	Yes. No change thus maintains.
Community 5 (Benson 57)	(Low Condition) 18.0ha	453	0ha	No	Moderate to Good (Extant) 17.15ha	170	0-5ha	No. Credits: n= 342 credits generated – 453 required = 111 deficit. Yes. Patch size exceeds minimum area required.
					Low Condition (Extant) 17.15ha	172	5-25ha	

Note 1: The Biobanking Credit Report was completed when the calculated area of disturbance was 3.6ha (as opposed to 2.7ha). The report therefore overstates the minimum area requirements for Community 1.

Critically, for all but Community 5 (Benson 57), the TGP BOS provides for a surplus of ecosystem credits when compared to those required. Overall, a surplus of 870 ecosystem credits is provided by the TGP BOS and, given two of the communities for which surplus credits are provided are EEC's (Benson 76 – 369 surplus credits and Benson 201 – 284 surplus credits), the TGP provides for conservation of "like for like or better" vegetation.

Considering the proposed TGP BOS against the BBAM generated offset requirements, the proposed offset meets the "No Net Loss" benchmark, only failing to meet the "maintain or Improve" benchmark given the unavoidable disturbance to EECs, i.e. red flag areas, and small deficit of credits provided for Community 5.

8.3.2.3 DSEWPaC Draft Policy Statement

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

1. Consideration 1 - Consistency with DSEWPaC definition;
2. Consideration 2 - Types of environmental offsets; and
3. Consideration 3 - Principle for the use of environmental offsets.

DSEWPaC listed items requiring consideration include:

- Mine Site: Inland Grey Box Woodland and Superb Parrot; and
- PHTETL: Weeping Myall Woodland13.

Consideration 1 – Consistency with DSEWPaC Definition

Offsets within the Project Site are not consistent with the DSEWPaC definition. However, the only inconsistencies are associated with long term security of the conservation offset and the location of the offsets within the Mine Site (**Table 21**).

Table 21
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'.	Offsets are within the Mine Site	As offsets are located within the Mine Site they are **inconsistent** 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 proposal 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.

No further reference to the Project Site offsets (as detailed above) will be made in the following sections.

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.

Two of the three direct offsets within the Mine Site are consistent with DSEWPaC defined environmental offset aims; only five of the eight offset aims are consistent with DSEWPaC definitions (**Table 22**).

[13] Inland Grey Box Woodland within the PHTETL did not meet the criteria for listing as the nationally EEC.

Table 22
Consistency Environmental Offset Aims

CONSISTENCY	Mine Site	PHTETL	TNWP
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;	**Inconsistent.** Relevance – Superb Parrot perching habitat and drinking water and Inland Grey Box Woodland has a reduction in the area of extent. The offset is not afforded long term protection though land tenure.	**Inconsistent.** Relevance – Myall Woodland to be impacted (20 of 1000 individuals).	**Inconsistent.** As per Mine Site.
2 restoration or rehabilitation of existing degraded habitat; or	**Consistent.** Relevance – Superb Parrot. Protection and enhancement of existing vegetation remnants would mitigate the impact for this species. More specifically introducing Blakelys Red Gum would provide species that is utilised for breeding (note: Climate change is likely to alter the existing core breeding habitat of the region potentially into the Mine Site Area). The Proposal would see an increase of perching habitat increase from 24.7ha to 42.6ha.	**Consistent**. As per Mine Site	**Consistent.** As per Mine Site.
3 re-establishing habitat.	**Consistent.** Perching habitat would be protected and new habitat would be planted. Myall would be planted within the Mine Site.	**Consistent.** As per Mine Site	**Consistent.** As per Mine Site
Indirect offsets			
4 implementation of recovery plan actions – including surveys;	**Consistent.** Perching habitat would be protected and new habitat would be planted. Myall would be planted within the Mine Site.	**Consistent.** As per Mine Site	**Consistent.** As per Mine Site.
5 contributions to relevant research or education programs;	**Inconsistent** Formalised per review research on Superb Parrot or Inland Grey Box Woodland is not a component of the activity.	**Inconsistent.** Formalised per review research on Myall Woodland EEC is not a component of the activity.	**Inconsistent** As per Mine Site.
6 removal of threatening processes;	**Consistent.** Relevance – Superb Parrot and Inland Grey Box Woodland. The offset and Land Management Plan has addressed many KTPs through revegetation and destocking. It is unknown if feral animal control is an active component of the sites management.	**Consistent.** Relevance – Myall Woodland EEC. As per Mine Site.	**Consistent.** As per Mine Site.
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	**Inconsistent.** The Proposal was not assessed under BioBanking. This 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.	**Inconsistent**	**Inconsistent**
8 on-going management activities such as monitoring, maintenance, preparation and implementation of management plans etc.	**Consistent.** The proposed Land Management Plan will be formerly undertaken for the purposes of this definition.	**Consistent.** As per Mine Site.	**Consistent.** As per Mine Site.

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 23**). These eight principles will be used to assess any proposed environmental offsets to ensure consistency, transparency and equity under the EPBC Act.

The inconsistency concerns the Mine Site not being a 'long term' conservation outcome as it does not involve acquisition and inclusion of land in a conservation estate or covenanting arrangements on private land. With respect to the latter this report will bring the issue to the attention of the Proponent for further consideration / investigation.

8.3.2.4 OE&H Offset Principles

Biota requiring offsetting has been identified and managed through the BioBanking Assessment Methodology for the Mine Site. The PHTETL and TNWP would affect paddock trees and as such have been managed by allowing 10m^2 of habitat offsetting per affected tree.

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 TGP BOS against the 13 OEH Offset Principles is provided in **Table 24**. Proposed offsets are only inconsistent with the NSW government's principles as 'long term' conservation goals of the land discussed is not secured by land tenure (i.e. private land conservation agreement).

Proposed offsets at the Mine Site through protection of remnants, revegetation, and habitat restoration amount to 139.6ha (73.6ha of existing remnants protected and 61.0ha vegetation community enhancement). Species used in revegetation will replace a missing structural layer (the ground layer and understory) and 'like for like' canopy species will be used. Habitat values of trees to be removed would be incorporated into the restored areas for habitat complexity. The result would increase the area of occupancy of the EECs impacted as well as assisting in natural recovery of the ecosystem and the animals and plants that depend on them.

8.3.3 Effectiveness of Offsets

The TGP BOS provides for conservation and enhancement of 139.6ha of native vegetation, including 73.7ha of EEC's. Species used in revegetation will replace a missing structural layer (the ground layer and understory) and 'like for like' canopy species will be used. Habitat values of trees to be removed would be incorporated into the restored areas for habitat complexity. The result would increase the area of occupancy of the EECs impacted, as well as assisting in natural recovery of the ecosystem and the animals and plants that depend on them. This is particularly relevant to the local population of Grey-crowned Babblers. The offsets would see the ability of the population to increase (by provision of more volume and the quality of habitat through relacing structural complexity). The Proponent has adopted the Grey-crown Babbler as a flagship species for the project.

Table 23
Principle for the Use of Environmental Offsets

The Australian Government's position is that:	Consistency - Mine Site	Consistency -PHTETL	Consistency -TNWP
1. Environmental offsets should be targeted to the matter protected by the EPBC Act that is being impacted.	**Consistent.** The impacts are not located in habitat that is used for breeding by Superb Parrot, however revegetation and habitat enhancement (through fencing and regeneration) would improve the volume and quality of remnant native vegetation. Similarly offsets and revegetation planned for Inland Grey Box Woodland exceed a maintain or improve outcome.	**Consistent.** Habitat enhancement (through fencing and regeneration) in the Mine Site would improve the volume and quality of remnant native vegetation including Myall Woodland as a component. Note: Any planting within agricultural land out of the Mine Site is not tenable or likely to be successful.	**Consistent.** Although no DSEWPaC items would be affected by this component offset actions within the Mine Site would see commensurate remnant vegetation protection and enhancement through a Land Management Plan.
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.	**Inconsistent** Relevance – Superb Parrot. By DSEWPaC definition the offset is not 'long term'. Mine voluntary rehabilitation as an offset for the TGP is cost effective for the Proponent.	**Inconsistent** As per Mine Site.	**Inconsistent** As per Mine Site.
3. Environmental offsets should deliver a real conservation outcome.	**Consistent.** Relevance – Superb Parrot. Mine Site revegetation and habitat protection will offset losses to perching habitat associated with the Proposal and add an additional feeding resource.	**Consistent.** Relevance – Superb Parrot, Myall Woodland EEC. As per Mine Site.	**Consistent** As per Mine Site.
4. Environmental offsets should be developed as a package of actions - which may include both direct and indirect offsets.	**Consistent.** Relevance – Superb Parrot. Recommendations within the report provide both direct and indirect offsets form the benefit of Superb Parrot.	**Consistent.** Relevance – Superb Parrot, Myall Woodland EEC. Recommendations within the report provide both direct and indirect offsets form the benefit of Superb Parrot within the Mine Site.	**Consistent** As per Mine Site.
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 – Superb Parrot. Rehabilitation within the Mine Site has offset the volume of perching locations to be removed.	**Consistent.** Relevance – Superb Parrot, Myall Woodland EEC. Recommendations within the report provide both direct and indirect offsets form the benefit of Superb Parrot within the Mine Site.	**Consistent** As per Mine Site.
6. Environmental offsets should be located within the same general area as the development activity.	**Consistent.** Relevance – Superb Parrot. The Project Site is within the same Catchment Management Area.	**Consistent.** Relevance – Superb Parrot, Myall Woodland EEC. As per Mine Site.	**Consistent** As per Mine Site.
7. Environmental offsets should be delivered in a timely manner and be long lasting.	**Consistent.** Relevance – Superb Parrot. Offset on the in the Mine Site has already been planned and budgeted.	**Consistent.** Relevance – Superb Parrot, Myall Woodland EEC. As per Mine Site.	**Consistent** As per Mine Site.
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.	**Consistent.** Relevance – Superb Parrot, Myall Woodland EEC. As per Mine Site.	**Consistent** As per Mine Site.

Table 24
OEH Offset Principles

Principle	Consideration	Consistency - Mine Site	Consistency - PHTETL	Consistency - TNWP
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 TGP was designed to avoid remnant native vegetation where possible, i.e. infrastructure was placed in disturbed areas. The only unmovable components were areas in which the mineral deposits are located. Vegetation conservation and enhancement would exceed the minimum requirements calculated by a BioBanking Credit Report meets the 'no net loss' benchmark of the OEH Part 3A Interim Offsets Policy	**Consistent.** Similarly project design is primarily within previously disturbed areas. Trees occurring in paper roads to be impacted cannot be avoided. Offsets within the Mine Site (see left column) have been developed to offset unavoidable impacts.	**Consistent.** The TNWP has been designed to follow a previously cleared Telstra easement in the Tomingley-Narromine Road transport corridor. Recommendations in this report have detailed options that would minimise impacts to the environment on the remainder of the route. Offsets for this project are incorporated into the TGP BOS.
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 TGP under Part 3A of the EP&A Act would ensure all regulatory requirements are met.	**Consistent.** As per Mine Site	**Consistent.** As per Mine Site
3 Offsets must never reward ongoing poor performance.	Offset schemes should not encourage landholders to deliberately degrade or mismanage offset areas in order to increase the value from the offset.	**Consistent.** Project design demonstrates the Proponents ability to avoid and mitigate and to exceed minimum offsets required.	**Consistent.** As per Mine Site	**Consistent.** As per Mine Site
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.	**Inconsistent.** Proposed offsets are not afforded long term protection though land tenure. However, by increasing the area of occupancy of EECs and addressing KTPs, the offset package is consistent with NSW government programmes.	**Inconsistent.** As per Mine Site.	**Inconsistent.** As per Mine Site.

Table 24 (cont'd)
OEH Offset Principles

Principle	Consideration	Consistency - Mine Site	Consistency - PHTETL	Consistency - TNWP
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. 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.	**Consistent.** The volume of requisite offsets has been identified by using the BioBanking Assessment Methodology. Offsets in the Mine Site aim to re-introduce, rehabilitate and revegetate the missing understorey layers of the EECs affected by the TGP, as well as increase the area of occupancy and ability to naturally recover of the extant EECs. The offsets would be managed through a LMP thus ensuring long term viability of the proposal.	**Consistent.** $10m^2$ offset for the associated vegetation community for each affected tree has been incorporated into the offset package. In this instance the Proponent has provided 34.2ha of remnant Inland Grey Box EEC. 5ha is allocated for the Mine Site and a further 0.2ha is required for the PHTETL. As noted above the Proponent would exceed the offset requirement by protecting existing remnants.	**Consistent.** $10m^2$ offset for the associated vegetation community for each affected tree has been incorporated into the offset package. See comments in the left hand column.
6 Offsets should aim to result in a net improvement in biodiversity over time.	Enhancement of biodiversity in offset areas 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.	**Consistent.** As per Mine Site	**Consistent.** As per Mine Site

Table 24 (cont'd)
OEH Offset Principles

Principle	Consideration	Consistency - Mine Site	Consistency - PHTETL	Consistency - TNWP
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.	**Inconsistent (Land tenure).** Proposed offsets are not afforded long term protection though land tenure. A commitment to maintain the offsets once the mine is decommissioned has been provided by the Proponent. **Consistent (Land Management Plan).** Proposed offsets are afforded long term protection though the Land Management Plan. Commitment to maintain the offsets once the mine is decommissioned requires documentation.	**Inconsistent.** As per Mine Site.	**Inconsistent.** As per Mine 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 then audit the TGP BOS as documented in this report. OEH through the DoP will have input into this process.	**Consistent.** As per Mine Site	**Consistent.** As per Mine Site
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.	**Consistent.** **Appendix 10** provides the Biobanking Credit Report completed in accordance with the OEH accepted BioBanking Assessment Methodology. Using this methodology, this report provides for the nature and extent of the impact and the existing and proposed offsets as provided by the Proponent.	**Consistent.** As per Mine Site	**Consistent.** As per Mine Site

Table 24 (cont'd)
OEH Offset Principles

Principle	Consideration	Consistency - Mine Site	Consistency - PHTETL	Consistency - TNWP
	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 areas are 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.			
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.** Offsets are consistent with BioBanking methods (documented in **Appendix 10**). This is also consistent with OEH Interim Part 3A Offsets Policy.	**Consistent.** As per Mine Site	**Consistent.** As per Mine Site
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 on the same property.	**Consistent.** Impacts would be offset in the Mine Site	**Consistent** Impacts would be offset in the Mine Site

Table 24 (cont'd)
OEH Offset Principles

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Principle	Consideration	Consistency - Mine Site	Consistency - PHTETL	Consistency - TNWP
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 and existing offsets are supplementary and not already funded or have been funded or considered previously for funding. Although land tenure of the offset sites remains an issue the Proposal will see implementation of a LMP (management action). The existing and proposed offsets are located on private land.	**Consistent.** As per Mine Site	**Consistent.** As per Mine Site
13 Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements o 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.	**Consistent.** As per Mine Site	**Consistent.** As per Mine Site

Attainment of a 'Tier 2 No Net Loss' as per the *DECCW Interim policy on assessing and offsetting biodiversity impacts of Part 3A developments* (Approved by Director General 30 November 2010) is therefore considered to be achieved as:

1. OEH offset requirements for threatened species have been achieved though habitat offsetting through BioBanking Methodology;
2. OEH offset requirements for native vegetation (habitat) as the type, location and volume of offsets are consistent with the 13 Offset Principles (**Table 24**); and
3. The TGP BOS is consistent with seven of the eight DSEWPaC principles for biodiversity offsets (for Inland Grey Box EEC, Superb Parrot and Weeping Myall Woodland EEC) (**Table 23**).

Given the above, the following section has been written after discussing and observing evidence with the Proponent that offsets, as stated above, will be part of the Proposal.

9 ASSESSMENT OF IMPACT

9.1 SELECTION OF 'AFFECTED' THREATENED BIOTA

Affected species are those that are likely to be affected by the proposed activities. To determine these a list of threatened species, populations communities, wetland and or migratory species was compiled from field assessment results, the literature review and database search. Those species, communities or populations considered to have potential to be 'affected' by the activity are presented in **Table 25**. **Table 25** is a summary of listed items requiring further assessment detailed in **Appendix 7. Table 26** documents species considered as either occurring or having potential to occur that would remain 'unaffected'. **Appendix 7** and **Tables 25** and **26** have been provided for the determining authority to review justification of decisions to undertake further assessment.

Table 25
Affected Threatened Species Known or with Potential to Occur

Page 1 of 2

Scientific name	Common name	Status	Reason	Type of assessment required
Pomatostomus temporalis temporalis (eastern subspecies);	Grey-crowned babbler	V TSC Act	• Known to occur in TNWP Study Area. • Considered as likely to occur in PHTETL Study Area. • Known to occur within Mine Site Impact Footprint. (at leat two families, likely to be three or more). • Roosting nests and breeding nest for Family#2 in proposed Mine Site Topsoil Dump area (east of Newell Highway), **Figure 2 & 10.** 4 other nests recorded in the Newell Highway corridor. Ten nests/breeding nests recorded in the western portion of the Mine Site Study Area. • 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 proposed revegetation of Mine Site.	7-part test of significance.
Chalinolobus picatus	Little Pied Bat	V TSC Act	• Known to occur in Mine Site Study Area Impact Footprint (although only one call recorded over four nights of assessment). • Considered as likely to occur in PHTETL and TNWP Study Area. • 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 Mine Site.	7-part test of significance.
Polytelis swainsonii	Superb Parrot	V TSC Act V EPBC Act	• Known to occur in TNWP and Mine Site Study Area. • Considered as likely to occur in PHTETL Study Area. • 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 proposed revegetation of Mine Site.	7-part test of significance. & Assessment of significance.

Table 25 (cont'd)
Affected Threatened Species Known or with Potential to Occur

Scientific name	Common name	Status	Reason	Type of assessment required
Phascolartos cinereus	Koala	V TSC Act	• Known to occur in TNWP Study Area (2 previous records), SEPP44 s.2 species, Bimble Box c. 10 to 15% of TNWP Study Area, i.e potential Koala habitat. • Considered as having potential to utilise river red gums in Mine Site along Gundong Ck (SEPP44, s.2 species); • May be affected by direct habitat removal. • Would be affected (positively) by proposed revegetation of Mine Site. • Not considered to have any potential to be affected by PHTETL.	7-part test of significance.
Inland Grey Box Woodlands Endangered Ecological Community in NSW	Inland Grey Box woodlands EEC	NSW listed EEC	• Known to occur in all study areas within the Project Site. • Would undergo loss of area of extent by direct habitat removal. • Would be affected (positively) by proposed revegetation of Mine Site.	7-part test of significance.
Fuzzy Box on Alluvials Endangered Ecological Community in NSW	Fuzzy box EEC	NSW listed EEC	• Known to occur Mine Site and TNWP Study Areas; • Would undergo loss of area of extent by direct habitat removal. • Would be affected (positively) by proposed revegetation of Mine Site.	7-part test of significance.
Weeping Myall open woodland of the Riverina and NSW South Western Slopes Bioregions.	Myall woodlands EEC	NSW and nationally listed EEC	• Known to occur PHTETL Study Area, 20 of 100 plants may be affected if Alkane cannot avoid the population. • Would undergo loss of area of extent by direct habitat removal. • Would be affected (positively) by proposed revegetation of Mine Site and exiting offsets (c. 3ha) undertaken on the Peak Hill Gold Mine (also an Alkane property).	7-part test of significance & Assessment of significance.
Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River Endangered Ecological Community	Aquatic EEC – lower darling River	NSW listed EEC	• All natural creeks and drainage lines are part of this community in the project Area, although Gundong Creek in the Mine Site Study Area is a man-made channel (thus excluded from this definition). • Impacts are extremely limited as under-boring would be undertaken under all waterways. • 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 Mine Site.	7-part test of significance.

Table 26
Unaffected Threatened Species that are Either Known or Having Potential to Occur

Scientific name	Common name	Status	Reason	Type of assessment required
(*Miniopterus (schreibersii) orianae oceanensis*)	Eastern Bentwing Bat	V TSC Act	• Known to occur in Mine Site Study Area (four probable calls over four consecutive nights). • Considered as likely to occur in PHTETL and TNWP Study Areas. • A cave roosting species, therefore no threat to loss of life from vegetation clearing. • Only very minor component of foraging resources would be affected by direct habitat removal however affect would be countered (positively) by proposed revegetation of Mine Site. • Loss of foraging resource outcome would be the same as for Little Pied Bat, i.e duplication not considered requisite.	None
Climacteris picumnus	Brown Treecreeper	V TSC Act	• 2 x previous sightings (from same time) occur just north of the Mine Site Study Area within the TNWP Study Area at Gundong Creek. • The author recorded white-throated treecreepers in this location and considered the remnant too small and linear for Brown Treecreepers. • Impacts within the TNWP Study Area would not remove breeding or foraging habitat for either treecreeper species. • Based upon the above, the Brown Treecreeper is considered unlikely to occur and if present it would not be impacted by the activity.	None
Hieraaetus morphnoides	Little Eagle	V TSC Act	• Sighted overflying TNWP Study Area. 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 Mine Site is likely to increase levels of biodiversity and as such improve opportunities for this species. • Based upon the above, the Little Eagle is considered unlikely to be impacted by the activity.	None
Circus assimilis	Spotted Harrier	V TSC Act	• Sighted sitting on a fence line in the TNWP Study Area near Gundong Creek. 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 Mine Site 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.	None

Table 26 (cont'd)
Unaffected Threatened Species that are Either Known or Having Potential to Occur

Scientific name	Common name	Status	Reason	Type of assessment required
Artamus leucorynchus	White-breasted Woodswallow	V TSC Act	• Sighted in mugga ironbark community in private land adjacent to the TNWP Study Area. Has the 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 Mine Site is likely to increase levels of biodiversity and as such improve opportunities for this species. • Based upon the above, the Rainbow Bee-eater is considered unlikely to be impacted by the activity.	None.
Petroica phoenicea	Flame Robin	V TSC Act	• Previous record approximately 3km east of the Mine Site (eastern portion). • Key habitat elements are present in the Benson 57 remnant that would remain unaffected by the activity (species not observed). • If extant individuals are present they are unlikely to be affected to cause decline in a local population. • Rehabilitation of Mine Site is likely to increase levels of biodiversity and structural complexity as such and improve opportunities for this species. • Based upon this, the Flame Robin is considered unlikely to be impacted by the activity.	None.
White Box, Yellow Box and Blakelys Red Gum Woodland Endangered Ecological Community in NSW and the nationally listed Critically Endangered Ecological Community White Box, Yellow Box and Blakelys Red Gum Woodland and Derived native Grasslands	Box-gum woodland EEC / Box-gum woodland & DNR CEEC	NSW EEC and nationally listed CEEC	• One remnant of 0.42ha along Dappo Road, falls within the definition of this EEC. • It does not fulfil the criteria to be eligible for listing as the nationally protected CEEC. • Further, trees are well species and ground layer to be impacted by the TNWP Study Area is comprised almost entirely of exotic species. • Based upon the above it is not considered that this NSW listed EEC would be affected by the activity.	None.
Wetland and Migratory species listed on OEH and EPBC database searches. Issue specifically focusing on tailings dams.	N/A	N/A	• Not known to occur but recognized as having potential to occur if a large free standing body of water is created in the Mine Site Study Area. • Large bodies of standing water would not be created and that Cyanide concentrations below 50 mg/L weak-acid-dissociable (WAD) are deemed safe to wildlife. These levels are considered an interim benchmark for discharge into tailings storage facilities and would be adopted by Alkane.	None.

9.2 ASSESSMENTS OF SIGNIFICANCE OF AFFECTED NSW LISTED SPECIES, POPULATIONS OR COMMUNITIES

9.2.1 Grey-crowned Babbler

- Definition of 'local population': Three family groups in the TNWP Study Area, locations are provided on **Figure 11** and **12.** At least three family groups (likely to be more) in the Mine Site Study Area, east and west of the Newell Highway. GPS coordinates of individual sightings are provided on **Table 13**. Of these, the family group east of the Newell Highway has breeding and roosting nests in the one rosewood tree in the Mine Site Study Area and four nests in the Newell Highway Tomingley Truck Rest Area. Families west of the Newell Highway have ten recorded nests in the south western corner of the property (not within the alignment of the 66kV PHTETL).
- Extent of habitat use within the Project Site: All remnant native vegetation in the Mine Site and TNWP Study Areas, would also feed in derived grass communities.
- Type of modification affecting this species is as follows.

  Mine Site

  - Removal of 18ha (25.6%) of Belah / Black Oak Western Rosewood, Wilga Woodland (Benson 57). This area contains the known breeding and roosting nests in the one rosewood tree.
  - Removal of 2.7ha (7.3%) of Inland Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams (Benson 76).
  - Removal of 0.9ha (2.9%) of Fuzzy Box – Inland Grey Box on alluvial brown soils (Benson 201).

  TNWP

  - Removal of removing a 4m wide strip dense pine, open grassland and occasional areas of shrubs along the length of the pipeline within woodland habitat utilised by the species.

An assessment of significance for Grey-crowned Babbler (**Table 27)** shows that the TGP is unlikely to cause local extinction of this species if amelioration measures identified in this report are implemented**.**

Table 27
Seven-part Test of Significance for Grey-crowned Babbler

	Grey-crowned Babbler *V TSC Act*
1) 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.	• There are few risks associated with managing the population along the TNWP. Risk would be reduced with Administrative Controls detailed in Section 7. • There are few risks associated to the population west of the Newell Highway in the Mine Site. No breeding nests in this location would be affected. Approximately 21.6ha of native vegetation (foraging habitat) would be removed, however, planned revegetation aims to improve the area of extent of retained vegetation (103.9ha) by enhancing a further 61.0ha in total. Native grasses and shrubs that are missing from the Mine Site Study Area 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. • Risks are present for the family occurring east of the Newell Highway. These risks are primarily associated with removal of a rosewood tree possessing several roosting nests and a breeding nest. This forms one of the two known areas for breeding for this family group. The rest of the available habitat is used for foraging and would remain unaffected and improved by revegetation. • 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. • Local knowledge states that the family group has at least breeding sites (possibly more) and as such are not dependant on any one breeding nest in the family's possession. • The breeding and roosting tree (the rosewood) would be immediately protected until the animals naturally disperse and build nests elsewhere or the nests are relocated. • Given the above, it is unlikely that a local population within the Mine Site Study Area would be impacted by the TGP such that it placed the population at risk of local extinction.
2) 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
3) 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
4) 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. • The area of occupancy of this habitat type would be initially reduced but it would be replaced at a much greater ratio (7.6:1) with an increased level of diversity and structural habitat complexity. The impacts would have only minor fragmentary effects from other areas of habitat. 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 is the tree with the roosting and breeding nest.

Table 27 (cont'd)
Seven-part Test of Significance for Grey-crowned Babbler

	Grey-crowned Babbler *V TSC Act*
5) 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.
6) 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.
7) 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.	• Clearing of native vegetation applies.
Conclusion	• The TGP would remove a tree with roosting and a breeding nest within core breeding habitat for this species. Recommendations in this report would ensure that no animals are harmed by the TGP. It's possible that the TGP 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.

9.2.2 Little Pied Bat

- Definition of 'local population': Positively identified by Anabat. Local population is likely to be bats that feed in the area that are unlikely to roost in the Mine Site Study Area 'Wyoming' Impact Footprint (results = one call over four consecutive nights). Locations have been provided on **Figure 10**. GPS coordinates of the record is provided on **Table 13**. Trees to be removed within the PHTETL Study Area have been shown in **Appendix 2**.
- Extent of habitat use within the Project Site: All remnant native vegetation in the Mine Site, TNWP and PHTETL Study Areas.
- Type of modification affecting this species:

  Mine Site

  The extent of clearing is the same as for the Grey-crowned Babbler (Section 9.2.1) and is not repeated here. The PHTETL would see the removal of the following trees with potential habitat values.

  - 83 inland grey box - 11 with High Habitat Values (HHV), 25 with Medium Habitat Values (MHV), 47 with Low Habitat Values (LHV).
  - 2 Bimble Box, one with MHV the other with LHV.
  - 2 Fuzzy Box, one with HHV the other with LHV.

  TNWP Study Area

  The extent of clearing would consist of removing a 4m wide strip dense pine, open grassland and occasional areas of shrubs along the length of the pipeline which is unlikely to directly affect the species.

An assessment of significance for the Little Pied Bat (**Table 28)** shows that the TGP is unlikely to cause local extinction of this species if amelioration measures identified in this report are implemented**.**

Table 28
Seven-part Test of Significance for Little Pied Bat

	Little Pied Bat *V TSC Act*
1) 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.	• There are few risks associated with managing any extant population of this species. Risk would be reduced with the implementation of the Administrative Controls detailed in Section 8.2. • 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 be placed at risk of local extinction.
2) 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
3) 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
4) 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 been provided previously. • The area of occupancy of this habitat type would be initially reduced but it would be replaced at a much greater ratio (7.6:1) in the Mine Site with an increased level of diversity and structural habitat complexity. The impacts would have only minor fragmentary effects from other areas of habitat. Revegetation is aimed at increasing habitat complexity. • Any component of an EEC / habitat / resource for this species is important.
5) 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.
6) 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.
7) 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.	• Clearing of native vegetation applies.
Conclusion	• The TGP would remove trees that have potential roosting habitat for this species. Recommendations in this report would ensure that risk associated with removing the trees would be low for the species. It's possible that the TGP 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.

9.2.3 Superb Parrot

- Definition of 'local population': 60 individuals resting in Mine Site Study Area, this species is frequently recorded in the locality.
- Extent of habitat use within the Study Area: All remnant native vegetation can be utilised, however, core breeding habitat is not provided within the locality, would feed in highly modified exotic grass dominated paddocks.

- Type of modification affecting this species: Removal of native vegetation as described for the Grey-crowned Babbler and Little Pied Bat (Sections 9.2.1 and 9.2.2) would remove resting areas. Individuals may be exposed to drinking polluted water.

An assessment of significance for Superb Parrot (**Table 29)** shows that the TGP is unlikely to cause local extinction of this species**.**

Table 29
Seven-part Test of Significance for Superb Parrot

	Superb Parrot *V TSC Act*
1) 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.	• The Study Area does not fall within core breeding habitat for the species. • Providing that recommendations are followed in this report especially monitoring of the RSF, it is unlikely that a local population within the Study Area would be impacted by the TGP such that it would be placed at risk of local extinction.
2) 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
3) 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
4) 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 of habitat is limited to removal of 3.6ha of potential resting habitat. • Habitat would be slightly fragmented, however, revegetation in the Mine Site would replace this between at ratios of 20:1 and 60:1 (depending on community). • Net habitat fragmentation would not occur as the revegetation plan aims to improve connectivity within the Mine Site. • Any component of an EEC / habitat / resource for this species is important.
5) 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.
6) 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.
7) 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.	• Clearing of native vegetation, loss of deadwood (stags) and loss of hollows apply.
Conclusion	• The TGP is unlikely to directly remove breeding habitat although it would reduce the extent of a feeding resource within the Project Site. The TGP is unlikely to cause impact to a locally occurring population of this species such that it is placed at risk of local extinction. An SIS is not warranted.

9.2.4 Inland Grey Box Endangered Ecological Community

- Consistency with NSW Scientific Committee determination: A review of BioMetric shows that Benson 76 is a component of this Endangered Ecological Community and is consistent with the NSW Scientific Committee determination.
- Location: **Figure 10** presents the locations within the Mine Site Study Area and Appendix 3 the locations within the TNWP Study Area. Nearly all trees in the PHTETL Study Area (Appendix 2) are scattered remnants of this EEC.
- Quality: Moderate – better and more diverse in the TNWP Study Area, exists without a grassy or understory layer in the Mine Site and PHTETL Study Areas. Health – healthy, not obviously stressed in Mine Site and TNWP Study Areas but several distinct areas assessed as highly stressed in the PHTETL Study Area.
- Definition of 'local population': Restricted remnants shown on **Figure 10** and **Appendices 2** & **3**. Approximately 36.9ha in six main remnants within the Mine Site Study Area, 28.6ha within 23 main remnants in the TNWP Study Area and 83 isolated trees in the PHTETL Study Area (11 HHV, 25 MHV and 47 LHV).
- Type of modification: Reduction in area of extent by 2.7ha in the Mine Site Study Area, loss of those trees listed above in the PHTETL Study Area. If a 1.3km section along Dappo Road in the TNWP Study Area cannot be avoided then loss of a further 0.5ha or 200 LHV trees and 20 MHV trees would also be removed.

An assessment of significance for Grey Box Woodland Endangered Ecological Community (**Table 30)** shows that the TGP is unlikely to cause local extinction of this EEC**.**

9.2.5 Fuzzy Box on Alluvials of South West Slopes, Darling Riverine Plains and the Brigalow Belt South Endangered Ecological Community

- Consistency with NSW Scientific Committee determination: A review of BioMetric shows that Benson 201 is a component of this Endangered Ecological Community and is consistent with the NSW Scientific Committee determination.
- Location: Figure 10 presents the locations within the Mine Site Study Area and Appendix 3 the locations within the TNWP Study Area.
- Quality: Predominantly moderate – better and more diverse in the TNWP Study Area, exists without a grassy or understory layer in the Mine Site and PHTETL Study Areas. Health – healthy, not obviously stressed.
- Definition of 'local population': Restricted remnants shown on Figure 10 and Appendix 3.
- Extent within the Project Site: Isolated individuals and small populations.
- Type of modification: Reduction in area of extent by 0.9ha (2.9%) of the in the Mine Site Study Area (The 30.6ha figure has been used in this report). This figure can be readjusted to 2.6% using fieldwork results where 34.57ha was recorded in the field in the Mine Site (Clients cartographers stated 6ha). Loss of two individual trees within the PHTETL Study Area (one with HHV the other with LHV).

Table 30
Seven-part Test of Significance for Inland Grey Box Woodland EEC

	Inland Grey Box Woodland EEC *V TSC Act*
1) 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.	• Not relevant
2) 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
3) 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,	• Loss of 2.7ha plus isolated trees would not substantially alter the EEC. Revegetation would see 55.7ha of this vegetation protected, enhanced and conserved. • Revegetation would substantially alter the EEC present by replacing missing ground layer and understorey components on the Mine Site, as well as broadening its genetic base.
4) 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.	• See above. • Net habitat fragmentation would not occur given the discrete location of the habitat to be removed and the revegetation plan that would serve to increase the area of occupancy of the EEC. • Any component of an EEC is important.
5) 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.
6) 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 EEC.
7) 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.	• Clearing of native vegetation, loss of deadwood (stags) and loss of hollows apply.
Conclusion	• The TGP would remove a component of an EEC. Is not likely to cause impact such that the EEC is placed at risk of local extinction as the revegetation plan would serve to replace it at approximately 1:20 ratio. An SIS is not warranted.

An assessment of significance for Fuzzy Box woodland **(Table 31)** shows that the TGP is unlikely to cause local extinction of this EEC**.**

9.2.6 Myall Woodlands Endangered Ecological Community

- Consistency with NSW Scientific Committee determination: A review of BioMetric shows that Benson 26 is a component of this EEC and is consistent with the NSW Scientific Committee determination.
- Location: Appendix 2, Image 8 presents the locations within the PHTETL Study Area.

Table 31
Seven-part Test of Significance for Fuzzy Box Woodland EEC

	Fuzzy Box Woodland EEC *V TSC Act*
1) 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.	• Not relevant
2) 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
3) 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,	• 0.9ha of the 30.6ha occurring in the five main remnants in the Mine Site would be removed. Remnant conservation and enhancement would see 52.2ha of this vegetation protected, enhanced and conserved. • Revegetation would substantially alter the EEC present by replacing missing ground layer and understorey components on the Mine Site, as well as broadening its genetic base.
4) 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.	• See above. • Net habitat fragmentation would not occur given the discrete location of the habitat to be removed and the revegetation plan that would serve to increase the area of occupancy of the EEC. • Any component of an EEC is important.
5) 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.
6) 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 EEC.
7) 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.	• Clearing of native vegetation, loss of deadwood (stags) and loss of hollows apply.
Conclusion	• The TGP would remove a component of an EEC. However, this is not likely to cause impact such that the EEC is placed at risk of local extinction s the revegetation plan would serve to replace it at ratio of approximately of 60:1. An SIS is not warranted.

- Quality: Poor – undesirable patch size, local hydrology has been altered, it's heavily grazed and was assessed as 'stressed'. Health – stressed, likely to become extinct irrespective of the activity.
- Definition of 'local population': Approximately 100 individuals within the PHTETL Study Area.
- Extent within the PHTETL Study Area: Approximately 20 individuals in the Impact Footprint.
- Type of modification: Reduction in area of extent by removing approximately 20 individuals although it is suspected scarification of soils may cause regeneration. Unlikely to require management of regrowth.

An assessment of significance for Myall Woodland Endangered Ecological Community (**Table 32)** shows that the TGP is unlikely to cause local extinction of this EEC**.** It is however suspected that it would become locally extinct irrespective of the TGP.

Table 32
Seven-part Test of Significance for Myall Woodland EEC

	Myall Woodland EEC *V TSC Act*
1) 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.	• Not relevant
2) 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
3) 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,	• 20 individuals would be removed. This may quicken the local extinction of this EEC however, it is noted land management practices where the remnant occurs are the primary factor in the demise of this EEC. Extinction is not inevitable. It may recover with better environmental conditions. It is assumed its 'poor condition' when observed was due to bag-moth infestation. • As noted above its possible that local extinction would occur. If so it likely that any amelioration within the remnant without changing land use practices on the property would fail. Undertaking minor ground surface disturbance would encourage seeds to grow that may be ultimately positive, further lopping of branches may also improve the health of the remnant. • Long term survival of the EEC would be aided by avoiding direct impact by spanning it, undertaking scalloped clearing and relocating genetic material to an area managed for conservation, i.e. Peak Hill Gold Mine land. • To quantify modification of the EEC, it is envisaged that the PHTETL would modify it but the modification would not be responsible for its extinction (should this occur).
4) 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.	• See above. • Habitat fragmentation would not occur given the discrete location of the habitat to be removed and the revegetation plan that would serve to increase the area of occupancy of the EEC. • Any component of an EEC is important.
5) 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.
6) 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 EEC.
7) 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.	• Clearing of native vegetation applies.
Conclusion	• The TGP would remove a component of an EEC. It is possible that it may contribute to local extinction, however, it appears as though the remnant is going locally extinct regardless of the proposed activity. The ecology of the species assumes that pruning and minor ground surface disturbance would encourage new propagates to grow. Recommendation in this report recognises that the best outcome for this EEC is to avoid impacts as much as possible and to collect genetic material from the small population and use it for rehabilitation in the Peak Hill Gold Mine in an area managed for conservation. An SIS would not be an appropriate way to ensure the genetics of the population is not lost, the recommendations in this report are.

9.2.7 Aquatic Ecological Community in the Natural Drainage System of the Lowland Catchment of the Darling River Endangered Ecological Community

- Consistency with NSW Scientific Committee determination: A review of the NSW Scientific Committee determination shows that any natural waterway in the Project Site is part of this Endangered Ecological Community. Manmade channels such as the portion of Gundong Creek in the Project Site are excluded from this definition.
- Location: Figure 10 presents the locations within the Mine Site Study Area and Appendix 3 the locations within the TNWP Study Area.
- Quality: variable – most named waterways assessed as having 'moderate fish habitat' as they have potential to allow for the passage of fish when inundated but not possess populations of fish during 'normal' periods. Health – no obvious health issues were observed.
- Definition of 'local population': See 'location'.
- Extent within the Project Site: See 'location'.
- Type of modification: All named creeks to be under-bored (no impact to vegetation within 40m of creek centreline) along the TNWP Study Area so no impacts are associated. Unnamed waterways would be trenched through. No expected impacts to any other waterway or drainage line in the Project Site.

An assessment of significance for the Aquatic Endangered Ecological Community of the lowland catchment of the Darling River **(Table 33)** shows that the TGP is unlikely to cause local extinction or impact to this EEC.

9.3 EPBC AFFECTED SPECIES, POPULATIONS OR COMMUNITIES

9.3.1 Superb Parrot

An assessment of significance for the Superb Parrot (**Table 34)** shows that the TGP is unlikely to cause local extinction or impact to this species**.** Refer to the NSW assessment of this species for definitions of local populations.

9.3.2 Myall Woodlands Endangered Ecological Community

Determination of a significant impact to this Endangered Ecological Community has been problematic as when observed it was stressed[14] and in an area where continued land management is likely, but not certainly, to result in its long term demise. The following assessment of significance for Myall Woodland EEC (**Table 35)** considered several possibilities, however, long term survival of the EEC is contingent on collection of genetic material for replanting in an area managed for conservation and knowledge of the species which surmises that a combination of avoidance, minimisation of impact would see regeneration occur. If the recommendations in this report are implemented it would see long term survival of the genetic material**.** Refer to the NSW assessment for definitions of local populations.

[14] Loss of leaves etc has been recorded in myall however it is not considered to be the normal state of the species, this may have been due to bag-moth infestation.

Table 33

Seven-part Test of Significance for Aquatic Ecological Community in the Natural Drainage System of the Lowland Catchment of the Darling River EEC

	Aquatic EEC *V FM Act*
1) 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.	• Not relevant
2) 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
3) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: (iii) 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 (iv) 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,	• If recommendations in this report are adopted then there would be no risk to this EEC. • As above.
4) in relation to habitat of a threatened species, population or ecological community: iv) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and v) 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 vi) 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.	• See above. • Net habitat fragmentation would not occur given the discrete location of the habitat to be removed and the revegetation plan that would serve to increase the area of occupancy of the EEC. • Any component of an EEC is important.
5) 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.
6) 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 EEC.
7) 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.	• Clearing of native vegetation applies.
Conclusion	• The TGP would remove a component of an EEC, however, should the works should occur following the implementation of the recommendations in this report, which are consistent with those DPI would expect. A SIS is not required.

Table 34
DSEWPaC Assessment of Significance for Superb Parrot

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 1999.
➢ lead to a long-term decrease in the size of a *important population*, or	• The Parkes and Narromine LGAs do have an *important population* but it's not considered that they breed in the Project Site. • Providing that recommendations in this report are followed there would be no long term decrease in the population.
➢ reduce the area of occupancy of an *important population*, or	• It is considered unlikely that TGP would reduce the area of occupancy for this important population.
➢ fragment the existing *important population*[15] into two or more populations, or	• The TGP would not fragment the existing.
➢ adversely affect *habitat critical*[16] to the survival of a species, or	• The TGP would not remove breeding habitat for this species.
➢ disrupt the breeding cycle of a *population*, or	• The TGP would not disrupt the breeding cycle for this species.
➢ 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 TGP is unlikely to destroy or reduce the quality of habitat available for the species.
➢ result in *invasive species* that are harmful to a vulnerable species becoming established in the species habitat, or	• Fragmentation of the existing remnant is unlikely to increase the probability of invasion by the European blackbird, starlings and noisy minors.
➢ interferes substantially with the recovery of the species.	• It is unlikely that TGP would interfere with the natural recovery of this species.
Conclusion	• It is unlikely that this species would be significantly impacted by the TGP. Referral to the D-G of DSEWPaC is not required.

[15] 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.

[16] 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.

Table 35
DSEWPaC Assessment of Significance for Myall Woodland EEC

Critically endangered and endangered ecological communities Significant impact criteria:	
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it would:	**Myall Woodlands EEC**
• reduce the extent of an ecological community;	The activity would not reduce the extent of the remnant.
• fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;	The activity would initially fragment the EEC, it is expected to locally recover.
• adversely affect habitat critical to the survival of an ecological community;	Habitat in the area is sub-par and is considered to have been altered by agriculture such that it is likely to send the remnant locally extinct. The PHTETL activity would not alter habitat critical to the survival of the EEC.
• modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;	As noted above it is suspected that land management practices are heavily impacting this remnant. The TGP would not alter factors in a manner that it would impede natural recovery of the EEC.
• cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;	The activity would not change species composition.
• cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: ➢ assisting invasive species, that are harmful to the listed ecological community, to become established; or ➢ causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community; or	The activity, by clearing and undertaking minor ground surface disturbance would initially affect the integrity of the community. If grazing were excluded it is suspected that the EEC would naturally recover (as seen with myall in other areas in the locality). The soil type is not suited for high densities of exotic weeds. Existing agricultural practices are ongoing and would have the same effect on the EEC as what is currently occurring.
• interfere with the recovery of an ecological community.	It is suspected that the EEC is in poor health (bag-moth infestation?) and may become locally extinct regardless of the activity. If health recovers and the PHTETL is constructed it is likely that the EEC would recolonise the disturbed areas, additionally the PHTETL can span the majority of the population.
Summary	The ultimate fate of this EEC is difficult to predict as when observed it was noted an 'stressed' and in a highly modified agricultural landscape where the proposed activity would have little impact on the long term survival and potential management for enhancement. It is suspected that the PHTETL is constructed as per recommendations in this report, then genetic material would be taken to a secure location managed for conservation and the remnant population may remain *in situ* and respond to minor disturbance. Notably, the bulk of the population would remain unaffected by the proposed works. Providing that recommendations in this report are implemented there would not be a need to refer this to the D-G of the DSEWPaC.

