Appendix 4

Flora and Fauna Assessment

(Biosis Pty Ltd)

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Bogo Quarry:
Flora and Fauna Assessment

FINAL REPORT

Prepared on behalf of Bogo Operations Pty Ltd.

25 February 2016

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- Department of Environment for access to the Protected Matters Search Tool of the Australian Government
- NSW Office of Environment and Heritage for access to the BioNet Atlas of NSW Wildlife.

Biosis staff involved in this project were:

- Stefan Rose – Project management and impact assessment
- Samantha Vertucci - Field survey and impact assessment
- James Shepherd - GIS and mapping
- Lauren Harley - GIS and mapping

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Glossary

AoS	Assessment of Significance
CEEC	Critically Endangered Ecological Community
DBH	Diameter at Breast Height
DoE	Commonwealth Department of the Environment
EARs	Environmental Assessment Requirements (OEH, NSW)
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FM Act	*Fisheries Management Act 1994*
HBT	Hollow Bearing Tree
KTP	Key Threatening Process
LEP	Local Environment Plan
NES	National Environmental Significance (refers to EPBC Act Matters of NES)
NSW	New South Wales
NV Act	*Native Vegetation Act 2003*
NW Act	*Noxious Weed Act 1993*
OEH	NSW Office of Environment and Heritage
SEARs	Secretary's Environmental Assessment Requirements (NSW Planning and Environment)
SEPP 44	State Environmental Planning Policy No. 44 – Koala Habitat Protection
SIS	Species Impact Statement
Study locality	The area within a 10 kilometre radius of the study area centre
study area	The broader area consisting of the entire quarry property in which the subject site is located
subject site	The area of impact for the proposed works
TEC	Threatened Ecological Community (generic term encompassing all threat levels)
TSC Act	*Threatened Species Conservation Act 1995*

Summary

Biosis Pty Ltd was commissioned by RW Corkery & Co Pty Ltd on behalf of Bogo Operations Pty Ltd to undertake a flora and fauna assessment of an area of land at the Bogo Quarry proposed for modifications relating to future quarry operations (the subject site). The subject site is located in mostly cleared farmland off Paynes Road, 5 kilometres east of the village of Bookham and 20 kilometres west of Yass, NSW.

The subject site, defined by the extent of the proposed modifications and 1.32 hectares in area, is located within the study area which includes adjacent areas which may be directly or indirectly affected by the proposal. The study area broadly comprises the entire Quarry Site, being Lot 1 DP 1205646 and Part Lot 115 DP 876302, Paynes Road. This assessment approach has been taken to allow for assessment of both the subject site as well as any additional areas in the broader study area which may be affected by the proposal, either directly or indirectly. Identified constraints will be used to guide detailed design, with an emphasis on avoiding impacts where feasible.

The subject site encompasses approximately 0.05 hectares of native vegetation, while the remaining 1.27 hectares consist of a predominantly exotic grassland community. Both communities extend well beyond the subject site into the study area, including substantial areas of the quarry property that would not be affected by the proposed or currently approved works.

Ecological values

Key ecological values identified within the subject site include:

- 0.05 ha of remnant native vegetation in three small patches consisting of paddock trees with a predominantly native grassy ground layer.
- Four potential habitat trees, but without visible hollows.
- One Threatened Ecological Community: *White Box Yellow Box Blakely's Red Gum Woodland* as listed as Endangered under the NSW TSC Act.

Government legislation and policy

An assessment of the proposal against key biodiversity legislation and policy is provided and summarised below.

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required
Environment Protection and Biodiversity Conservation Act 1999	No Matters of National Significance or their habitat were located within the subject site. Foraging habitat for some fauna species may occur within the study area, but they are highly unlikely to be significantly impacted by the proposal.	No further assessment recommended (refer to Table 5).
Threatened Species Conservation Act 1995	One Threatened Ecological Community (TEC), *White Box Yellow Box Blakely's Red Gum Woodland* (Box Gum Woodland)	An Assessment of Significance (AoS) was carried out for: • Box Gum Woodland