9.4 UNOBSERVED THREATENED SPECIES WITH POTENTIAL TO BE AFFECTED

9.4.1 Koala

This species is listed as threatened under the NSW TSC Act 1995.

- Definition of 'local population': Two records on BioNet, one at Gundong Creek near the Newell Highway the other approximately 5km south of Narromine. It is considered that the TNWP Study Area has potential to possess dispersing or transient individuals.
- Extent of habitat use within the Study Area: The TNWP has approximately between 10% to 15% Bimble Box as a canopy component. This is consistent with the SEPP44 definition as 'potential Koala habitat'. As such all of the TNWP Study Area and the river red gum community along Gundong Creek in the Project Site is 'potential Koala habitat'.
- Type of modification affecting this species: Removal of native vegetation would not include mature trees however some clearing of young river red gums near the Tomingley West Road (up to 20 x 20 DBH trees) would occur. It's possible that Bimble Box seedlings and stems may be impacted by the TNWP. Positive alteration of habitat would see 11ha of riparian revegetation that would benefit this species along Gundong Creek, as well as 27ha of temperate woodland species being used within the Mine Site Study Area in which Bimble Box is 24% of the total quantity of seed to be used.

An assessment of significance for the Koala (**Table 36)** shows that the TGP is unlikely to cause local extinction of this species.

10 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The EPBC Act requires that the following matters of National Environmental Significance (NES) be considered (**Appendix 7** and **Table 37**).

Table 36
Seven-part Test of Significance for the Koala

	Koala *V TSC Act*
1) 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.	• There are few risks associated with managing any extant population of this species. Risk would be reduced with Administrative Controls detailed in Section 7. • 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 placed at risk of local extinction.
2) 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
3) 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
4) 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 been provided previously. • The area of occupancy of this habitat type would be initially reduced but it would be replaced at a much greater ratio in the Mine Site with an increased level of diversity and structural habitat complexity. The impacts would have only minor fragmentary effects from other areas of habitat. Revegetation is aimed at increasing habitat complexity. • Any component of an EEC / habitat / resource for this species is important.
5) 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.
6) whether the actions proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	• There is a draft recovery plan for this species. Revegetation as proposed is consistent with the aims of the recovery plan.
7) 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.	• Clearing of native vegetation applies.
Conclusion	• The TGP would remove trees that have potential for this species to feed upon, however, it is not considered that it would cause a significant impact to the local population.

Table 37
Compliance with Commonwealth EPBC Act Requirements

EPBC Act Factors	Impact
• **Any environmental impact on World Heritage property?** There would be no impacts on any World Heritage properties as a result of the TGP.	Nil
• **Any environmental impact on National Heritage places?** There would be no impacts on any National Heritage places as a result of the TGP.	Nil
• **Any environmental impact on wetlands of international importance?** There would be no impacts on any wetlands of International importance as a result of the TGP.	Nil
• **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 TGP.	Yes The Biodiversity Offset Strategy has addressed all affected NES (See Chapter 8.3).
• **Any environmental impact on Commonwealth listed migratory species?** There would be no environmental impacts on any Commonwealth listed migratory species as a result of the TGP.	Nil
• **Does any part of the TGP involve nuclear action?** The TGP would not involve any Nuclear action.	Nil
• **Any environmental impact on a Commonwealth Marine area?** There are no Commonwealth Marine areas located in the vicinity of the TGP.	Nil
h) Any impact on Commonwealth Land? The TGP would no impact upon any Commonwealth Land.	Nil

11 CONCLUSIONS

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

- unlikely to significantly affect any of the listed threatened species, fauna populations or communities if amelioration measures as stated are adopted, implemented and maintained;
- unlikely to augment or significantly contribute to any of the National or State listed key threatening processes, if amelioration measures as stated 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 ROKAMBA, CAMBA or JAMBA 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 ESD 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 activity 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 as a result of the TGP.



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APPENDICES

(No. of pages excluding this page = 234)

Appendix 1 Plates

Appendix 2 Aerial Imagery of the PHTETL Study Area

Appendix 3 Aerial Imagery of the TNWP Study Area

Appendix 4 Imagery of the Mine Site Study Area

Appendix 5 Observed Flora

Appendix 6 Observed Fauna

Appendix 7 OEH / DSEWPaC Predicted Threatened Species

Appendix 8 Desktop Database Search Results

Appendix 9 Detail of Impacts to Trees in the Mine Site

Appendix 10 BioBanking Assessment Methodology Supporting Documentation

(Note: Appendices 2, 3, 4, 7, 8 and 9 are available on the Project CD only)

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Appendix 1

Plates

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

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Mine Site STUDY AREA	Plates 1 to 19
	Plate 1 Mine Site Study Area. Paddock 1. Shows a relatively undisturbed portion of land within an old crown road area (paper road) showing a relatively undisturbed ground layer > At best the soil A horizon has been depleted by grazing.
	Plate 2 Mine Site Study Area. Paddock 1. Shows ground surface disturbance from the eroded sides of a large dam in the foreground with a ploughed field and low crop in the background. It is suspected that dams occur now where once natural springs occurred.

	Plate 3 Mine Site Study Area. Paddock 1. Ground surface visibility within the cropped area showing 0 % native species.
	Plate 4 Mine Site Study Area. Paddock 1 showing thin strip of well spaced inland grey box with sparse native grasses – virtually no dead / down timber.
	Plate 5 Mine Site Study Area. Paddock 2. Remnant vegetation portion of Gundong Creek that has been disturbed and has severely eroded banks.

	Plate 6 General view of paddock 10, low grass indicative of active grazing.
	Plate 7 Knee high crops limit ground surface visibility to exposures on the vehicular track in the majority of paddock 6.
	Plate 8 General view of paddock 7 and emerging crops nest to an old paper road with remnant vegetation.

	Plate 9 Southern corner of Paddock 5, with windrow of remnant vegetation along the fence line. Ground surface visibility is high due to skeletal soil.
	Plate 10 View of paddock 13 within Mine Site Study Area. This paddock is subject to grazing and is densely populated with Black Oak.
	Plate 11 General view of western portion of paddock 9. Several Gilgai's characterise this area. Crops further to the east reduce ground surface visibility; however access tracks reveal areas of soil expose.

	Plate 12 Small dam in paddock 4 allows good ground surface visibility along the disturbed edge.
	Plate 13 Large dam in paddock 3 along Gundog Ck
	Plate 14 General view of paddock 6. That includes a large dam.

	Plate 15 View of one of the two adjoining dams in paddock1.
	Plate 16 View of Gundong Creek within paddock 11a west of the proposed water pipeline easement entering the Mine Site Study Area. Visibility is high on the disturbed eroded banks.
	Plate 17 Vegetated banks of Gundong Creek within paddock 11a west of the proposed water pipeline.

	Plate 18 Bricks and rubble dumped adjacent to Gundong Creek next to the Newell Highway. To the east of the proposed water pipeline.
	Plate 19 Vegetated banks of Gundong Creek within paddock 3.
PHTETL STUDY AREA	**Plates 20 to 34**
	Plate 20 PHTETL. Pole 1. View of substation where ETL will connect. The ground surface is highly disturbed in this area.

	Plate 21 PHTETL. General view of ground surface between proposed Pole 15 to 30.
	Plate 22 View north along fence line near pole 36 for the proposed ETL alignment
	Plate 23 View north along fence line near pole 37 for the proposed ETL alignment. This photo show intermittent areas of erosion and pools of water.

	Plate 24 View north towards pole 45 for the proposed ETL alignment.
	Plate 25 View south showing clearing at pole 45 for the proposed ETL alignment.
	Plate 26 Lace monitor at Pole 24

	Plate 27 View north from pole 54 of the proposed ETL alignment.
	Plate 28 View north through group of trees between pole 63 and 64 of the proposed ETL alignment.
	Plate 29 Clearing at pole 77.

	Plate 30 Clearing at 82
	Plate 31 View north through group of trees at pole 83 of the proposed ETL alignment.
	Plate 32 PHTETL. Pole 86 - Mine Site.

	Plate 33 PHTETL. Pole 86 - Mine Site.
	Plate 34 PHTETL. Substation site in the Mine Site.
TNWP STUDY AREA	**Plates 35 to 53**
	Plate 35 TNWP in Mine Site approximately 300 m north of where Plate 19 was taken. Water pipeline occurs in similar ploughed paddocks next to Gundong Creek in the Mine Site Study Area.

	Plate 36 TNWP in Mine Site approximately 50 m south of the tarred road to the proposed mine main entrance. Photo taken within 50 m of Gundong Creek, vegetation dominated by thick growth of river red gums and African box thorn.
	Plate 38 North of tarred road to mine main entrance, view north up Narromine to Tomingley Road. Water pipeline easement in this area will be on left hand side (west) of road but quickly crosses the road to be on the eastern side approximately where the yellow sign can be seen.
	Plate 39 Causeway at Gundong Creek showing the section of the creek the pipeline will cross. Pipeline at this stage is in the eastern side of the road corridor.

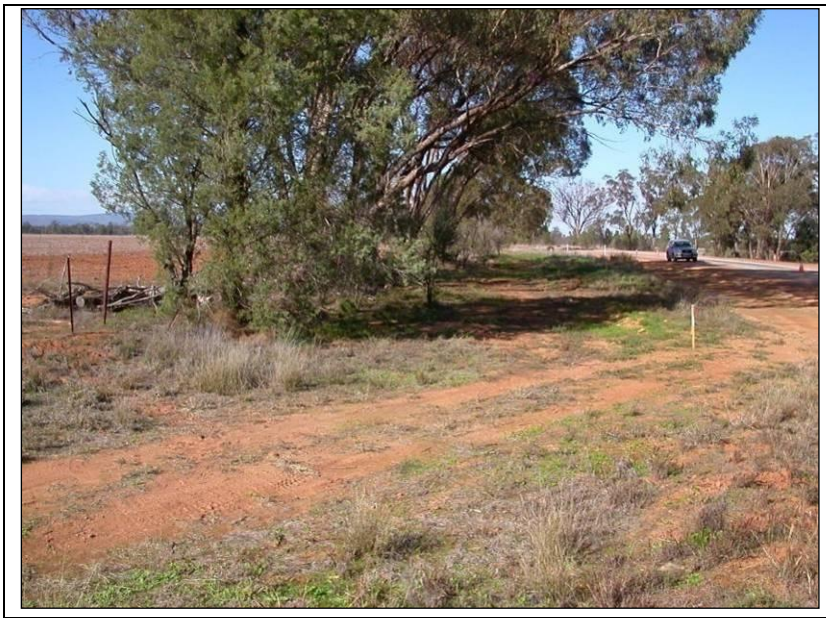
	Plate 40 Example of typical vegetation along TNWP at Tomingley end.
	Plate 41 Culverts over Tomingley Creek.
	Plate 42 Example of vegetation along at Tomingley Creek within the impact footprint.

	Plate 43 Example of typical vegetation along TNWP in the vicinity to the many southern tributaries of Yellow Creek.
	Plate 44 Example of typical vegetation along TNWP in the vicinity to the many northern tributaries of Yellow Creek.
	Plate 45 Example of typical vegetation along the western end of Pinedene Road (closest to the Tomingley / Narromine Rod intersection). Mixed derived grasses and acacia. Bimble box woodlands occur east of here and continue to mid way along Pinedene Road where it changes to Fuzzy Box woodland c. Wallaby Creek

	Plate 45 Example of typical vegetation east of Wallaby Creek along Pinedene Road. This section of the Project Area possessed the best remnants of all structural layers of Fuzzy Box Woodland albeit small, invaded by exotic weeds and very linear.
	Plate 46 View south along unsealed portion of Bootles Road. Very few trees remain within the landscape as a result of agricultural pressures.
	Plate 47 View south along unsealed portion of Dappo Road showing regrowth EEC in the impact footprint.

	Plate 48 View of typical tree spacing, size and type of ground cover in the abovementioned inland grey box EEC.
	Plate 49 Option assess for realignment to minimise reduction of area of extent to inland grey box woodland EEC shown above. Note existing channel against agricultural fence line and thinner strip of native vegetation when compared to remnant on the other (eastern) side of the road.
	Plate 50 ARTC easement north of Dappo Road looking toward Mitchell Highway (north). Pipeline can easily avoid any substantive native vegetation in this area.

	Plate 51 ARTC easement with a small remanet patch of yarran, not a threatened species but could be considered to have local significance.
	Plate 52 Representative image of the majority of the *Woodlands* portion of the TNWP Study Area which occurs immediately north of the Mitchell Highway.
	Plate 53 Pump marking the end of the TNWP Study Area.

Appendix 2

Aerial Imagery of the PHTETL Study Area

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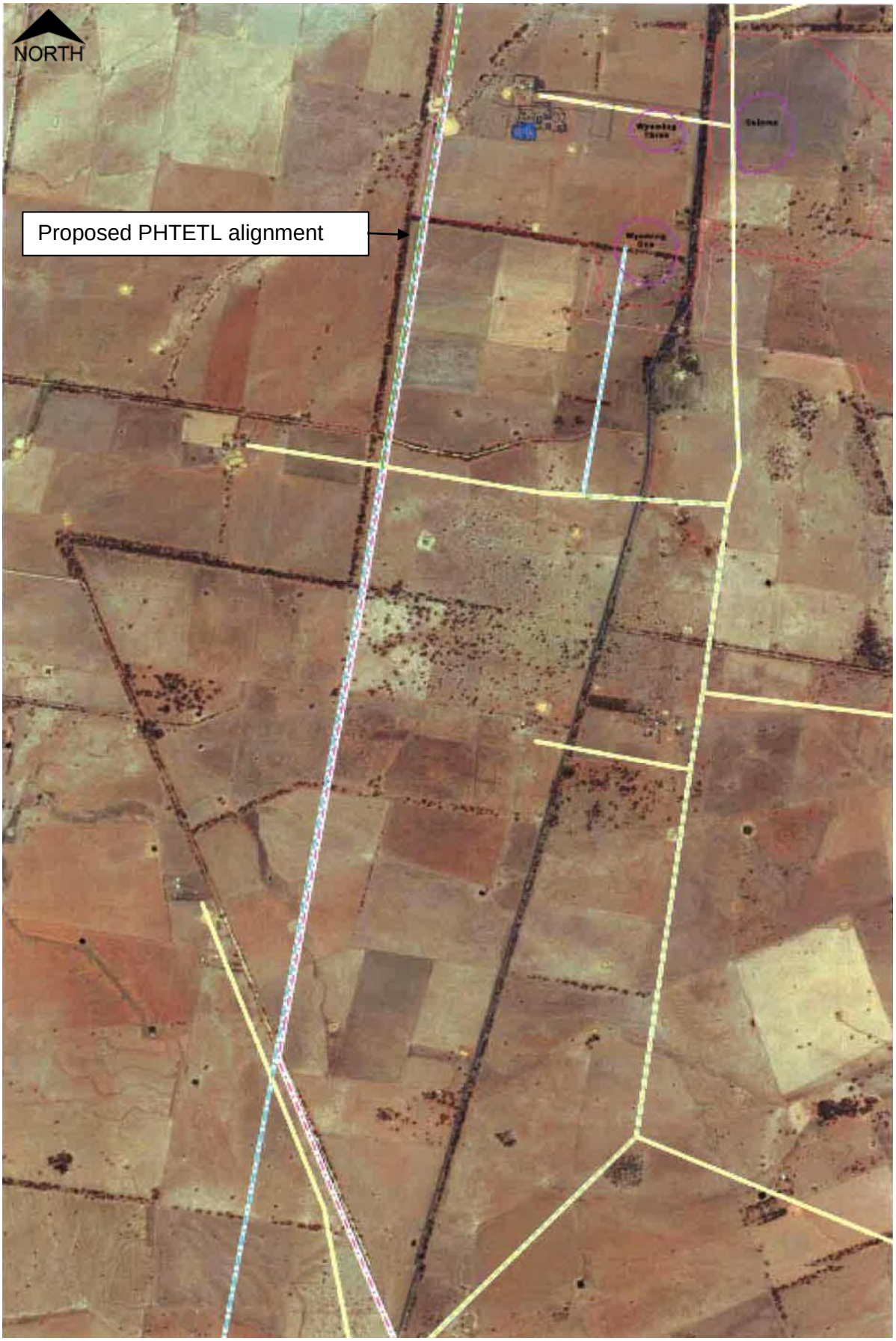
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Appendix 2: Image 1



Appendix 2: Image 2



Appendix 2: Image 3 (From existing Peak Hill sub-station east across Newell Highway).



Appendix 2: Image 4 (From Golf Course to Bogan Street)



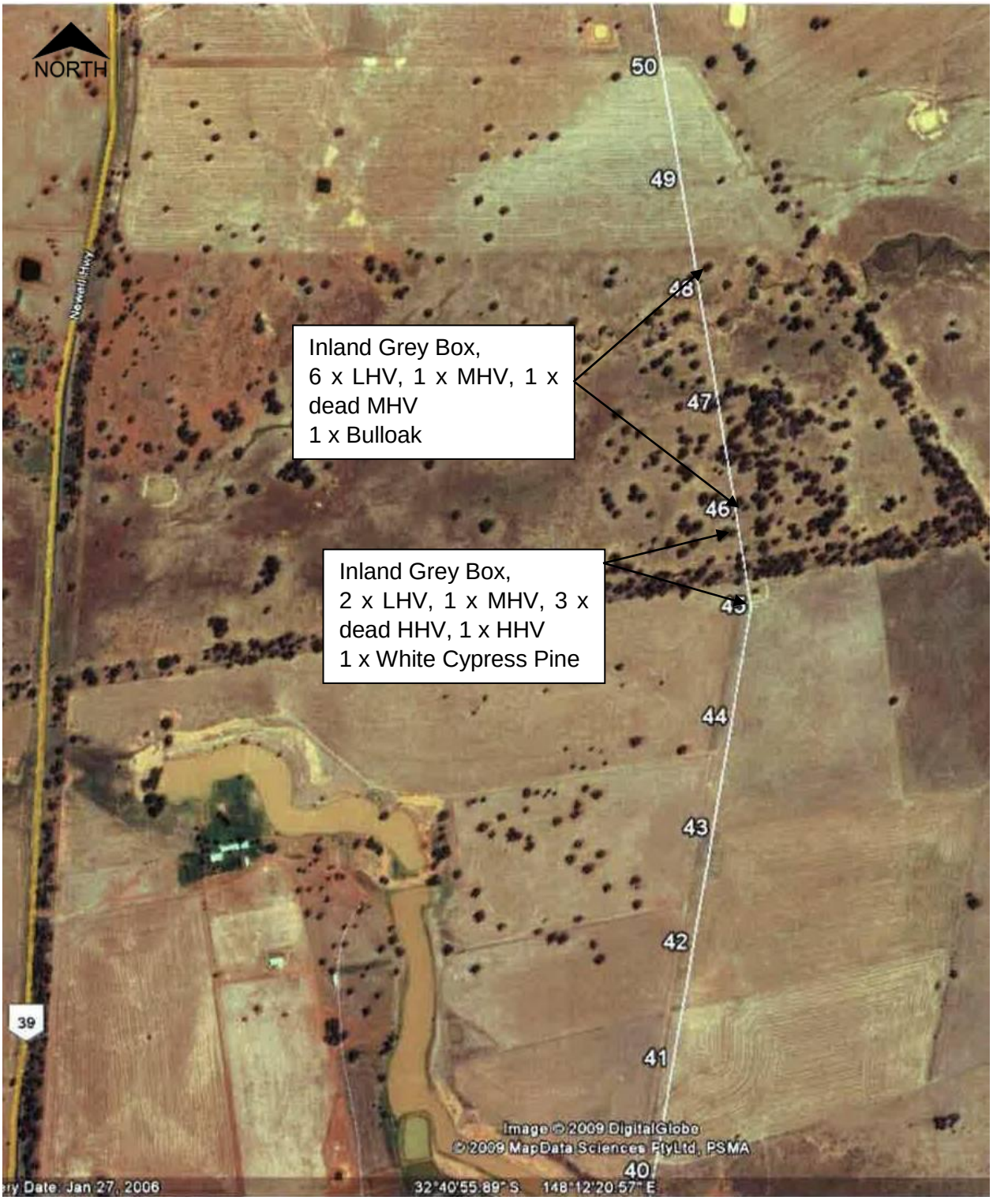
Appendix 2: Image 5 (east of Newell Highway, opposite Peak Hill Gold Mine)



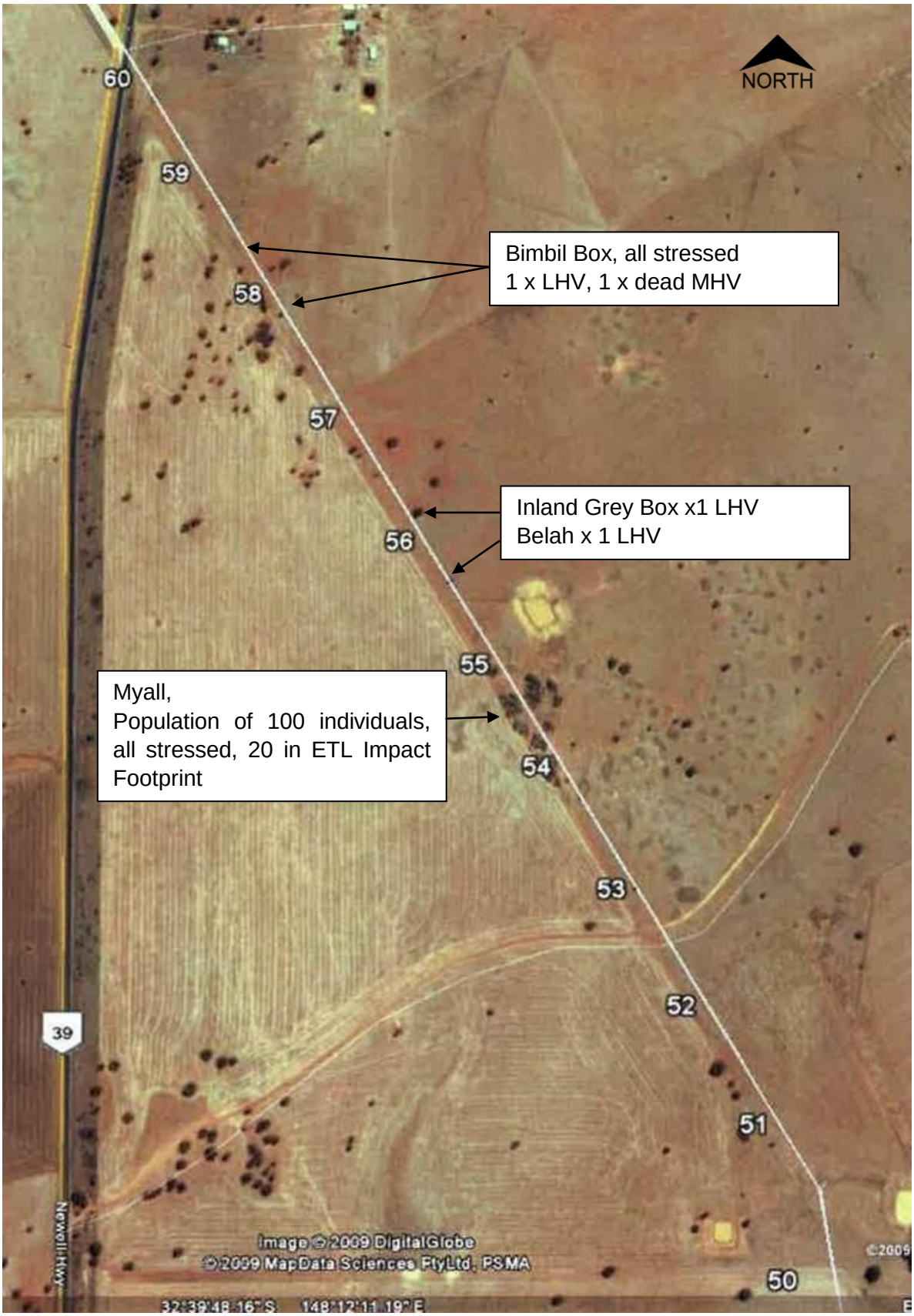
Appendix 2: Image 6 (east of Newell Highway)



Appendix 2: Image 7 (east of Newel Highway)



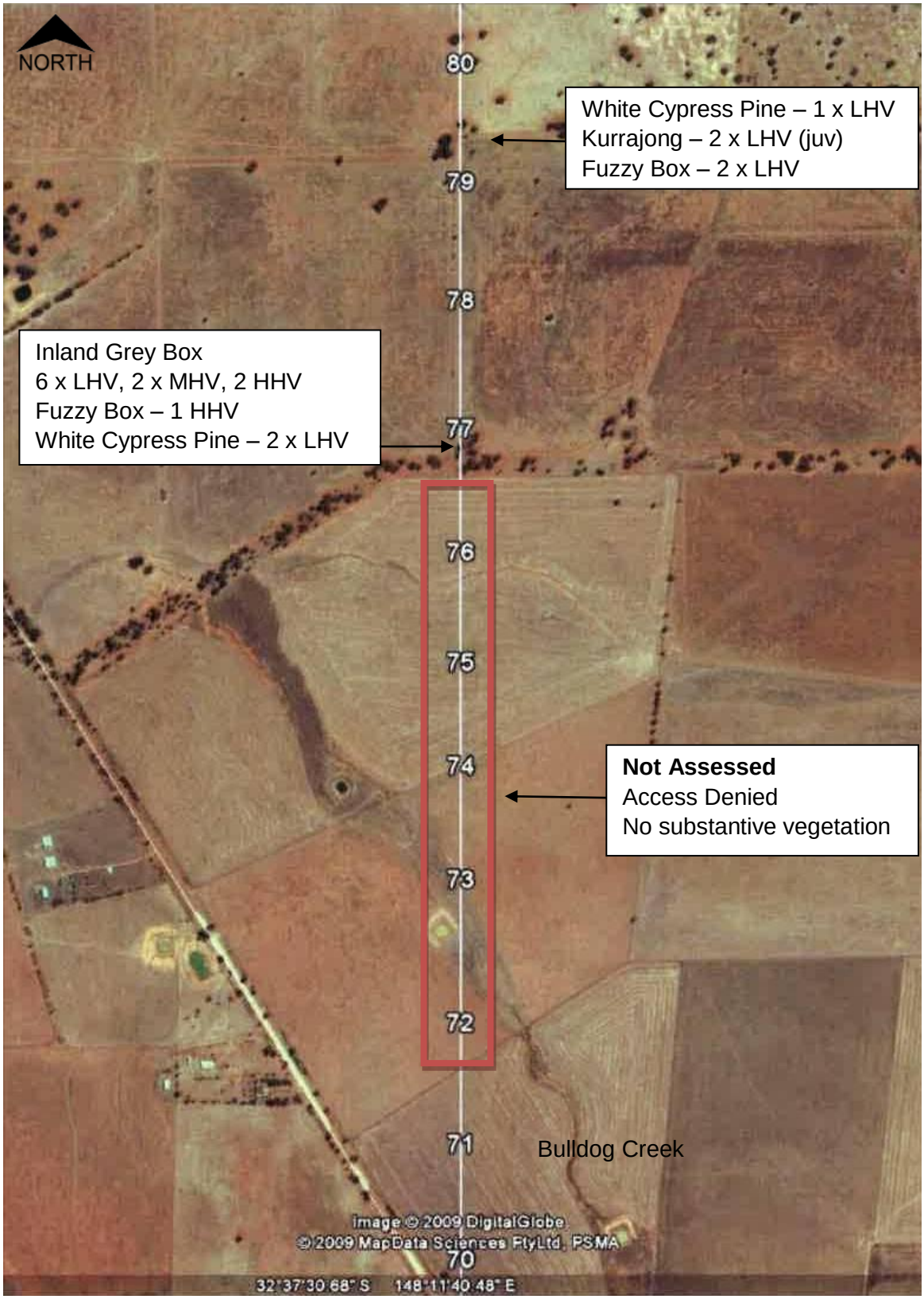
Appendix 2: Image 8 (east of Newell Highway)



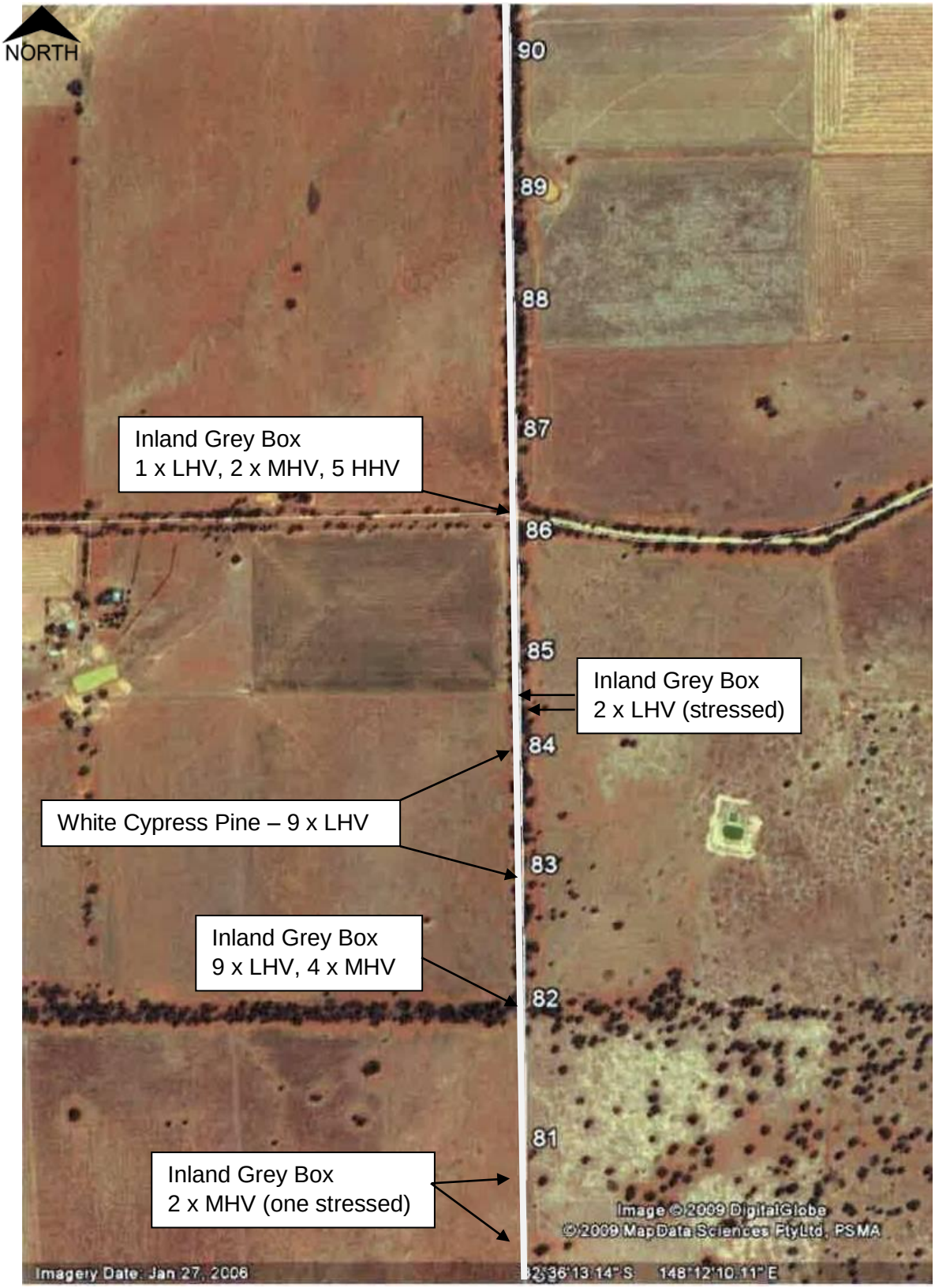
Appendix 2: Image 9 (west of Newell Highway adjacent to back Tomingley West Road). ETL alignment adjusted on the image to show a more accurate representation.



Appendix 2: Image 10



Appendix 2: Image 11. ETL alignment adjusted on the image to show a more accurate representation.



Appendix 2: Image 12 ETL alignment adjusted on the image to show a more accurate representation.



Structure Number	Station (m)	X Easting (m) MGA	Y Northing (m) MGA	Centerline Z Elevation (m)
1	0.0	611331.2	6377083.9	268.8
2	43.8	611348.3	6377043.6	267.9
3	140.3	611443.1	6377025.4	268.6
4	232.8	611534.0	6377008.0	269.1
5	371.5	611670.0	6376981.0	271.5
6	540.3	611835.3	6377015.3	271.3
7	665.8	611958.2	6377040.8	274.5
8	839.2	612128.0	6377076.0	277.6
9	962.6	612239.9	6377128.0	279.0
10	1115.4	612378.4	6377192.4	281.3
11	1237.8	612489.4	6377244.0	282.1
12	1398.1	612617.4	6377340.4	284.6
13	1545.0	612734.8	6377428.8	283.8
14	1699.4	612858.1	6377521.7	283.4
15	1852.7	612850.6	6377674.9	285.1
16	2008.4	612842.9	6377830.3	286.2
17	2188.6	612750.7	6377985.1	291.0
18	2416.3	612634.2	6378180.8	298.1
19	2606.3	612537.0	6378344.0	307.2
20	2786.6	612644.5	6378488.8	306.8
21	2949.9	612741.8	6378619.9	303.8
22	3141.1	612855.8	6378773.4	300.0
23	3336.9	613027.9	6378866.9	294.9
24	3547.5	613212.9	6378967.3	290.5
25	3737.0	613379.5	6379057.6	284.9
26	3949.9	613345.5	6379267.8	285.6
27	4157.9	613312.3	6379473.1	283.8
28	4421.6	613270.2	6379733.5	281.2
29	4655.9	613232.9	6379964.8	278.0
30	4856.8	613200.8	6380163.1	275.3
31	5070.3	613166.7	6380373.9	274.8
32	5281.0	613133.1	6380581.8	276.7
33	5457.3	613104.9	6380755.9	275.0
34	5667.9	613071.3	6380963.8	270.9
35	5876.8	613038.0	6381170.0	266.9
36	5979.7	613052.0	6381272.0	266.7
37	6147.6	613027.9	6381438.1	264.0
38	6370.6	612995.8	6381658.8	266.3
39	6630.6	612958.5	6381916.1	263.8
40	6856.8	612926.0	6382140.0	264.1
41	7091.9	613002.5	6382362.2	263.3

42	7332.0	613080.7	6382589.3	264.4
43	7568.2	613157.6	6382812.7	264.6
44	7798.6	613232.5	6383030.5	265.9
45	8028.2	613307.3	6383247.6	265.1
46	8228.3	613305.7	6383447.7	270.9
47	8449.9	613303.9	6383669.3	271.0
48	8684.4	613302.0	6383903.8	267.9
49	8910.9	613300.2	6384130.3	265.2
50	9145.8	613298.4	6384365.1	265.7
51	9378.9	613296.5	6384598.3	265.9
52	9586.0	613217.9	6384789.8	265.8
53	9791.5	613139.8	6384980.0	266.4
54	10011.2	613056.4	6385183.2	266.2
55	10196.3	612986.2	6385354.4	267.4
56	10422.7	612900.2	6385563.9	266.1
57	10651.5	612813.3	6385775.5	270.1
58	10887.4	612723.8	6385993.7	273.6
59	11118.2	612636.1	6386207.3	270.3
60	11303.1	612565.9	6386378.4	268.9
61	11529.5	612479.9	6386587.8	267.1
62	11759.3	612392.7	6386800.3	266.4
63	11988.1	612305.8	6387012.0	265.5
64	12158.5	612241.1	6387169.7	266.6
65	12408.9	612146.0	6387401.4	265.2
66	12628.6	612062.6	6387604.5	265.9
67	12866.9	611972.1	6387825.1	265.9
68	13053.9	611901.1	6387998.0	264.6
69	13275.5	611817.0	6388203.0	265.4
70	13490.2	611854.5	6388414.4	264.6
71	13725.2	611895.6	6388645.8	262.6
72	13970.2	611938.3	6388887.1	260.1
73	14260.2	611989.0	6389172.6	258.8
74	14490.2	612029.2	6389399.1	257.5
75	14700.2	612065.8	6389605.9	257.8
76	14924.2	612105.0	6389826.4	257.8
77	15174.2	612148.6	6390072.6	260.9
78	15434.2	612194.0	6390328.6	258.0
79	15674.2	612236.0	6390564.9	258.7
80	15916.2	612278.2	6390803.2	260.8
81	16196.2	612327.1	6391078.9	260.9
82	16481.8	612377.0	6391360.0	263.5
83	16755.2	612420.5	6391630.0	262.2
84	17000.2	612459.4	6391871.9	262.1
85	17193.2	612490.1	6392062.4	261.4
86	17440.9	612529.4	6392306.9	263.8
87	17649.2	612562.5	6392512.6	262.4

88	17914.2	612604.6	6392774.3	263.2
89	18144.2	612641.2	6393001.3	263.9
90	18425.2	612685.8	6393278.8	264.1
91	18683.2	612726.8	6393533.5	265.0
92	18958.2	612770.5	6393805.0	269.4
93	19212.2	612810.9	6394055.8	265.7
94	19456.2	612849.7	6394296.7	267.3
95	19651.2	612880.7	6394489.2	269.8
96	19854.6	612913.0	6394690.0	270.9
97	19957.9	612421.3	6377520.9	292.9
98	20056.6	612447.0	6377616.2	294.4
99	20169.1	612476.3	6377724.8	295.9
100	20279.2	612505.0	6377831.1	298.0
101	20402.5	612537.2	6377950.1	296.5
102	20528.7	612570.1	6378071.9	297.0
103	20659.7	612604.2	6378198.4	299.7
104	20788.4	612637.8	6378322.7	302.7
105	20899.1	612666.6	6378429.5	304.6
106	21011.0	612695.8	6378537.6	305.7
107	21142.1	612730.0	6378664.1	303.8

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Appendix 3

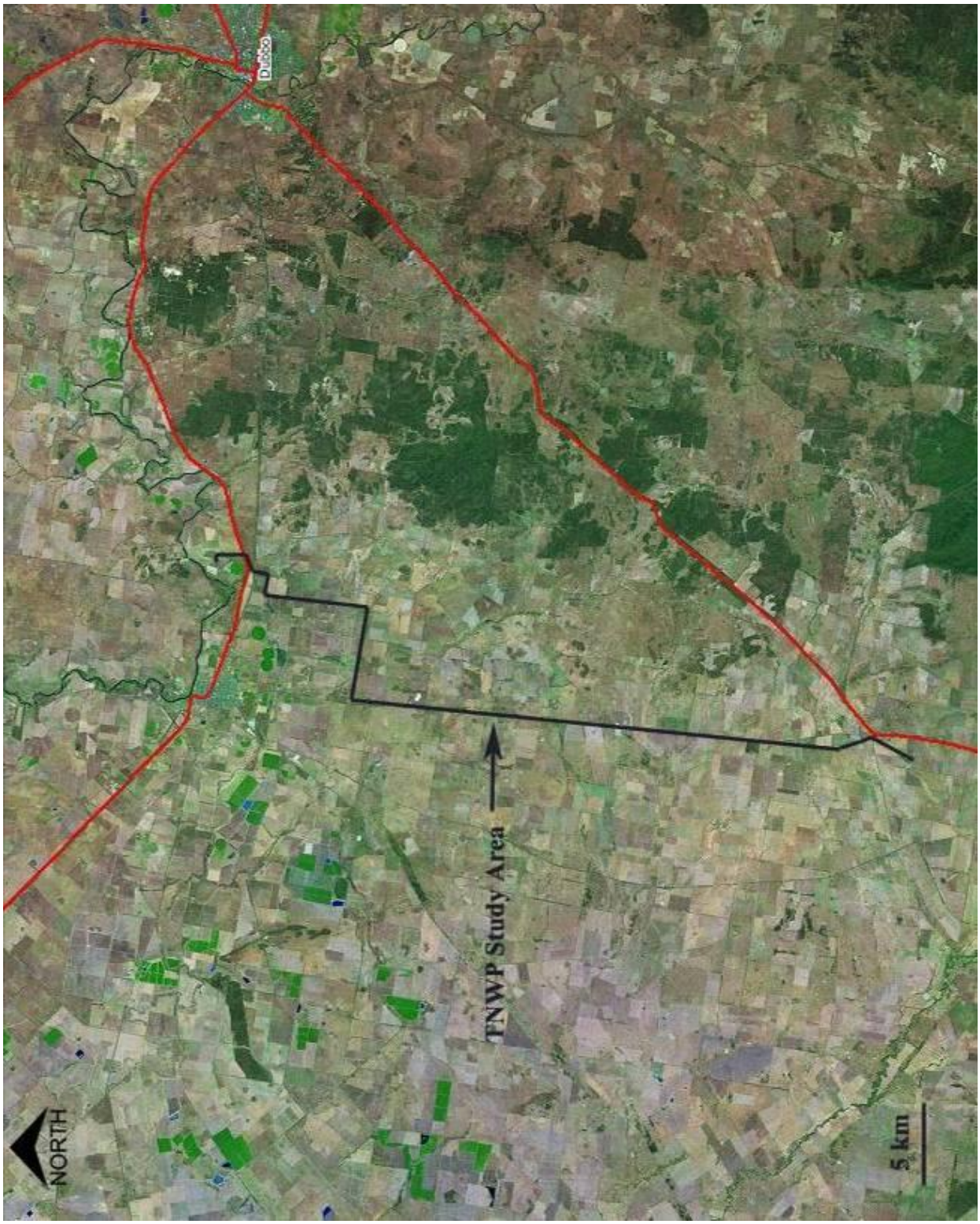
Aerial Imagery of the TNWP Study Area

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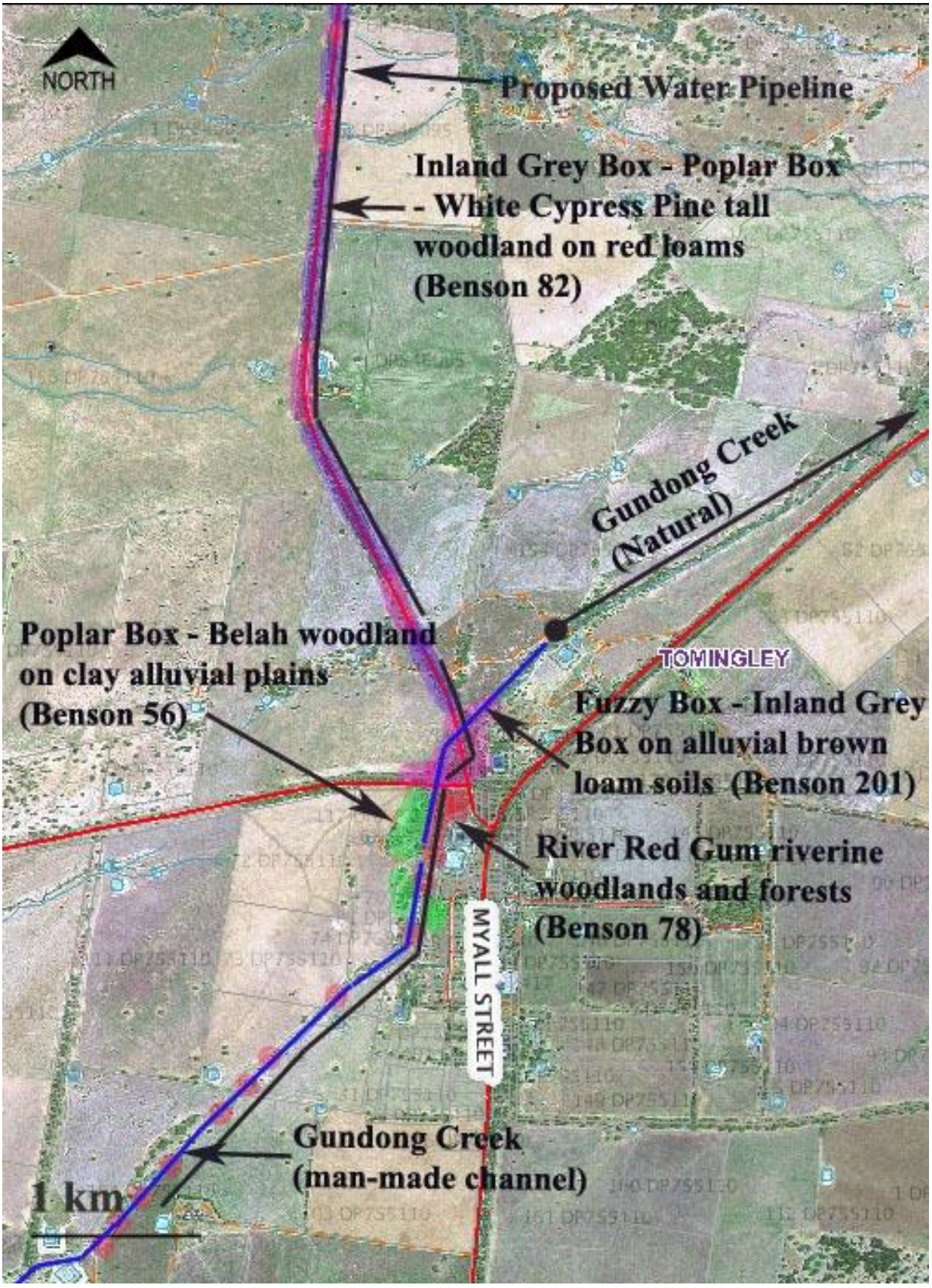
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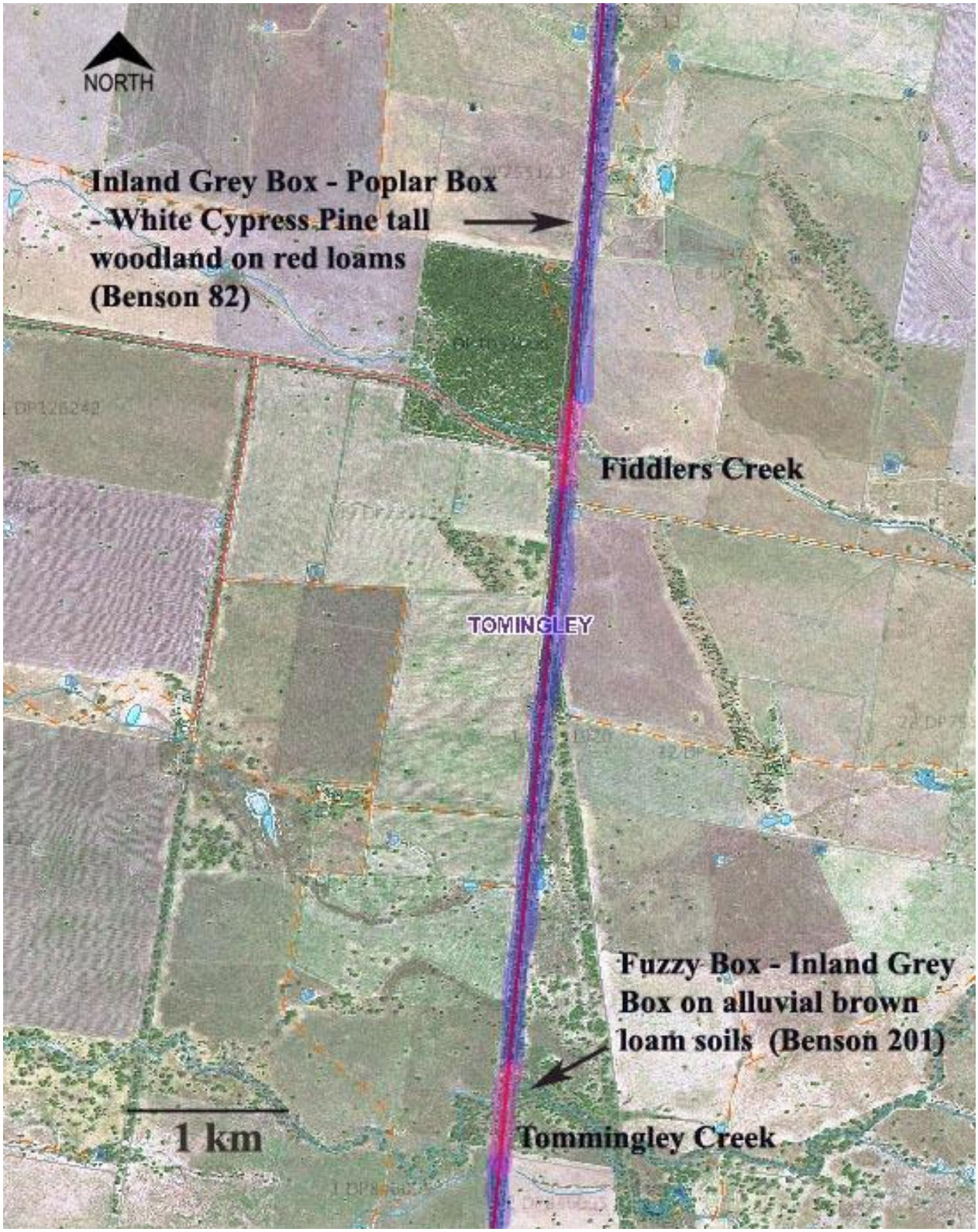
Appendix 3: Image 1



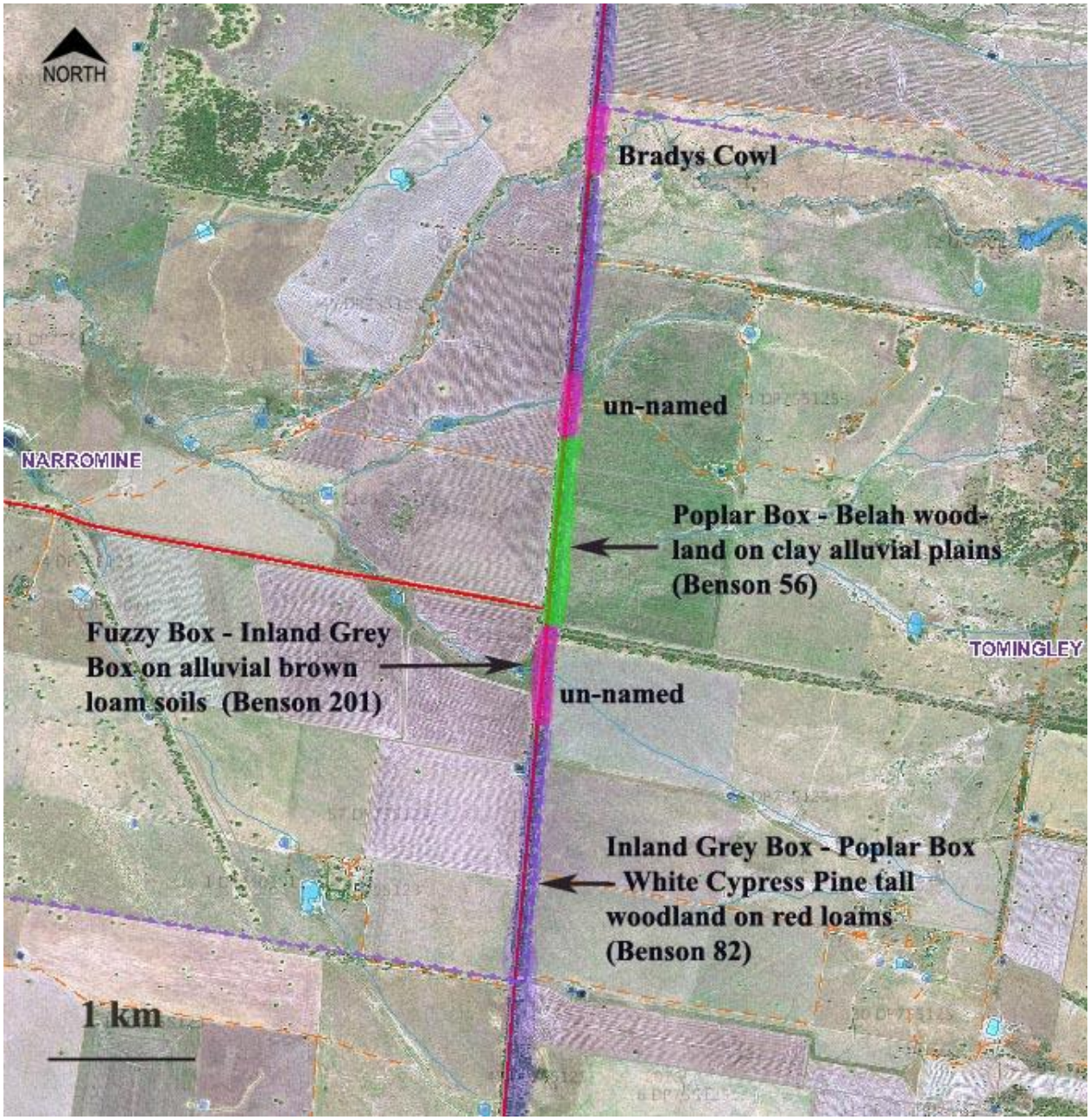
Appendix 3: Image 2 (From the Mine Site moving north along Narromine to Tomingley Road)



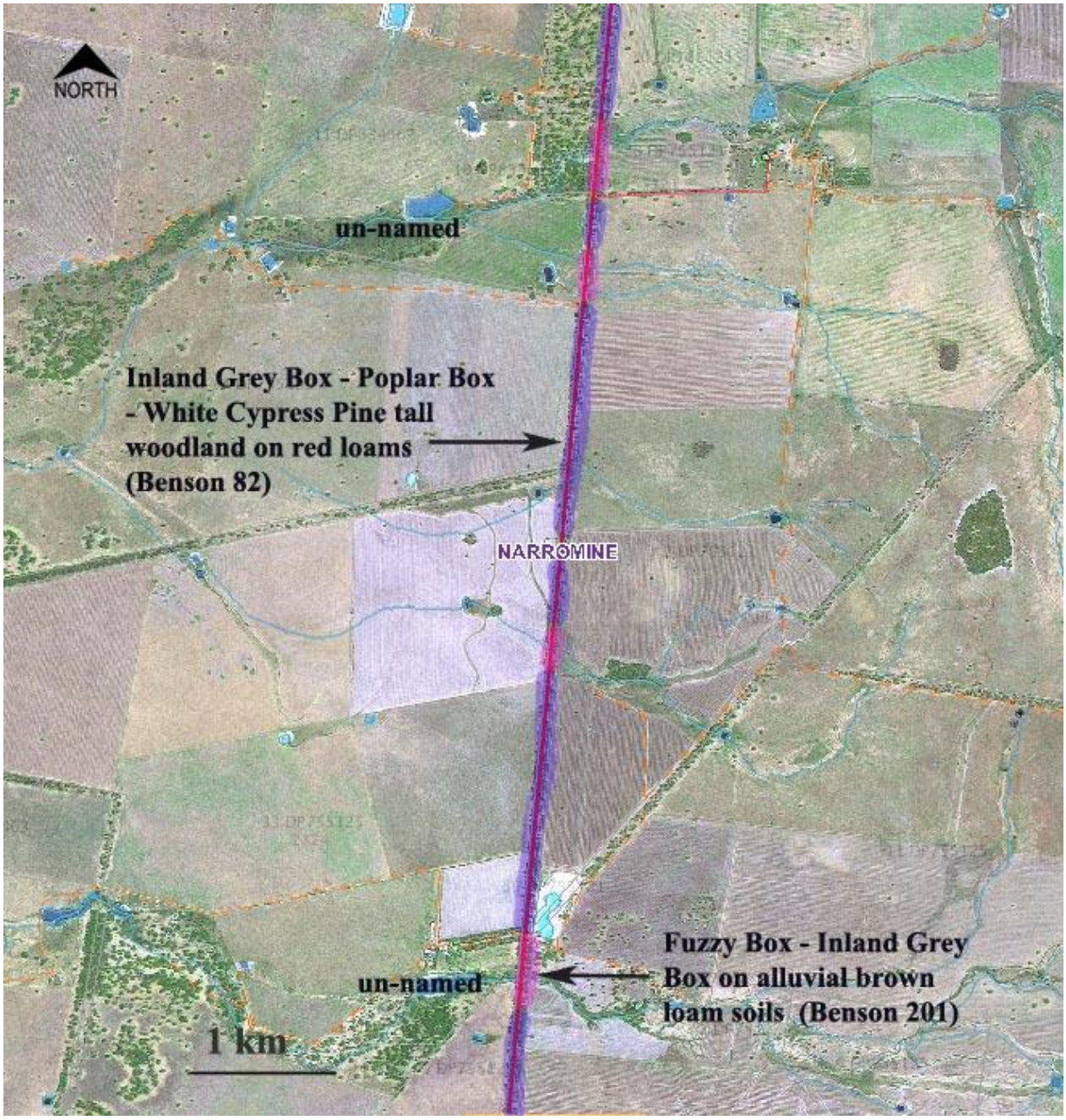
Appendix 3: Image 3 (moving north along Narromine to Tomingley Road)



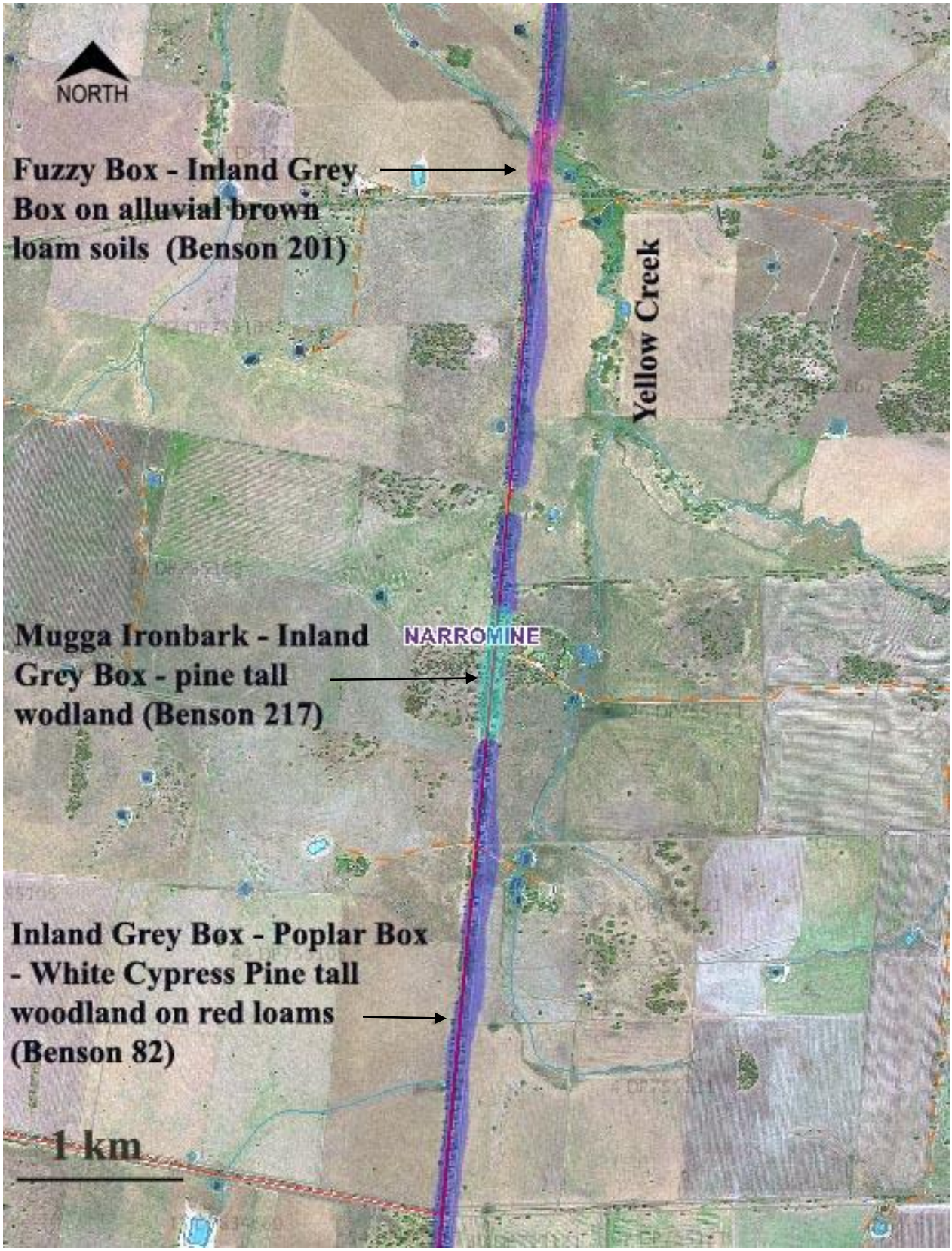
Appendix 3: Image 4 (moving north along Narromine to Tomingley Road)



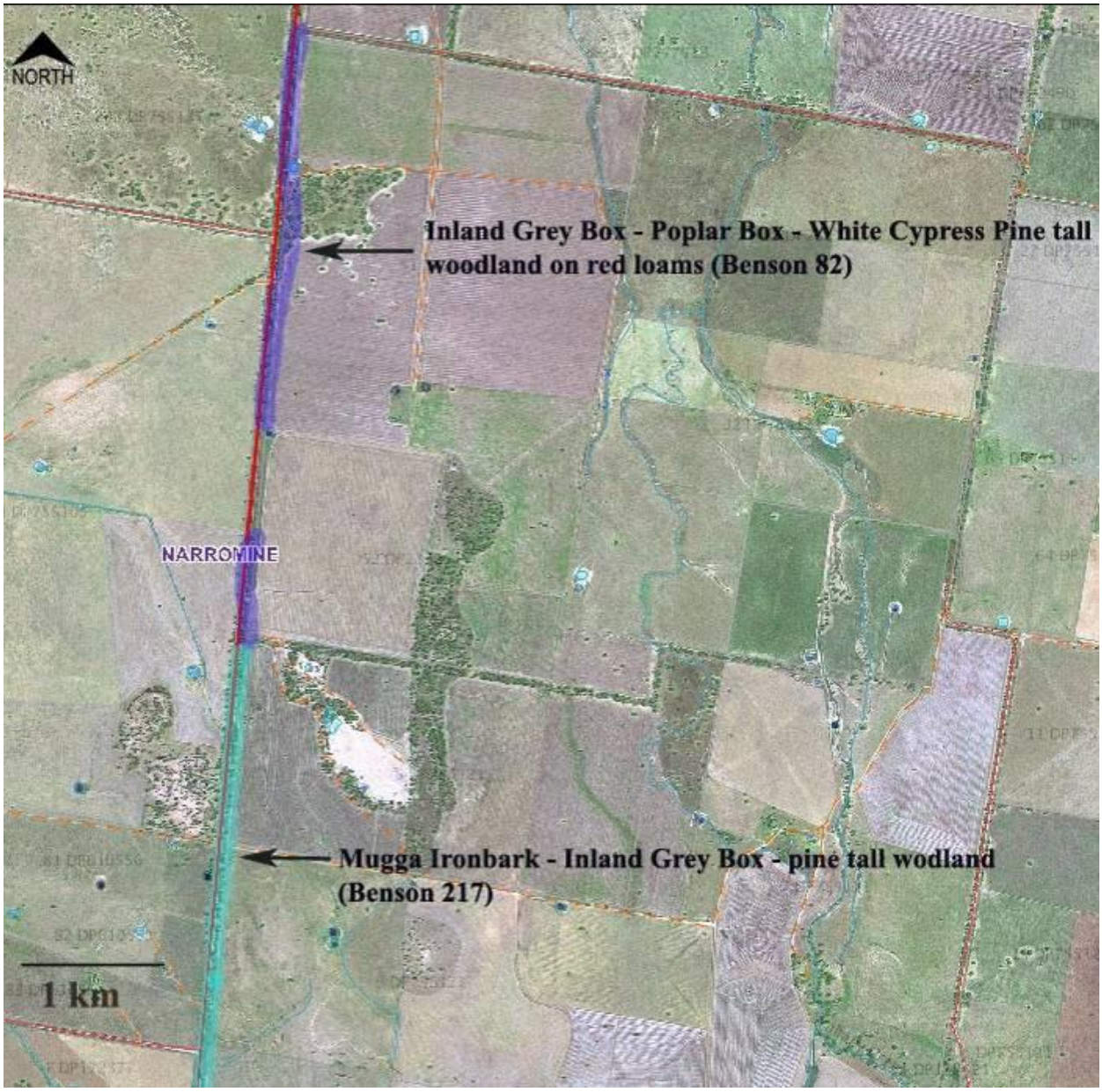
Appendix 3: Image 5 (From the Mine Site moving north along Narromine to Tomingley Road)



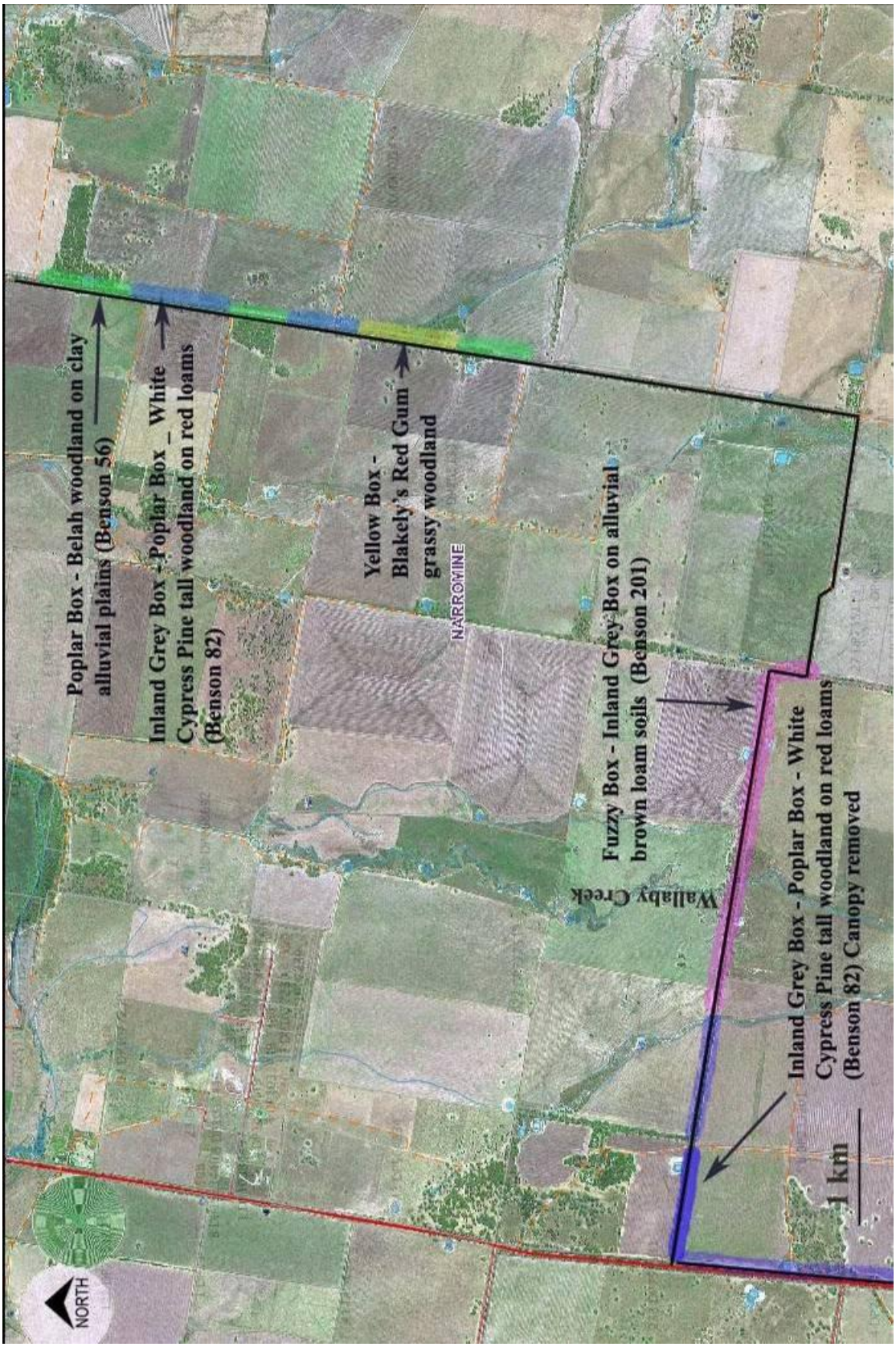
Appendix 3: Image 6 (moving north along Narromine to Tomingley Road)



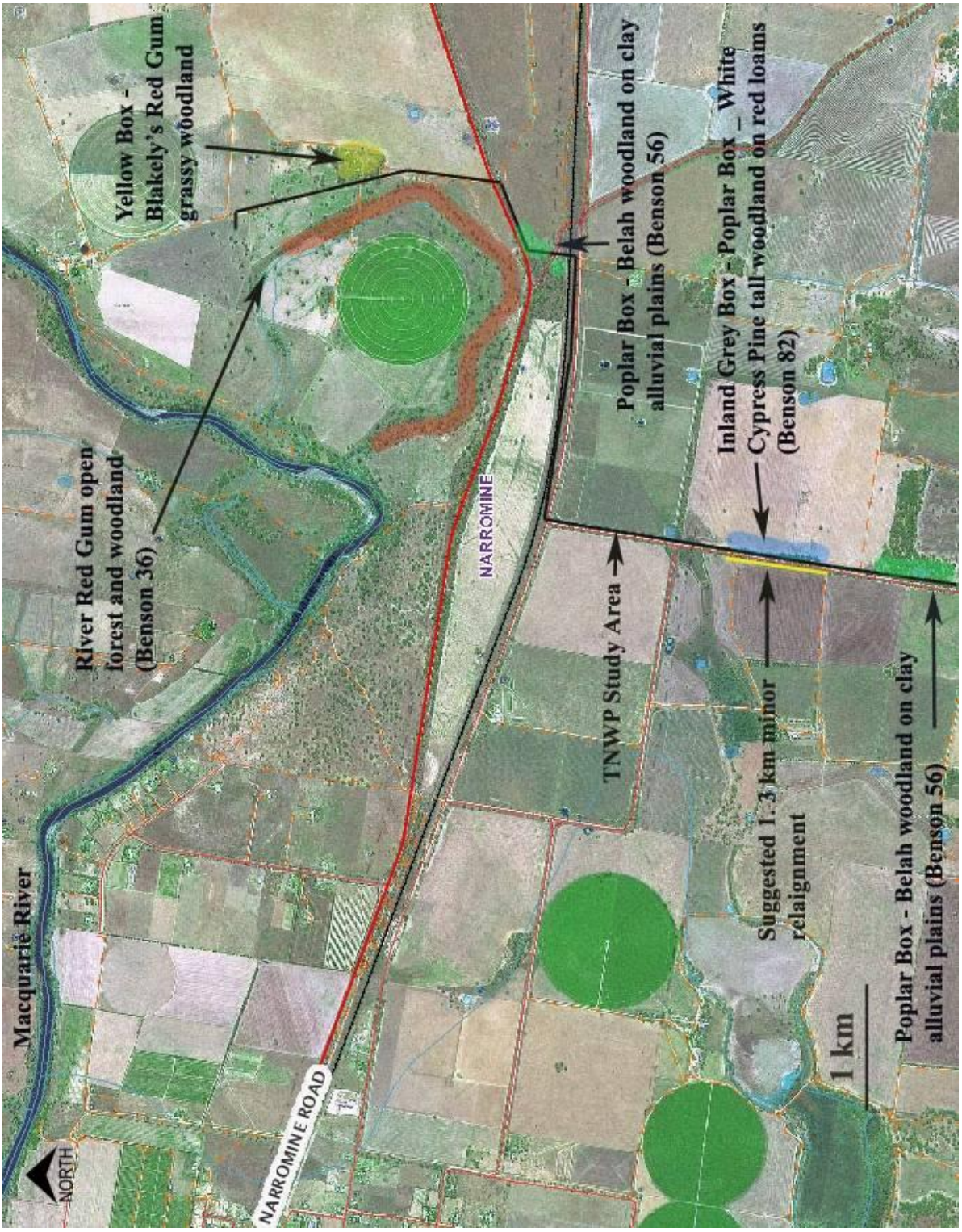
Appendix 3: Image 7 (moving north along Narromine to Tomingley Road)



Appendix 3: Image 8 (From Narromine to Tomingley Road, turn west into Pinedene Road, Bootles Road, and north into Dappo Road).



Appendix 3: Image 9 (From Dappo Road, turn east into ARTC easement, north then east across / along Mitchell Highway and north into Woodlands).



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Appendix 4

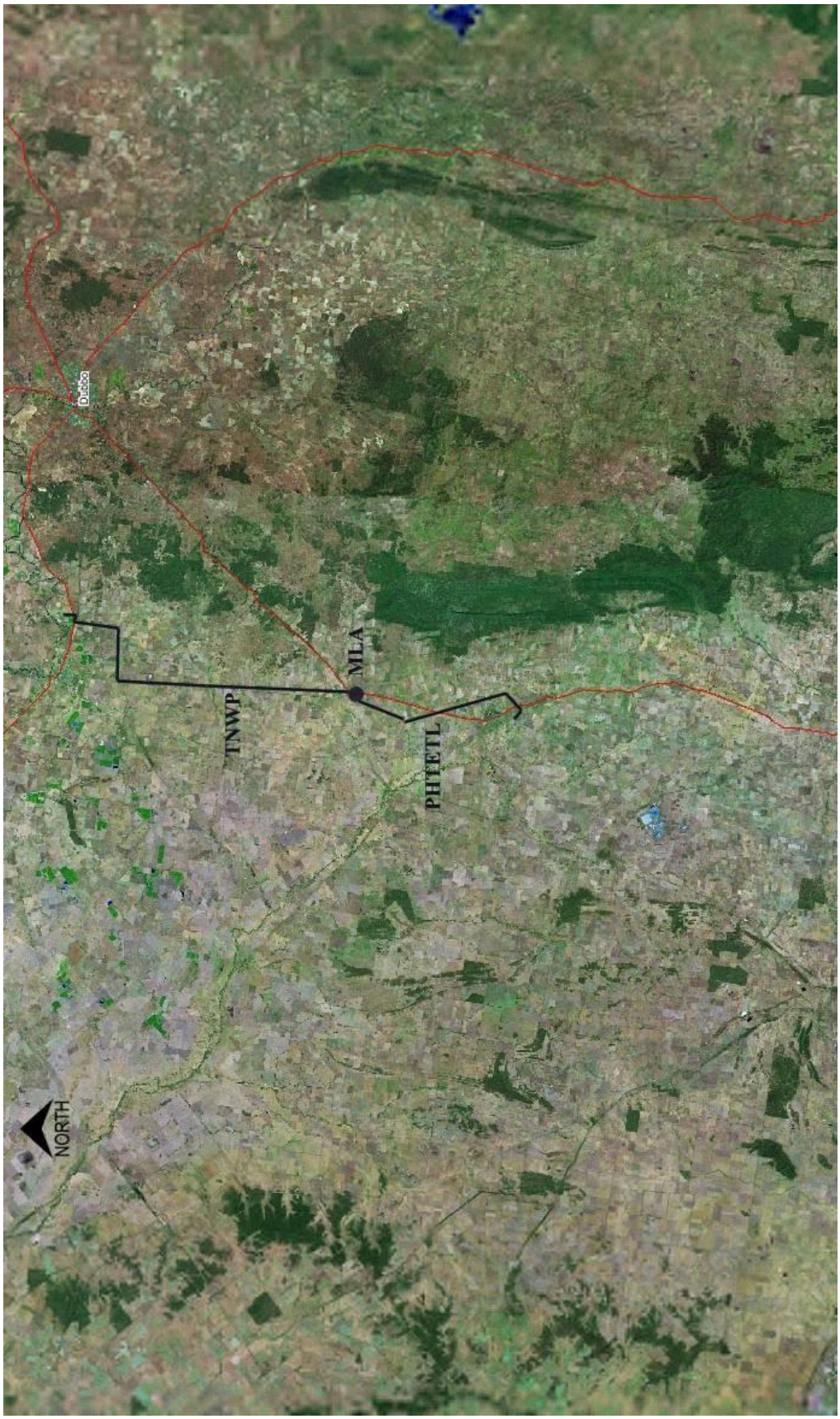
Imagery of the Mine Site Study Area

(No. of pages including blank pages = 6)

Note: this Appendix is only available on the Project CD

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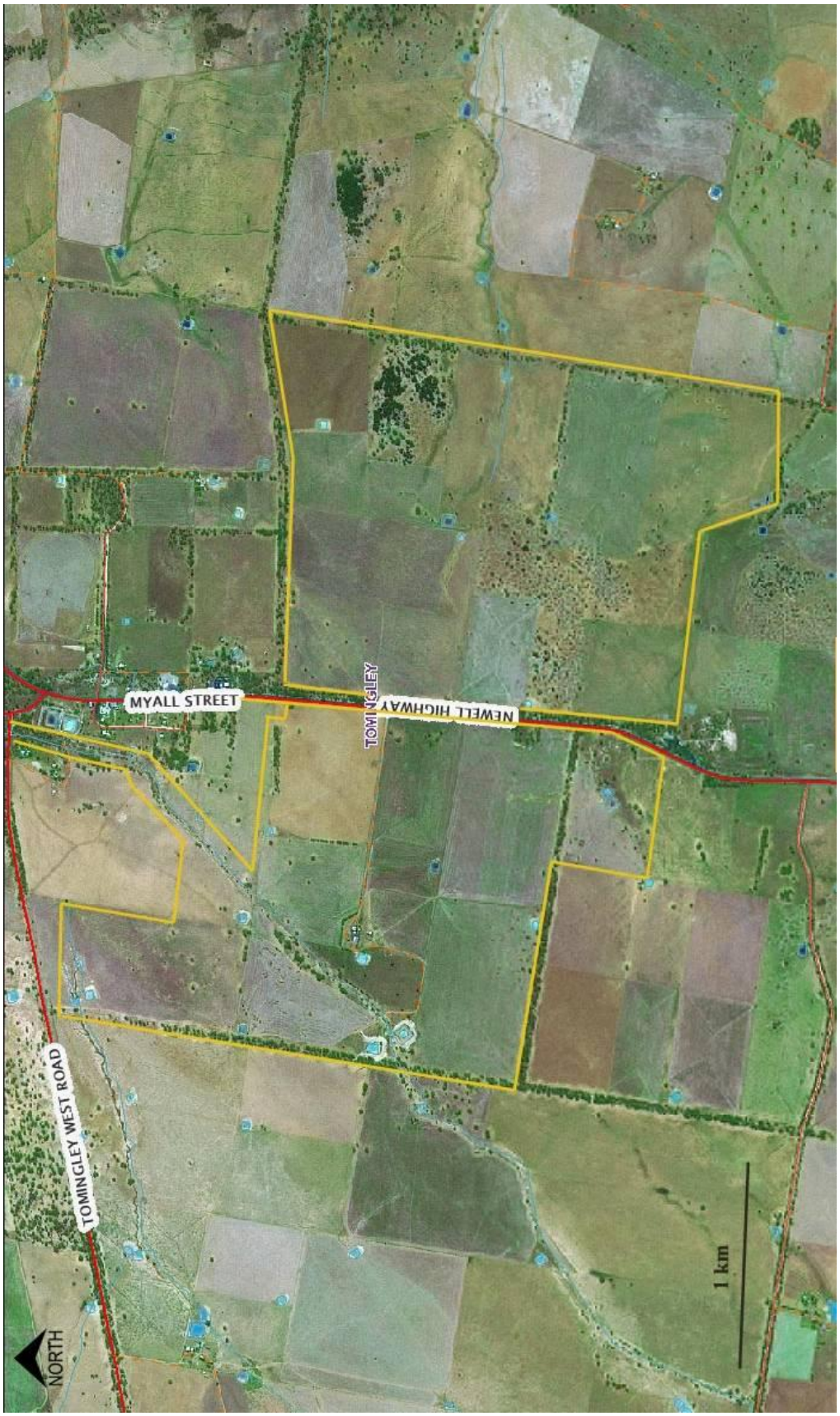
Appendix 4: Image 1. The Mine Site, TNWP and PHTETL (1:500K).



Appendix 4: Image 2. Extent of vegetation remnants surrounding the Mine Site, (1:90K). Mine Site approximately where Tomingley / Narromine is ion the image.



Appendix 4: Image 3. Extent of vegetation remnants within and immediately next to the Mine Site.



Appendix 4: Image 4. Vegetation communities within and immediately next to the Mine Site.



Appendix 5

Observed Flora

(No. of pages including blank pages = 10)

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

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*Exotic species
Red cells = Weed listed as noxious in the Noxious Weeds Act 1993

SPECIES	COMMON NAME	Mine Site	PHTETL	TNWP
FERNS				
FAMILY ADIANTACEAE				
Cheilanthes lasiophylla	Woolly Cloak Fern	x	x	x
C. tenuifolia	Mulga Fern		x	
GYMNOSPERMS				
FAMILY CUPRESSACEAE				
Callitris glaucophylla	White Cypress Pine	x	x	x
MONOCOTYLEDONS				
FAMILY TYPHACEAE				x
Typha orientale	Cumbungi			
FAMILY JUNCACEAE				
Juncus usitatus	Common Rush	x		x
FAMILY POACEAE				
Bothriochloa decipiens	Red Grass	x	x	x
Dichanthium sericeum	Bluegrass			x
Poa labillardieri	Poa Grass			x
Eragrostis sp	Love Grass	x	x	x
Themeda australis	Kangaroo Grass			x
Bromus unioloides	Prairie Grass	x	x	x
Chloris truncata	Windmill Grass	x	x	x
Chloris verticillata	Tall Windmill Grass	x		x
Austrodanthonia auriculata	Wallaby Grass	x	x	x
Austrodanthonia caespitosa	White Top	x	x	x
**Avena barbata*	Bearded Oats	x	x	x
**Briza minor*	Shivery Grass	x	x	x
**Cenchrus ciliaris*	Buffel Grass			x
**Chloris gayana*	Rhodes Grass	x		x
Dactyloctenium radulans	Button Grass	x	x	x
**Echinochloa colonum*	Awnless Barnyard Grass	x	x	x
Enneapogon nigricans	Bottlewashers			x
Enteropogon acicularis	Curly Windmill Grass	x	x	x
Eriochloa australiensis	Australian Cupgrass	x		x
**Hordeum leporinum*	Barley Grass	x	x	x
**Lolium rigidum*	Wimmera Ryegrass	x	x	x
**Phalaris aquatica*	Phalaris	x	x	x
**Phalaris paradoxa*	Canary Grass	x	x	x
Sporobolus caroli	Fairy Grass			x
Sporobolus creber	Western Rats tail grass	x		x
Elymus scaber	Common Wheat Grass			x
Austrostipa densiflora	Foxtail Speargrass	x		x
Austrostipa setacea	Corkscrew Grass	x	x	x
Austrostipa scabra	Speargrass	x		x

SPECIES	COMMON NAME	Mine Site	PHTETL	TNWP
Austrostipa verticillata	Slender Bamboo Grass			x
Aristrida jerichoensis		x		x
Aristrida ramosa				x
**Lamarckia aurea*	Golden-top			x
Microleana stipoides				x
Panicum decompistium	Native Millet			x
FAMILY XANTHORRHOEACEAE				
Lomandra patens	Irongrass	x		x
Lomandra filiformis	Wattle Matrush			x
L multiflora	Many-flowered Matrush			x
FAMILY LILIACEAE				
Dianella laevis	Smooth Flax-lily			x
Dianella revoluta	Spreading Flax-lily			x
Bulbinopsis bulbosa	Native Leek	x		x
Thysanotus patersonii	Twining Fringed Lily			x
T tuberosus	Common Fringe Lily			x
FAMILY AGAVACEAE				
Agave americane	Century Plant			x
FAMILY ORCHIDACEAE				
Thelymitra sp	Sun Orchid			x
Microtis unifolia	Common Onion Orchid			x
Pterostylis nan	Dwarf Greenhood			x
Caladenia caerulea	Blue Fingers			x
C alba	White Fingers			x
C carnea	Pink Fingers			x
DICOTYLEDONS				
FAMILY CASUARINACEAE				
Allocasuarina cristata	Belah	x		x
Allocasuarina stricta	Drooping Sheoak			x
Allocasuarina leuhmannii	Buloke / Bull Oak	x	x	x
FAMILY PROTEACEAE				
Hakea sericea	Needle Bush	x		
FAMILY POLYGONACEAE				
**Acetosella vulgaris*	Sheep Sorrel	x	x	x
Polygonum aviculare	Wireweed	x	x	x
Rumex brownii	Slender Dock	x	x	x
Rumex crispus	Curled Dock	x	x	x
Rumex crystallinus	Shiny Dock	x	x	x

SPECIES	COMMON NAME	Mine Site	PHTETL	TNWP
FAMILY CHENOPODIACEAE				
Atriplex semibiccata	Creeping Saltbush	x	x	x
Bassia birchii	Galvinised Burr	x	x	x
Bassia diacantha	Grey Copperburr	x	x	x
**Chenopodium album*	Fat-Hen	x	x	x
**Chenopodium murale*	Neetle-leaf Goosefoot	x	x	x
Bassia quinquecuspis	Black Roly-Poly	x	x	x
Maireana coronata	Crown Fissure-weed	x	x	x
Maireana microphylla	Eastern Cottonbush	x	x	x
Salsola kali	Buckbush	x	x	x
Enchylaena tomentosa	Ruby Saltbush	x		x
FAMILY PAPAVERACEAE				
**Argemone ochrolenca*	Mexican Poppy	x	x	x
**Papaver hybridum*	Rough Poppy	x	x	x
FAMILY FUMARIACEAE				
**Fumaria muralis*	Wall Fumitory	x	x	x
FAMILY BRASSICACEAE				
**Capsella bursa-pastoris*	Shepherd's Purse	x	x	x
**Lepidium bonariense*	Cut-leaf Peppercress	x	x	x
**Sisymbrium irio*	London Rocket	x	x	x
FAMILY CAPPARIDACEAE				
Apophyllum anomalum	Warrior Bush			
**Caesalpinia gilliesii*	Bird-of-paradise flower			x
Cassia artemisioides	Silver cassia			x
C. barclayana	Pepper-leaf senna	x	x	x
C. eremophila	Punty bush			x
FAMILY MYRTACEAE				
Eucalyptus camaldulensis	River Red Gum			x
Eucalyptus dealbata	Tumbledown Red Gum			x
E dwyeri	Dwyers Red Gum			x
E sideroxylon	Mugga Iron Bark	x		x
E microcarpa	Inland Grey Box	x	x	x
E melliodora	Yellow Box			x
E connica	Fuzzy Box	x	x	x
E populnea	Bimble Box	x	x	x
FAMILY SAPINDACEAE				
Dodonaea cuneata	Wedge-leafed Hopbush	x		x
Dodonaea viscosa	Broad-leafed Hopbush			x
Alectryon oleifolium	Rosewood	x		x

SPECIES	COMMON NAME	Mine Site	PHTETL	TNWP
FAMILY APIACEAE				
Platysace lanceolata	Shrubby Platysace			x
**Ammi majus*	Bishops Weed	x	x	x
**Foeniculum vulgare*	Fennel	x	x	x
Hydrocotyle trachycarpa	Wild Parsely			x
FAMILY ASTERACEAE				
Calotis lappulacea	Yellow Burr-daisy	x	x	x
Calotis cuneifolia	Bogan Flea	x	x	x
Senecio runcinifolius	Tall Groundsell			x
Gnaphalium sphaericum	Japanese Cudweed			x
**Bidens pilosa*	Cobbler's Peg	x	x	x
**Helianthus annus*	Sunflower	x	x	x
**Arctotheca calendula*	Capeweed	x	x	x
**Chondrilla juncea*	Skeleton Weed	x	x	x
**Taraxacum officinale*	Dandelion	x	x	x
**Hypochoeris radicata*	Cat's Ear	x	x	x
**Sonchus oleraceus*	Milk Thistle	x	x	x
**Lactuca serriola*	Prickly Lettuce	x	x	x
**Carthamus lanatus*	Saffron Thistle	x	x	x
**Cirsium vulgare*	Black / Spear Thistle		x	
**Carduus tenuiflorus*	Winged Slender Thistle	x	x	x
**Xanthium occidentale*	Noogoora Burr			x
**Xanthium spinosum*	Bathurst Burr	x	x	x
**Centaurea calcitrape*	Star Thistle	x	x	x
Cassinia quinquefaria	Biddy Bush			x
Helichrysum vicosum	Sticky Everlasting			x
Helichrysum diosmifolium	Pill Flower			x
Helichrysum bracteatum	Goldeny Everlasting			x
Helichrysum viscosum	Sticky Everlasting			x
Vittadinia triloba/cuneata complex	Fuzzweed	x	x	x
**Conyzya bonariensis*	Flax-leaf fleabane	x	x	x
Centipeda cunninghamii	Common Sneezeweed	x	x	x
Cymbonotus pressianus	Australian bears-ear	x		x
Cassina laevis	Cough-bush			x
Cassina arcuata	Chinese-scrub			x
**Chicorium intybus*	Chicory	x	x	x
**Hypochoeris radicata*	Flatweed	x	x	x
**Lactuca saligna*	Wild (prickly) lettuce	x	x	x
FAMILY RUTACEA				
Geijera parviflora	Wilga	x	x	x
FAMILY GOODENIACEAE				
Goodenia pinnatifida	Scrambled Eggs	x		x
Goodenia hederacea	Forest Goodenia			x
FAMILY MELIACEAE				
Melia azedarach	White Cedar	x		x