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required
	occurs within the study area and subject site. Foraging habitat for some fauna species may occur within the study area, but they are highly unlikely to be significantly impacted by the proposal.	Refer to Table 5 and Table 6 and Appendix 3.
Fisheries Management Act 1994	The proposed extraction area is unlikely to significantly affect any watercourse or biota covered by the Act.	No permits are considered to be required under the FM Act.
Environmental Planning & Assessment Act 1979	A Threatened ecological community occurs within the study area.	Impacts to any threatened species and communities present or likely to occur within the study area must be assessed through undertaking an AoS (see Appendix 3).
National Parks & Wildlife Act 1974	The proposal does not require the removal of vegetation within a National Park.	No permits or approvals are required under the current scope of works.
Native Vegetation Act 2003	Although the proposal will involve a small amount of native vegetation removal in an LGA and zone to which the Act applies, being designated development under Part 4 of the EP&A Act the NV Act is unlikely to apply.	No permits or approvals are expected to be required under the current scope of works and assessment pathway. The Applicant is advised to confirm that is the case with the Local Land Services Office.
Noxious Weeds Act 1993	The following noxious weed is present within the study area: • Blackberry	This noxious weed is listed as Class 4, meaning that: *"The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed".* The land owner has an obligation under the Noxious Weeds Act 1993 to control all noxious weeds on their land according to the specified control class.

Recommendations

The primary measure for the development to minimise impacts to ecological values on the site is to restrict removal of native vegetation and habitat to within the proposed impact footprint, to manage runoff from the Quarry Site into adjoining downslope habitat by applying current best practice sedimentation and siltation measures where appropriate and to manage weeds.

1 Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by RW Corkery & Co on behalf of Bogo Operations Pty Ltd to undertake a terrestrial flora and fauna assessment of the subject site and broader study area at Bogo Quarry, near Bookham (Figure 1). The subject site, defined by the extent of proposed works, is located within the study area which includes adjacent areas which may be directly or indirectly affected by the proposal. The study area broadly comprises the entire Quarry Site, being Lot 1 DP 1205646 and Part Lot 115 DP 876302, Paynes Road. This assessment approach has been taken to allow for assessment of both the subject site as well as any additional areas in the broader study area which may be affected by the proposal, either directly or indirectly. Identified constraints will be used to guide detailed design, with an emphasis on avoiding impacts where feasible.

Modifications are proposed to the nature and extent of quarry operations to extend the operational life of the existing quarry.

The works required to achieve this objective include:

- Increase the annual production to a maximum of 500 000 tonnes per year.
- Operate a mobile asphalt plant and/or concrete batching plant on site as required.
- Modify the approved extraction area slightly to better approximate the natural topography of the hill. The modified extraction area would remain similar to that already approved but overall would be slightly larger.

The first two items relating to this development application will present no additional impacts to biodiversity and will not be considered further. This assessment focuses on the potential impacts to biodiversity of the proposed extension to the extraction area and considers its cumulative impact with the extraction area that is already approved.

The proposed modification to the extraction area is shown in Figure 2.

1.2 Scope of assessment

A flora and fauna assessment was previously carried out for the study area by Ecotone Ecological Consultants (2010) to address an earlier quarry proposal, but this proposal was not submitted for approval.

The legislation under which the proposal was previously assessed has changed from Part 3A to Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act)(Designated Development).

The Applicant has obtained the Secretary's Environmental Assessment Requirements (SEARs) for the quarry proposal from NSW Planning and Environment. A summary of the SEARs requirements relevant to assessment of biodiversity, include:

- The layout of the proposed works and components (including any existing infrastructure that would be used for the development).
- An assessment of the potential impacts of the development, as well as any cumulative impacts, including the measures that would be use to minimise, manage or offset these impacts.
- Accurate predictions of any vegetation clearing on site.

- A detailed assessment of the potential biodiversity impacts of the development, paying particular attention to threatened species and/or populations (or their habitats), endangered ecological communities and groundwater dependent ecosystems, including the potential occurrence of threatened species listed in OEH's correspondence (see below).
- A detailed description of the proposed measures to maintain or improve the biodiversity values of the site in the medium to long term, as relevant.

In regard to OEH's recommended Environmental Assessment Requirements (EARs), attached to the SEARs, the Applicant has elected to have the proposal assessed under Scenario 2 – outside the OEH BioBanking Scheme. A summary of the requirements that are relevant to biodiversity assessment under this pathway include:

- A plan showing the distribution of any threatened flora or fauna species and the vegetation communities on or adjacent to the subject site, and the extent of vegetation proposed to be cleared.
- A field survey conducted and documented in accordance with relevant requirements, in particular requirements as set out in Attachment 3 'Survey guidelines for threatened species' and Attachment 4 'Grassland fauna habitat assessment sheet'.
- An assessment of the significance of direct and indirect impacts of the proposal for threatened biodiversity known or considered likely to occur in the study area based on the presence of suitable habitat. This assessment must take into account the factors identified in section 5A of the EP&A Act and the guidance provided by the *Threatened Species Assessment Guideline – The Assessment of Significance* (DECCW 2007).
- Methods to mitigate any expected environmental impacts of the proposal.