SPECIES	COMMON NAME	Mine Site	PHTETL	TNWP
FAMILY MIMOSACEAE				
Acacia deanei subsp. paucijuga	Deans Wattle			x
A. buxifolia	Box-leaf Wattle	x		x
A. decora	Western Golden Wattle	x		x
A. doratoxylon	Currawang			x
A. gladiiformis	Sword-leaf Wattle			x
A. hakeoides	Western Black or Hakea Wattle			x
A. homalophylla	Yarran			x
A. lineata	Streaked Wattle	x		x
A. oswaldii	Miljee			x
A. pendula	Myall			x
A. spectabilis	Mudgee Wattle	x		x
A. stenophylla	River Cooba			x
FAMILY PITTOSPORACEAE				
Pittosporum phylliraeoides	Butterbush	x		x
FAMILY ROSACEAE				
Acaena anerinifolias	Bidgee-widgee	x		x
**Rosa rubiginosa*	Sweet Briar		X	X
FAMILY FABACEAE				
**Astragalus sesamues*	Purple milk vetch	x	X	X
Glycine clandestina	Twining glycine	x		X
Hardenburgia violacea	False sarsparilla			X
**Medicago arabica*	Spotted medic	x	X	X
**Medicago polymorpha*	Burr medic	x	X	X
Mirbalia pungens	Prickly pea-bush			X
**Trifolium arvense*	Harefoot clover	x	X	X
**T. Campestre*	Hop clover	x	X	X
FAMILY GERANIACEAE				
**Eridium botrys*	Long storksbill	X	X	X
**E. cicutariums*	Common crowfoot	X	X	X
**E. crinitum*	Blue crowfoot	X	X	X
Geranium retrosum	Common cranebill			X
G. solanderi	Australian cranebill			X
FAMILY EUPHORBIACEAE				
Beyeria opaca (not 100% sure)	Smooth wallaby-bush			X
Euphorbia australis	Hairy caustic weed			X
E. drummondii	Caustic weed	X		X
**E. terracina*	False caper			X
FAMILY ANACARDIACEAE				
**Schinus areira*	Peppercorn tree	X		X
FAMILY MALVACEAE				
Sida corrugata	Corrugated sida	X	X	X
S. cunninghamii	Ridge sida			X

SPECIES	COMMON NAME	Mine Site	PHTETL	TNWP
S. subspicata	Spiked sida			X
S. rhombifolia	Paddy's lucurne	X		X
FAMILY STRECULIACEAE				
Brachychiton populneus	Kurrajong	X	X	X
FAMILY VIOLACEAE				
Viola hederacea	Native violet	X	X	X
FAMILY THYMELAEACEAE				
Pimelea pauciflora	rice flower	X		X
FAMILY EPACRIDACEAE				
Melichrus urceolatus	Urn heath			X
FAMILY PRIMULACEAE				
**Anagallis arvensis*	Scarlet pimpernel	X	X	X
FAMILY APOCYNACEAE				
Parsonia eucalyptophylla	Gargaloo			X
FAMILY CONVOLVULACEAE				
Convolvulus erubescens	Australian bindiweed	X	X	X
FAMILY BORAGINACEAE				
**Echium plantagineum*	Pattersons curse	X	X	X
**Heliotropium amplexicaule*	Blue heliotrope	X	X	X
**Heliotropium europaeum*	Common heliotrope	X	X	X
**Verbena bonariensis*	Purple top	X	X	X
**Verbena tenuisecta*	Maynes Pest	X	X	X
**Lamium amplexicaule*	Dead-nettle	X	X	X
**Marrubium vulgare*	Horehound	X	X	X
**Stachys arvensis*	Stagger weed	X	X	X
**Salvia verbenaca*	Wild sage			
FAMILY SOLANACEAE				
**Datura spp. (incl D. stramonium)*	Datura / thornapple		X	
**Lycium ferocissimum*	African box thorn	X	X	X
**Solanum nigrum*	Blackberry Nightshade	X	X	X
Solanum ferocissimum	Spiny potato-bush	X		X
Solanum esuriale	Quena	X	X	X
FAMILY SCROPHULARIACEAE				
**Verbascum virgatum*	Twiggy mullen	X	X	X
FAMILY MARTYNIACEAE				
**Ibicella lutea*	Yellow-flowered devils claw		X	

SPECIES	COMMON NAME	Mine Site	PHTETL	TNWP
**Proboscidea louisianica*	Purple-flowered devils claw		X	
FAMILY MYOPORACEAE				
Eremophila mitchellii	Budda			X
Myoporum parvifolium	Creeping boobialla / winter apple	X		X
Myoporum montanum	Western boobialla			X
Myoporum platycarpum	Sugarwood			X
FAMILY PLANTAGINACEAE				
Plantago cunninghamii	Sago-weed	X	X	X
FAMILY RUBIACEAE				
Asperula conferta	Common woodruff			X
**Galium aparine*	Cleavers	X	X	X
FAMILY CUCURBITACEAE				
**Cucumis myriocarpus*	Paddy melon	X	X	X
*Citrullus lanatus	Camel melon	X	X	X
FAMILY CAMPANULACEAE				
Whalenbergia communis	Tufted bluebell	X	X	X
Whalenbergia fluminalis	River bluebell			X

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Appendix 6

Observed Fauna

(No. of pages including blank pages = 6)

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

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Yellow # 1 listed in the Schedules of the TSC or EPBC Acts
Yellow #2 Preliminary Determination as threatened in the TSC Act (as of May 2009)
Green – Regionally significant species (not additional legislative consequence but a species of conservation concern)
*Exotic species

Scientific Name	Common Name	Mine Site	PHTETL	TNWP
MAMMALS				
Tachyglossus aculeatus	Short-beaked Echidna			x
Sminthopsis crassicaudata	Fat-tailed Dunnart	x		
Phascolarctos cinereus	**# Koala**			**K**
Petaurus breviceps	· Sugar Glider			K
Trichosurus vulpecula	Common Brushtail Possum	x		x
Macropus giganteus	Eastern Grey Kangaroo	x	x	x
Macropus robustus	Common Wallaroo			x
Macropus rufogriseus	Red-necked Wallaby			x
Wallabia bicolor	Swamp Wallaby			x
Chalinolobus gouldii	Gould's Wattled Bat	x	L	L
Chalinolobus morio	· Chocolate Wattled Bat	x	L	L
Chalinolobus picatus	**# Little Pied Bat**	**x**	**L**	**L**
Miniopterus schreibersii	**# Common Bentwing-bat**	**x**	**L**	**L**
Mormopterus sp. 4	Southern Freetail-bat	x	L	L
Scotorepens greyii	Little Broad-nosed Bat	x	L	L
Austronomus australis	White-striped Freetail-bat	x	L	L
Vespadelus vulturnus	Little Forest Bat	x	L	L
Mus musculus	* House Mouse	x	x	x
Felis catus	* Feral Cat	x	x	x
Vulpes vulpes	* Fox	x	x	x
Canis familiaris	* Dog			x
Oryctolagus cuniculus	* Rabbit	x	x	x
Lepus capensis	* Brown Hare	x	x	x
Sus scrofa	* Pig		x	
Capra hircus	* Goat		x	
BIRDS				
Coturnix pectoralis	Stubble Quail	x	x	
Phalacrocorax melanoleucos	Little Pied Cormorant	x		
Tachybaptus novaehollandiae	Australasian Grebe	x		
Anas superciliosa	Pacific Black Duck	x		
Chenonetta jubata	Australian Wood Duck	x		
Egretta novaehollandiae	White-faced Heron	x		
Vanellus miles	Masked Lapwing	x	x	
Elanus axillaris	Black-shouldered Kite			x
Milvus migrans	Black Kite	x		x
Haliastur sphenurus	Whistling Kite	x		x
Aquila audax	Wedge-tailed Eagle		x	
Accipiter fasciatus	Brown Goshawk	x		x
Accipiter cirrhocephalus	Collared Sparrowhawk	x		x
Hieraaetus morphnoides	Little Eagle			x
Circus assimilis	Spotted Harrier			x
Falco longipennis	Australian Hobby			x
Falco cenchroides	Nankeen Kestrel	x	x	x
Geopelia striata	Peaceful Dove	x		x
Phaps chalcoptera	Common Bronzewing			x
Ocyphaps lophotes	Crested Pigeon	x	x	x
Eolophus roseicapilla	Galah	x	x	x
Cacatua sanguinea	Little Corella			x
Cacatua galerita	Sulphur-crested Cockatoo			x
Alisterus scapularis	Australian King Parrot			x
Aprosmictus erythropterus	Red-winged Parrot			x

Scientific Name	Common Name	Mine Site	PHTETL	TNWP
Polytelis swainsonii	**U # Superb Parrot**	**x**		
Nymphicus hollandicus	Cockatiel	x	x	x
Platycercus eximius	Eastern Rosella			x
Barnardius zonarius	Australian Ringneck			x
Psephotus haematonotus	Red-rumped Parrot	x	x	x
Northiella haematogaster	Blue Bonnet			x
Cuculus pallidus	Pallid Cuckoo			x
Ninox novaeseelandiae	Southern Boobook	x		x
Tyto alba	Barn Owl			x
Podargus papuensis	Tawny Frogmouth			x
Aegotheles cristatus	Australian Owlet-nightjar			x
Dacelo novaeguineae	Laughing Kookaburra	x	x	x
Todiramphus sancta	Sacred Kingfisher			x
Merops ornatus	**O Rainbow Bee-eater**			**x**
Eurystomus orientalis	Dollarbird			x
Cormobates leucophaeus	· White-throated Treecreeper	x		x
Malurus cyaneus	Superb Fairy-wren			x
Pardalotus punctatus	Spotted Pardalote			x
Pardalotus striatus	Striated Pardalote	x		x
Smicrornis brevirostris	Weebill	x		x
Gerygone fusca	· Western Gerygone			x
Acanthiza pusilla	Brown Thornbill	x		x
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	x		x
Acanthiza nana	Yellow Thornbill	x		x
Plectorhyncha lanceolata	Striped Honeyeater			x
Philemon corniculatus	· Noisy Friarbird			x
Philemon citreogularis	Little Friarbird	x		
Entomyzon cyanotis	Blue-faced Honeyeater			x
Manorina melanocephala	Noisy Miner	x	x	x
Lichenostomus penicillatus	White-plumed Honeyeater	x		x
Lichmera indistincta	Brown Honeyeater			x
Phylidonyris nigra	White-cheeked Honeyeater			x
Pomatostomus temporalis	**# Grey-crowned Babbler**	**x**		**x**
Microeca fascinans	· Jacky Winter			x
Falcunculus frontatus	· Crested Shrike-tit			x
Rhipidura fuliginosa	Grey Fantail			x
Rhipidura leucophrys	Willie Wagtail	x	x	x
Colluricincla harmonica	Grey Shrike-thrush	x		x
Pachycephala rufiventris	· Rufous Whistler			x
Myiagra inquieta	· Restless Flycatcher			x
Grallina cyanoleuca	Magpie-lark	x	x	x
Coracina novaehollandiae	Black-faced Cuckoo-shrike	x	x	x
Artamus superciliosus	· White-browed Woodswallow			x
Gymnorhina tibicen	Australian Magpie	x	x	x
Strepera graculina	Pied Currawong	x		x
Corvus coronoides	Australian Raven	x	x	x
Corvus mellori	Little Raven	x	x	x
Hirundo neoxena	Welcome Swallow	x	x	x
Hirundo ariel	Fairy Martin	x	x	x
Corcorax melanorhamphos	White-winged Chough	x		x
Struthidea cinerea	Apostlebird	x		x
Anthus novaeseelandiae	Richard's Pipit	x	x	x
Cinclorhamphus cruralis	Brown Songlark			x
Taeniopygia bichenovii	Double-barred Finch	x		x
Taeniopygia guttata	Zebra Finch			x
Neochmia temporalis	Red-browed Finch			x
Dicaeum hirundinaceum	Mistletoebird	x		x
Zosterops lateralis	Silvereye			x

Scientific Name	Common Name	Mine Site	PHTETL	TNWP
Passer domesticus	* House Sparrow	x	x	x
Turdus merula	* Common Blackbird	x	x	x
Sturnus vulgaris	* Common Starling	x	x	x
REPTILES				
Chelodina longicollis	Eastern Snake-necked Turtle	x		
Underwoodisaurus milii	Thick-tailed Gecko			x
Carlia tetradactyla	Southern Rainbow Skink			x
Pygopus lepidopodus	Common Scaly-foot	x		x
Pogona barbata	Bearded Dragon	x		x
Cryptoblepharus virgatus	Wall Skink	x	x	x
Varanus varius	Lace Monitor	x	x	x
Morethia boulengeri	"No Common Name"	x	x	x
Ctenotus robustus	Striped Skink	x		x
Lerista bouganvilli	South-eastern Slider	x		x
Tiliqua scincoides	Eastern Blue-tongued			x
Trachydosaurus rugosus	Shingle-back	x		x
Ramphotyphlops bituberculatus	Blind or Worm Snake			x
Demansia psammophis	Yellow-faced Whip Snake			x
Pseudechis guttatus	Blue-bellied Black Snake	x		x
Pseudechis porphyriacus	· Red-bellied Black Snake	x		x
Pseudonaja textilis	Eastern Brown Snake	x	x	x
AMPHIBIANS				
Crinia parinsignifera	· Eastern Froglet			x
Crinia signifera	Common Eastern Froglet	x		
Limnodynastes interioris	Giant Banjo Frog	x		x
Limnodynastes peroni	Striped Marsh Frog	x		x
Litoria caerulea	· Green Tree Frog	x		
Litoria peronii	Peron's Tree Frog	x		

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Appendix 7

OEH / DSEWPaC Predicted Threatened Species

(No. of pages including blank pages = 56)

Note: this Appendix is only available on the Project CD

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Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
Austrostipa wakoolica	A Spear-grass	Plant> grass	Endangered TSC & EPBC Acts	Predicted	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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Ambassis agassizii - endangered population	Olive Perchlet population in Western NSW	Animal > Endangered Populations	Endangered Population	Predicted	**Distribution.** Olive perchlets are a small native fish that occur in both eastern (coastal) and western (Murray-Darling) drainages, but these populations may be genetically distinct. The western population of the olive perchlet was once widespread throughout the Murray-Darling system of South Australia, Victoria, western New South Wales and southern Queensland. This population has suffered a serious decline and is now found only at a few sites in the Darling River drainage. The species is extinct in Victoria and has not been found in South Australia since 1983. **Habitat and ecology**. Olive perchlets inhabit rivers, creeks, ponds and swamps. They are usually found in slow-flowing or still waters, often near overhanging vegetation or amongst logs, dead branches and boulders. They often congregate around suitable shelter (e.g. snags and vegetation) during the day but disperse during the night to	Low, this species will not be affected by the proposed works.	No Low, this species will not be affected by the proposed works.	Low, this species will not be affected by the proposed works.	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					feed on micro-crustaceans and insects, including larvae. Males and females reach sexual maturity in one year. Spawning occurs in November and December, when water temperatures reach about 23°C. Females release adhesive eggs about 0.7mm in diameter amongst aquatic vegetation.				
Anseranas semipalmata	Magpie Goose	Animal > Birds	Vulnerable	Not predicted but know to occur near Backwater Cowl in Narromine and occasionally in Dubbo (Wildlife Atlas Records).	**Distribution.** Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. **Habitat and ecology**. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level; most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW (DEC threatened species website 2005). Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation	Low, this species will not be affected by the proposed works.	No	No	No
Antechinomys laniger	Kultarr	Animal > Marsupials	Endangered	Predicted	**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. **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	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					environmental stresses, including declines following periods of drought and intensive flooding. (DEC threatened species web page 2005).	Proposal	Proposal		
Anthochaera phrygia	Regent Honeyeater	Animal > Birds	Critically Endangered Endangered Migratory Terrestrial Species	Predicted	The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast. In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. The Regent Honeyeater is a generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Also utilises : E. microcarpa, E. punctata, E. polyanthemos, E. mollucana, Corymbia robusta, E. crebra, E. caleyi, Corymbia maculata, E.mckieana, E. macrorhyncha, E. laevopinea, and Angophora floribunda. Nectar and fruit from the mistletoes A. miquelii, A. pendula, A. cambagei are also eaten during the breeding season. When nectar is scarce lerp and honeydew comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. A shrubby understorey is an important source of insects and nesting material. Colour-banding of Regent Honeyeater has shown that the	Has potential to occur (Grey Box is secondary habitat – favours Box-gum Woodland) but was not recorded. This species will not be affected by the Proposal.	Has potential to occur (Grey Box is secondary habitat – favours Box-gum Woodland) but was not recorded. This species will not be affected by the Proposal.	Has potential to occur (Grey Box is secondary habitat – favours Box-gum Woodland) but was not recorded. This species will not be affected by the Proposal.	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					species can undertake large-scale nomadic movements in the order of hundreds of kilometres. However, the exact nature of these movements is still poorly understood. It is likely that movements are dependent on spatial and temporal flowering and other resource patterns. To successfully manage the recovery of this species a full understanding of the habitats used in the non-breeding season is critical. There are three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria. An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. Two or three eggs are laid and incubated by the female for 14 days. Nestlings are brooded and fed by both parents at an average rate of 23 times per hour and fledge after 16 days. Fledglings fed by both parents 29 times per hour.				
Ardea alba	Great Egret	Animal > Birds	Migratory Species	Predicted	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.	This species was not recorded. This species will not be affected by the Proposal.	This species was not recorded. This species will not be affected by the Proposal.	This species was not recorded. This species will not be affected by the Proposal.	No
Ardea ibis	Cattle Egret	Animal > Birds	Migratory Species	Predicted	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	This species was not recorded. This species will not be affected by the Proposal..	This species was not recorded. This species will not be affected by the Proposal..	This species was not recorded. This species will not be affected by the Proposal..	No

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					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 .				
Apus pacificus	Fork-tailed swift	Animal > Birds	Migratory Species	Predicted	In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. They forage aerially, up to hundreds of meters above ground, but also less than 1 m above open areas or over water. They often occur in areas of updraughts, especially around cliffs. They are said to search along edges of low-pressure systems, which assist flight. Low-flying Swifts are said to be precursors of unsettled weather, possibly because insect prey fly at a lower altitude when the air is humid and when the air density is low. They sometimes feed aerially among tree-tops in open forest. They probably roost aerially, but are occasionally observed to land. They were once recorded roosting in trees, using a bare exposed branch emergent above the foliage. Sometimes they loaf in the air, by allowing strong winds to support them). There have been rare records of loafing elsewhere including Swifts briefly resting on ground and alighting on wire netting of a tennis court. Once, one was seen attempting to land on the wall of a lighthouse.	Has potential to occur but was not recorded. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. This species will not be affected by the Proposal.	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
Ardeotis australis	Australian Bustard	Animal > Birds	Endangered	Known	**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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal	No
Artesian Springs Ecological Community	Artesian Springs Ecological Community	Community > Threatened Ecological Communities	Endangered Ecological Community	Predicted	**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).	Low, this EEC does not occur in the Project Site.	Low, this EEC does not occur in the Project Site.	No Low, this EEC does not occur in the Project Site.	No
Bidyanus bidyanus	Silver perch	Animal > Fish	Vulnerable	Known	**Distribution.** Silver perch are a moderate to large freshwater fish native to the Murray-Darling river system. Silver perch are oval shaped with a small head that can	Low, this species will not be affected by	No	No	No

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					become beak-like in larger fish. The colour can be grey, greenish, gold or silvery, darker on the back and paler on the sides, with a white belly. Juveniles may be mottled with vertical dark bars. Silver perch usually reach 30-40 cm and 0.5-1.5 kg, but have been recorded up to 8 kg. Silver perch were once widespread and abundant throughout most of the Murray-Darling river system. They have now declined to low numbers or disappeared from most of their former range. Silver perch are now successfully bred for aquaculture, conservation and to enhance recreational fishing, and large numbers have been stocked into impoundments and smaller numbers into rivers in the Murray-Darling Basin. However, in most cases stocking of silver perch has not managed to establish reproducing populations, and they are still considered under threat in the wild. The most abundant remaining natural population occurs in the central Murray River downstream of Yarrawonga Weir as well as several of its anabranches and tributaries (including the Edward River, an anabranch of the Murray which flows through Deniliquin and the Murrumbidgee River). The central Murray population is considered secure and self-sustaining. There have also been reports of self-sustaining populations in other rivers, including the MacIntyre and Macquarie rivers in northern NSW and the Warrego River in Queensland, mostly from recreational anglers. Little is currently known about the status of these populations. **Habitat and ecology.** Silver perch seem to prefer fast-flowing, open waters, especially where there are rapids and races, however they will also inhabit warm, sluggish water with cover provided by large woody debris and reeds. They are omnivorous, feeding on small aquatic insects, molluscs, earthworms and green algae. Males reach sexual maturity at three years of age, when around 25 cm in length, and	the proposed works.			

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					females at five years, when around 29 cm. Adults migrate upstream in spring and summer to spawn. Juveniles also sometimes move upstream in response to rising water temperatures and levels. Females can shed 300,000 or more semi-buoyant eggs of about 2.75 mm in diameter. The eggs develop in a few days to become feeding larvae that drift downstream.				
Botaurus poiciloptilus	Australasian Bittern	Animal > Birds	Vulnerable	Known	**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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	Brigalow Community	Community > Threatened Ecological Communities	Endangered Ecological Community	Known	**Distribution.** Scattered remnants on the North West Slopes and Plains and Darling River Plains in NSW and also in Queensland. Usually occurs on heavy clay soils. **Habitat and ecology.** This community has been extensively cleared for agriculture, with most surviving remnants along roadsides and paddock edges. It provides important habitat for rare native wildlife such as the Black-striped Wallaby.	Low, this EEC was not recorded in the Project Site.	Low, this EEC was not recorded in the Project Site.	Low, this EEC was not recorded in the Project Site.	No
Burhinus grallarius	Bush Stone-curlew	Animal > Birds	Endangered	Known	**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	Has potential to occur but was not recorded.	Has potential to occur but was not recorded.	Has potential to occur but was not recorded.	No

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					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.	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	
Cacatua leadbeateri	Pink Cockatoo	Animal > Birds	Vulnerable	Known	**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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Calyptorhynchus banksii	Red-tailed Black-Cockatoo	Animal > Birds	Vulnerable	Known	**Distribution.** 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-	Has potential to occur but was not recorded. The	Has potential to occur but was not recorded. The	Has potential to occur but was not recorded. The	No

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					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.	assessment included targeted inspection for this species. This species will not be affected by the Proposal.	assessment included targeted inspection for this species. This species will not be affected by the Proposal.	assessment included targeted inspection for this species. This species will not be affected by the Proposal.	
Calyptorhynchus lathami	Glossy Black-cockatoo	Animal > Birds	Vulnerable	Known	**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, inhabits 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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Cercartetus nanus	Eastern Pygmy-possum	Animal > Marsupials	Vulnerable	Lower Slopes	Predicted	Has potential to occur but was not recorded. The assessment	Has potential to occur but was not recorded. The assessment	Has potential to occur but was not recorded. The assessment	No

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						included targeted inspection for this species. This species will not be affected by the Proposal.	included targeted inspection for this species. This species will not be affected by the Proposal.	included targeted inspection for this species. This species will not be affected by the Proposal.	
Certhionyx variegatus	Pied Honeyeater	Animal > Birds	Vulnerable	Known	**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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Chalinolobus picatus	Little Pied Bat	Animal > Bats	Vulnerable	Known	**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, rock outcrops, mine shafts, tunnels, tree hollows and	Recorded in Mine Site	Likely to occur	Likely to occur	**Yes – 7part test required.**

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					buildings. Can tolerate high temperatures and dryness but need access to nearby open water. Feeds on moths and possibly other flying invertebrates.				
Chalinolobus dwyeri	Large-eared Pied Bat	Animal > Bats	Vulnerable	Lower Slopes	**Distribution** Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes. **Habitat and ecology** •Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Hirundo ariel), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves. They remain loyal to the same cave over many years. •Found in well-timbered areas containing gullies. •The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. •Likely to hibernate through the coolest months. •It is uncertain whether mating occurs early in winter or in spring.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Cheilanthes sieberi subsp. pseudovellea	*Cheilanthes sieberi* subsp. *pseudovellea*	Plant > Ferns and Cycads	Endangered	Known	**Distribution.** Only one NSW specimen is recorded, from Mount Foster NW of Warren, collected in 1952. In other states the taxon has been recorded from Mount Olga, and the Kimberley, MacDonnell and Musgrave Ranges. **Habitat and ecology**. This fern grows in soil pockets in rocky areas of arid mountain ranges. Specific habitats include shaded rock crevices, under rock ledges and	Has potential to occur but was not recorded. The assessment included	Has potential to occur but was not recorded. The assessment included	Has potential to occur but was not recorded. The assessment included	No

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					between boulders in damp, shallow soils. Spores of this taxon germinated 12 days after sowing and grew into small, 1-2 mm wide gametophytes that bore no antheridia or archegonia. A small swelling developed on the underside of the prothallus about 8 weeks after sowing and developed into the first leaf of the young sporophyte. The fern is usually common where it grows.	targeted inspection for this species. This species will not be affected by the Proposal.	targeted inspection for this species. This species will not be affected by the Proposal.	targeted inspection for this species. This species will not be affected by the Proposal.	
Circus assimilis	Spotted Harrier	Animal > Birds	Vulnerable T SC Act	Predicted	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, inner wing 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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Recorded during the assessment but determined as unaffected by the activity.	No
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Animal > Birds	Vulnerable	Known	**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	Has potential to occur but was not recorded.	Has potential to occur but was not recorded.	Has potential to occur but was not recorded.	No

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					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. 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	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	

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					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.				
Crinia sloanei	Sloane's Froglet	Animal > Frog	Vulnerable T SC Act	Predicted	It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species.	No

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						This species will not be affected by the Proposal.	This species will not be affected by the Proposal.	This species will not be affected by the Proposal.	
Coolibah-Black Box woodland of the northern riverine plains in the Darling Riverine Plains and Brigalow Belt South bioregions	Coolibah-Black Box woodland of the northern riverine plains in the Darling Riverine Plains and Brigalow Belt South bioregions	Community > Threatened Ecological Communities	Endangered Ecological Community	Known	**Distribution.** Northern riverine plains in the Darling Riverine Plains and Brigalow Belt South bioregions	This EEC was not recorded in the Project Site thus would not be affected by the proposed works.	This EEC was not recorded in the Project Site thus would not be affected by the proposed works.	This EEC was not recorded in the Project Site thus would not be affected by the proposed works.	No
Dasyurus maculatus	Spotted-tailed Quoll	Animal > Marsupials	Vulnerable <u>Endangered</u>	Known	**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	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

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					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.				
Dichanthium setosum	Bluegrass	Plant > Herbs and Forbs	Vulnerable	Known (from NSW Wildlife Atlas Record)	**Distribution.** Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, as well as in Queensland and Western Australia. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas. **Habitat and ecology**. Associated with heavy basaltic black soils. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched). It is open to question whether the species tolerates or is promoted by a certain amount of disturbance, or whether this is indicative of the threatening processes behind its depleted habitat. Associated species include *Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra* aff. *longifolia, Ajuga australis, Calotis hispidula* and *Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia* and *Psoralea* species. Locally	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

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					common or found as scattered clumps in populations. Flowering time is mostly in summer.				
Diuris tricolor	Pine Donkey Orchid	Plant > Orchids	Vulnerable	Known	**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.	Has potential to occur but was not recorded. The assessment was undertaken outside of the flowering period however an informal spot check was undertaken in September during a period of high rain fall to see if it was present. . This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment did not include targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment was undertaken outside of the flowering period however an informal spot check was undertaken in September during a period of high rain fall to see if it was present. . This species will not be affected by the Proposal.	No
Ephippiorhynchus asiaticus	Black-necked Stork	Animal > Birds	Endangered	Known	**Distribution.** The species is widespread across coastal northern and eastern Australia, becoming increasingly uncommon further south into NSW, and rarely south of Sydney. Some birds may move long distances and can be recorded well outside their normal range. **Habitat and ecology**. Inhabits permanent freshwater wetlands including margins of billabongs, swamps, shallow	Has potential to occur but was not recorded. The assessment included	Has potential to occur but was not recorded. The assessment included	Has potential to occur but was not recorded. The assessment included	No

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					floodwaters, and adjacent grasslands and savannah woodlands; can also be found occasionally on inter-tidal shorelines, mangrove margins and estuaries. Feeds in shallow, still water on a variety of prey including fish, frogs, eels, turtles, crabs and snakes. Breeds in late summer in the north, and early summer further south. A large nest, up to 2 m in diameter, is made in a live or dead tree, in or near a freshwater swamp. Two to four eggs are laid; incubation is by both parents.	targeted inspection for this species. This species will not be affected by the Proposal.	targeted inspection for this species. This species will not be affected by the Proposal.	targeted inspection for this species. This species will not be affected by the Proposal.	
Falco hypoleucos	Grey Falcon	Animal > Birds	Vulnerable	Known	**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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Fuzzy Box on alluvials of South West Slopes, Darling Riverine Plains & the Brigalow Belt South	Fuzzy Box on alluvials of South West Slopes, Darling Riverine Plains & the Brigalow Belt South	Community > Threatened Ecological Communities	Endangered Ecological Community	Predicted	**Distribution.** Alluvial soils of the South West Slopes, Brigalow Belt South and Darling Riverine Plains Bioregions. Mainly in the Dubbo-Narromine-Parkes-Forbes area. **Habitat and ecology.** Community occurs on brown loam or clay, alluvial or colluvial soils on prior streams and abandoned channels or slight depressions on undulating plains or flats of the western slopes. Community often occurs upslope from River Red Gum communities above frequently inundated areas of the floodplain. It also occurs on colluvium soils on lower slopes and valley flats. Less	Yes – recorded in the study area and will be affected.	No – not recorded in the ETL study area.	Yes – recorded in the study area and will be affected.	**Yes – 7part test required.**

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					than 5% of the original extent is estimated to remain. Shrubs include Wilga, Deane's Wattle, Hop Bush, Cassia, Water Bush and Sifton Bush.				
Gallinago hardwickii	Latham's Snipe	Animals> Birds	Migratory Species EPBC Act	Predicted	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. 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	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

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					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				
Grantiella picta	Painted Honeyeater	Animal > Birds	Vulnerable	Known	**Distribution.** The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs 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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Grus rubicunda	Brolga	Animal > Birds	Vulnerable	Known	**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	Has potential to occur but was not recorded. The assessment	Has potential to occur but was not recorded. The assessment	Has potential to occur but was not recorded. The assessment	No

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					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).	included targeted inspection for this species. This species will not be affected by the Proposal.	included targeted inspection for this species. This species will not be affected by the Proposal.	included targeted inspection for this species. This species will not be affected by the Proposal.	
Haliaeetus leucogaster	White-bellied Sea-eagle	Animal > Birds	Migratory Species	Predicted	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, 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 1400 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, 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. 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	Unlikely to and was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Unlikely to and was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Unlikely to and was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					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 1999. The White-bellied Sea-Eagle is not known to associate with any other listed threatened species.				
Hamirostra melanosternon	Black-breasted Buzzard	Animal > Birds	Vulnerable	Known	**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).	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Hieraaetus morphnoides	Little Eagle	Animal > Birds	Vulnerable TSC Act	Predicted	Occupies open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian	Has potential to occur but was	Has potential to occur but was	Has potential to occur but was	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					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.	not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	
Hirundapus caudacutus	White-throated Needletail	Animal > Birds	Migratory Species	Predicted	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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Hoplocephalus bitorquatus	Pale-headed Snake	Animal > Reptiles	Vulnerable	Predicted	**Distribution.** A patchy distribution from north-east Queensland to north-east NSW. In NSW it occurs from the	Has potential to occur but was	Has potential to occur but was	Has potential to occur but was	No

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					coast to the western side of the Great Divide as far south as Tuggerah. **Habitat and ecology.** Found mainly in dry eucalypt forests and woodlands, cypress woodland and occasionally in rainforest or moist eucalypt forest. Favours streamside areas, particularly in drier habitats. Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees. The main prey is tree frogs although lizards and small mammals are also taken.	not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	
Inland grey box woodland EEC in the SW Slopes, Brigalow Belt South, Cobar Peneplain, and Riverina Bioregions – Gazetted April 2007.	Inland Grey Box Woodland	Community > Threatened Ecological Communities	Endangered Ecological Community Endangered Ecological Community	Known	**Habitat and ecology** •Inland Grey Box Woodland occurs on fertile soils of the western slopes and plains of NSW. The community generally occurs where average rainfall is 375- 800 mm pa and the mean maximum annual temperature is 22- 26°C. •There is a correlation between the distribution of Eucalyptus microcarpa communities and soils of Tertiary and Quaternary alluvial origin, largely corresponding with the Red Brown Earths. •The majority of remnant patches of Inland Grey Box Woodland survive with trees largely intact but with the shrub or ground layers degraded to varying degrees through grazing or pasture modification. Some species that are part of the community appear intolerant to heavy grazing by domestic stock and are confined to the least disturbed remnants.	Yes- Recorded in the Study Area and will be affected by the activity.	Yes- Recorded in the Study Area and will be affected by the activity.	Yes- Recorded in the Study Area and will be affected by the activity.	**Yes 7-part test has been provided.** **Yes an assessment of significance has been provided.**
Lathamus discolor	Swift Parrot	Animal > Birds	Endangered Endangered	Predicted	**Habitat and ecology** •Migrates to the Australian south-east mainland between March and October. •On the mainland they occur in areas where eucalypts are	Has potential to occur but was not recorded. The	Has potential to occur but was not recorded. The	Has potential to occur but was not recorded. The	No

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					flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. •Favoured feed trees include winter flowering species such as Swamp Mahogany Eucalyptus robusta, Spotted Gum Corymbia maculata, Red Bloodwood C. gummifera, Mugga Ironbark E. sideroxylon, and White Box E. albens. •Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey Box E. moluccana and Blackbutt E. pilularis. •Return to some foraging sites on a cyclic basis depending on food availability. •Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum Eucalyptus globulus.	assessment included targeted inspection for this species. This species will not be affected by the Proposal.	assessment included targeted inspection for this species. This species will not be affected by the Proposal.	assessment included targeted inspection for this species. This species will not be affected by the Proposal.	
Leipoa ocellata	Malleefowl	Animal > Birds	Endangered	Predicted	**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	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

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					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. (DEC threatened species web page 2005)				
Limosa limosa	Black-tailed Godwit	Animal > Birds	Vulnerable	Known	**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	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

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					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.				
Lophoictinia isura	Square-tailed Kite	Animal > Birds	Vulnerable	Known	**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 100km2. Breeding is from July to February, with nest sites generally located along or near water-courses, in a fork or on large horizontal limbs.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Maccullochella macquariensis	Trout Cod	Animal > Fish	Vulnerable Vulnerable	Predicted	**Distribution** The species is endemic to Australia, occurring in scattered localities within the Murray-Darling system. Some fish have been translocated to coastal New South Wales.	The Project Site does not possess habitat for this species.	The Project Site does not possess habitat for this species.	The Project Site does not possess habitat for this species.	No

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					Habitat It is usually found in rapidly flowing freshwater streams, often near snags or over rocky or gravel substrates. Larger fishes are found in deeper water. **Behaviour and adaptations** Feeding and Diet Adult and juvenile fish eat other fishes, crustaceans, aquatic insects and molluscs. Larvae feed on zooplankton.	This species would not be affected by the Proposal.	This species would not be affected by the Proposal.	This species would not be affected by the Proposal.	
Maccullochella pelii peelii	Murray Cod	Animal > Fish	Vulnerable <u>Vulnerable</u>	Predicted	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.	The Project Site does not possess habitat for this species. This species would not be affected by the Proposal.	The Project Site does not possess habitat for this species. This species would not be affected by the Proposal.	The Project Site does not possess habitat for this species. This species would not be affected by the Proposal.	No
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Animal > Birds	Vulnerable	Known	**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	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					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 (DEC threatened species web page 2005)				
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Animal > Birds	Vulnerable	Known	**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 hectares. Moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

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					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.				
Merops ornatus	Rainbow Bee-eater	Animal > Birds	Migratory Species	Predicted	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 1999*.	The assessment included targeted inspection for this species as well as tunnels in steep sided embankments used for breeding. It was not recorded in the area. This species will not be affected by the Proposal.	The assessment included targeted inspection for this species as well as tunnels in steep sided embankments used for breeding. It was not recorded in the area. This species will not be affected by the Proposal.	The assessment included targeted inspection for this species as well as tunnels in steep sided embankments used for breeding. It was recorded in the area feeding in Mugga Ironbark that would remain unaffected. . This species will not be affected by the Proposal.	**No.**
Myall Woodland in the Darling Riverine Plains, Brigalow Belt	Myall Woodland in the Darling Riverine	Community > Threatened Ecological Communities	Endangered Ecological Community	Known	**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,	No, not recorded in the Study Area	Yes, recorded in the Study Area and will be affected by the	No, not recorded in the Study Area.	**Yes – a 7-part test has been provided.**

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South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions	Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions		Endangered Ecological Community		Leeton, Lockhart, Moree Plains, Murray, Murrumbidgee, Narrabri, Narranderra, Narromine, Parkes, Urana, Wagga Wagga and Warren, and but may occur elsewhere in these bioregions.		activity.		**Yes – an assessment of significance has been provided.**
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Community > Threatened Ecological Communities	Critically Endangered Ecological Community	Predicted	**Description** The Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales (NSW) and southern Queensland are native grasslands typically composed of perennial native grasses. They are found on soils that are fine textured (often cracking clays) derived from either basalt or alluvium on flat to low slopes (< 1 degree). A tree canopy is usually absent, but when present, comprises ≤10% projective foliage cover. **Distribution and Habitat** This ecological community occurs from the Darling Downs in Queensland to Dubbo in NSW and incorporates the Liverpool and Moree Plains. This ecological community occurs within the Brigalow Belt South Bioregion and Border Rivers-Gwydir, Central West, Namoi, Condamine, Burnett Mary and Fitzroy Basin Natural Resource Management Regions.	No, not recorded in the Study Area	No, not recorded in the Study Area	No, not recorded in the Study Area	No
Neophema pulchella	Turquoise Parrot	Animal > Birds	Vulnerable	Known	**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	Has potential to occur but was not recorded.	Has potential to occur but was not recorded.	Has potential to occur but was not recorded.	No

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					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.	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	
Nettapus coromandelianus	Cotton Pygmy-goose	Animal > Birds	Endangered	Known	**Distribution.** Although once found from north Queensland to the Hunter River in NSW, the Cotton Pygmy-goose is now only a rare visitor to NSW. Uncommon in Queensland. **Habitat and ecology.** Freshwater lakes, lagoons, swamps and dams, particularly those vegetated with waterlilies and other floating and submerged aquatic vegetation. The Cotton Pygmy-goose uses standing dead trees with hollows close to water for roosting and breeding.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Ninox connivens	Barking Owl	Animal > Birds	Vulnerable	Known	**Distribution.** The barking owl is distributed sparsely throughout temperate and semi-arid areas of mainland Australia, however is most abundant in the tropical north	Has potential to occur but was not recorded.	Has potential to occur but was not recorded.	Has potential to occur but was not recorded.	No

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					(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.	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	
Notopala sublineata	River snail	Animal > Aquatic Invertebrates	Endangered	Known	**Distribution.** Until 2004 no live specimens of the river snail had been found in NSW for over 30 years. Although now virtually extinct throughout its natural range, some populations have been recorded as surviving in artificial habitats (irrigation pipelines) in the Murray and Darling systems. Live specimens were discovered in late 2004 from irrigation pipelines near Mildura. **Habitat and ecology.** The river snail once occurred in flowing rivers throughout the Murray-Darling system, where it was found along the banks attached to logs and rocks or crawling in the mud. Like other species in the family Viviparidae, the females brood their young to a crawl-away stage, rather than having drifting or swimming larvae. As a result they have limited dispersal abilities. As a filter feeder the river snail feeds on bacteria suspended in the water and also grazes on the bacterial biofilms that occur on hard surfaces in free flowing waters	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Nyctophilus timoriensis	Greater Long-eared Bat (south eastern form)	Animal > Bats	Vulnerable <u>Vulnerable</u>	Predicted	**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.	Has potential to occur but was not recorded. The	Has potential to occur but was not recorded. The	Has potential to occur but was not recorded. The	No

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					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.	assessment included targeted inspection for this species. This species will not be affected by the Proposal.	assessment included targeted inspection for this species. This species will not be affected by the Proposal.	assessment included targeted inspection for this species. This species will not be affected by the Proposal.	
Oxyura australis	Blue-billed Duck	Animal > Birds	Vulnerable	Known	**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	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

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					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).				
Pachycephala inornata	Gilbert's Whistler	Animal > Birds	Vulnerable	Predicted	**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 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	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

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					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	Animal > Marsupials	Vulnerable	Predicted	**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. in family groups of a single adult male one or more adult les 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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Petroica boodang	Scarlet Robin	Animal > Birds	Vulnerable	Predicted	**Distribution** The Scarlet Robin is found from SE Queensland to SE South Australia and also in Tasmania and SW Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the	Has potential to occur but was not recorded. The assessment included	Has potential to occur but was not recorded. The assessment included	Has potential to occur but was not recorded. The assessment included	No

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					inland plains in autumn and winter. **Habitat and ecology** •The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. •This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. •Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. •The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. •The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. •In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. •The Scarlet Robin is a quiet and unobtrusive species which is often quite tame and easily approached. •Birds forage from low perches, fence-posts or on the ground, from where they pounce on small insects and other invertebrates which are taken from the ground, or off tree trunks and logs; they sometimes forage in the shrub or canopy layer. •Scarlet Robin pairs defend a breeding territory and mainly breed between the months of July and January; they may raise two or three broods in each season. •This species' nest is an open cup made of plant fibres and cobwebs and is built in the fork of tree usually more than 2 metres above the ground; nests are often found in a dead branch in a live tree, or in a dead tree or shrub.	targeted inspection for this species. This species will not be affected by the Proposal.	targeted inspection for this species. This species will not be affected by the Proposal.	targeted inspection for this species. This species will not be affected by the Proposal.	

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					•Eggs are pale greenish-, bluish- or brownish-white, spotted with brown; clutch size ranges from one to four. •Birds usually occur singly or in pairs, occasionally in small family parties; pairs stay together year-round. •In autumn and winter, the Scarlet Robin joins mixed flocks of other small insectivorous birds which forage through dry forests and woodlands.				
Petroica phoenicea	Flame Robin	Animal > Birds	Vulnerable T SC Act	Predicted	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. 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	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

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					and marked with brownish blotches; clutch size is three or four eggs.				
Phascolarctos cinereus	Koala	Animal > Marsupials	Vulnerable	Known	**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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to be recorded in the Study Area (River Red Gum and Bimble Box trees).	**Yes 7-part test provided.**
Philotheca ericifolia	Philotheca ericifolia	Plant > Shrubs	Not listed	Predicted	**Distribution** Known only from the upper Hunter Valley and Pilliga to Peak Hill districts of NSW. The records are scattered over a range of over 400 km between West Wyalong and the Pilliga Scrub. Site localities include Pilliga East State Forest, Goonoo State Forest, Hervey Range, Wingen Maid Nature Reserve, Toongi, Denman, Rylestone district and Kandos Weir. **Habitat and ecology**	Has potential to occur but was not recorded. The assessment included targeted inspection for this species.	Has potential to occur (Wildlife Atlas record near ETL north of Peak Hil)l but was not recorded. The assessment	Has potential to occur but was not recorded. The assessment included targeted inspection for this species.	No

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					•Grows chiefly in dry sclerophyll forest and heath on damp sandy flats and gullies. It has been collected from a variety of habitats including heath, open woodland, dry sandy creek beds, and rocky ridge and cliff tops. •Associated species include Melaleuca uncinata, Eucalyptus crebra, E. rossii, E. punctata, Corymbia trachyphloia, Acacia triptera, A. burrowii, Beyeria viscosa, Philotheca australis, Leucopogon muticus and Calytrix tetragona. •Flowering time is in the spring. Fruits are produced from November to December. •Noted as being a "moisture-loving plant", with plants common on the sides of a particular spur of the Hervey Ranges where soakage from the high background provides sufficient moisture for the plants. •Also recorded growing in a recently burnt site (wildfire) and within a regeneration zone resulting from clearing. •Populations comprise from 3-12 adult plants to approx. 200 plants (mostly seedlings in one population). Also described as uncommon, scattered, common, locally occasional and locally frequent. Populations in Pilliga State Forest consist of hundreds or thousands of individuals. A very large population occurs in Lincoln State Forest near Gilgandra.	This species will not be affected by the Proposal.	included targeted inspection for this species. This species will not be affected by the Proposal.	This species will not be affected by the Proposal.	
Polytelis swainsonii	Superb Parrot	Animal > Birds	Vulnerable <u>Vulnerable</u>	Known	**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	Yes, recorded determined as an affected species.	Has potential to occur and determined as an affected species.	Has potential to occur and determined as an affected species.	**Yes, a 7-part test has been provided.**

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					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.				
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Animal > Birds	Vulnerable	Known	**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	Yes, recorded in the Study Area and determined to be affected.	Not observed in the Study Area however considered to be affected by the activity.	Yes, recorded in the Study Area and determined to be affected.	**Yes, 7-part test provided.**

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					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. 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 (DEC threatened species web page 2005).				
Pteropus poliocephalus	Grey-headed Flying-fox	Animal > Bats	Vulnerable	Known	**Distribution.** Grey-headed Flying-foxes are found within 200 km of the eastern coast of Australia, from Bundaberg in Queensland to Melbourne in Victoria. **Habitat and ecology.** Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Has very low potential to occur but was not recorded. The assessment included targeted opportunistic	Has very low potential to occur but was not recorded. The assessment included targeted opportunistic	Has very low potential to occur but was not recorded. The assessment included targeted opportunistic	No

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					Individual camps may have tens of thousands of animals and are used for mating, birth and the rearing of young. Annual mating commences in January and a single young is born each October or November. Site fidelity to camps is high with some caps being used for over a century. Travel up to 50 km to forage. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops and can inflict severe crop damage.	inspection for this species in September but was not recorded. This species will not be affected by the Proposal.	inspection for this species in September but was not recorded. This species will not be affected by the Proposal.	inspection for this species in September but was not recorded. This species will not be affected by the Proposal.	
Pterostylis cobarensis	Greenhood Orchid	Plant > Orchids	Vulnerable	Known	**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	Has very low potential to occur but was not recorded. The assessment included targeted opportunistic inspection for this species in September but was not recorded. This species will not be affected by the Proposal.	Has very low potential to occur but was not recorded. The assessment included targeted opportunistic inspection for this species in September but was not recorded. This species will not be affected by the Proposal.	Has very low potential to occur but was not recorded. The assessment included targeted opportunistic inspection for this species in September but was not recorded. This species will not be affected by the Proposal.	No

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					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.				
Pyrrholaemus sagittatus	Speckled Warbler	Animal > Birds	Vulnerable	Known	**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'.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					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.				
Rostratula benghalensis australis	Painted Snipe	Animal > Birds	Endangered Endangered Migratory Wetland Species	Known	**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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Animal > Bats	Vulnerable	Known	**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	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

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					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.				
Sminthopsis macroura	Stripe-faced Dunnart	Animal > Marsupials	Vulnerable	Known	**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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Stagonopleura guttata	Diamond Firetail	Animal > Birds	Vulnerable	Known	**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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
Stictonetta naevosa	Freckled Duck	Animal > Birds	Vulnerable	Known	**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).	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Swainsona murrayana	Slender Darling Pea	Plant > Herbs and Forbs	Vulnerable <u>Vulnerable</u>	Predicted	**Distribution.** Found throughout NSW , it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. **Habitat and ecology.** Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants have been found in remnant native grasslands or grassy woodlands	Has potential to occur but was not recorded. The assessment included targeted inspection for this species.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species.	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					that have been intermittently grazed or cultivated. Plants produce winter-spring growth, flower in spring to early summer and then die back after flowering. They re-shoot readily and often carpet the landscape after good cool-season rains. The species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated. *Swainsona* species contain a poisoning principle, swainsonine, which affects the nervous system and is toxic to stock. The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams.	This species will not be affected by the Proposal.	This species will not be affected by the Proposal.	This species will not be affected by the Proposal.	
Swainsona plagiotropis	Red Darling Pea	Plant > Herbs and Forbs	Vulnerable	Known	**Distribution.** Occurs in the upper Murray River valley in the south-western plains of NSW and into Victoria. Most NSW records are from the Jerilderie area, with possible collections from the Louth-Bourke area and a disjunct record in the north-western plains from Buttabone Stud Park 35 km NW of Warren. Also rare in Victoria, restricted to a few sites in the central north, mostly between Bendigo and the Murray River south of Echuca. **Habitat and ecology**. Grows on flat grassland and in heavy red soil, often on roadsides and especially in table drains. Soils are derived from quaternary sediments and are usually red-brown clay-loams. The species is absent from black low-lying soils. Recorded from roadsides, rail reserves, stock routes and areas of lightly grazed unimproved pasture comprising *Austrodanthonia, Enteropogon acicularis* and *Austrostipa* grassland communities. Associated species include *Austrostipa aristiglumis, A. nodosa, A. setacea, Homopholis proluta, Chloris truncata, Austrodanthonia caespitosa, A. duttoniana, Enteropogon acicularis, Hordeum* spp., *Lolium rigidum, Rhodanthe corymbiflora, Calotis scabiosifolia,*	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					Microseris lanceolata and *Chrysocephalum apiculatum*. *Swainsona plagiotropis* appears to be an indicator species of *Enteropogon* and *Austrostipa* grasslands, communities which are poorly known and almost extinct. Other significant plants found in these grassland communities include *Sclerolaena napiformis, Swainsona murrayana, S. sericea, Brachyscome chrysoglossa, Leptorhynchos panaetioides* and *Maireana excavata*. Flowering is from August to November, with fruit maturing in November. The species is a perennial, but the lifespan is unknown. Plants die back over summer and remain dormant over several months as a subterranean woody root. When temperatures drop and sufficient rains have fallen towards autumn end, the roots begin to resprout. Growth is slow over the cold winter months, but by September plants have produced considerable foliage and buds begin to flower. Most flowers successfully develop into pods, containing an average of 20 seeds. By the beginning of November plants are rapidly maturing and the aerial foliage begins to die back. Some form of disturbance (for example, light grazing at appropriate times, occasional soil disturbance or periodic fire) appears to be necessary to reduce competition and enhance seedling growth of *Swainsona plagiotropis* within grassy swards. As with most other hard-seeded pea species, it is likely to require fire, prolonged wet conditions or soil disturbance to break the water-impermeable testa of the seed and allow germination. The large numbers present at Jerilderie 18 months after a fire and after two successive wet seasons support this hypothesis. Light grazing also reduces grass cover, maintaining an open sward and allowing sufficient inter-tussock space for germination and establishment. Populations are variable in size, ranging from a handful of individuals to many thousands. The species is often prolific				

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					in good seasons and abundances vary from locally rare to abundant. Collections from the NSW north-western plains were from a population of 100+ plants scattered over 2 hectares.				
Swainsona recta	Mountain Swainson-pea	Plant > Herbs and Forbs	Endangered	Known	**Distribution.** Mountain Swainson-pea was recorded historically from places such as Carcoar, Culcairn and Wagga Wagga where it is probably now extinct. Populations still exist in the Queanbeyan and Wellington-Mudgee areas. Over 80% of the southern population grows on a railway easement. It is also known from the ACT and Victoria. **Habitat and ecology**. Generally tolerant of fire, which also enhances germination by breaking the seed coat and reduces competition from other species. Individual plants have been known to live for up to 20 years. Before European settlement Mountain Swainson-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum *Eucalyptus blakelyi*, Yellow Box *E. melliodora*, Candlebark Gum *E. rubida* and Long-leaf Box *E. goniocalyx*. Grows in association with understorey dominants that include Kangaroo Grass *Themeda australis*, poa tussocks *Poa* spp. and spear-grasses *Austrostipa* spp. Plants die back in summer, surviving as rootstocks until they shoot again in autumn. Flowers throughout spring, with a peak in October. Seeds ripen at the end of the year.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No
Turnix maculosa	Red-backed Button-quail	Animal > Birds	Vulnerable	Bogan Macquarie	**Distribution** In Australia, the Red-backed Button-quail extends discontinuously from the Kimberley region of Western Australia, through the Top End of the Northern Territory and the southern Gulf of Carpentaria, to Cape York Peninsula and eastern Queensland and central-eastern and north-eastern NSW. It is mainly a species of coastal and	Has potential to occur but was not recorded. The assessment included	Has potential to occur but was not recorded. The assessment included	Has potential to occur but was not recorded. The assessment included	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					subcoastal regions. Beyond Australia, the species is distributed from the Philippines, south to the islands of eastern Indonesia and east through south-eastern and eastern New Guinea to the Bismarck and Louisiade Archipelagos and the Solomon Islands (Guadalcanal). The Red-backed Button-quail is recorded only infrequently in NSW, with most records from the North Coast Bioregion; there are historical records south as far as Sydney and three outlying records from western NSW (a breeding record from Finley in 1954; the Macquarie Marshes in 1955; and Coolabah in 2000). The population around Sydney was last recorded in 1912. Between 1980 and 1995 the average reporting rate for this species in NSW was 2 birds per year; from 1996 to 2005, there were only six additional observations in NSW (0.75 records per year). There have been few recent records of this species within reserves: between 1977 and 1994, there were 17 records of the species from four north coast reserves in NSW: Bundjalung, Crowdy Bay, Nymboida and Yuraygir National Parks. There have been no further records within reserves in NSW since August 1994. **Habitat and ecology** •The timing of breeding is not well known. In NSW, clutches recorded October to mid-February, but elsewhere in Australia, clutches recorded from late November to as late as May-June. •It appears only the male incubates the clutch and tends the young, which are precocial. •Red-backed Button-quail are nocturnal and crepuscular in their activity, and forage on the ground. They eat seeds and insects, but little is known of their diet. •Over their Australian range, Red-backed Button-quail inhabit grasslands, open and savannah woodlands with grassy ground layer, pastures and crops of warm temperate	targeted inspection for this species. This species will not be affected by the Proposal.	targeted inspection for this species. This species will not be affected by the Proposal.	targeted inspection for this species. This species will not be affected by the Proposal.	

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					areas, typically only in regions subject to annual summer rainfall greater than 400 mm. In NSW, said to occur in grasslands, heath and crops. Said to prefer sites close to water, especially when breeding. The species has been observed associated with the following grasses (in various vegetation formations): speargrass Heteropogon, Blady Grass Imperata cylindrica, Triodia, Sorghum, and Buffel Grass Cenchrus ciliaris. •Observations of populations in other parts of its range suggest the species prefers sites near water, including grasslands and sedgelands near creeks, swamps and springs, and wetlands. •Red-backed Button-quail usually breed in dense grass near water, and nests are made in a shallow depression sparsely lined with grass and ground litter.				
Tylophora linearis		Plant > Herbs and Forbs	Vulnerable Endangered	Known	**Distribution** Found in the Barraba, Mendooran, Temora and West Wyalong districts in the northern and central western slopes of NSW. Records include Crow Mountain near Barraba, Goonoo SF, Pillaga West SF, Cumbil SF, Eura SF, Coolbaggie NR, Goobang NP and Beni CCA. Also occurs in Qld, from near Glenmorgan in the western Darling Downs. **Habitat and ecology** •Grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla and Allocasuarina luehmannii. •Also grows in association with Acacia hakeoides, Acacia lineata, Melaleuca uncinata, Myoporum species and Casuarina species. •Flowers in spring, with flowers recorded in November or				

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					May with fruiting probably 2 to 3 months later. •Very low number of confirmed populations and has been recorded in very low abundances.				
Tyto novaehollandiae	Masked Owl	Animal > Birds	Vulnerable	Known	**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.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	Has potential to occur but was not recorded. The assessment included targeted inspection for this species. This species will not be affected by the Proposal.	No.
White Box Yellow Box Blakely's Red Gum Woodland	White Box Yellow Box Blakely's Red Gum Woodland	Community > Threatened Ecological Communities	Endangered Ecological Community Critically Endangered Ecological Community	Known	**Habitat and ecology** •Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. •The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. •Commonly co-occurring eucalypts include Apple Box (E. bridgesiana), Red Box (E. polyanthemos), Candlebark (E. rubida), Snow Gum (E. pauciflora), Argyle Apple (E. cinerea), Brittle Gum (E. mannifera), Red Stringybark (E. macrorhyncha), Grey Box (E. microcarpa), Cabbage Gum (E. amplifolia) and others. •The understorey in intact sites is characterised by native grasses and a high diversity of herbs; the most commonly encountered include Kangaroo Grass (Themeda australis) Poa Tussock (Poa sieberiana), wallaby grasses (Austrodanthonia spp.), spear-grasses (Austrostipa spp.),	Not recorded in the Study Area	Recorded in the Study Area however the Proponent has avoided it.	No recorded in the Study Area.	No

Scientific Name	Common Name	Type of species	Level of Threat	Known or Predicted to occur	Habitat requirements (as per OEH or SEWPaC websites)	Potential for this species to occur in the Mine Site Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the PHTETL Study Area and so will it be affected by the proposed works?	Potential for this species to occur in the TNWP Study Area and so will it be affected by the proposed works?	Is an assessment of significance (State or National) required?
					Common Everlasting (Chrysocephalum apiculatum), Scrambled Eggs (Goodenia pinnatifida), Small St John's Wort (Hypericum gramineum), Narrow-leafed New Holland Daisy (Vittadinia muelleri) and blue-bells (Wahlenbergia spp.). •Shrubs are generally sparse or absent, though they may be locally common. •Remnants generally occur on fertile lower parts of the landscape where resources such as water and nutrients are abundant. •Sites with particular characteristics, including varying age classes in the trees, patches of regrowth, old trees with hollows and fallen timber on the ground are very important as wildlife habitat. •Sites in the lowest parts of the landscape often support very large trees which have leafy crowns and reliable nectar flows - sites important for insectivorous and nectar feeding birds. •Sites that retain only a grassy groundlayer and with few or no trees remaining are important for rehabilitation, and to rebuild connections between sites of better quality. •Remnants support many species of threatened fauna and flora. •Retention of remnants is important as they contribute to productive farming systems (stock shelter, seed sources, sustainable grazing and water-table and salinity control). •The fauna of remnants (insectivorous birds, bats, etc) can contribute to insect control on grazing properties. •Some of the component species (e.g. wattles, she-oaks, native legumes) fix nitrogen that is made available to other species in the community, while fallen timber and leaves recycle their nutrients. •Disturbed remnants are considered to form part of the community, including where the vegetation would respond to assisted natural regeneration.				

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Appendix 8

Desktop Database Search Results

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OE&H Considerations

Combined geographic and habitat search results

geographic region: Central West (Bogan-Macquarie) & Central West (Lower Slopes)
vegetation type: all
type: all

Common Name	Type	Status in NSW	CMA SubRegion	Potential to occur
Artesian Springs Ecological Community	Community > Threatened Ecological Communities	Endangered Ecological Community	Lower Slopes	Predicted
Artesian Springs Ecological Community	Community > Threatened Ecological Communities	Endangered Ecological Community	Bogan Macquarie	Predicted
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	Community > Threatened Ecological Communities	Endangered Ecological Community	Bogan Macquarie	Known
Coolibah-Black Box woodland of the northern riverine plains in the Darling Riverine Plains and Brigalow Belt South bioregions	Community > Threatened Ecological Communities	Endangered Ecological Community	Bogan Macquarie	Known
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	Community > Threatened Ecological Communities	Endangered Ecological Community	Lower Slopes	Predicted
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	Community > Threatened Ecological Communities	Endangered Ecological Community	Bogan Macquarie	Predicted
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Community > Threatened Ecological Communities	Endangered Ecological Community	Lower Slopes	Known

Common Name	Type	Status in NSW	CMA SubRegion	Potential to occur
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Community > Threatened Ecological Communities	Endangered Ecological Community	Lower Slopes	Known
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Community > Threatened Ecological Communities	Endangered Ecological Community	Bogan Macquarie	Known
White Box Yellow Box Blakely's Red Gum Woodland	Community > Threatened Ecological Communities	Endangered Ecological Community	Lower Slopes	Known
Kultarr	Animal > Marsupials	Endangered	Bogan Macquarie	Predicted
Australian Bustard	Animal > Birds	Endangered	Bogan Macquarie	Known
A spear-grass	Plant > Herbs and Forbs	Endangered	Lower Slopes	Predicted
Australasian Bittern	Animal > Birds	Endangered	Lower Slopes	Predicted
Australasian Bittern	Animal > Birds	Endangered	Bogan Macquarie	Known
Bush Stone-curlew	Animal > Birds	Endangered	Lower Slopes	Known
Bush Stone-curlew	Animal > Birds	Endangered	Bogan Macquarie	Known
Cheilanthes sieberi subsp. pseudovellea	Plant > Ferns and Cycads	Endangered	Bogan Macquarie	Known
Black-necked Stork	Animal > Birds	Endangered	Bogan Macquarie	Known
Grey Falcon	Animal > Birds	Endangered	Lower Slopes	Predicted
Grey Falcon	Animal > Birds	Endangered	Bogan Macquarie	Known
Malleefowl	Animal > Birds	Endangered	Lower Slopes	Predicted
Malleefowl	Animal > Birds	Endangered	Bogan Macquarie	Predicted
Cotton Pygmy-goose	Animal > Birds	Endangered	Bogan Macquarie	Known
Painted Snipe (Australian subspecies)	Animal > Birds	Endangered	Lower Slopes	Predicted
Painted Snipe (Australian subspecies)	Animal > Birds	Endangered	Bogan Macquarie	Known
Small Purple-pea	Plant > Herbs and Forbs	Endangered	Bogan Macquarie	Known
Philotheca ericifolia	Plant > Shrubs	Not listed	Lower Slopes	Known
Magpie Goose	Animal > Birds	Vulnerable	Lower Slopes	Predicted
Magpie Goose	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Major Mitchell's Cockatoo	Animal > Birds	Vulnerable	Lower Slopes	Known
Major Mitchell's Cockatoo	Animal > Birds	Vulnerable	Bogan Macquarie	Known

Common Name	Type	Status in NSW	CMA SubRegion	Potential to occur
Red-tailed Black-Cockatoo (Inland subspecies)	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Glossy Black-cockatoo	Animal > Birds	Vulnerable	Lower Slopes	Predicted
Glossy Black-cockatoo	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Eastern Pygmy-possum	Animal > Marsupials	Vulnerable	Lower Slopes	Predicted
Pied Honeyeater	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Large-eared Pied Bat	Animal > Bats	Vulnerable	Lower Slopes	Predicted
Little Pied Bat	Animal > Bats	Vulnerable	Lower Slopes	Predicted
Little Pied Bat	Animal > Bats	Vulnerable	Bogan Macquarie	Known
Spotted Harrier	Animal > Birds	Vulnerable	Lower Slopes	Known
Spotted Harrier	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Brown Treecreeper (eastern subspecies)	Animal > Birds	Vulnerable	Lower Slopes	Known
Brown Treecreeper (eastern subspecies)	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Sloane's Froglet	Animal > Amphibians	Vulnerable	Lower Slopes	Predicted
Sloane's Froglet	Animal > Amphibians	Vulnerable	Bogan Macquarie	Known
Spotted-tailed Quoll	Animal > Marsupials	Vulnerable	Lower Slopes	Predicted
Spotted-tailed Quoll	Animal > Marsupials	Vulnerable	Bogan Macquarie	Known
Bluegrass	Plant > Herbs and Forbs	Vulnerable	Bogan Macquarie	Known
Pine Donkey Orchid	Plant > Orchids	Vulnerable	Lower Slopes	Predicted
Pine Donkey Orchid	Plant > Orchids	Vulnerable	Bogan Macquarie	Known
Painted Honeyeater	Animal > Birds	Vulnerable	Lower Slopes	Known
Painted Honeyeater	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Brolga	Animal > Birds	Vulnerable	Lower Slopes	Known
Brolga	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Black-breasted Buzzard	Animal > Birds	Vulnerable	Lower Slopes	Predicted
Black-breasted Buzzard	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Little Eagle	Animal > Birds	Vulnerable	Lower Slopes	Known
Little Eagle	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Pale-headed Snake	Animal > Reptiles	Vulnerable	Bogan Macquarie	Predicted
Black-tailed Godwit	Animal > Birds	Vulnerable	Lower Slopes	Predicted
Black-tailed Godwit	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Square-tailed Kite	Animal > Birds	Vulnerable	Lower Slopes	Predicted
Square-tailed Kite	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Hooded Robin (south-eastern form)	Animal > Birds	Vulnerable	Lower Slopes	Known
Hooded Robin (south-eastern form)	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Black-chinned Honeyeater (eastern subspecies)	Animal > Birds	Vulnerable	Lower Slopes	Known
Black-chinned Honeyeater (eastern subspecies)	Animal > Birds	Vulnerable	Bogan Macquarie	Known

Common Name	Type	Status in NSW	CMA SubRegion	Potential to occur
Turquoise Parrot	Animal > Birds	Vulnerable	Lower Slopes	Predicted
Turquoise Parrot	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Barking Owl	Animal > Birds	Vulnerable	Lower Slopes	Known
Barking Owl	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Greater Long-eared Bat	Animal > Bats	Vulnerable	Lower Slopes	Predicted
Greater Long-eared Bat	Animal > Bats	Vulnerable	Bogan Macquarie	Predicted
Blue-billed Duck	Animal > Birds	Vulnerable	Lower Slopes	Predicted
Blue-billed Duck	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Gilbert's Whistler	Animal > Birds	Vulnerable	Lower Slopes	Predicted
Gilbert's Whistler	Animal > Birds	Vulnerable	Bogan Macquarie	Predicted
Squirrel Glider	Animal > Marsupials	Vulnerable	Lower Slopes	Predicted
Squirrel Glider	Animal > Marsupials	Vulnerable	Bogan Macquarie	Predicted
Scarlet Robin	Animal > Birds	Vulnerable	Lower Slopes	Predicted
Scarlet Robin	Animal > Birds	Vulnerable	Bogan Macquarie	Predicted
Flame Robin	Animal > Birds	Vulnerable	Lower Slopes	Known
Flame Robin	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Brush-tailed Phascogale	Animal > Marsupials	Vulnerable	Bogan Macquarie	Known
Koala	Animal > Marsupials	Vulnerable	Lower Slopes	Known
Koala	Animal > Marsupials	Vulnerable	Bogan Macquarie	Known
Superb Parrot	Animal > Birds	Vulnerable	Lower Slopes	Known
Superb Parrot	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Grey-crowned Babbler (eastern subspecies)	Animal > Birds	Vulnerable	Lower Slopes	Known
Grey-crowned Babbler (eastern subspecies)	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Grey-headed Flying-fox	Animal > Bats	Vulnerable	Lower Slopes	Known
Grey-headed Flying-fox	Animal > Bats	Vulnerable	Bogan Macquarie	Known
Greenhood Orchid	Plant > Orchids	Vulnerable	Bogan Macquarie	Known
Speckled Warbler	Animal > Birds	Vulnerable	Lower Slopes	Known
Speckled Warbler	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Yellow-bellied Sheathtail-bat	Animal > Bats	Vulnerable	Lower Slopes	Predicted
Yellow-bellied Sheathtail-bat	Animal > Bats	Vulnerable	Bogan Macquarie	Known
Stripe-faced Dunnart	Animal > Marsupials	Vulnerable	Lower Slopes	Predicted
Stripe-faced Dunnart	Animal > Marsupials	Vulnerable	Bogan Macquarie	Known
Diamond Firetail	Animal > Birds	Vulnerable	Lower Slopes	Known
Diamond Firetail	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Freckled Duck	Animal > Birds	Vulnerable	Lower Slopes	Predicted
Freckled Duck	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Slender Darling Pea	Plant > Herbs and Forbs	Vulnerable	Lower Slopes	Predicted

Common Name	Type	Status in NSW	CMA SubRegion	Potential to occur
Slender Darling Pea	Plant > Herbs and Forbs	Vulnerable	Bogan Macquarie	Predicted
Red Darling Pea	Plant > Herbs and Forbs	Vulnerable	Bogan Macquarie	Known
Red-backed Button-quail	Animal > Birds	Vulnerable	Bogan Macquarie	Known
Masked Owl	Animal > Birds	Vulnerable	Lower Slopes	Predicted
Masked Owl	Animal > Birds	Vulnerable	Bogan Macquarie	Known

DSEWPaC Considerations

Summary: Search Results of the Project Site

Scientific name	Status	Potential
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area
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 likely to occur within area

Scientific Name	Common name	Status	Potential
Anthochaera phrygia	Regent Honeyeater [82338]	Endangered	Species or species habitat may occur within area
Lathamus discolor	Swift Parrot [744]	Endangered	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	Vulnerable	Species or species habitat may occur within area
Maccullochella macquariensis	Trout Cod [26171]	Endangered	Species or species habitat may occur within area
Maccullochella peelii peelii	Murray Cod, Cod, Goodoo [68443]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Nyctophilus timoriensis (South-eastern form)	Greater Long-eared Bat, South-eastern Long-eared Bat [66888]	Vulnerable	Species or species habitat may occur within area
Swainsona murrayana	Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Tylophora linearis [55231]		Endangered	Species or species habitat known to occur within area
Apus pacificus	Fork-tailed Swift [678]	Migratory Marine Birds	Species or species habitat may occur within area
Ardea alba	Great Egret, White Egret [59541]	Migratory Marine Birds	Species or species habitat may occur within area
Ardea ibis	Cattle Egret [59542]	Migratory Marine Birds	Species or species habitat may occur within area
Haliaeetus leucogaster	White-bellied Sea-Eagle [943]	Migratory Terrestrial Species	Species or species habitat likely to occur within area
Hirundapus caudacutus	White-throated Needletail [682]	Migratory Terrestrial Species	Species or species habitat may occur within area
Merops ornatus	Rainbow Bee-eater [670]	Migratory Terrestrial Species	Species or species habitat may occur within area
Xanthomyza phrygia	Regent Honeyeater [430]	Migratory Terrestrial Species	Species or species habitat may occur within area
Ardea alba	Great Egret, White Egret [59541]	Migratory Wetlands Species	Species or species habitat may occur within area
Ardea ibis	Cattle Egret [59542]	Migratory Wetlands Species	Species or species habitat may occur within area
Gallinago hardwickii	Latham's Snipe, Japanese Snipe [863]	Migratory Wetlands Species	Species or species habitat may occur within area
Rostratula benghalensis s. lat.	Painted Snipe [889]	Migratory Wetlands Species	Species or species habitat may occur within area

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

Protected Matters Search Tool

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.

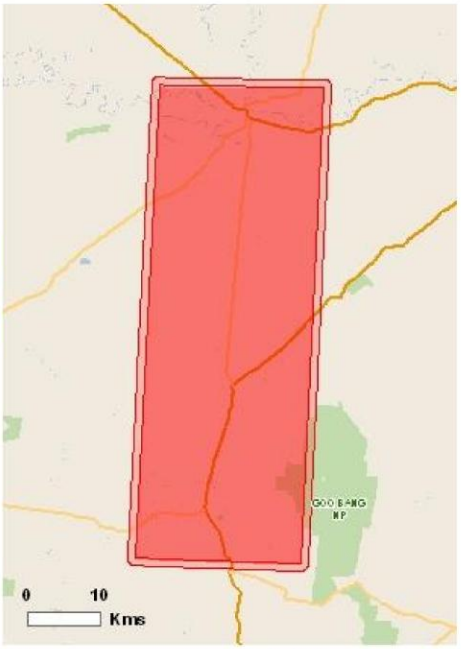
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

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

Report created: 13/04/11 10:33:43





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Summary
Details
Matters of NES
Other matters protected by the EPBC Act
Extra Information
Caveat
Acknowledgements

Coordinates
Buffer: 1Km

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:	4
Threatened Species:	12
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:	4
Commonwealth Heritage Places:	None
Listed Marine Species:	9

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:	3
State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	14
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
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area
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 likely to occur within area

Threatened Species **[Resource Information]**

Name	Status	Type of Presence
BIRDS		
Anthochaera phrygia Regent Honeyeater [82338]	Endangered	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Endangered	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	Vulnerable	Species or species habitat may occur within area

[77037]

FISH		
Maccullochella macquariensis		
Trout Cod [26171]	Endangered	Species or species habitat may occur within area
Maccullochella peelii peelii		
Murray Cod, Cod, Goodoo [68443]	Vulnerable	Species or species habitat may occur within area
MAMMALS		
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Nyctophilus timoriensis (South-eastern form)		
Greater Long-eared Bat, South-eastern Long-eared Bat [66888]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse [96]	Vulnerable	Species or species habitat likely to occur within area
PLANTS		
Bothriochloa biloba		
Lobed Blue-grass [3153]	Vulnerable	Species or species habitat likely to occur within area
Swainsona murrayana		
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Tylophora linearis		
[55231]	Endangered	Species or species habitat known 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
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Xanthomyza phrygia		
Regent Honeyeater [430]		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 Postal Commission
Commonwealth Land - Australian & Overseas Telecommunications Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land -

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
Lathamus discolor		
Swift Parrot [744]	Endangered	Species or species habitat likely to 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

Places on the RNE **[Resource Information]**

Note that not all Indigenous sites may be listed.

Name	Status

Historic	
Peak Hill General Cemetery NSW	Indicative Place
Butchers Shop NSW	Registered
Railway Station NSW	Registered
State and Territory Reserves	**[Resource Information]**
Goobang, NSW	
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
Frogs		
Bufo marinus Cane Toad [1772]		Species or species habitat likely to occur within area
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
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat may occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat may occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate		

Blackberry, European Blackberry [68406]	Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtiji	
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]	Species or species habitat may occur within area
Ulex europaeus	
Gorse, Furze [7693]	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

148.13898
-32.19544,148.3341
-32.19663,148.30555
-32.78555,148.13066
-32.7796,148.10091
-32.77841,148.13066
-32.19306,148.13066
-32.19306,148.13898 -32.19544

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

Environment Australia 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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Last updated: Thursday, 16-Sep-2010 09:13:25 EST

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Noxious weed declarations for Narromine Shire Council

The following weeds are declared noxious in the control area of Narromine Shire Council:

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	The plant must be eradicated from the land and the land must be kept free of the plant
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]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with 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/Californian/cockle burrs [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]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with 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 [Cabomba caroliniana]	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
Cockle burrs [Xanthium species]		See Bathurst/Noogoora/Californian/cockle burrs
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 [Achnatherum brachychaetum]	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]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Leafy elodea [Egeria densa]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Long-leaf willow primrose [Ludwigia longifolia]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with 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
Onion grass [Romulea species] Includes all Romulea species and varieties except R. rosea var. australis	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Oxalis [Oxalis species and varieties] Includes all Oxalis species and varieties except the native species O. chnoodes, O. exilis, O. perennans, O. radicosa, O. rubens, and O. thompsoniae	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Pampas grass [Cortaderia 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
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
Sand oat [Avena strigosa]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
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
Silk forage sorghum [Sorghum species hybrid cultivar]	3	The plant must be fully and continuously suppressed and destroyed
Silver-leaf nightshade [Solanum elaeagnifolium]	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
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 maculosa]	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
St. John's wort [Hypericum perforatum]	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
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
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	The plant must be eradicated from the land and the land must be kept free of the plant
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] Includes all Striga species except native species and 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

Noxious weed declarations for Parkes Shire Council

The following weeds are declared noxious in the control area of Parkes Shire Council:

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	The plant must be eradicated from the land and the land must be kept free of the plant
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]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with 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/Californian/cockle burrs [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
Bridal creeper [Asparagus asparagoides]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with 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
Buffalo burr [Solanum rostratum]	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
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 [Cabomba caroliniana]	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
Cockle burrs [Xanthium species]		See Bathurst/Noogoora/Californian/cockle burrs
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
Devil's claw (purple-flowered) [Proboscidea louisianica]	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
Devil's claw (yellow-flowered) [Ibicella lutea]	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
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 [Achnatherum brachychaetum]	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]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Leafy elodea [Egeria densa]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration

Long-leaf willow primrose [Ludwigia longifolia]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with 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
Onion grass [Romulea species] Includes all Romulea species and varieties except R. rosea var. australis	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Oxalis [Oxalis species and varieties] Includes all Oxalis species and varieties except the native species O. chnoodes, O. exilis, O. perennans, O. radicosa, O. rubens, and O. thompsoniae	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
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
Sand oat [Avena strigosa]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Scotch, Stemless, Illyrian and Taurian thistles [Onopordum 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
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
Silk forage sorghum [Sorghum species hybrid cultivar]	3	The plant must be fully and continuously suppressed and destroyed
Silver-leaf nightshade [Solanum elaeagnifolium]	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
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 maculosa]	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
St. John's wort [Hypericum perforatum]	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
Star thistle [Centaurea calcitrapa]	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
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
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	The plant must be eradicated from the land and the land must be kept free of the plant
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
Wild radish [Raphanus raphanistrum]	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
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] Includes all Striga species except native species and 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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Appendix 9

Detail of Impacts to Trees in the Mine Site

(No. of pages including blank pages = 8)

Note: this Appendix is only available on the Project CD

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Image 1: Key to Mine Site Impact Areas Images shown below



Image 2: Habitat Values of Trees in Paddock 2 of the Proposed RSF

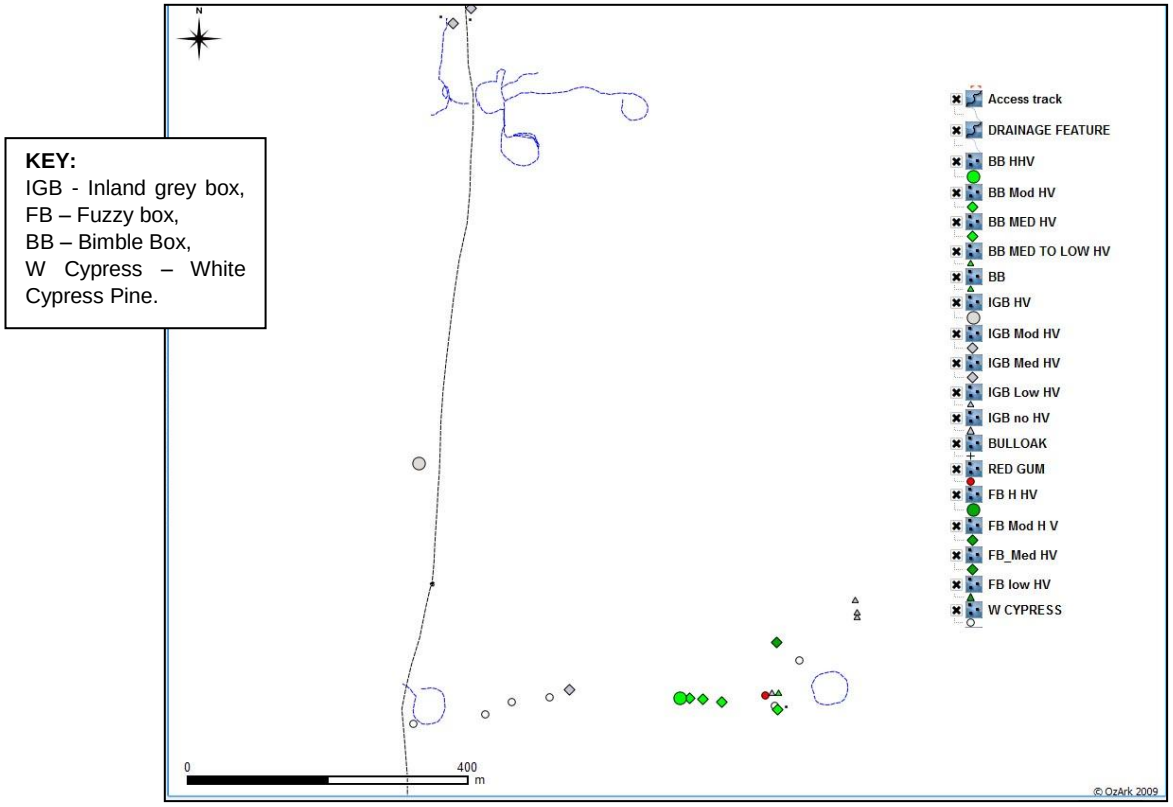


Image 3: Locality map showing locations of isolated paddock tress in Paddocks 4 and the lower portion of Paddock 6.

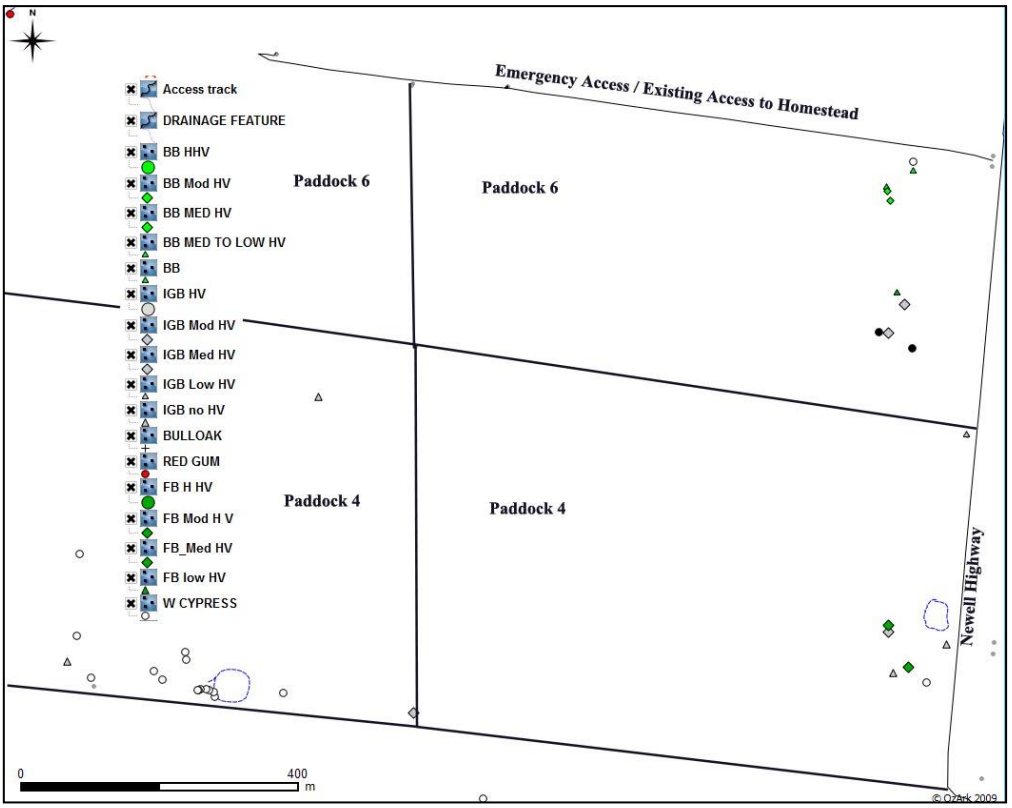


Image 4: Locality map showing locations and habitat values of isolated paddock tress and remnant vegetation in the upper portion of Paddock 6.

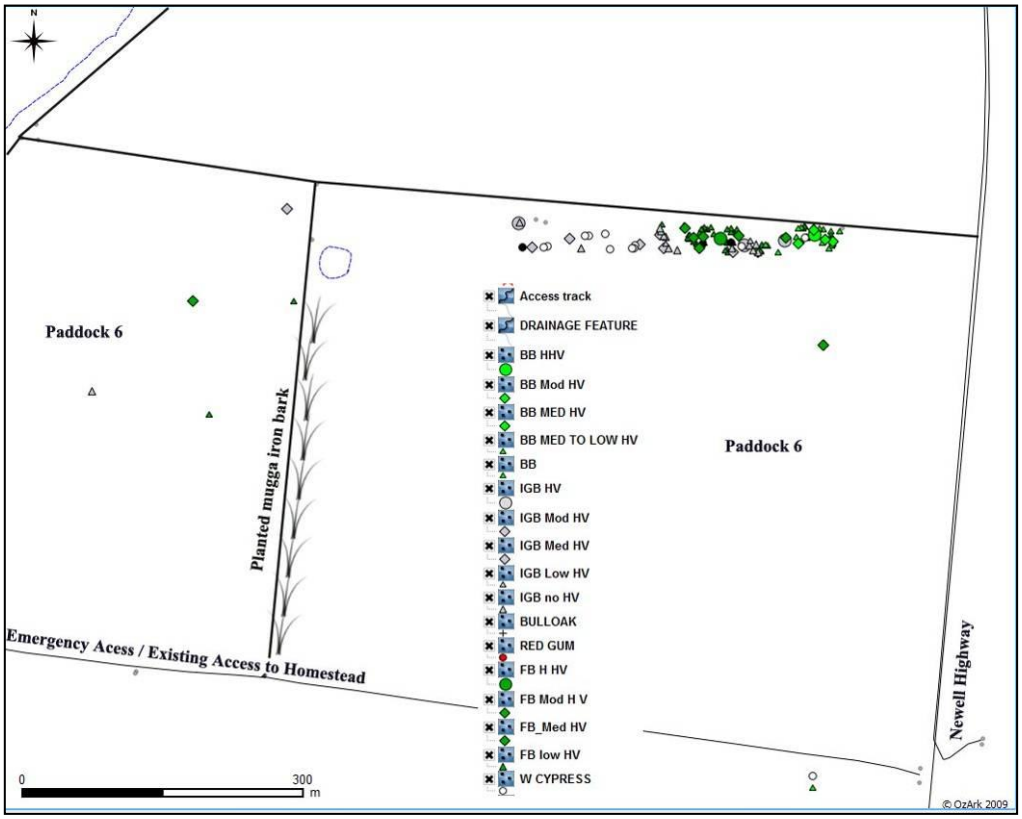


Image 5: Locality map showing habitat values of trees in the upper portion of Paddock 6.

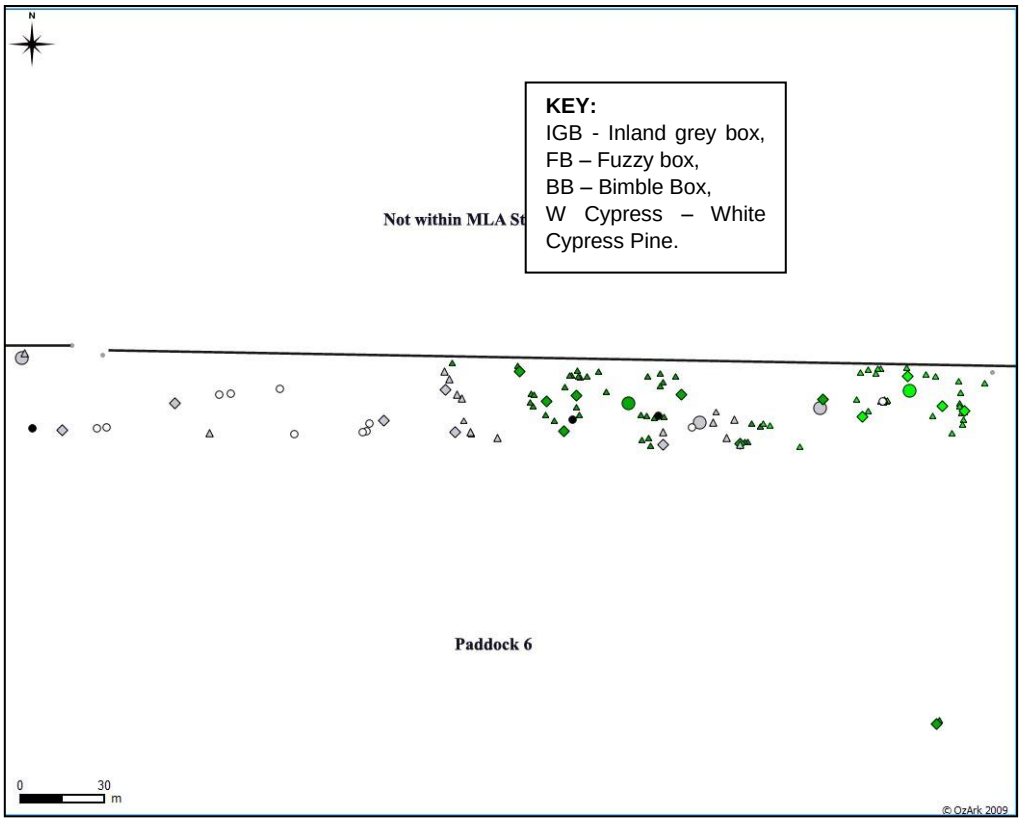


Image 6: Locality map showing locations of isolated paddock trees and trees within Benson 76 and 201 in Paddock 5.

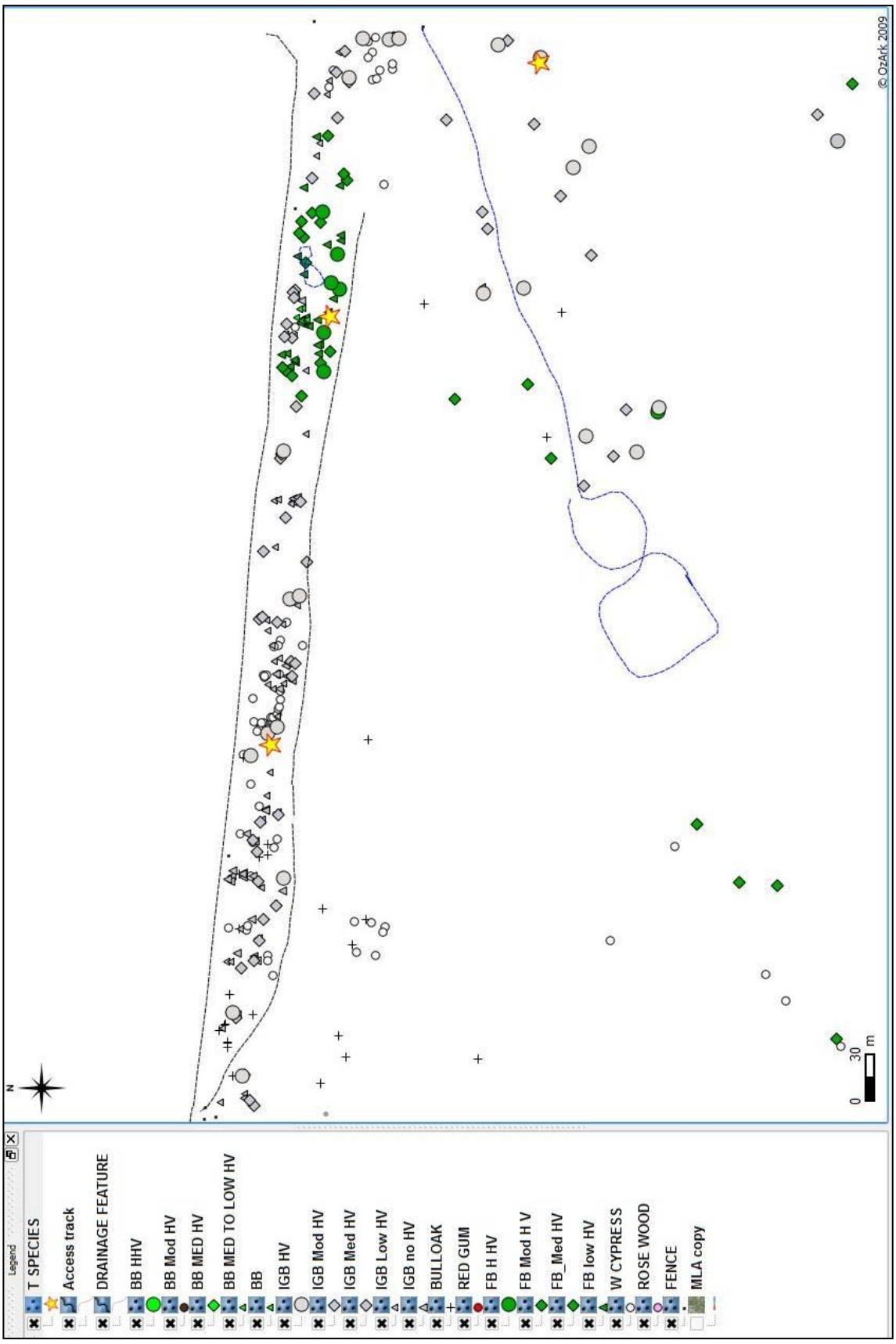
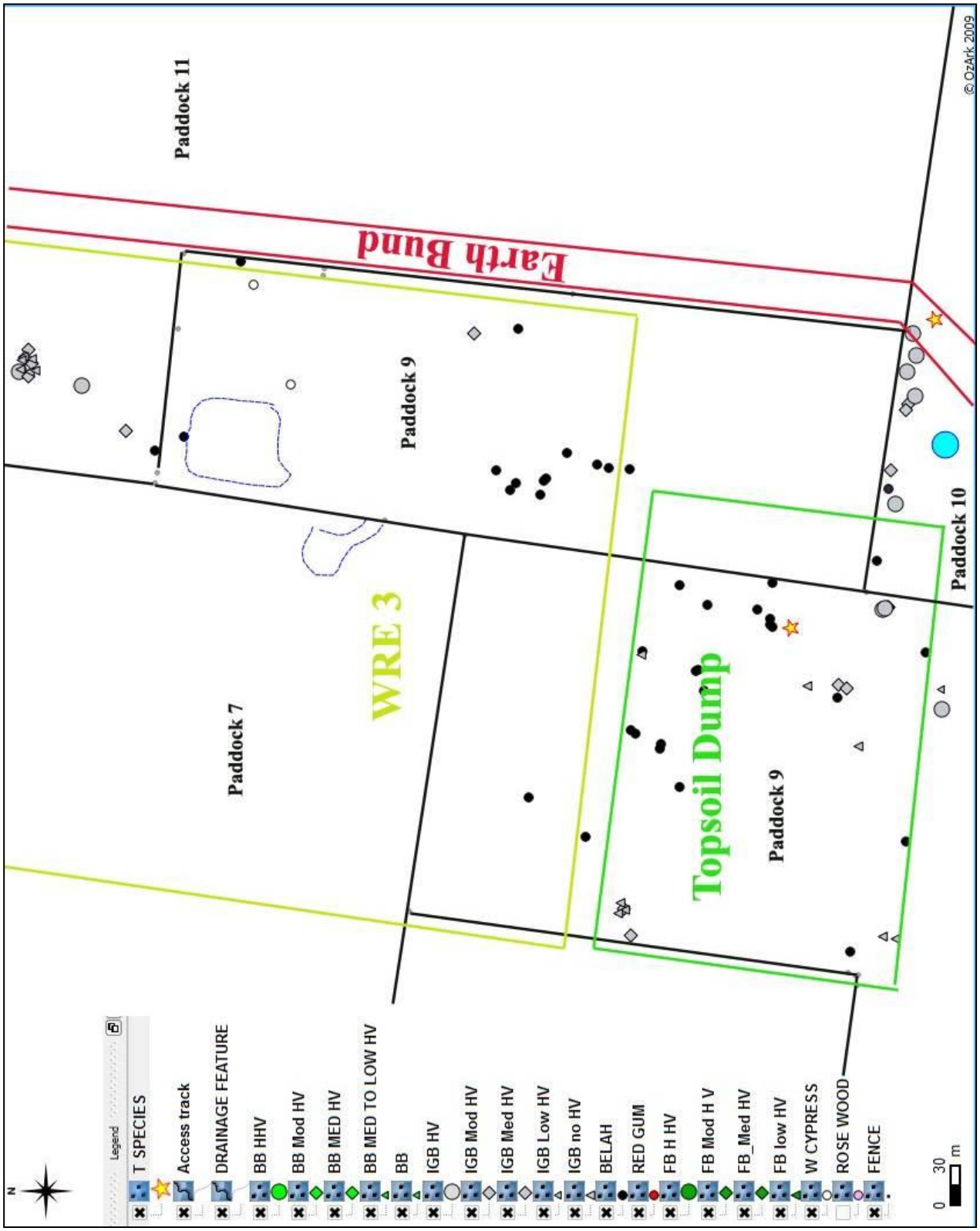


Image 7: **Locality map showing locations of isolated paddock trees and trees within the 16ha of Benson 57 within the Impact Footprint east of the Newell Highway.**



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Appendix 10

BioBanking Assessment Methodology Supporting Documentation

(No. of pages including blank pages = 70)

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

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WORKING BACKGROUND

1. ASSESS LANDSCAPE VALUE

- The Mine Site is located within the Central West Catchment Management Area (Bogan-Macquarie).

1.1. ASSESSMENT CIRCLES

- The Mine Site occupies roughly 1000 ha (**Figures A10.1** and **A10.3,** top showing areas to be rehabilitated and below showing extant vegetation).
- Native vegetation cover within the 1000ha circle = 11-20% (Score of 4.8)
- Native vegetation within the 100ha circle is <10% (Score of 1.5)

1.2. MAP ADJACENT REMNANT VEGETATION

- Mitchells Landscape value (V3) DRP Upper Darling Bogan – Macquarie (area = 1,322.690 km^2)
- Adjacent remanet vegetation area = Very large
- Remnant area value to identify threatened species > 100ha.

1.3. CONNECTIVITY ASSESSMENT

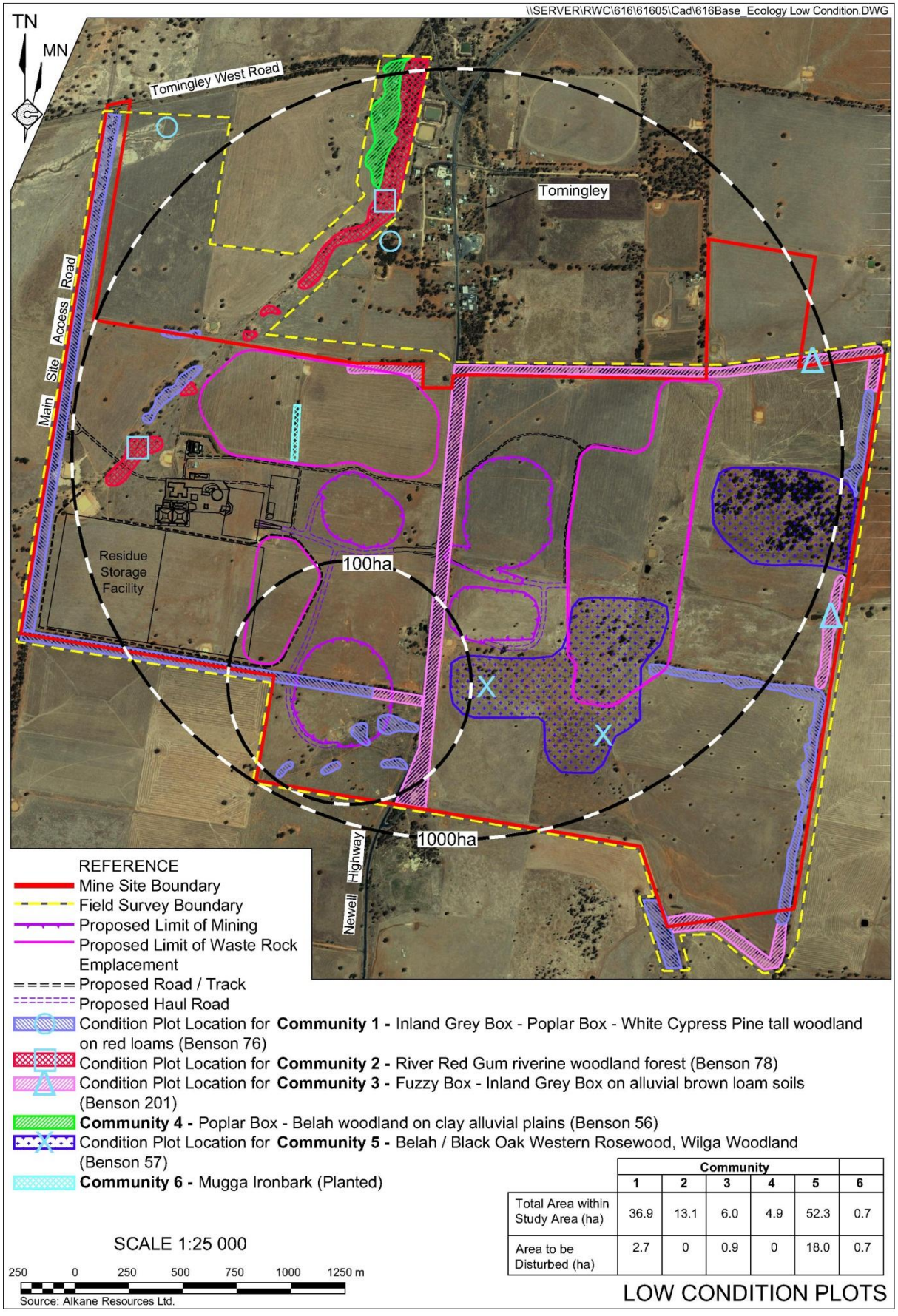
Steps 1 & 2 Determining the number of linkages width classes that are crossed

- The Newell Highway corridor forms the primary habitat linkage (see black arrow on **Figure A10.2** and **A10.3**).
- A review of a wider scale images reveals that other remnants within the Project Site are not as well connected at vegetation in the Newel Highway corridor.
- Details of the link have been provided in **Table A10.1**:

Table A10.1: Connectivity value Score.

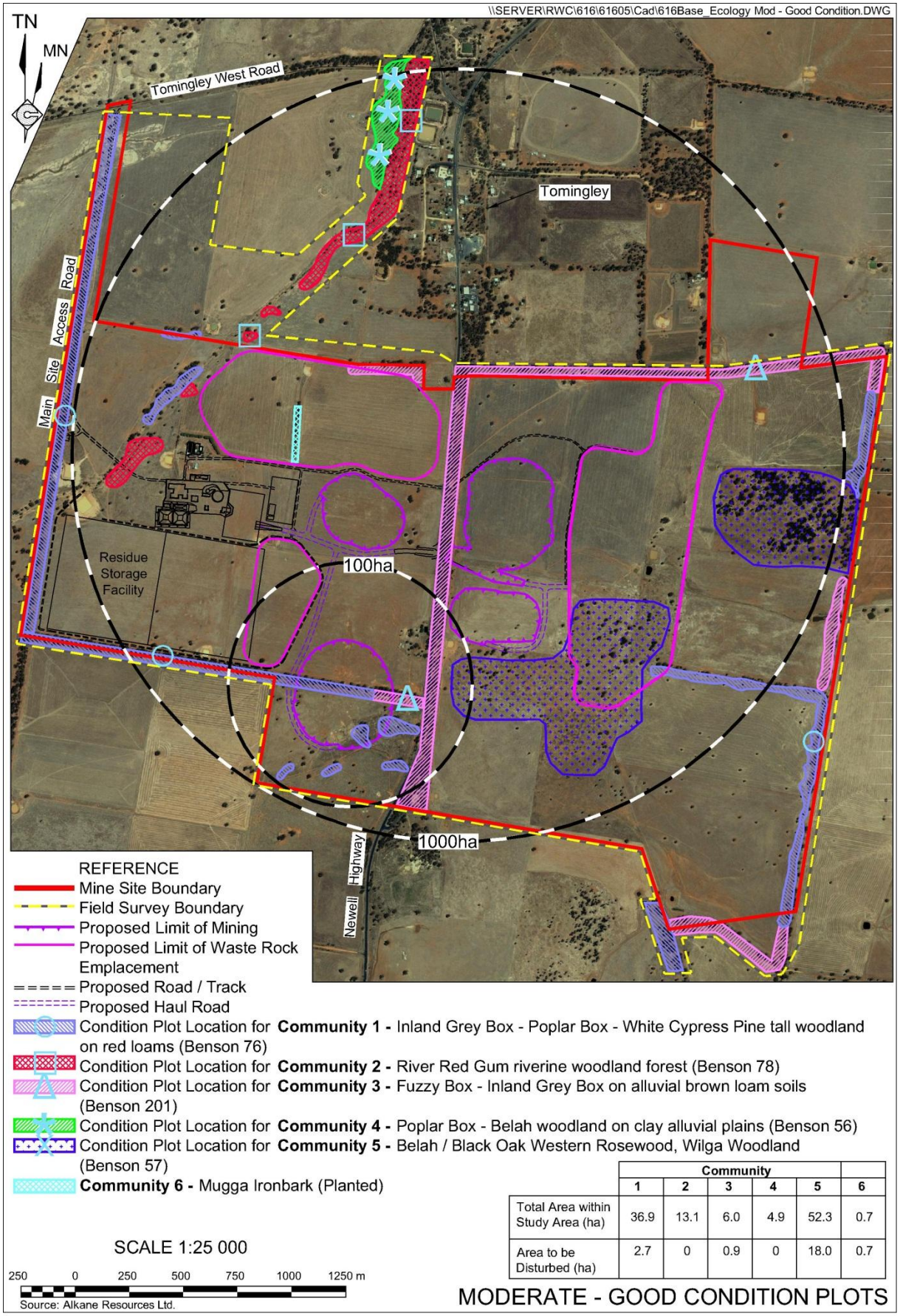
Link	Link width calls before / after	Condition class (as per Table 8 of the BioBanking Methodology)	Final Connectivity Value (as per Table 10 of the BioBanking Methodology)
Newell Highway Corridor (Fuzzy Box Inland Grey Box on alluvial brown loams (Benson 201).	5-30m to 5-30m crossed no threshold	Before: 1.5 After: 1.5	0

Figure A10.1: 1000ha circle and 100ha circle of vegetation zones in the Mine Site



	Community					
	1	2	3	4	5	6
Total Area within Study Area (ha)	36.9	13.1	6.0	4.9	52.3	0.7
Area to be Disturbed (ha)	2.7	0	0.9	0	18.0	0.7

Figure A10.2: 1000ha circle and 100ha circle showing linkage



	Community					
	1	2	3	4	5	6
Total Area within Study Area (ha)	36.9	13.1	6.0	4.9	52.3	0.7
Area to be Disturbed (ha)	2.7	0	0.9	0	18.0	0.7

Figure A10.3: 1000ha circle and 100ha circle showing aerial image without overlays



1.4. Red flag areas in the Mine Site

Table A10.2: Red flag areas in the Mine Site

BioMetric Community Name	% cleared in CW-CMA	Condition	Red Flag Area
Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)	65%	Moderate to good	No
Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56)	80%	Moderate to good	Yes
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)	95%	Moderate to good	Yes
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)	95%	Moderate to good	Yes
Inland Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion (Benson 76)	75%	Moderate to good	Yes

1.5. Map patch size including low condition

Vegetation map has been provided on **Figure A10.1**. It is noted that some areas are not mapped as part of the remnant**.** Notwithstanding the majority of remanets have been mapped on the Mine Site the figure of ha is very accurate. Details of remnant sizes (patch size) have been provided on **Table A10.3**.

Table A10.3: Remnant sizes (patch size)

	Inland Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams (Benson 76) EEC	River Red Gum riverine woodland forest (Benson 78)	Fuzzy Box – Inland Grey Box on alluvial brown loam soils (Benson 201) EEC	Poplar Box – Belah woodland on clay alluvial plains (Benson 56)	Belah Black Oak Western Rosewood Wilga Woodland (Benson 57)	Planted Mugga Iron barks	Total ha (Mine Site)
Total Area within Study Area (ha)	24.7	13.1	6.0	0	52.3	0.7	**96.8**
Area to be disturbed (ha)	3.6	0	0.9	4.9	18.0	0.7	**28.1**
Total after impact	21.1	13.1	5.1	0	34.3	0	**73.6**
Planting and / or regeneration (ha)	21.5	13.5	26.0	4.9	0	0	**65.9**
Total of remnants – impact + revegetation	42.6	26.7	31.1	4.9	34.3	0	**139.6**
Ration of impact to protected and planted	1:11.8	0:13.5	1:34	0:0	1:-1.9	1:-0.7	**1:1.9**

1.6. DETERMINE THE LANDSCAPE VALUE (LV) SCORE.

The landscape attributes are combined to provide a Landscape Value score out of 50. Percent native vegetation cover in the 100 ha assessment circle is scored out of 10, and percent native vegetation cover in the 1000 ha assessment circle is scored out of 16. Connectivity value and adjacent remnant area are each scored out of 12.

LV = (a + b + c + d)

- where LV is the Landscape Value score of the development site or biobank sites
- a is the connectivity value score (section 3.6.2)
- b is percent native vegetation cover in the 100 ha assessment circle score (see
- Table 6)
- c is percent native vegetation cover in the 1000 ha assessment circle score (see
- Table 7)
- d is adjacent remnant area value (see Table 8).

LV = (a - section 5) + 1.5 + 4.8 + 1.5

Table 1: BioMetric database (Vegetation Types Database)

Vegetation type	Dominant canopy spp	Main associated spp	Landscape position	Characteristic mid-storey spp	Characteristic groundcover spp	Other diagnostic features	Profile source	Full reference	Vegetation formation [CMA]	Vegetation class	Cleared Estimate rounded to nearest 5%
Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)	Belah (Casuarina cristata), Black Oak (Casuarina pauper)	Poplar Box (Eucalyptus populnea subsp. bimbil), Smooth-barked Coolibah (Eucalyptus intertexta), White Cypress Pine (Callitris glaucophylla)	On peneplains, plains or clay pans	Western Rosewood (Alectryon oleifolius subsp. canescens), Wilga (Geijera parviflora), Warrior Bush (Apophyllum anomalum), Exocarpos aphyllus, Silver Cassia (Senna form taxon 'artemisioides'), Maireana decalvans, Maireana georgei, Thorny Saltbush (Rhagodia spinescens), Black Bluebush (Maireana pyramidata)	Ruby Saltbush (Enchylaena tomentosa), Atriplex stipitata, Sclerolaena diacantha, Sclerolaena birchii, Zygophyllum glaucum, Salsola tragus subsp. tragus, Aristida jerichoensis var. subspinulifera, Austrodanthonia caespitosa, Speargrass (Austrostipa scabra subsp. scabra)	Low to mid-high woodland or open woodland. Occurs on texture contrast soils of brown to red-brown sandy loams sometimes overlying red to red-brown clays or on claypans of silty clay on the eastern and northern edges of the Hay Plain from Gunbar to Ivanhoe to Round Hill/Hillston mainly in the Riverina Bioregion on the south west plains of NSW.	Benson 57 (Benson et al. 2006)	Benson, J.S., Allen, C.B., Togher, C.& Lemmon, J. (2006) New South Wales Vegetation Classification and Assessment: Part 1 Plant Communities of the NSW Western Plains. Cunninghamia 9(3): 383-450	Semi-arid Woodlands (Shrubby subformation) [CW]	Semi-arid Sand Plain Woodlands	65

Vegetation type	Dominant canopy spp	Main associated spp	Landscape position	Characteristic mid-storey spp	Characteristic groundcover spp	Other diagnostic features	Profile source	Full reference details	Vegetation formation [CMA]	Vegetation class	Cleared Estimate rounded to nearest 5%
Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56)	Poplar Box (Eucalyptus populnea subsp. bimbil), Belah (Casuarina cristata)	Bulloak (Allocasuarina luehmannii), White Cypress Pine (Callitris glaucophylla), Inland Grey Box (Eucalyptus microcarpa), Whitewood (Atalaya hemiglauca)	In the transition zone between the floodplain and the peneplain in the central and northern plains of the NSW wheatbelt.	Wilga (Geijera parviflora), Western Rosewood (Alectryon oleifolius subsp. canescens), Warrior Bush (Apophyllum anomalum), Thorny Saltbush (Rhagodia spinescens), Western Boobialla (Myoporum montanum), Western Rosewood (Alectryon oleifolius subsp. elongatus), Wild Orange (Capparis mitchellii), Capparis lasiantha, Santalum acuminatum	Einadia nutans subsp. nutans, Curly Windmill Grass (Enteropogon acicularis), Sclerolaena birchii, Black Roly Poly (Sclerolaena muricata), Oxalis chnoodes, Speargrass (Austrostipa scabra subsp. scabra), Queensland Bluegrass (Dichanthium sericeum subsp. sericeum), Aristida jerichoensis var. jerichoensis, Ruby Saltbush (Enchylaena tomentosa), Tetragonia tetragonioides, Rhodanthe floribunda, Slender Bamboo Grass (Austrostipa verticillata), Aristida behriana	Tall to mid-high woodland generally occurring on red or red-brown loams or light clay.	Benson 56 (Benson et al. 2006)	Benson, J.S., Allen, C.B., Togher, C. & Lemmon, J. (2006) New South Wales Vegetation, Classification and Assessment: Part 1 Plant Communities of the NSW Western Plains. Cunninghamia 9(3): 383-450.	Grassy Woodlands [CW]	Floodplain Transition Woodlands	80

Vegetation type	Dominant canopy spp	Main associated spp	Landscape position	Characteristic mid-storey spp	Characteristic groundcover spp	Other diagnostic features	Profile source	Full reference details	Vegetation formation [CMA]	Vegetation class	Cleared Estimate rounded to nearest 5%
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)	Fuzzy Box (Eucalyptus conica)	Inland Grey Box (Eucalyptus microcarpa), Yellow Box (Eucalyptus melliodora), Bulloak (Allocasuarina luehmannii), Blakely's Red Gum (Eucalyptus blakelyi), Kurrajong (Brachychiton populneus subsp. populneus), Poplar Box (Eucalyptus populnea subsp. bimbil), White Cypress Pine (Callitris glaucophylla)	On prior streams and abandoned channels, or slight depressions on the undulating plains or flats, or on lower slopes and on valley flats.	Acacia deanei subsp. deanei, Dodonaea viscosa subsp. cuneata, Wilga (Geijera parviflora), Acacia implexa, Silver Cassia (Senna form taxon 'artemisioides'), Western Boobialla (Myoporum montanum), Cassinia aculeata, Black Roly Poly (Sclerolaena muricata var. muricata), Maireana enchylaenoides	Speargrass (Austrostipa scabra subsp. scabra), Windmill Grass (Chloris truncata), Calotis cuneifolia, Eremophila debilis, Sida corrugata, Einadia hastata, Dianella revoluta var. revoluta, Xerochrysum viscosa, Elymus scaber, Kangaroo Grass (Themeda australis), Austrodanthonia setacea	Tall woodland or open forest. This community occurs on brown loam or clay, alluvial or colluvial soils It also occurs on colluvium soils on lower slopes and on valley flats.	Benson 201 (Benson et al. 2006)	Benson, J.S., Allen, C.B., Togher, C.& Lemmon, J. (2006) New South Wales Vegetation Classification and Assessment: Part 1 Plant Communities of the NSW Western Plains. Cunninghamia 9(3): 383-450	Grassy Woodlands [CW]	Western Slopes Grassy Woodlands	95

Vegetation type	Dominant canopy spp	Main associated spp	Landscape position	Characteristic mid-storey spp	Characteristic groundcover spp	Other diagnostic features	Profile source	Full reference details	Vegetation formation [CMA]	Vegetation class	Cleared Estimate rounded to nearest 5%
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)	River Red Gum (Eucalyptus camaldulensis)	Rough-barked Apple (Angophora floribunda), River Oak (Casuarina cunninghamiana), Yellow Box (Eucalyptus melliodora), Blakely's Red Gum (Eucalyptus blakelyi), White Box (Eucalyptus albens), Carbeen (Corymbia tessellaris)	On the banks of watercourses and on adjoining flats	Bracteate Honey Myrtle (Melaleuca bracteata), Weeping Bottlebrush (Callistemon viminalis), Callistemon sieberi, Leptospermum polygalifolium, Acacia decora, Leptospermum brachyandrum, Leptospermum brevipes, Native Olive (Notelaea microcarpa var. microcarpa), Nyssanthes diffusa	Couch Grass (Cynodon dactylon), Slender Bamboo Grass (Austrostipa verticillata), Kidney Weed (Dichondra repens), Lomandra longifolia, Aristida vagans, Swainsona galegifolia, Ajuga australis, Einadia hastata, Urtica incisa, Sida rhombifolia, Commelina cyanea, Carex incomitata, Cyperus gracilis	Tall open forest or woodland to 30 m high. This community occurs on alluvial loamy soils in undulating low hills or hill landscapes in the Nandewar and Brigalow Belt South Bioregion. The watercourses flood regularly.	Benson 78 (Benson et al. 2006)	Benson, J.S., Allen, C.B., Togher, C.& Lemmon, J. (2006) New South Wales Vegetation Classification and Assessment: Part 1 Plant Communities of the NSW Western Plains. Cunninghamia 9(3): 383-450	Forested Wetlands [CW]	Inland Riverine Forests	95

Vegetation type	Dominant canopy spp	Main associated spp	Landscape position	Characteristic mid-storey spp	Characteristic groundcover spp	Other diagnostic features	Profile source	Full reference details	Vegetation formation [CMA]	Vegetation class	Cleared Estimate rounded to nearest 5%
Inland Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion (Benson 76)	Inland Grey Box (Eucalyptus microcarpa), Poplar Box (Eucalyptus populnea subsp. bimbil), White Cypress Pine (Callitris glaucophylla)	Bulloak (Allocasuarina luehmannii), Pittosporum angustifolium, Kurrajong (Brachychiton populneus subsp. populneus)	On terraces on old alluvial plains or undulating peneplain landforms overlaying a range of underlying rock types including sandstone.	Dodonaea viscosa subsp. spatulata, Wilga (Geijera parviflora), Acacia deanei subsp. paucijuga, Pimelea microcephala subsp. microcephala, Budda (Eremophila mitchellii), Western Boobialla (Myoporum montanum), Warrior Bush (Apophyllum anomalum), Tarbush (Eremophila glabra)	Austrodanthonia bipartita, Calotis cuneifolia, Speargrass (Austrostipa scabra subsp. scabra), Einadia nutans subsp. nutans, Curly Windmill Grass (Enteropogon acicularis), Eragrostis lacunaria, Sclerolaena bicornis var. bicornis, Walwhalleya subxerophilum, Aristida jerichoensis var. subspinulifera, Austrodanthonia caespitosa, Paspalidium constrictum, Sclerolaena diacantha, Sclerolaena birchii	Tall woodland between 12 and 25 m high. Occurs on red-brown earths soils comprising Quaternary alluvium. Distributed in central western NSW mostly in the eastern section of the Cobar Peneplain Bioregion near Nymagee, Tottenham and Boona and extending south.	Benson 76 (Benson et al. 2006)	Benson, J.S., Allen, C.B., Togher, C.& Lemmon, J. (2006) New South Wales Vegetation Classification and Assessment: Part 1 Plant Communities of the NSW Western Plains. Cunninghamia 9(3): 383-450	Grassy Woodlands [CW]	Floodplain Transition Woodlands	75

Table 2: Vegetation type benchmarks: CENTRAL WEST

Veg Type Name	Keith Formation Name	Keith Class (2004)	Veg Type ID	Native plant species richness		Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)					
				Richness	Source	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Cover estimates - Source	hollows	Number of trees with hollows	Total length of fallen logs	Hollows & logs - Source
Benchmark Inland Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion (Benson 76)	Grassy woodlands	Floodplain Transition Woodlands	CW144	25	P	8	35	3	10	13	50	3	5	3	15	P		1	75	E
Results Inland Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion (Benson 76)	Grassy woodlands	Floodplain Transition Woodlands	CW144	7		3		0		4		0		0				1	30	
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)	Forested Wetlands	Inland Riverine Forests	CW184	25	P	10	33	4	15	5	20	3	10	5	20	P		2	56	E

Veg Type Name	Keith Formation Name	Keith Class (2004)	Veg Type ID	Native plant species richness		Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)					
				Richness	Source	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Cover estimates - Source	Number of trees with hollows	Total length of fallen logs	Hollows & logs - Source
Benchmark **Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)**	**Grassy woodlands**	**Western Slopes Grassy Woodlands**	**CW138**	**25**	**P**	**12**	**35**	**1**	**25**	**15**	**70**	**3**	**5**	**3**	**20**	**P**	**0.8**	**66**	**E**
Results Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)	Grassy woodlands	Western Slopes Grassy Woodlands	CW138	6				3		0		3		0		0		1	20
Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56)	**Grassy woodlands**	**Floodplain Transition Woodlands**	**CW167**	**25**	**P**	**8**	**35**	**3**	**10**	**13**	**50**	**3**	**5**	**3**	**15**	**P**	**1**	**75**	**E**

Veg Type Name	Keith Formation Name	Keith Class (2004)	Veg Type ID	Native plant species richness		Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Cover estimates - Source	Number of trees with hollows	Total length of fallen logs	Hollows & logs - Source
				Richness	Source	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper				
Benchmark Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)	Semi-arid woodlands (shrubby sub-formation)	Semi-arid Sand Plain Woodlands	CW105	15	A	10	40	0	5	0	10	5	15	5	15	A	1	25	A
Results																			

2. TRANSECT PLOT WORKSHEETS

Full species IDs are not required for BioBanking, but may be useful for identification of correct vegetation type and for monitoring and audit purposes.

Site type: **Development** / BioBank **Proposal ID: Tomingley Gold Mine** **Date: May 2009** **Recorder(s): Phillip Cameron**

Vegetation type: Fuzzy Box – Inland Grey Box on alluvial brown soils (Benson 201) Remnant 170x 40m. AMG Zone 55 GDA Easting= 51069.4 /Northing = 6384076.9:

Photos: See attached

Native over-storey species list At 10 points along the 50-m transect	Regen-eration (√) (zone)	**Native mid-storey species list** (>1m to <over-storey) At 10 points along the 50-m transect	**Native ground cover (grasses) species list** (ground stratum <1m) At 50 points along the 50-m transect			**Native ground cover (shrubs) species list** (ground stratum <1m) At 50 points along the 50-m transect			**Native ground cover (other) species list** (ground stratum <1m) At 50 points along the 50-m transect			**Exotic plants species list** At 50 points along the 50-m transect			**Fallen logs** (min. 10 cm diameter x 50 cm long) (20 x 50m plot)
Fuzzy Box	No	Nil	1. **1**	21. **0**	41. **1**	1.	21.	41.	1.	21.	41.	1.	21.	41.	0
Inland Grey Box	No	Nil	2. **2**	22. **1**	42. **0**	2.	22.	42.	2.	22.	42.	2.	22.	42.	0
Inland Grey Box	No	Nil	3. **0**	23. **1**	43. **0**	3.	23.	43.	3.	23.	43.	3.	23.	43.	0
Fuzzy Box	No	Nil	4. **1**	24. **0**	44. **0**	4.	24.	44.	4.	24.	44.	4. **1**	24.	44.	0
Fuzzy Box	No	Nil	5. **2**	25. **1**	45. **1**	5.	25.	45.	5.	25.	45.	5.	25.	45. **1**	1
Fuzzy Box	No	Nil	6. **0**	26. **0**	46. **1**	6.	26.	46.	6.	26.	46.	6.	26.	46.	0
Fuzzy Box	No	Nil	7. **2**	27. **1**	47. **0**	7.	27.	47.	7.	27.	47.	7.	27.	47.	0
Inland Grey Box	No	Nil	8. **1**	28. **0**	48. **1**	8.	28.	48.	8.	28.	48.	8.	28.	48.	0
Bimble Box	No	Nil	9. **0**	29. **0**	49. **0**	9.	29.	49.	9.	29.	49.	9.	29.	49.	0
Fuzzy Box	No	Nil	10. **0**	30. **0**	50. **0**	10.	30.	50.	10.	30.	50.	10. **1**	30.	50.	1
			11. **0**	31. **1**		11.	31.		11.	31.		11.	31.		
			12. **1**	32. **1**		12.	32.		12.	32.		12.	32.		
Total number of species = **3** Foliage cover (%) = 70% Benchmark value (%FC) = (12-35%) Average crown diameter = 10m Average foliage cover (%) = 40% Number of trees = 13 Sample area = 50m along transect **Whole zone** Number of trees with hollows = 4 (in 50m transect) Sample area = Benchmark value = 0.8			13. **0**	33. **0**		13.	33.		13.	33.		13.	33.		
			14. **0**	34. **2**		14.	34.		14.	34.		14.	34.		
			15. **1**	35. **1**		15.	35.		15.	35.		15.	35.		
			16. **0**	36. **0**		16.	36.		16.	36.		16. **1**	36.		
			17. **0**	37. **0**		17.	37.		17.	37.		17.	37.		
			18. **1**	38. **0**		18.	38.		18.	38.		18.	38.		
			19. **2**	39. **1**		19.	39.		19.	39.		19.	39.		
			20. **0**	40. **0**		20.	40.		20.	40.					
		Total no of species = **0**	Total no of species = **3** *Bothriochloa decipiens* *Chloris truncata* *Austrodanthonia caespitosa*			Total no of species = 0			Total no of species = **0**			Total no of species = **3** *Argemone ochrolenca* *Xanthium spinosum* Lycium ferocissimum			Total (m) = **20cm**
		Foliage cover (%) = 0%	Foliage cover (%) = 46%			Foliage cover (%) = 0%			Foliage cover (%) =0%			Foliage cover (%) = 8%			Benchmark (m) = E

SITE AND OTHER NOTES: Grazed by sheep, grasses rarely have heads – largely eaten to ground level.

NB: Transects / plots should be placed randomly with the minimum number required for the zone in accordance with Table 4 of the Operational Manual.

Schematic showing the Fuzzy Box-Inland Grey Box community (Benson 201).

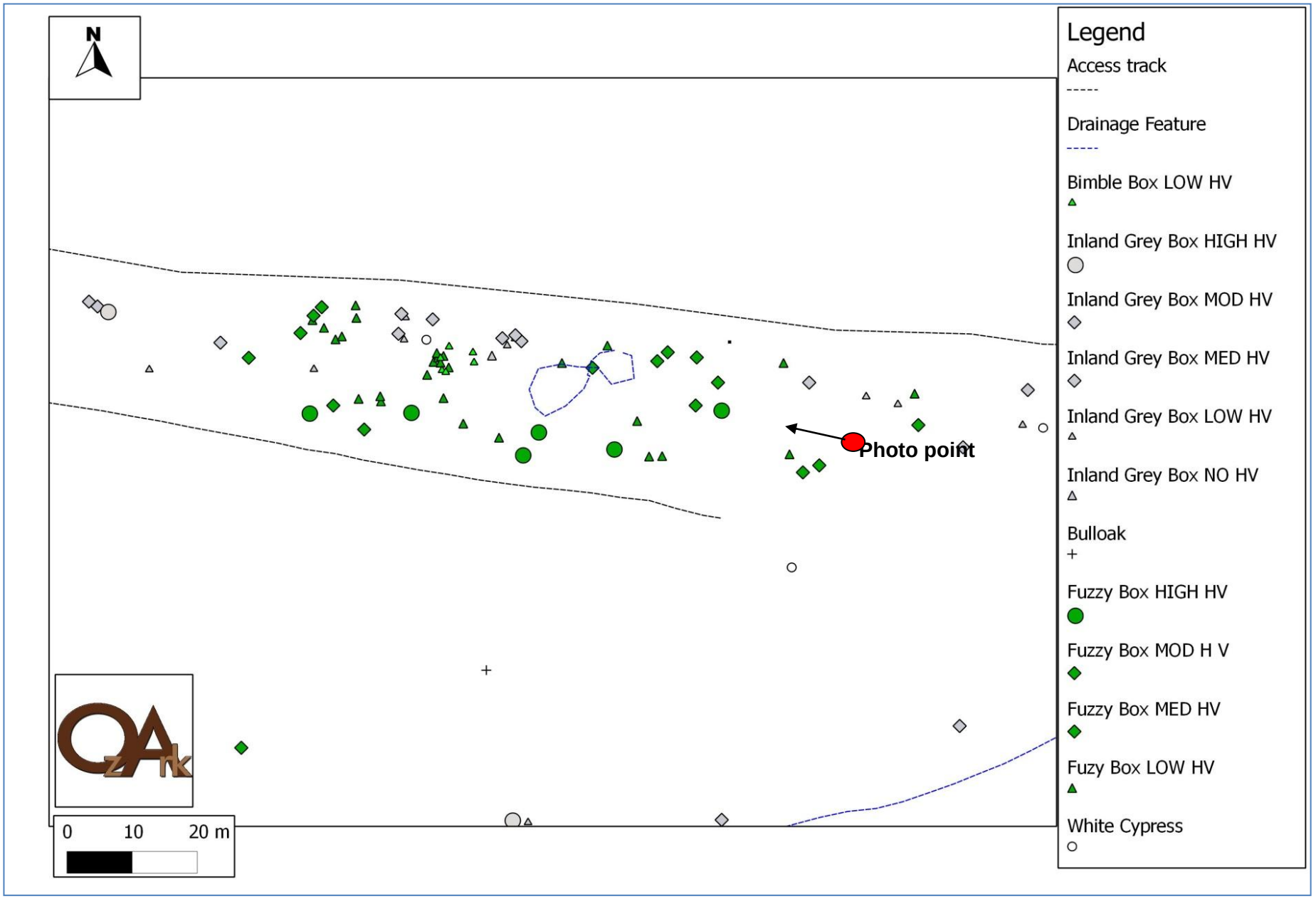


Photo: View west through the Fuzy Box - Inland Grey Box portion of the remnant.



Site type: **Development** / BioBank **Proposal ID: Tomingley Gold Mine** **Date: May 2009** **Recorder(s): Phillip Cameron**

Vegetation type: Inland Grey Box – Poplar Box – White Cypress Pine tall woodland on red loams (Benson 76) Remnant 465x 40m. AMG Zone 55 GDA Easting= 50775.4 /Northing = 6384110.9: Photos: See attached

Native over-storey species list At 10 points along the 50-m transect	Regen-eration (√) (zone)	**Native mid-storey species list** (>1m to <over-storey) At 10 points along the 50-m transect	**Native ground cover (grasses) species list** (ground stratum <1m) At 50 points along the 50-m transect			**Native ground cover (shrubs) species list** (ground stratum <1m) At 50 points along the 50-m transect			**Native ground cover (other) species list** (ground stratum <1m) At 50 points along the 50-m transect			**Exotic plants species list** At 50 points along the 50-m transect			**Fallen logs** (min. 10 cm diameter x 50 cm long) (20 x 50m plot)
Inland Grey Box	No	Nil	1. **0**	21. **0**	41. **1**	1.	21.	41.	1.	21.	41.	1.	21.	41.	0
Inland Grey Box	No	Nil	2. **1**	22. **1**	42. **0**	2.	22.	42.	2.	22.	42.	2.	22.	42.	0
White Cypress Pine	No	Nil	3. **0**	23. **1**	43. **0**	3.	23.	43.	3.	23.	43.	3.	23.	43.	0
White Cypress Pine	No	Nil	4. **1**	24. **0**	44. **1**	4.	24.	44.	4.	24.	44.	4. **1**	24.	44.	1
Inland Grey Box	No	Nil	5. **1**	25. **1**	45. **1**	5.	25.	45.	5.	25.	45.	5.	25.	45. **1**	0
Bulloak	No	Nil	6. **0**	26. **0**	46. **1**	6.	26.	46.	6.	26.	46.	6.	26.	46.	0
Inland Grey Box	No	Nil	7. **0**	27. **1**	47. **0**	7.	27.	47.	7.	27.	47.	7.	27.	47.	0
Inland Grey Box	No	Nil	8. **1**	28. **0**	48. **1**	8.	28.	48.	8.	28.	48.	8.	28.	48.	0
Inland Grey Box	No	Nil	9. **0**	29. **0**	49. **0**	9.	29.	49.	9.	29.	49.	9.	29.	49.	0
Inland Grey Box	No	Nil	10. **0**	30. **0**	50. **1**	10.	30.	50.	10.	30.	50.	10. **1**	30.	50.	0
			11. **0**	31. **1**		11.	31.		11.	31.		11.	31.		0
			12. **1**	32. **1**		12.	32.		12.	32.		12.	32.		0
Total number of species = 3 Foliage cover (%) = 70% Benchmark value (%FC) = (8-35%) Average crown diameter = 8m Average foliage cover (%) = 30% Number of trees = 10 Sample area = 50m along transect **Whole zone** Number of trees with hollows = 4 (in 50m transect) Sample area = Benchmark value = 1			13. **0**	33. **0**		13.	33.		13.	33.		13.	33.		0
			14. **0**	34. **1**		14.	34.		14.	34.		14.	34.		0
			15. **0**	35. **1**		15.	35.		15.	35.		15.	35.		0
			16. **0**	36. **0**		16.	36.		16.	36.		16. **1**	36.		0
			17. **0**	37. **0**		17.	37.		17.	37.		17.	37.		1
			18. **1**	38. **0**		18.	38.		18.	38.		18.	38.		1
			19. **1**	39. **1**		19.	39.		19.	39.		19.	39.		0
			20. **0**	40. **0**		20.	40.		20.	40.					
		Total no of species = **0**	Total no of species = 4 *Bothriochloa decipiens* *Chloris truncata* *Austrodanthonia caespitosa* *Austrostipa setacea*			Total no of species = 0			Total no of species = **0**			Total no of species = **3** *Argemone ochrolenca* *Xanthium spinosum* Lycium ferocissimum			Total (m) = **30cm**
		Foliage cover (%) = 0%	Foliage cover (%) = 44%			Foliage cover (%) = 0%			Foliage cover (%) =0%			Foliage cover (%) = 8%			Benchmark (m) = E

SITE AND OTHER NOTES: Grazed by sheep, grasses rarely have heads – largely eaten to ground level.

Schematic showing species and habitat value of trees to be affected in Benson 76.

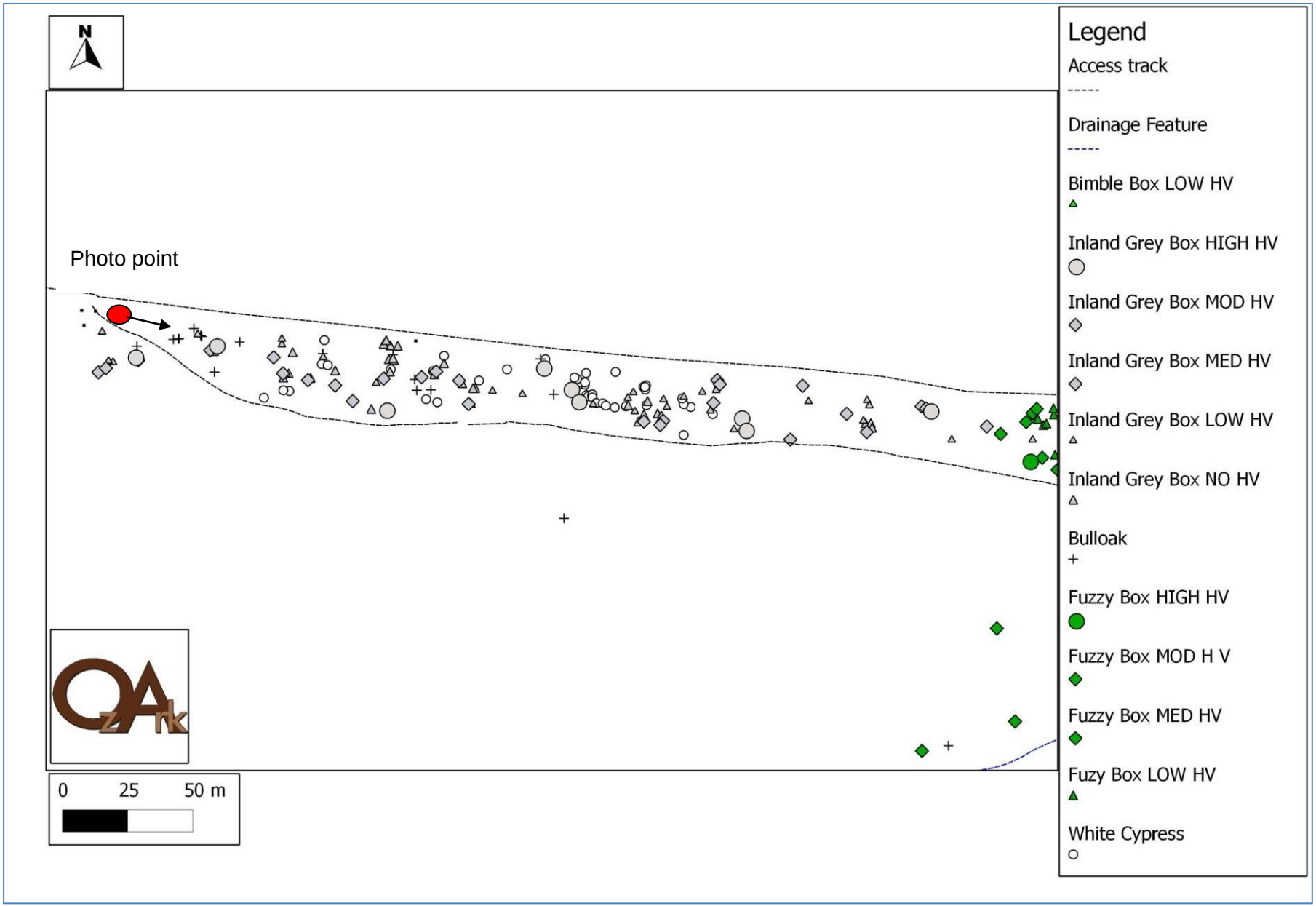


Photo: View west through the Fuzy Box - Inland Grey Box portion of the remnant.



Site type: **Development** / BioBank **Proposal ID: Tomingley Gold Mine** **Date: May 2009** **Recorder(s): Phillip Cameron**

Vegetation type Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)
Remnant 13.1ha. AMG Zone 55 GDA Easting= 615492 /Northing = 6393790: Photos: See attached

Native over-storey species list At 10 points along the 50-m transect	Regen-eration (√) (zone)	**Native mid-storey species list** (>1m to <over-storey) At 10 points along the 50-m transect	**Native ground cover (grasses) species list** (ground stratum <1m) At 50 points along the 50-m transect			**Native ground cover (shrubs) species list** (ground stratum <1m) At 50 points along the 50-m transect			**Native ground cover (other) species list** (ground stratum <1m) At 50 points along the 50-m transect			**Exotic plants species list** At 50 points along the 50-m transect			**Fallen logs** (min. 10 cm diameter x 50 cm long) (20 x 50m plot)
Black Oak	No	Nil	1. **1**	21. **0**	41. **1**	1.	21.	41.	1.	21.	41.	1.	21.	41.	0
Inland Grey Box	No	Nil	2. **1**	22. **0**	42. **0**	2.	22.	42.	2.	22.	42.	2.	22.	42.	0
Black Oak	No	Nil	3. **0**	23. **1**	43. **0**	3.	23.	43.	3.	23.	43.	3.	23.	43.	0
Rosewood	No	Nil	4. **1**	24. **0**	44. **1**	4.	24.	44.	4.	24.	44.	4.	24.	44.	0
	No	Nil	5. **1**	25. **1**	45. **1**	5.	25.	45.	5.	25.	45.	5.	25. **1**	45.	0
	No	Nil	6. **0**	26. **0**	46. **1**	6.	26.	46.	6.	26.	46.	6. **1**	26.	46.	0
	No	Nil	7. **0**	27. **1**	47. **0**	7.	27.	47.	7.	27.	47.	7.	27.	47.	1
	No	Nil	8. **1**	28. **0**	48. **1**	8.	28.	48.	8.	28.	48.	8.	28. **1**	48.	1
	No	Nil	9. **0**	29. **1**	49. **0**	9.	29.	49.	9.	29.	49.	9.	29.	49.	0
	No	Nil	10. **0**	30. **0**	50. **1**	10.	30.	50.	10.	30.	50.	10.	30.	50.	0
			11. **0**	31. **1**		11.	31.		11.	31.		11. **1**	31.		0
			12. **1**	32. **1**		12.	32.		12.	32.		12.	32.		0
Total number of species = 3 Foliage cover (%) = 30% Benchmark value (%FC) = (10-40%) Average crown diameter = 5m Average foliage cover (%) = 30% Number of trees = 4 Sample area = 50m along transect **Whole zone** Number of trees with hollows = 1 (in 50m transect) Sample area = Benchmark value = 1			13. **0**	33. **0**		13.	33.		13.	33.		13.	33.		0
			14. **0**	34. **1**		14.	34.		14.	34.		14.	34.		0
			15. **1**	35. **1**		15.	35.		15.	35.		15.	35.		0
			16. **0**	36. **0**		16.	36.		16.	36.		16.	36.		0
			17. **0**	37. **0**		17.	37.		17.	37.		17.	37.		1
			18. **1**	38. **0**		18.	38.		18.	38.		18.	38.		1
			19. **1**	39. **1**		19.	39.		19.	39.		19.	39.		0
			20. **0**	40. **0**		20.	40.		20.	40.					
		Total no of species = **0**	Total no of species = 4 *Bothriochloa decipiens* *Chloris truncata* *Austrodanthonia caespitosa* *Austrostipa setacea*			Total no of species = 0			Total no of species = **0**			Total no of species = **3** *Argemone ochrolenca* *Xanthium spinosum* Lycium ferocissimum			Total (m) = 4**0cm**
		Foliage cover (%) = 0%	Foliage cover (%) = 44%			Foliage cover (%) = 0%			Foliage cover (%) =0%			Foliage cover (%) = 8%			Benchmark (m) = E

SITE AND OTHER NOTES: Grazed by sheep, grasses rarely have heads – largely eaten to ground level.

Impact Footprint Belah/Black Oak - Western Rosewood - Wilga woodland (Benson 57) portion of the remnant.

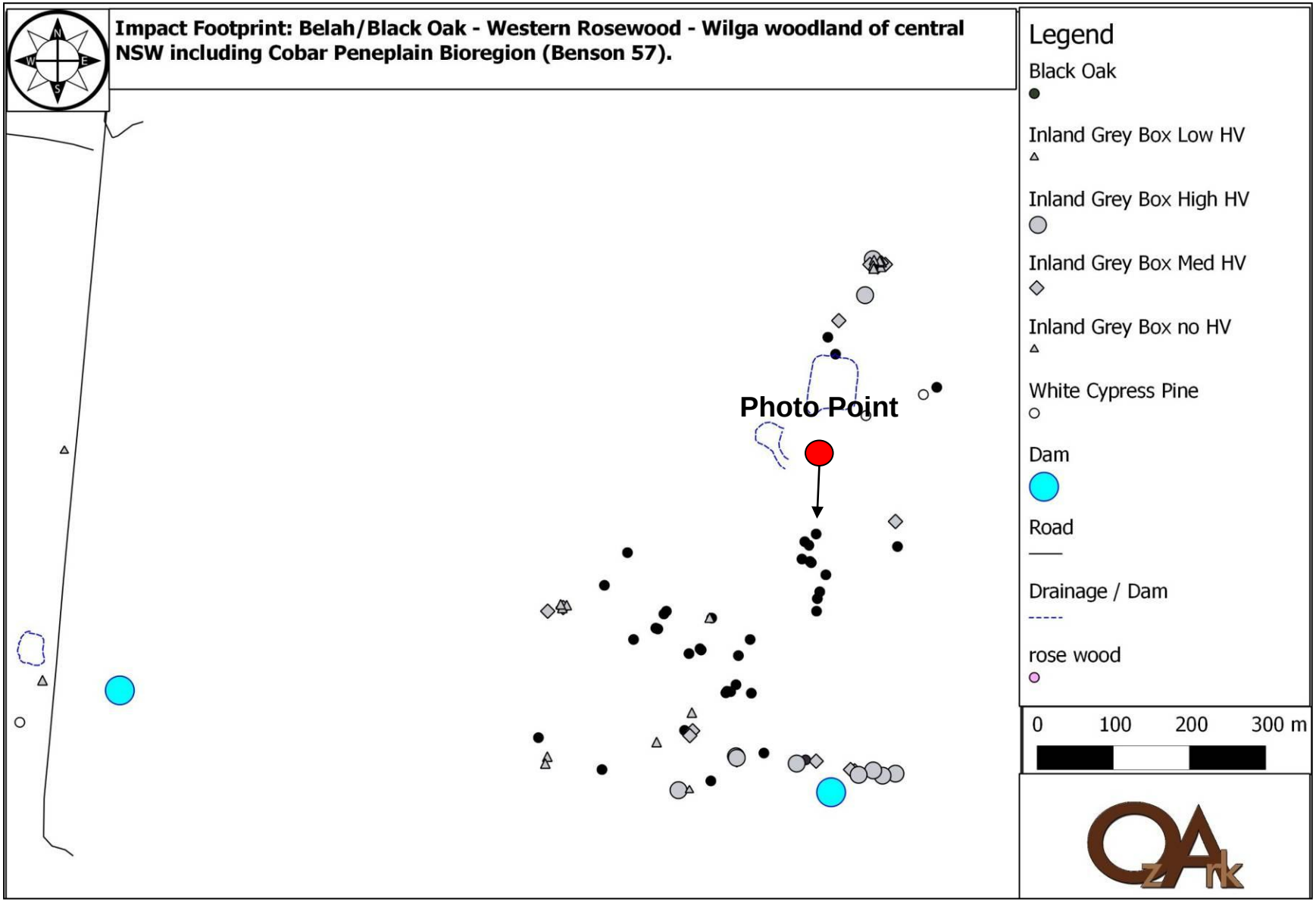
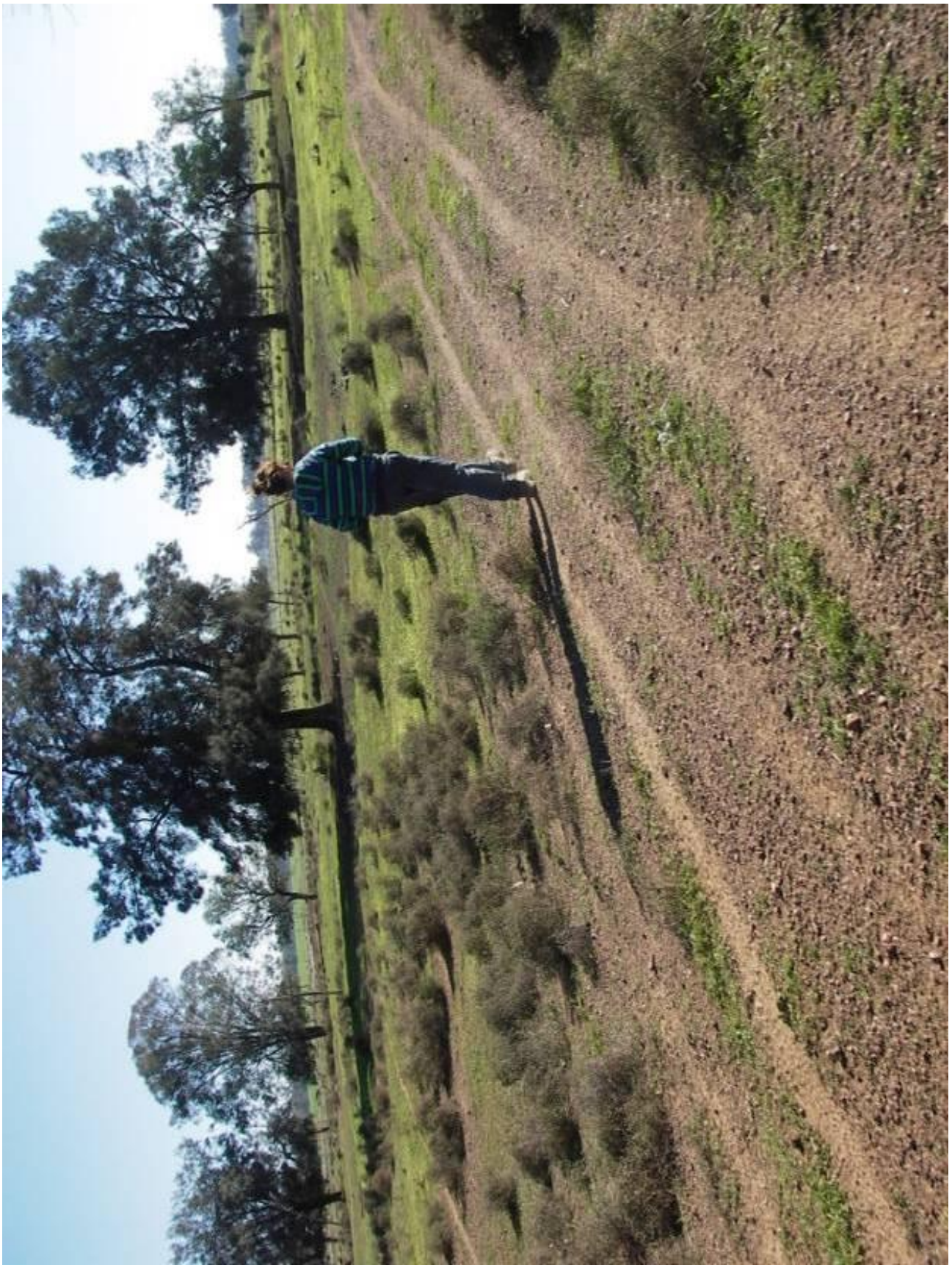


Photo: View south through the Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57) portion of the remnant.



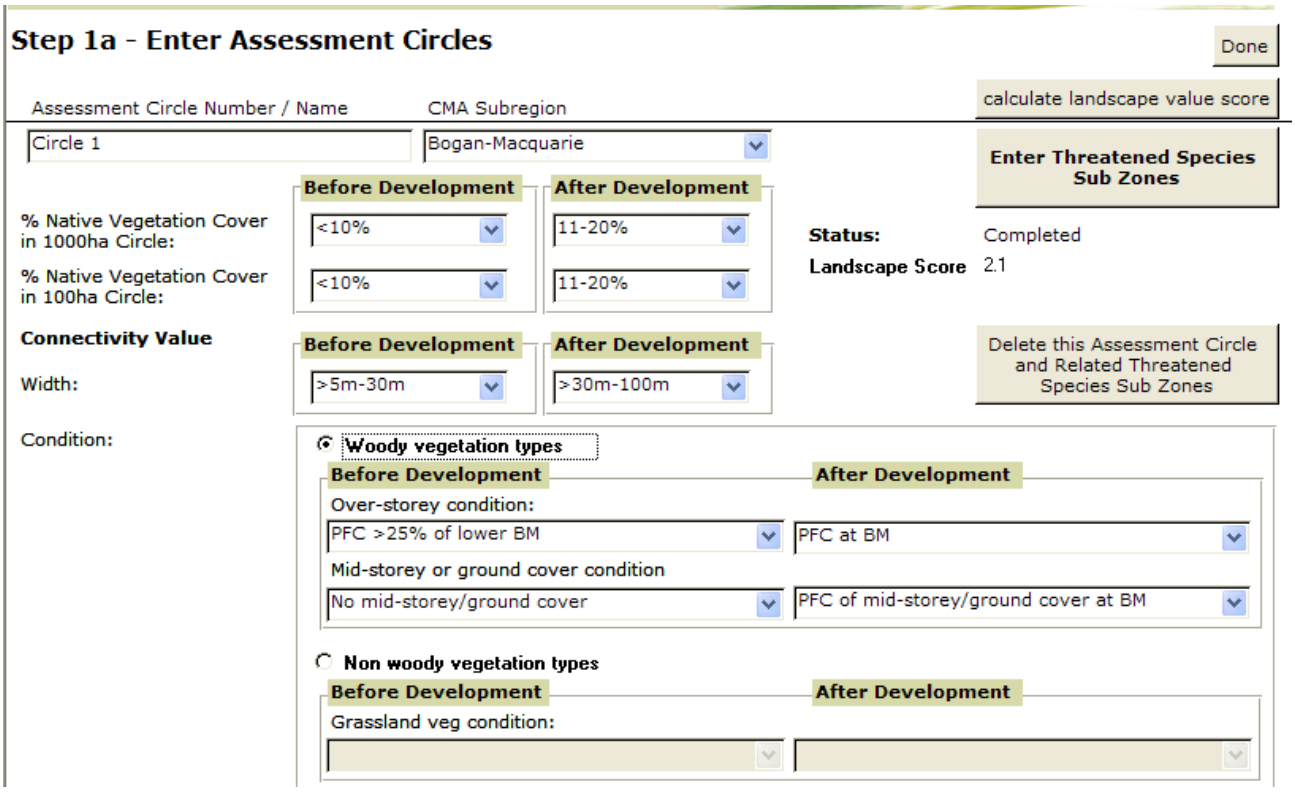
BioBanking Report

The following provides the actual information entered into the Biometric Tool by the assessor for both:

1. **The Impacted (Development) Site; and**

2. **The Biodiversity Offset Strategy (BioBanking) Site.**

1 IMPACTED (DEVELOPMENT) SITE



Step 1b - Enter Threatened Species Sub Zones

Done

Assessment Circle: Circle 1

Threatened Species Sub Zone Number:	Impact_Ben201	Condition class:	Moderate/Good	Status: Completed	Delete this Sub Zone
TS Sub Zone Area:	0.90 ha	Ancillary Code: (optional)	ImpactFootprint		
Adjacent Remnant Vegetation Area:	6.00 ha	Vegetation Zone:	CW138_Moderate/Good_ImpactFoot		
Patch Size, Including Low Condition Veg:	41.20 ha				
Veg Formation:	Grassy woodlands				
	Choose veg type from the drop-down menu				
Veg Type:	CW138				
Veg Type Name:	Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)				

Threatened Species Sub Zone Number:	Impact_Ben76	Condition class:	Moderate/Good	Status: Started	Delete this Sub Zone
TS Sub Zone Area:	3.60 ha	Ancillary Code: (optional)	ImpactFootprint		
Adjacent Remnant Vegetation Area:	24.70 ha	Vegetation Zone:	_Moderate/Good_ImpactFootprint		
Patch Size, Including Low Condition Veg:	31.30 ha				
Veg Formation:	Grassy woodlands				
	Choose veg type from the drop-down menu				
Veg Type:	CW145				
Veg Type Name:	Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)				

Threatened Species Sub Zone Number:	Impact Ben57	Condition class:	Low	Status: Completed	Delete this Sub Zone
TS Sub Zone Area:	18.00 ha	Ancillary Code: (optional)	Ben57_low		
Adjacent Remnant Vegetation Area:	0.00 ha	Vegetation Zone:	CW105_Low_Ben57_low		
Patch Size, Including	18.00 ha				

Add New Sub Zone | veg type field definitions | Export TS sub-zone data

Step 2

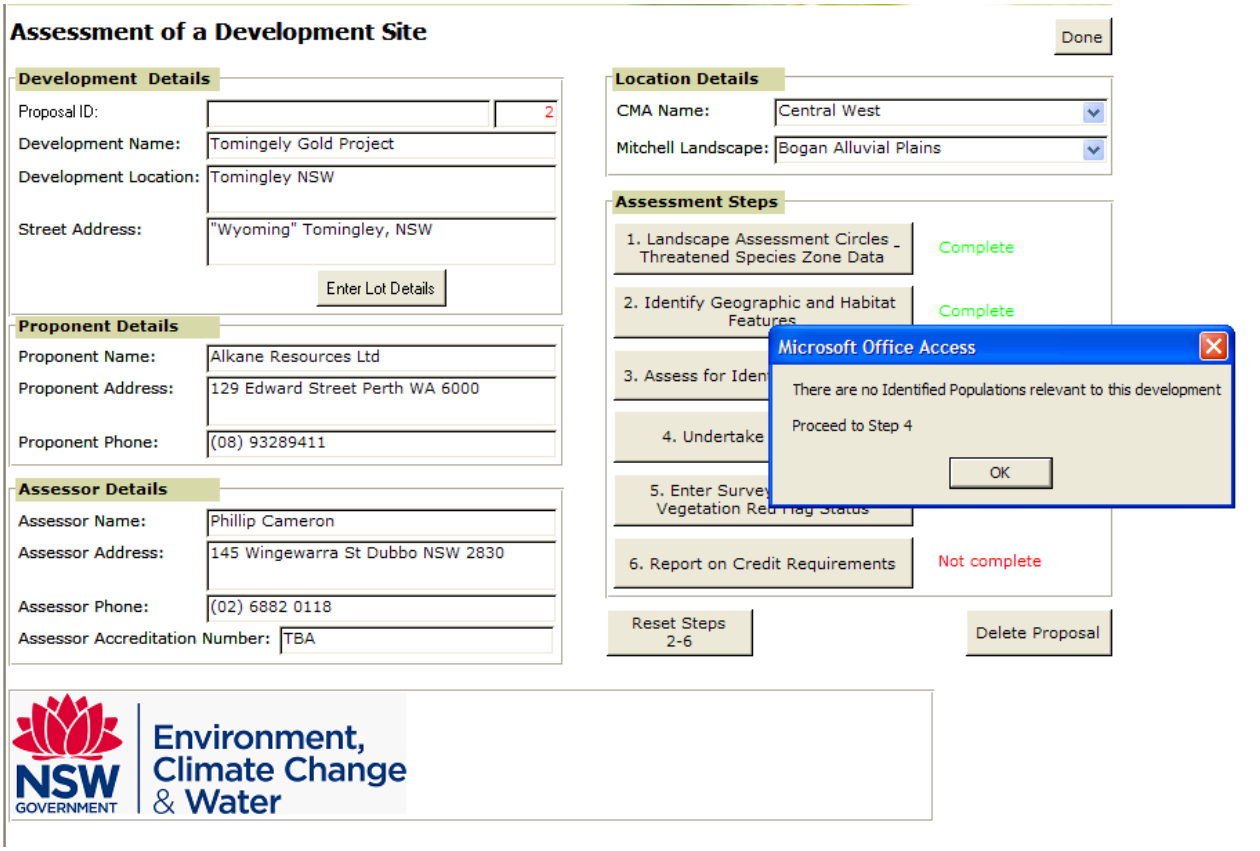
Step 2 - Identify Geographic and Habitat Features

Print Form | Done

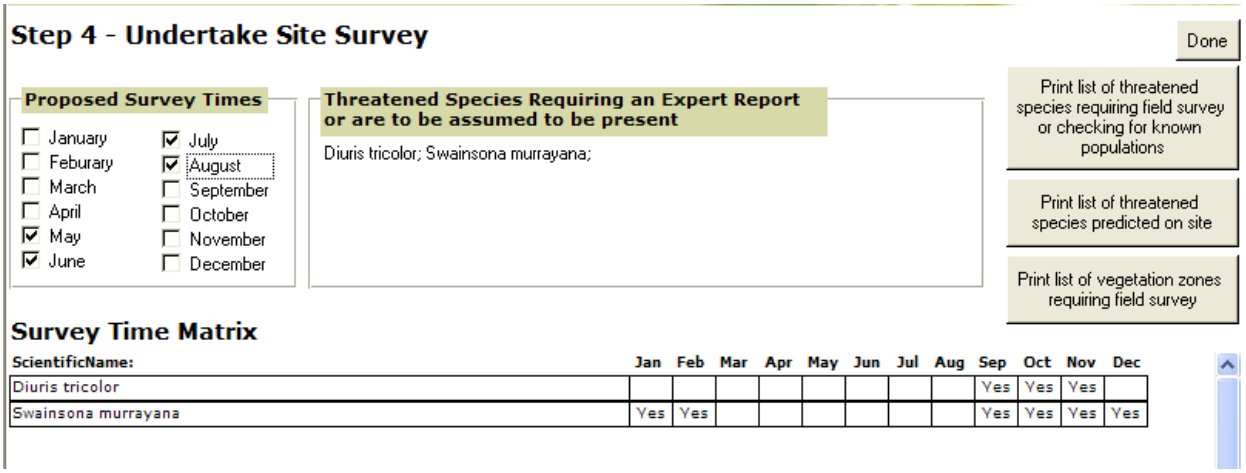
Does any part of the development impact on:

land containing a forb-rich grassy groundlayer	No
land within 40 m of rainforest, coastal scrub, riparian or estuarine communities	No
Land within 50 meters of identified breeding habitat.	No

Step 3


Assessment of a Development Site
Done
Development Details
Proposal ID:
2
Development Name:
Tomingely Gold Project
Development Location:
Tomingley NSW
Street Address:
"Wyoming" Tomingley, NSW
Enter Lot Details
Proponent Details
Proponent Name:
Alkane Resources Ltd
Proponent Address:
129 Edward Street Perth WA 6000
Proponent Phone:
(08) 93289411
Assessor Details
Assessor Name:
Phillip Cameron
Assessor Address:
145 Wingewarra St Dubbo NSW 2830
Assessor Phone:
(02) 6882 0118
Assessor Accreditation Number:
TBA
Location Details
CMA Name:
Central West
Mitchell Landscape:
Bogan Alluvial Plains
Assessment Steps
1. Landscape Assessment Circles _ Threatened Species Zone Data
Complete
2. Identify Geographic and Habitat Features
Complete
3. Assess for Iden
4. Undertake
5. Enter Survey Vegetation Red Flag Status
6. Report on Credit Requirements
Not complete
Reset Steps 2-6
Delete Proposal
Microsoft Office Access
There are no Identified Populations relevant to this development
Proceed to Step 4
OK
NSW GOVERNMENT
Environment, Climate Change & Water

Step 4


Step 4 - Undertake Site Survey
Done
Proposed Survey Times
January
Feburary
March
April
May
June
July
August
September
October
November
December
Threatened Species Requiring an Expert Report or are to be assumed to be present
Diuris tricolor; Swainsona murrayana;
Print list of threatened species requiring field survey or checking for known populations
Print list of threatened species predicted on site
Print list of vegetation zones requiring field survey
Survey Time Matrix
ScientificName: Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Diuris tricolor Yes Yes Yes Yes
Swainsona murrayana Yes Yes Yes Yes Yes Yes Yes Yes

Threatened Species Requiring Survey

Assessor Name: Phillip Cameron
Assessor Accreditation Number: TBA
Tool Version: 1.2
Report Created: 24-Jun-2011 14:43

Proposed Survey Time(s):

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
☐	☐	☐	☐	☑	☑	☑	☑	☐	☐	☐	☐

List of species requiring survey

Common Name	Scientific Name
Pine Donkey Orchid	Diuris tricolor
Slender Darling Pea	Swainsona murrayana

Threatened Species Predicted on Site

Assessor Name: Phillip Cameron
Assessor Accreditation Number: TBA
Tool Version: 1.2
Report Created: 24-Jun-2011 14:44

Threatened Species reliably predicted to utilize the site. No surveys are required for these species. Ecosystem credits apply to these species.

Diamond Firetail	Stagonopleura guttata
Glossy Black-cockatoo	Calyptorhynchus lathami
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis
Grey-headed Flying-fox	Pteropus poliocephalus
Koala	Phascolarctos cinereus
Little Pied Bat	Chalinolobus picatus
Pink Cockatoo	Cacatua leadbeateri
Red-tailed Black-Cockatoo (Inland subspecies)	Calyptorhynchus banksii samueli
Squirrel Glider	Petaurus norfolcensis
Superb Parrot	Polytelis swainsonii
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris

Vegetation Zones Requiring Transect/Plots Survey

Assessor Name: Phillip Cameron
Assessor Accreditation Number: TBA
Tool Version: 1.2
Report Created: 24-Jun-2011 14:45

Vegetation zone name: CW105_Low_Ben57_low

Vegetation type: Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)

Vegetation condition: Low **Ancillary code:** Ben57_low

Total area of zone (ha): 18 **Number of TS sub zones in the zone:** 1

Minimum number of survey transect/plots required within the zone: 2

Vegetation zone name: CW138_Moderate/Good_ImpactFootprint

Vegetation type: Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)

Vegetation condition: Moderate/Good **Ancillary code:** ImpactFootprint

Total area of zone (ha): 0.9 **Number of TS sub zones in the zone:** 1

Minimum number of survey transect/plots required within the zone: 1

Vegetation zone name: CW145_Moderate/Good_ImpactFootprint

Vegetation type: Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)

Vegetation condition: Moderate/Good **Ancillary code:** ImpactFootprint

Total area of zone (ha): 3.6 **Number of TS sub zones in the zone:** 1

Minimum number of survey transect/plots required within the zone: 2

Step 5

Step 5a - Vegetation Zone: EEC and Red Flag Status

Done

Name	% Cleared	EEC?	Red Flag?	Have minimum number of Transect/ plots been entered?	Area (ha)		
CW105_Low_Ben57_low	65	Not an EEC	No	Yes	18.00	Enter Transect/ Plots Complete	Enter Management Scores Complete
Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)							
CW138_Moderate/Good_ImpactFo	95	Fuzzy Box on alluvials of South	Yes	Yes	0.90	Enter Transect/ Plots Complete	Enter Management Scores Complete
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)							
CW145_Moderate/Good_ImpactFo	95	Not an EEC	Yes	Yes	3.60	Enter Transect/ Plots Complete	Enter Management Scores Complete
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)							

Step 5b - Enter Vegetation Transect/Plot Information

Done

Vegetation Zone Name: CW105_Low_Ben57_low

Vegetation Type: Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)

Required Plots
Minimum No. required transect/ plots: 2

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name:	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=15	10 to 40	0 to 5	0 to 10	5 to 15	5 to 15	See Manu	>=1	1	>=25				
Ben57_Low1	10	8	0	2	0	0	2	0	0	15	615397	6393919	55	Complete
Ben57_low2	7	1	0	0	0	0	2	0	0	10	615421	6393764	55	Complete

Step 5d - Enter Management Zone Attribute Score with Development

Management Zone Total destruction

Vegetation Zone: CW105_Low_Ben57_low

Vegetation Zone Type: Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)

TS Sub Zone Impact Ben57

Enter score with development for each site attribute

	Current Score (0-3)	Score with development (0-3)
Native plant species:	2	0
Native over-storey cover:	1	0
Native mid-storey cover:	3	0
Native ground cover (grasses):	3	0
Native ground cover (shrubs):	0	0
Native ground cover (other):	0	0
Exotic plant cover:	0	0
Number of trees with hollows:	0	0
Overstorey regeneration:	0	0
Total length of fallen logs:	2	0

Current Site Value Score (out of 100)	Future Site Value Score (out of 100)	Decrease in Site Value Score
30	0	30

Step 5b - Enter Vegetation Transect/Plot Information

Done

Vegetation Zone Name: CW138_Moderate/Good_ImpactFootprint

Vegetation Type: Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson

Required Plots
Minimum No. required transect/ plots: 1

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name:	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=25	12 to 35	1 to 25	15 to 70	3 to 5	3 to 20	See Manu	>=1	1	>=66				
Fuzzy Box Impact	6	20	0	3	0	3	3	1	1	20	614485	6393502	55	Complete

Step 5d - Enter Management Zone Attribute Score with Development

Done

Management Zone Total Destruction

Vegetation Zone: CW138_Moderate/Good_ImpactFootprint

Vegetation Zone Type: Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)

TS Sub Zone Impact_Ben201

Enter score with development for each site attribute

	Current Score (0-3)	Score with development (0-3)
Native plant species:	1	0
Native over-storey cover:	3	0
Native mid-storey cover:	0	0
Native ground cover (grasses):	1	0
Native ground cover (shrubs):	0	0
Native ground cover (other):	3	0
Exotic plant cover:	1	0
Number of trees with hollows:	3	0
Overstorey regeneration:	3	0
Total length of fallen logs:	1	0

Current Site Value Score (out of 100)	Future Site Value Score (out of 100)	Decrease in Site Value Score
51	0	51

Step 5b - Enter Vegetation Transect/Plot Information

Done

Vegetation Zone Name: CW145_Moderate/Good_ImpactFootprint

Vegetation Type: Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)

Required Plots
Minimum No. required transect/ plots: 2

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name:	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=25	8 to 35	3 to 10	13 to 50	3 to 5	3 to 15	See Manu	>=1	1	>=75				
Transect 1 IGB	7	20	0	3	0	3	2	1	0	30	614179	6393552	55	Complete
Transect 2 IGB	7	20	0	4	0	4	2	1	0	45	614068	6393572	55	Complete

Step 5d - Enter Management Zone Attribute Score with Development

Management Zone Total Destruction

Vegetation Zone: CW145_Moderate/Good_ImpactFootprint

Vegetation Zone Type: Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)

TS Sub Zone Impact_Ben76

Enter score with development for each site attribute

	Current Score (0-3)	Score with development (0-3)
Native plant species:	1	0
Native over-storey cover:	3	0
Native mid-storey cover:	0	0
Native ground cover (grasses):	1	0
Native ground cover (shrubs):	0	0
Native ground cover (other):	3	0
Exotic plant cover:	2	0
Number of trees with hollows:	3	0
Overstorey regeneration:	0	0
Total length of fallen logs:	2	0

Current Site Value Score (out of 100)	Future Site Value Score (out of 100)	Decrease in Site Value Score
41	0	41

Step 5e - Threatened Species - Survey Results

Next > >

		Is the species impacted by the development?	Identification Method	Loss	Units	No. considered a negligble loss
Diuris tricolor	Pine Donkey Orchid	No	Assumed	0	individuals	N/A
Swainsona murrayana	Slender Darling Pea	No	Assumed	0	individuals	N/A

Step 5f - Threatened Species - Loss Summary

Done

		Is it an Identified Population?	Can Identified Population be offset?	Total Loss	Units	Red flagged?
Diuris tricolor	Pine Donkey Orchid	N/A	N/A	0	individuals	No
Swainsona murrayana	Slender Darling Pea	N/A	N/A	0	individuals	No

Step 5 - Enter Survey Results

Enter Vegetation Plot Information and Red Flag Status — Complete

Enter Threatened Species Survey Information — Complete

Step 6 Report on credits to be created

BioBanking
Biodiversity Banking and Offsets Scheme

Biobanking Credit Report

This report identifies the number and type of credits required at a DEVELOPMENT SITE.

Date of report: 24/06/2011 Time: 15:17 Tool Version: 1.2

Development Details

Proposal ID:

Development Name:	TomingelyGold Project		
Development Location:	TomingleyNSW		
Development Address:	"Wyoming" Tomingley, NSW		
	Lot:	Section:	DP: 824086
	Lot:	Section:	DP: 115119
	Lot: 111	Section:	DP: 775511
	Lot: 10	Section:	DP: 775511
	Lot: 162	Section:	DP: 775509
	Lot: 17	Section:	DP: 775509
CMA:	Central West		
Proponent Name:	Alkane Resources Ltd		
Proponent Address:	129 Edward Street Perth WA 6000		
Proponent Phone:	(08) 93289411		
Assessor Name:	Phillip Cameron		
Assessor Address:	145 Wingewarra St Dubbo NSW 2830		
Assessor Phone:	(02) 6882 0118		
Assessor Accreditation Number:	TBA		

The following information is required to be submitted with this BioBanking Statement (where ticked)

☐ Local reference data is required for the following vegetation zones

☐ An Expert Report for the following species

☐ The minimum number of plots were not entered for the following vegetation zones

NSW GOVERNMENT Environment, Climate Change & Water

Improving or maintaining biodiversity values

The proposal has 1 or more Red Flag areas, as listed below:

Red Flag	Reason
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)	Vegetation type being > 70% cleared; Vegetation type contains an endangered ecological community;
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)	Vegetation type being > 70% cleared;

The development does not improve or maintain biodiversity values and a biobanking statement cannot be issued.

Ecosystem Credits

Vegetation Type	Area (ha)	Credits Required	Red Flag
Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57) [CW105]	18.0	453	No
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201) [CW138]	0.9	30	Yes
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) [CW145]	3.6	113	Yes

Credit Profiles

Group: 1 Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)

Ecosystem credits: 453 credits

Total area of vegetation(s): 18 ha

1. Surrounding vegetation cover	2. Patch size, including low condition
Description: Minimum surrounding vegetation cover in which the credits must be obtained.	Description: Minimum area of contiguous vegetation in which credits must be obtained.
Minimum percent cover: 0%	**Minimum area: 0 ha**

3. CMA subregion & vegetation types
Credits must be obtained in anyone or more of the following CMA Sub-regions and vegetation types:

Central West

CMA Sub-Region(s)	Veg Type(s)
Bogan-Macquarie	Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57) (CW105)
Castlereagh-Barwon	

Namoi

CMA Sub-Region(s)	Veg Type(s)
Castlereagh-Barwon	Carbeen woodland on alluvial soils (Benson 71) (NA126)

Group: 2 Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)

Ecosystem credits: 30 credits

Total area of vegetation(s): 0.9 ha

1. Surrounding vegetation cover	2. Patch size, including low condition
Description: Minimum surrounding vegetation cover in which the credits must be obtained. **Minimum percent cover: 0%**	Description: Minimum area of contiguous vegetation in which credits must be obtained. **Minimum area: 5 ha**

3. CMA subregion & vegetation types
Credits must be obtained in anyone or more of the following CMA Sub-regions and vegetation types:

Central West

CMA Sub-Region(s)	Veg Type(s)
Bogan-Macquarie	Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201) (CW138)
Canbelego Downs	
Castlereagh-Barwon	
Lower Slopes	
Nymagee-Rankins Springs	
Pilliga	
Pilliga Outwash	
Talbragar Valley	
Upper Slopes	

Lachlan

CMA Sub-Region(s)	Veg Type(s)
Upper Slopes	Riverine Inland Grey Box grassy woodland of the semi-arid (warm) climate zone (Benson 237) (LA194)

Group: 3 Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)

Ecosystem credits: 113 credits

Total area of vegetation(s): 3.6 ha

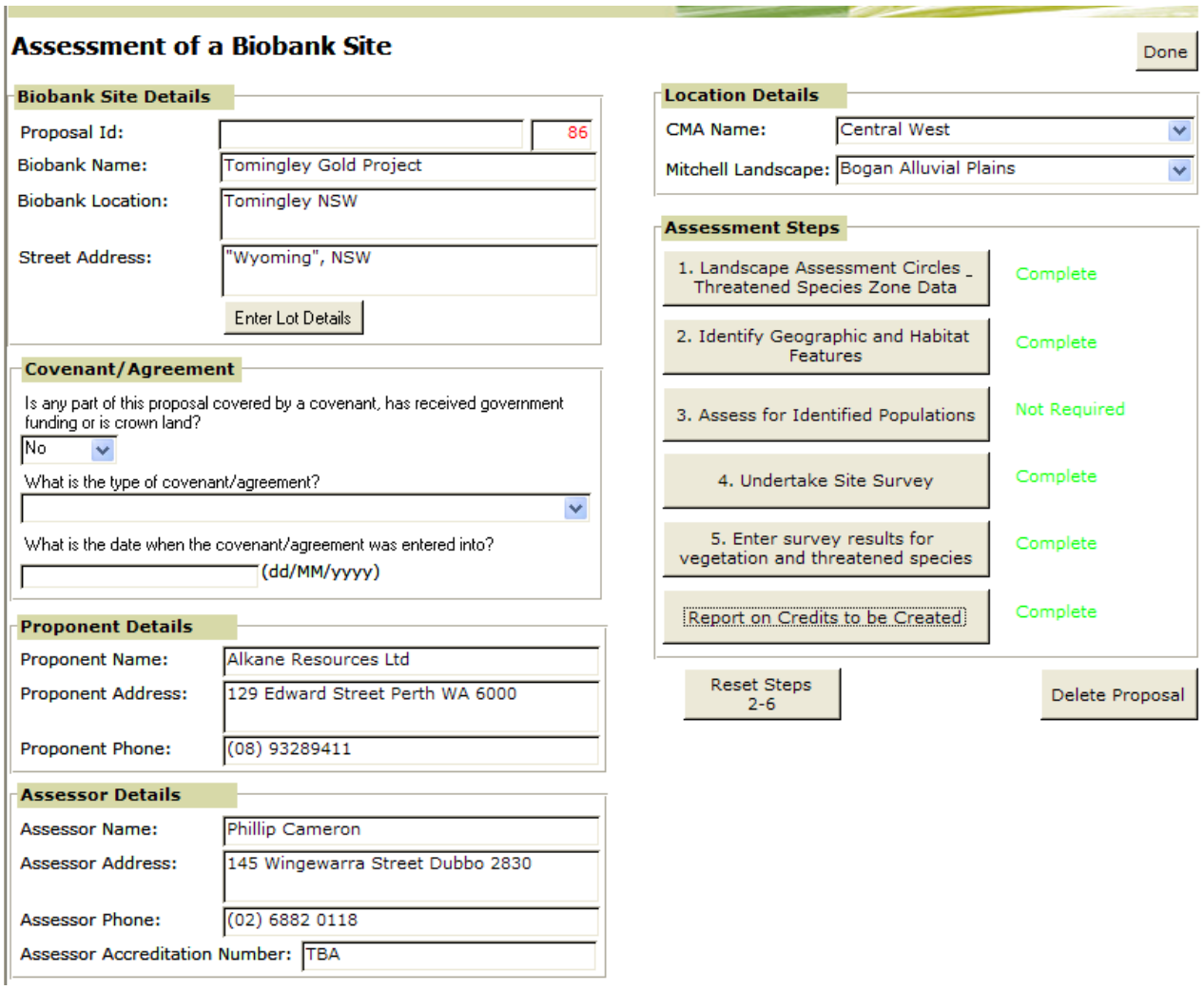
1. Surrounding vegetation cover	2. Patch size, including low condition
Description: Minimum surrounding vegetation cover in which the credits must be obtained. **Minimum percent cover: 0%**	Description: Minimum area of contiguous vegetation in which credits must be obtained. **Minimum area: 5 ha**

NSW GOVERNMENT Environment, Climate Change & Water

3. CMA subregion & vegetation types	
Credits must be obtained in anyone or more of the following CMA Sub-regions and vegetation types:	
Central West	
CMA Sub-Region(s)	**Veg Type(s)**
Bogan-Macquarie	Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) (CW145)

Species Credits

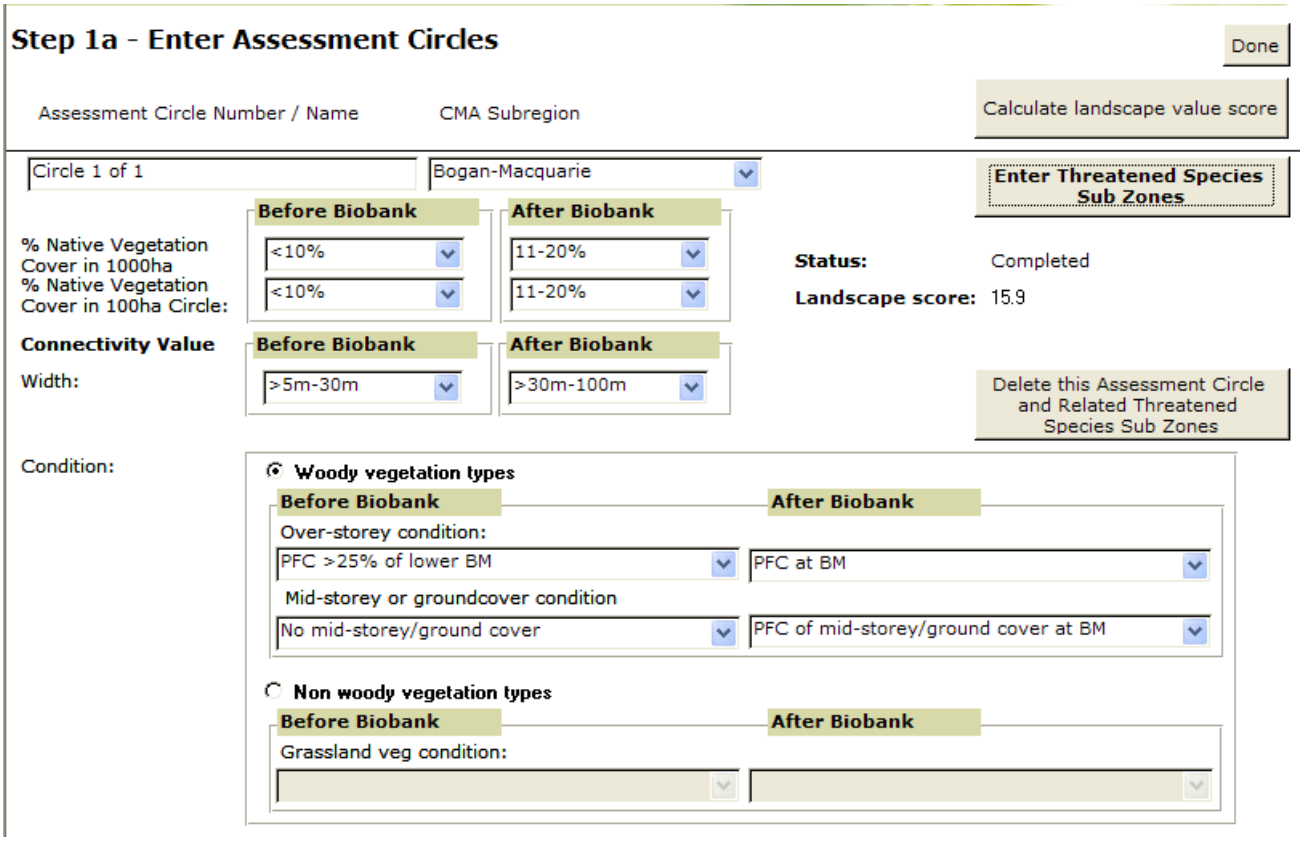
2 BIODIVERSITY OFFSET STRATEGY (BIOBANKING) SITE



Note: The author completed and passed the TAFE course mid 2010 but has not applied to be accredited by (OEH). This situation will be shortly rectified.

Step 1: Landscape Assessment Circles Threatened Species Zone data

Circle 1



Threatened species sub zones

Constraints:

Two condtions scores are applied. Extant vegegtion is given Moderate to Good (ground truthed) while areas to be rehabilitated / revegetated are currently in Low Condition (i.e. at the outer edges of the Moderate to Good remnant areas but either cropped or have trees cleared).

Step 1b - Enter Threatened Species Sub Zones

Done

Assessment Circle: Circle 1 of 1

Threatened Species Sub Zone Number:	Extant Ben_56		Condition class: Moderate/Good	Status: Completed	Delete This Sub Zone
TS Sub Zone Area:	4.90 ha		Ancillary Code (optional): No Change pre / post activity		
Adjacent Remnant Vegetation Area:	4.90 ha		Vegetation Zone: CW167_Moderate/Good _No Change pre / post		
Patch Size, Including Low Condition Veg:	4.90 ha				
Veg Formation:	Grassy woodlands				
	Choose veg type from the drop-down menu				
Veg Type:	CW167				
Veg Type Name:	Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56)				

Threatened Species Sub Zone Number:	Extant Ben_57_Good		Condition class: Moderate/Good	Status: Completed	Delete This Sub Zone
TS Sub Zone Area:	17.15 ha		Ancillary Code (optional): Extant Ben_57		
Adjacent Remnant Vegetation Area:	17.15 ha		Vegetation Zone: CW105_Moderate/Good _Extant Ben_57		
Patch Size, Including Low Condition Veg:	34.30 ha				
Veg Formation:	Semi-arid woodlands (shrubby sub-formation)				
	Choose veg type from the drop-down menu				
Veg Type:	CW105				
Veg Type Name:	Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)				

Threatened Species Sub Zone Number:	Extant Ben57_Low		Condition class: Low	Status: Started	Delete This Sub Zone
TS Sub Zone Area:	17.15 ha		Ancillary Code (optional): Ben 57_Extant_Low		
Adjacent Remnant Vegetation Area:	0.00 ha		Vegetation Zone: _Low		
Patch Size, Including Low Condition Veg:	17.15 ha				

Step 1b - Enter Threatened Species Sub Zones

Done

Assessment Circle: Circle 1 of 1

Threatened Species Sub Zone Number:	Reveg Ben_76		Condition class:	Low	Status: Completed
TS Sub Zone Area:	21.50	ha	Ancillary Code (optional):	Reveg Ben_76	Delete This Sub Zone
Adjacent Remnant Vegetation Area:	0.00	ha	Vegetation Zone:	CW145_Low_Reveg Ben_76	
Patch Size, Including Low Condition Veg:	31.10	ha			
Veg Formation:	Grassy woodlands				
	Choose veg type from the drop-down menu				
Veg Type:	CW145				
Veg Type Name:	Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)				

Threatened Species Sub Zone Number:	Extant Ben_78		Condition class:	Moderate/Good	Status: Completed
TS Sub Zone Area:	13.10	ha	Ancillary Code (optional):	Extant Ben_78	Delete This Sub Zone
Adjacent Remnant Vegetation Area:	18.10	ha	Vegetation Zone:	CW184_Moderate/Good _Extant Ben_78	
Patch Size, Including Low Condition Veg:	18.10	ha			
Veg Formation:	Forested wetlands				
	Choose veg type from the drop-down menu				
Veg Type:	CW184				
Veg Type Name:	River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)				

Threatened Species Sub Zone Number:	Reveg Ben_78		Condition class:	Low	Status: Completed
TS Sub Zone Area:	13.50	ha	Ancillary Code (optional):	Reveg Ben_78	Delete This Sub Zone
Adjacent Remnant Vegetation Area:	0.00	ha	Vegetation Zone:	CW184_Low_Reveg Ben_78	
Patch Size, Including Low Condition Veg:	31.60	ha			

Step 1b - Enter Threatened Species Sub Zones

Done

Assessment Circle: Circle 1 of 1

Threatened Species Sub Zone Number:	Extant Ben_201		Condition class:	Moderate/Good	Status: Completed
TS Sub Zone Area:	5.10	ha	Ancillary Code: (optional)	Extant Ben_201	Delete This Sub Zone
Adjacent Remnant Vegetation Area:	10.10	ha	Vegetation Zone:	CW138_Moderate/Good _Extant Ben_201	
Patch Size, Including Low Condition Veg:	15.20	ha			

Veg Formation: Grassy woodlands

Choose veg type from the drop-down menu

Veg Type: CW138

Veg Type Name: Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)

Threatened Species Sub Zone Number:	Reveg Ben_201		Condition class:	Low	Status: Completed
TS Sub Zone Area:	26.00	ha	Ancillary Code: (optional)	Reveg Ben_201	Delete This Sub Zone
Adjacent Remnant Vegetation Area:	0.00	ha	Vegetation Zone:	CW138_Low_Reveg Ben_201	
Patch Size, Including Low Condition Veg:	41.20	ha			

Veg Formation: Grassy woodlands

Choose veg type from the drop-down menu

Veg Type: CW138

Veg Type Name: Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)

Threatened Species Sub Zone Number:	Extant Ben_76		Condition class:	Moderate/Good	Status: Completed
TS Sub Zone Area:	21.10	ha	Ancillary Code: (optional)	Extant Veg Ben_76	Delete This Sub Zone
Adjacent Remnant Vegetation Area:	21.10	ha	Vegetation Zone:	CW145_Moderate/Good _Extant Veg Ben_76	
Patch Size, Including Low Condition Veg:	31.10	ha			

Step 2 Identify Geographic and habitat Features

Step 2 - Identify Geographic and Habitat Features Print Form Done

Is any part of the biobank site on:

land containing a forb-rich grassy groundlayer	No
land within 40 m of freshwater or saline wetlands (eg saltmarsh, mangroves, mudflats, swamps, billabongs, floodplains, watercourse pools, wet heathland and/or farm dams)	Yes
land within 40 m of rainforest, coastal scrub, riparian or estuarine communities	Yes
land within 40 m of watercourses, containing hollow-bearing trees, loose bark and/or fallen timber	Yes
Land within 50 meters of identified breeding habitat.	No
land within Capertee Valley in the Capertee CMA subregion	No

Step 3 Assess for Identified Populations

Assessment of a Biobank Site Done

Biobank Site Details

Proposal Id: 1111/1111/B111 86
Biobank Name: Tomingley Gold Project
Biobank Location: Tomingley, NSW
Street Address: "Wyoming" Tomingley, NSW.
Enter Lot Details

Covenant/Agreement

Is any part of this proposal covered by a covenant, has received government funding or is crown land? No
What is the type of covenant/agreement?
What is the date when the covenant/agreement was entered into? 18/06/2008

Proponent Details

Proponent Name: Alkane Resources Ltd
Proponent Address: 129 Edward Street Peth WA 6000
Proponent Phone: (08) 93289411

Assessor Details

Assessor Name: Phillip Cameron
Assessor Address: 145 Wingewarra Street Dubbo 2830
Assessor Phone: 02 6882 0118
Assessor Accreditation Number:

Location Details

CMA Name: Central West
Mitchell Landscape: Bogan Channels and Floodplains

Assessment Steps

1. Landscape Assessment Circles _ Threatened Species Zone Data — Complete
2. Identify Geographic and Habitat Features — Not Required
3. [illegible] — Not complete

Microsoft Office Access

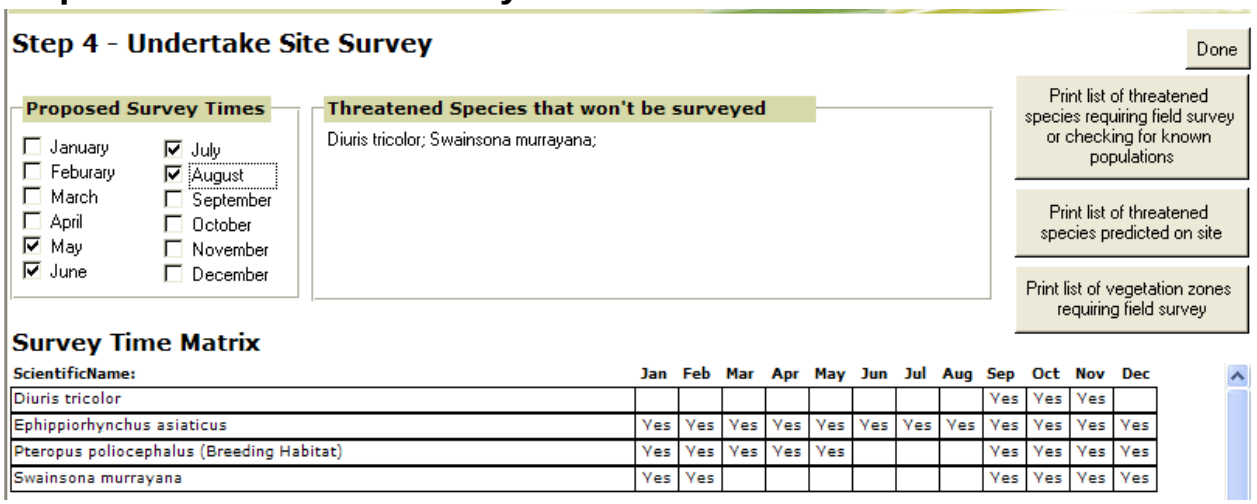
There are no Identified Populations relevant to this Biobank

Proceed to Step 4

OK

Reset Steps 2-6 Delete Proposal

Step 4 Undertake Site Survey



Step 4 - Undertake Site Survey

Done

Proposed Survey Times

- [ ] January
- [ ] Feburary
- [ ] March
- [ ] April
- [x] May
- [x] June
- [x] July
- [x] August
- [ ] September
- [ ] October
- [ ] November
- [ ] December

Threatened Species that won't be surveyed

Diuris tricolor; Swainsona murrayana;

Print list of threatened species requiring field survey or checking for known populations

Print list of threatened species predicted on site

Print list of vegetation zones requiring field survey

Survey Time Matrix

ScientificName:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Diuris tricolor									Yes	Yes	Yes	
Ephippiorhynchus asiaticus	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pteropus poliocephalus (Breeding Habitat)	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes	Yes
Swainsona murrayana	Yes	Yes							Yes	Yes	Yes	Yes

Threatened Species Requiring Survey

Assessor Name: Phillip Cameron
Assessor Accreditation Number: TBA
Tool Version: 1.2
Report Created: 24-Jun-2011 10:26

Proposed Survey Time(s):

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
☐	☐	☐	☐	☑	☑	☑	☑	☐	☐	☐	☐

List of species requiring survey

Common Name	Scientific Name
Pine Donkey Orchid	Diuris tricolor
Black-necked Stork	Ephippiorhynchus asiaticus
Grey-headed Flying-fox (Breeding Habitat)	Pteropus poliocephalus (Breeding Habitat)
Slender Darling Pea	Swainsona murrayana

Threatened Species Predicted on Site

Assessor Name: Phillip Cameron
Assessor Accreditation Number: TBA
Tool Version: 1.2
Report Created: 24-Jun-2011 10:28

Threatened Species reliably predicted to utilize the site. No surveys are required for these species. Ecosystem credits apply to these species.

Brolga	Grus rubicunda
Diamond Firetail	Stagonopleura guttata
Freckled Duck	Stictonetta naevosa
Glossy Black-cockatoo	Calyptorhynchus lathami
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis
Grey-headed Flying-fox	Pteropus poliocephalus
Koala	Phascolarctos cinereus
Little Pied Bat	Chalinolobus picatus
Magpie Goose	Anseranas semipalmata
Painted Snipe	Rostratula benghalensis
Pink Cockatoo	Cacatua leadbeateri
Red-tailed Black-Cockatoo (Inland subspecies)	Calyptorhynchus banksii samueli
Squirrel Glider	Petaurus norfolcensis
Superb Parrot	Polytelis swainsonii
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris

Vegetation Zones Requiring Transect/Plots Survey

Assessor Name: Phillip Cameron
Assessor Accreditation Number: TBA
Tool Version: 1.2
Report Created: 24-Jun-2011 10:30

Vegetation zone name: CW105_Low_Ben 57_Extant_Low

Vegetation type: Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW induding Cobar Peneplain Bioregion (Benson 57)

Vegetation condition: Low **Ancillary code:** Ben 57_Extant_Lo

Total area of zone (ha): 17.15 **Number of TS sub zones in the zone:** 1

Minimum number of survey transect/plots required within the zone: 2

Vegetation zone name: CW105_Moderate/Good_Extant Ben_57

Vegetation type: Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW induding Cobar Peneplain Bioregion (Benson 57)

Vegetation condition: Moderate/Good **Ancillary code:** Extant Ben_57

Total area of zone (ha): 17.15 **Number of TS sub zones in the zone:** 1

Minimum number of survey transect/plots required within the zone: 3

Vegetation zone name: CW138_Low_Reveg Ben_201

Vegetation type: Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)

Vegetation condition: Low **Ancillary code:** Reveg Ben_201

Total area of zone (ha): 26 **Number of TS sub zones in the zone:** 1

Minimum number of survey transect/plots required within the zone: 3

This vegetation type is potentially part of the following EECs:

- Fuzzy Box on alluvials of South West Slopes, Darling Riverine Plains & the Brigalow Belt South

Vegetation zone name: CW138_Moderate/Good_Extant Ben_201

Vegetation type: Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)

Vegetation condition: Moderate/Good **Ancillary code:** Extant Ben_201

Total area of zone (ha): 5.1 **Number of TS sub zones in the zone:** 1

Minimum number of survey transect/plots required within the zone: 3

This vegetation type is potentially part of the following EECs:

- Fuzzy Box on alluvials of South West Slopes, Darling Riverine Plains & the Brigalow Belt South

Vegetation zone name: CW145_Low_Reveg Ben_76

Vegetation type: Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)

Vegetation condition: Low **Ancillary code:** Reveg Ben_76

Total area of zone (ha): 21.5 **Number of TS sub zones in the zone:** 1

Minimum number of survey transect/plots required within the zone: 3

This vegetation type is potentially part of the following EECs:

- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions

Vegetation zone name: CW145_Moderate/Good_Extant Veg Ben_76

Vegetation type: Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)

Vegetation condition: Moderate/Good **Ancillary code:** Extant Veg Ben_7

Number of TS sub zones in the zone: 1

Total area of zone (ha): 21.1

Minimum number of survey transect/plots required within the zone: 4

This vegetation type is potentially part of the following EECs:

- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions

Vegetation zone name: CW167_Moderate/Good_No Change pre / post activity

Vegetation type: Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56)

Vegetation condition: Moderate/Good **Ancillary code:** No Change pre / p

Number of TS sub zones in the zone: 1

Total area of zone (ha): 4.9

Minimum number of survey transect/plots required within the zone: 3

This vegetation type is potentially part of the following EECs:

- Artesian Springs Ecological Community
- Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions

Vegetation zone name: CW184_Low_Reveg Ben_78

Vegetation type: River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)

Vegetation condition: Low **Ancillary code:** Reveg Ben_78

Number of TS sub zones in the zone: 1

Total area of zone (ha): 13.5

Minimum number of survey transect/plots required within the zone: 2

Vegetation zone name: CW184_Moderate/Good_Extant Ben_78

Vegetation type: River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)

Vegetation condition: Moderate/Good **Ancillary code:** Extant Ben_78

Number of TS sub zones in the zone: 1

Total area of zone (ha): 13.1

Minimum number of survey transect/plots required within the zone: 3

Step 5 Enter Survey Results for Vegetation and Threatened Species

Note Constraints:

- Development sites were assessed as per BioBanking methods.
- The BioBanking area assessment is desk top (but an educated assessment as the author has assessed each location under Part 3A).
- The BioBanking sites were assessed on foot during the ecological investigation. Values included are based upon assessed impact footprints (collected BioBanking style) or modified where local knowledge has been applied.
- In summary the vegetation is largely homogenous in the Project Site and as such using development impact footprints as the benchmark and local knowledge is not considered to be a significant constraint to determine habitat values. The author knows the property very well and was able to increase or decrease impact footprint benchmark values as required.
- Benson 76 is an EEC but the BioBanking Calculator drop box does not allow for this to be entered in (default is 'No or Not an EEC').

Benson 57 Low Condition

Step 5b - Enter Vegetation Transect/Plot Information Done

Vegetation Zone Nam CW105_Low_Ben 57_Extant_Low

Vegetation Type: Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)

Required Plots
Minimum No. required transect/plots: 2

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=15	10 to 40	0 to 5	0 to 10	5 to 15	5 to 15	See Manu	>=1	1	>=25				
West	3	5	0	2	0	1	3	0	0	5	614815	6393636	55	Complete
East	3	5	0	2	0	1	3	0	0	10	615249	6393517	55	Complete

Enter additional site value increase or decrease

Done

Management Zone All of remnant

Vegetation Zone: CW105_Low_Ben 57_Extant_Low

Vegetation Zone Type: Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)

TS Sub Zone Extant Ben57_Low

Any additional gain in the site value score requires the approval of the Director General. Additional gain in the site value score will only be approved where it can be demonstrated that additional management actions will be undertaken

	Current Score (0-3)	Default Increased Score (0-3)	Score with management (0-3)	Reason for score changes
Native plant species:	1	1.5	2	Exclusion of grazing
Native over-storey cover:	2	3	3	
Native mid-storey cover:	3	3	3	
Native ground cover (grasses):	3	3	3	
Native ground cover (shrubs):	0	1	1	
Native ground cover (other):	1	2	2	
Exotic plant cover:	1	1.5	2	Weed Management
Number of trees with hollows:	0	0	0	
Overstorey regeneration:	0	0.5	1	Feral Animal Control
Total length of fallen logs:	1	1.5	1.5	
	Current Site Value (out of 100)	**Default Increased Site Value (out of 100)**	**Future Site Value (out of 100)**	**Increase in Site Value**
	28	**43**	**49**	**21**

Benson 57 Moderate Condition

Step 5b - Enter Vegetation Transect/Plot Information Done

Vegetation Zone Nam CW105_Moderate/Good_Extant Ben_57

Vegetation Type: Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)

Required Plots
Minimum No. required transect/plots: 3

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=15	10 to 40	0 to 5	0 to 10	5 to 15	5 to 15	See Manu	>=1	1	>=25				
West	10	20	0	2	0	2	3	0	0	25	615959	6394371	55	Complete
Central	10	20	0	2	0	2	3	0	0	25	616212	6394464	55	Complete
East	10	10	0	2	0	2	3	0	0	5	616427	6394189	55	Complete

Enter additional site value increase or decrease

Done

Management Zone All of Remnant

Vegetation Zone: CW105_Moderate/Good_Extant Ben_57

Vegetation Zone Type: Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)

TS Sub Zone Extant Ben_57_Good

Any additional gain in the site value score requires the approval of the Director General. Additional gain in the site value score will only be approved where it can be demonstrated that additional management actions will be undertaken

	Current Score (0-3)	Default Increased Score (0-3)	Score with management (0-3)	Reason for score changes
Native plant species:	2	3	3	
Native over-storey cover:	3	3	3	
Native mid-storey cover:	3	3	3	
Native ground cover (grasses):	3	3	3	
Native ground cover (shrubs):	0	1	1	
Native ground cover (other):	1	2	2	
Exotic plant cover:	1	1.5	2	Weed Control
Number of trees with hollows:	0	0	0	
Overstorey regeneration:	0	0.5	0.5	
Total length of fallen logs:	2	3	3	
	Current Site Value (out of 100)	**Default Increased Site Value (out of 100)**	**Future Site Value (out of 100)**	**Increase in Site Value**
	43	**61**	**63**	**20**

Benson 201 Low Condition (area to be revegetated)

Vegetation Zone Nam CW138_Low_Reveg Ben_201

Vegetation Type: Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)

Required Plots
Minimum No. required transect/plots: 3

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=25	12 to 35	1 to 25	15 to 70	3 to 5	3 to 20	See Manu	>=1	1	>=66				
FB_LC1	10	12	0	3	0	1	3	1	0	10	614352	6395300	55	Complete
FB_LC2	10	12	0	3	0	2	3	1	0	5	616438	6393936	55	Complete
FB_LC3	10	12	0	3	0	2	3	1	0	5	616223	6395097	55	Complete

Enter additional site value increase or decrease

Done

Management Zone All Areas

Vegetation Zone: CW138_Low_Reveg Ben_201

Vegetation Zone Type: Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)

TS Sub Zone Reveg Ben_201

Any additional gain in the site value score requires the approval of the Director General. Additional gain in the site value score will only be approved where it can be demonstrated that additional management actions will be undertaken

	Current Score (0-3)	Default Increased Score (0-3)	Score with management (0-3)	Reason for score changes
Native plant species:	1	1.5	2	Direct Seeding, Exclusion of Grazing, Weed Control
Native over-storey cover:	3	3	3	
Native mid-storey cover:	0	1	1.5	Direct Seeding, Exclusion of Grazing, Weed Control
Native ground cover (grasses):	1	2	3	Exclusion of Grazing, Weed Control
Native ground cover (shrubs):	0	1	1	
Native ground cover (other):	2	3	3	
Exotic plant cover:	1	1.5	2	Weed Control
Number of trees with hollows:	3	3	3	
Overstorey regeneration:	0	0.5	1	Direct Seeding, Exclusion of Grazing, Weed Control
Total length of fallen logs:	1	1.5	2	Impacted trees on Project Site relocated into these areas
	Current Site Value (out of 100)	**Default Increased Site Value (out of 100)**	**Future Site Value (out of 100)**	**Increase in Site Value**
	33	**48**	**62**	**29**

Benson 201 Moderate Condition (Extant vegetation)

Step 5b - Enter Vegetation Transect/Plot Information Done

Vegetation Zone Nam CW138_Moderate/Good_Extant Ben_201

Vegetation Type: Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)

Required Plots Minimum No. required transect/plots: 3

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=25	12 to 35	1 to 25	15 to 70	3 to 5	3 to 20	See Manu	>=1	1	>=66				
FB_MC1	10	20	0	3	0	2	3	1	0	25	614546	6393475	55	Complete
FB_MC2	10	20	0	3	0	2	3	1	0	20	615640	6395010	55	Complete
FB_MC3	10	20	0	3	0	2	3	1	0	20	616495	6393994	55	Complete

Enter additional site value increase or decrease

Done

Management Zone All of remnants

Vegetation Zone: CW138_Moderate/Good_Extant Ben_201

Vegetation Zone Type: Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)

TS Sub Zone Extant Ben_201

Any additional gain in the site value score requires the approval of the Director General. Additional gain in the site value score will only be approved where it can be demonstrated that additional management actions will be undertaken

	Current Score (0-3)	Default Increased Score (0-3)	Score with management (0-3)	Reason for score changes
Native plant species:	1	1.5	2	Exclusion of stock, weed control
Native over-storey cover:	3	3	3	
Native mid-storey cover:	0	1	1.5	Exclusion of stock, weed control, direct seeding adjacent to remnant
Native ground cover (grasses):	1	2	3	Exclusion of stock, weed control,
Native ground cover (shrubs):	0	1	1	
Native ground cover (other):	2	3	3	
Exotic plant cover:	1	1.5	2	Weed Control
Number of trees with hollows:	3	3	3	
Overstorey regeneration:	0	0.5	1	Exclusion of stock and weed control
Total length of fallen logs:	1	1.5	1.5	
	Current Site Value (out of 100)	**Default Increased Site Value (out of 100)**	**Future Site Value (out of 100)**	**Increase in Site Value**
	33	**48**	**59**	**27**

Benson 76 Low Condition (area to be revegetated)

Step 5b - Enter Vegetation Transect/Plot Information

Done

Vegetation Zone Nam CW145_Low_Reveg Ben_76

Vegetation Type: Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)

Required Plots
Minimum No. required transect/plots: 3

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=25	8 to 35	3 to 10	13 to 50	3 to 5	3 to 15	See Manu	>=1	1	>=75				
IGB_Low1	6	8	0	3	0	2	3	1	0	0	613135	6396137	55	Complete
IGB_Low2	1	1	0	0	0	0	3	0	0	0	614266	6395595	55	Complete
IGB_Low3	6	8	0	3	0	2	3	1	0	0	616296	6393489	55	Complete

Enter additional site value increase or decrease

Done

Management Zone all of areas

Vegetation Zone: CW145_Low_Reveg Ben_76

Vegetation Zone Type: Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)

TS Sub Zone Reveg Ben_76

Any additional gain in the site value score requires the approval of the Director General. Additional gain in the site value score will only be approved where it can be demonstrated that additional management actions will be undertaken

	Current Score (0-3)	Default Increased Score (0-3)	Score with management (0-3)	Reason for score changes
Native plant species:	1	1.5	2	Direct drilling, exclusion of grazing, weed control, feral animal control
Native over-storey cover:	2	3	3	
Native mid-storey cover:	0	1	1.5	Direct drilling, exclusion of grazing, weed control, feral animal control
Native ground cover (grasses):	1	2	3	Exclusion of grazing, weed control, feral animal control
Native ground cover (shrubs):	0	1	1	
Native ground cover (other):	1	2	2	
Exotic plant cover:	1	1.5	2	Exclusion of grazing, weed control, feral animal control
Number of trees with hollows:	2	2.5	2.5	
Overstorey regeneration:	0	0.5	1	Direct drilling, exclusion of grazing, weed control, feral animal control
Total length of fallen logs:	0	0	0.5	Removed trees to be relocated into this area.
	Current Site Value (out of 100)	**Default Increased Site Value (out of 100)**	**Future Site Value (out of 100)**	**Increase in Site Value**
	21	**37**	**51**	**30**

Benson 76 Moderate Condition (Extant vegetation)

Step 5b - Enter Vegetation Transect/Plot Information

Done

Vegetation Zone Nam CW145_Moderate/Good_Extant Veg Ben_76

Vegetation Type: Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)

Required Plots
Minimum No. required transect/plots: 4

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=25	8 to 35	3 to 10	13 to 50	3 to 5	3 to 15	See Manu	>=1	1	>=75				
Ben76_MC1	25	12	0	4	0	2	3	1	0	30	612991	6395349	55	Complete
Ben76_MC2	25	12	0	4	0	2	3	1	0	56	613267	6393703	55	Complete
Ben76_MC3	25	12	0	4	0	2	3	1	0	40	616394	6393354	55	Complete
Ben76_MC4	25	12	0	4	0	2	3	1	0	40	616632	6394815	55	Complete

Enter additional site value increase or decrease

Done

Management Zone All areas

Vegetation Zone: CW145_Moderate/Good_Extant Veg Ben_76

Vegetation Zone Type: Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)

TS Sub Zone Extant Ben_76

Any additional gain in the site value score requires the approval of the Director General. Additional gain in the site value score will only be approved where it can be demonstrated that additional management actions will be undertaken

	Current Score (0-3)	Default Increased Score (0-3)	Score with management (0-3)	Reason for score changes
Native plant species:	3	3	3	
Native over-storey cover:	3	3	3	
Native mid-storey cover:	0	1	1.5	Exclusion of Grazing, Weed Control, Feral Animal Control
Native ground cover (grasses):	1	2	3	Exclusion of Grazing, Weed Control, Feral Animal Control
Native ground cover (shrubs):	0	1	1	
Native ground cover (other):	2	3	3	
Exotic plant cover:	1	1.5	1.5	
Number of trees with hollows:	3	3	3	
Overstorey regeneration:	0	0.5	1	Exclusion of Grazing, Weed Control, Feral Animal Control
Total length of fallen logs:	2	3	3	
	Current Site Value (out of 100)	**Default Increased Site Value (out of 100)**	**Future Site Value (out of 100)**	**Increase in Site Value**
	51	**66**	**72**	**22**

Benson 201 Low Condition (area to be revegetated)

Step 5b - Enter Vegetation Transect/Plot Information Done

Vegetation Zone Nam CW167_Moderate/Good_No Change pre / post activity

Vegetation Type: Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56)

Required Plots
Minimum No. required transect/plots: 3

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=25	8 to 35	3 to 10	13 to 50	3 to 5	3 to 15	See Manu	>=1	1	>=75				
PB_MC1	25	30	3	13	3	8	2	1	1	50	614401	6395932	55	Complete
PB_MC2	25	30	3	13	3	8	2	1	1	50	614387	6395908	55	Complete
PB_MC3	25	30	3	13	3	8	2	1	1	50	614434	6396097	55	Complete

Step 5d- Enter Management Zone Attribute Score for Biobank Done

Management Zone All of remnant

Vegetation Zone: CW167_Moderate/Good_No Change pre / post activity

Vegetation Zone Type: Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56)

TS Sub Zone Extant Ben_56

This is a summary sheet. No data entry is required.

	Current Score (0-3)	Default Increased Score (0-3)
Native plant species:	3	3
Native over-storey cover:	3	3
Native mid-storey cover:	3	3
Native ground cover (grasses):	3	3
Native ground cover (shrubs):	3	3
Native ground cover (other):	3	3
Exotic plant cover:	2	3
Number of trees with hollows:	3	3
Overstorey regeneration:	3	3
Total length of fallen logs:	2	3
		Increase in Site Value
Total Score (Out of 100):	**91**	**100**	**9**	**100**

Request additional gain in site value | Reduce in gain in site value lower than default

Benson 76 Moderate Condition (Extant vegetation)

Step 5b - Enter Vegetation Transect/Plot Information

Done

Vegetation Zone Nam CW184_Moderate/Good_Extant Ben_78

Vegetation Type: River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)

Required Plots
Minimum No. required transect/plots: 3

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=25	10 to 33	4 to 15	5 to 20	3 to 10	5 to 20	See Manu	>=2	1	>=56				
Ben78_MC1	8	10	0	3	0	0	0	0	0	0	614222	6395652	55	Complete
Ben78_MC1	14	20	4	9	0	5	0	0	1	50	614441	6396029	55	Complete
Ben78_MC1	25	30	10	17	2	5	0	0	1	70	614522	6396366	55	Complete

Enter additional site value increase or decrease

Done

Management Zone All of remnant

Vegetation Zone: CW184_Moderate/Good_Extant Ben_78

Vegetation Zone Type: River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)

TS Sub Zone Extant Ben_78

Any additional gain in the site value score requires the approval of the Director General. Additional gain in the site value score will only be approved where it can be demonstrated that additional management actions will be undertaken

	Current Score (0-3)	Default Increased Score (0-3)	Score with management (0-3)	Reason for score changes
Native plant species:	2	3	3	
Native over-storey cover:	3	3	3	
Native mid-storey cover:	3	3	3	
Native ground cover (grasses):	3	3	3	
Native ground cover (shrubs):	1	2	2.5	Weed Control
Native ground cover (other):	2	3	3	
Exotic plant cover:	3	3	3	
Number of trees with hollows:	0	0	0	
Overstorey regeneration:	2	3	3	
Total length of fallen logs:	2	3	3	

Current Site Value (out of 100)	**Default Increased Site Value (out of 100)**	**Future Site Value (out of 100)**	**Increase in Site Value**
57	**77**	**77**	**20**

Benson 78 Low Condition (area to be revegetated)

Step 5b - Enter Vegetation Transect/Plot Information

Done

Vegetation Zone Nam CW184_Low_Reveg Ben_78

Vegetation Type: River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)

Required Plots
Minimum No. required transect/plots: 2

Enter measurements for each site attribute

Local Benchmark used: No

Edit Benchmarks

Transect/Plot Number/Name	Native plant species:	Native over-storey cover:	Native mid-storey cover:	Native ground cover (grasses):	Native ground cover (shrubs):	Native ground cover (other):	Exotic plant cover:	Number of trees with hollows:	Overstorey regeneration:	Total length of fallen logs:	Easting:	Northing:	Zone:	Plot status:
Benchmarks	>=25	10 to 33	4 to 15	5 to 20	3 to 10	5 to 20	See Manu	>=2	1	>=56				
Ben78_MC1	15	5	0	3	0	0	3	1	0	0	614085	6395521	55	Complete
Ben78_MC2	15	5	0	3	0	0	3	0	0	0	613856	6395322	55	Complete

Enter additional site value increase or decrease

Done

Management Zone All of area

Vegetation Zone: CW184_Low_Reveg Ben_78

Vegetation Zone Type: River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)

TS Sub Zone Reveg Ben_78

Any additional gain in the site value score requires the approval of the Director General. Additional gain in the site value score will only be approved where it can be demonstrated that additional management actions will be undertaken

	Current Score (0-3)	Default Increased Score (0-3)	Score with management (0-3)	Reason for score changes
Native plant species:	2	3	3	
Native over-storey cover:	2	3	3	
Native mid-storey cover:	0	1	1.5	Direct drilling, grazing excluded, weed and feral animal control
Native ground cover (grasses):	2	3	3	
Native ground cover (shrubs):	0	1	1	
Native ground cover (other):	0	1	1	
Exotic plant cover:	1	1.5	2	Weed Control
Number of trees with hollows:	1	1.5	1.5	
Overstorey regeneration:	0	0.5	1	Direct drilling, grazing excluded, weed and feral animal control.
Total length of fallen logs:	0	0	0	
	Current Site Value (out of 100)	**Default Increased Site Value (out of 100)**	**Future Site Value (out of 100)**	**Increase in Site Value**
	23	**43**	**49**	**26**

Step 5f- Threatened Species- Survey Results

Next > >

		Is the species present and to be managed at the Biobank site?	Identification Method	size of species polygon	Units	Name of man
Diuris tricolor	Pine Donkey Orchid	No	Expert Report	0	individuals	
Ephippiorhynchus asiaticus	Black-necked Stork	No	Survey	0	ha	
Pteropus poliocephalus (Breeding Habitat)	Grey-headed Flying-fox (Breeding Habitat)	No	Survey	0	ha	
Swainsona murrayana	Slender Darling Pea	No	Expert Report	0	individuals	

Step 5g- Threatened Species- Summary

Done

		Is it an Identified Population?	Total Size	Units	
Diuris tricolor	Pine Donkey Orchid	N/A	0	individuals	Pre-existing management actions
Ephippiorhynchus asiaticus	Black-necked Stork	N/A	0	ha	Pre-existing management actions
Pteropus poliocephalus (Breeding Habitat)	Grey-headed Flying-fox (Breeding Habitat)	N/A	0	ha	Pre-existing management actions
Swainsona murrayana	Slender Darling Pea	N/A	0	individuals	Pre-existing management actions

Step 5 - Enter Survey Results

Enter Vegetation Plot Information and EEC Status — Complete

Enter Threatened Species Survey Information — Complete

Step 6 Report on credits to be created

BioBanking
Biodiversity Banking and Offsets Scheme

Biobanking Agreement Credit Report

This report identifies the number and type of credits that may be created at a BIOBANK SITE.

Date of report: 24/06/2011 Time: 12:45 Tool Version: 1.2

Property Details

Proposal ID:

Biobank Name:	TomingleyGold Project		
Biobank Location:	TomingleyNSW		
Biobank Adress:	"Wyoming", NSW		
	Lot:	**Section:**	**DP:** 775511
	Lot:	**Section:**	**DP:** 755093
	Lot:	**Section:**	**DP:** 824086
	Lot:	**Section:**	**DP:** 115119
	Lot:	**Section:**	**DP:**
	Lot:	**Section:**	**DP:**
CMA:	Central West		
Landholder Name:	Alkane Resources Ltd		
Landholder Address:	129 Edward Street Perth WA 6000		
Landholder Phone:	(08) 93289411		
Assessor Name:	Phillip Cameron		
Assessor Address:	145 Wingewarra Street Dubbo 2830		
Assessor Phone:	(02) 6882 0118		
Assessor Accreditation Number:	TBA		

The following information is required to be submitted with this BioBanking Agreement (where ticked)

☐ **All or part of the biobank site is covered by a covenant, has received govt funding or is crown land**

☐ **Local reference data is required for the following vegetation zones**

☑ **Expert Report for the following species:**

Diuris tricolor — Pine Donkey Orchid
Swainsona murrayana — Slender Darling Pea

☑ **Justification for request of additional increase in site value score with management for the following vegetation zones:**

Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)

Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes

NSW GOVERNMENT Environment, Climate Change & Water

Bioregion and southern BBS Bioregion (Benson 201)

Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)

River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)

☐ **The minimum number of plots were not entered for the following vegetation zones**

Ecosystem Credits

Vegetation Type	Area (ha)	Credits created
Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)	17.15	170
Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)	17.15	172
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)	26	314
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)	5.1	58
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)	21.5	256
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)	21.1	226
Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56)	4.9	42
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)	13.5	149
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)	13.1	137

Credit Profile

Group 1 : Ecosystem credits: 170 credits

CMA	Central West
CMA Sub-region	Bogan-Macquarie (843)
Vegetation type	Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57)
Surrounding vegetation cover class	0-10%
Patch size, including low condition	0 - 5 ha

Total area of Vegetation zone(s) included in this group: 17.15 ha

Group 2 : Ecosystem credits: 172 credits

CMA	Central West
CMA Sub-region	Bogan-Macquarie (843)
Vegetation type	Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar



	Peneplain Bioregion (Benson 57)
Surrounding vegetation cover class	0-10%
Patch size, including low condition	5 - 25 ha

Total area of Vegetation zone(s) included in this group: 17.15 ha

Group 3 : Ecosystem credits: 314 credits

CMA	Central West
CMA Sub-region	Bogan-Macquarie (843)
Vegetation type	Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)
Surrounding vegetation cover class	0-10%
Patch size, including low condition	0 - 5 ha

Total area of Vegetation zone(s) included in this group: 26 ha

Group 4 : Ecosystem credits: 58 credits

CMA	Central West
CMA Sub-region	Bogan-Macquarie (843)
Vegetation type	Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201)
Surrounding vegetation cover class	0-10%
Patch size, including low condition	5 - 25 ha

Total area of Vegetation zone(s) included in this group: 5.1 ha

Group 5 : Ecosystem credits: 256 credits

CMA	Central West
CMA Sub-region	Bogan-Macquarie (843)
Vegetation type	Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)
Surrounding vegetation cover class	0-10%
Patch size, including low condition	0 - 5 ha

Total area of Vegetation zone(s) included in this group: 21.5 ha

Group 6 : Ecosystem credits: 226 credits

CMA	Central West
CMA Sub-region	Bogan-Macquarie (843)
Vegetation type	Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76)
Surrounding vegetation cover class	0-10%
Patch size, including low condition	5 - 25 ha

Total area of Vegetation zone(s) included in this group: 21.1 ha

Group 7 : Ecosystem credits: 42 credits



CMA	Central West
CMA Sub-region	Bogan-Macquarie (843)
Vegetation type	Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56)
Surrounding vegetation cover class	0-10%
Patch size, including low condition	0 - 5 ha

Total area of Vegetation zone(s) included in this group: 4.9 ha

Group 8 : Ecosystem credits: 149 credits

CMA	Central West
CMA Sub-region	Bogan-Macquarie (843)
Vegetation type	River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)
Surrounding vegetation cover class	0-10%
Patch size, including low condition	0 - 5 ha

Total area of Vegetation zone(s) included in this group: 13.5 ha

Group 9 : Ecosystem credits: 137 credits

CMA	Central West
CMA Sub-region	Bogan-Macquarie (843)
Vegetation type	River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78)
Surrounding vegetation cover class	0-10%
Patch size, including low condition	5 - 25 ha

Total area of Vegetation zone(s) included in this group: 13.1 ha



Species Credits

Additional Management Actions

The following management actions are required at the property. These actions are in addition to the standard management actions required at the property

Cat and/or Fox control	
Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57) (CW105)	17.15 ha
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201) (CW138)	5.1 ha
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201) (CW138)	26 ha
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) (CW145)	21.1 ha
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) (CW145)	21.5 ha
Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56) (CW167)	4.9 ha
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78) (CW184)	13.1 ha
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78) (CW184)	13.5 ha
Control feral pigs	
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78) (CW184)	13.1 ha
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78) (CW184)	13.5 ha
Exclude miscellaneous feral species	
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201) (CW138)	5.1 ha
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201) (CW138)	26 ha
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) (CW145)	21.1 ha
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) (CW145)	21.5 ha
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78) (CW184)	13.1 ha
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78) (CW184)	13.5 ha

Feral and/or native herbivore control/ exclusion (eg rabbit, goats, deer etc)	
Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57) (CW105)	17.15 ha
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201) (CW138)	5.1 ha
Fuzzy Box - Inland Grey Box on alluvial brown loam soils of the NSW South Western Slopes Bioregion and southern BBS Bioregion (Benson 201) (CW138)	26 ha
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) (CW145)	21.1 ha
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) (CW145)	21.5 ha
Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56) (CW167)	4.9 ha
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78) (CW184)	13.1 ha
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78) (CW184)	13.5 ha
Maintain or reintroduce flow regimes (aquatic flora)	
Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including Cobar Peneplain Bioregion (Benson 57) (CW105)	17.15 ha
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) (CW145)	21.1 ha
Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) (CW145)	21.5 ha
Poplar Box - Belah woodland on clay-loam soils of the alluvial plains of north-central NSW (Benson 56) (CW167)	4.9 ha
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78) (CW184)	13.1 ha
River Red Gum riverine woodlands and forests in the Nandewar and Brigalow Belt South Bioregions (Benson 78) (CW184)	13.5 ha

NSW GOVERNMENT Environment, Climate Change & Water

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Assessment of a Biobank Site

Done

Biobank Site Details

Proposal Id: 86
Biobank Name: Tomingley Gold Project
Biobank Location: Tomingley NSW
Street Address: "Wyoming", NSW
Enter Lot Details

Covenant/Agreement

Is any part of this proposal covered by a covenant, has received government funding or is crown land?
No
What is the type of covenant/agreement?
What is the date when the covenant/agreement was entered into? (dd/MM/yyyy)

Proponent Details

Proponent Name: Alkane Resources Ltd
Proponent Address: 129 Edward Street Perth WA 6000
Proponent Phone: (08) 93289411

Assessor Details

Assessor Name: Phillip Cameron
Assessor Address: 145 Wingewarra Street Dubbo 2830
Assessor Phone: (02) 6882 0118
Assessor Accreditation Number: TBA

Location Details

CMA Name: Central West
Mitchell Landscape: Bogan Alluvial Plains

Assessment Steps

1. Landscape Assessment Circles _ Threatened Species Zone Data	Complete
2. Identify Geographic and Habitat Features	Complete
3. Assess for Identified Populations	Not Required
4. Undertake Site Survey	Complete
5. Enter survey results for vegetation and threatened species	Complete
Report on Credits to be Created	Complete

Reset Steps 2-6
Delete Proposal