At a minimum, the following threatened entities require particular consideration, according to the EARs, of their likelihood of occurring in the study area and, if relevant, an assessment of the likely impacts on these entities:

Threatened Ecological Communities

- *White Box Yellow Box Blakely's Red Gum Woodland* (Box Gum Woodland).

Flora

- Yass Daisy *Ammobium craspedioides*

Fauna

- Pink-tailed Worm Lizard *Aprasia parapulchella*
- Striped Legless Lizard *Delma impar*
- Little Whip Snake *Suta flagellum*
- Golden Sun Moth *Synemon plana*
- Gang-gang Cockatoo *Callocephalon fimbriatum*
- Hooded Robin *Melanodryas cucullata cucullata*
- Diamond Firetail *Stagonopleura guttata*
- Flame Robin *Petroica phoenicea*

- Scarlet Robin *Petroica boodang*
- Speckled Warbler *Chthonicola sagittata*
- Brown Treecreeper *Climacteris picumnus*
- Swift Parrot *Lathamus discolour*
- Superb Parrot *Polytelis swainsonii*

The minimum information required in the EIS for the assessment of biodiversity according to the EARs, and the relevant section(s) of this report where they are addressed are set out in Table 1.

Table 1 Minimum report information required (OEH) and where addressed

Information required	Relevant section(s) of report
The requirements set out in the *Guidelines for Threatened Species Assessment* (Department of Planning, July 2005).	4
Description and geo-referenced mapping of study area (and spatial data files), e.g. overlays on topographic maps, satellite images and /or aerial photos, including details of map datum, projection and zone, all survey locations, vegetation communities (including classification and methodology used to classify), key habitat features and reported locations of threatened species, populations and ecological communities present in the subject site and study area.	Figures 2 and 3
Description of survey methodologies used, including timing, location and weather conditions.	2.3
Details, including qualifications and experience of all staff undertaking the surveys, mapping and assessment of impacts as part of the REF.	1.5
Identification of national and state listed threatened biota known or likely to occur in the study area and their conservation status.	3.4, Appendices 1 and 2
Description of the likely impacts of the proposal on biodiversity and wildlife corridors, including direct and indirect and construction and operation impacts. Wherever possible, quantify these impacts such as the amount of each vegetation community or species habitat to be cleared or impacted, or any fragmentation of a wildlife corridor.	4
Identification of the avoidance, mitigation and management measures that will be put in place as part of the proposal to avoid or minimise impacts, including details about alternative options considered and how long term management arrangements will be guaranteed.	5
Description of the residual impacts of the proposal. If the proposal cannot adequately avoid or mitigate impacts on biodiversity, then a biodiversity offset package is expected.	5

Given the extent and components of the proposal and legislative mechanism, the SEARs requirements including OEH EARs, and threatened species schedules, the Applicant will now require a new development consent issued by the Southern Joint Regional Planning Panel under Part 4 of the EP&A Act, with an EIS to be submitted to Yass Valley Council.

1.3 Objectives

The objectives of this investigation are to update the earlier assessment (Ecotone Ecological Consultants 2010), in particular:

- Review databases relating to flora and terrestrial fauna issues relevant to the study area, including the OEH Atlas of NSW Wildlife and EPBC Act Protected Matters Search Tool.
- Describe the vascular flora (ferns, conifers, and flowering plants), vertebrate fauna (birds, mammals, reptiles and frogs) and any listed invertebrate fauna that are potentially relevant in the locality.
- Map native vegetation and other habitat features.
- Confirm the current condition of the vegetation communities and habitat for significant flora and fauna species previously documented, and determine whether any additional threatened species or communities are present or likely to occur.
- Assess the potential for the study area to support habitat for any recently listed threatened species not detected during the field survey.
- Review the implications of biodiversity legislation and any planning policies relevant to the proposal.
- Update the impact assessment previously undertaken.
- Identify potential implications of the proposed development and provide recommendations to assist with any refinements to the development design.
- Discuss mitigation options relevant to the proposal.
- Recommend any further assessments of the site that may be required (such as targeted searches for threatened biota).

1.4 Location of the study area

The study area is located near the Hume Highway, off Paynes Road approximately 7.5 km east of the village of Bookham and 28 kilometres west of Yass, NSW.

The study area is within the:

- NSW South Western Slopes Bioregion
- Murrumbidgee River Basin catchment, via Stony Creek and Bogolong Creek
- Murrumbidgee Catchment Management Area (CMA)
- South Western Slopes Botanical Region
- Yass Valley Council Local Government Area (LGA).

1.5 Qualifications and experience of survey, assessment and mapping staff

Qualifications and experience of key staff involved in this project are as follows:

- Stefan Rose, Senior Ecologist: *BA (Biological Sciences), MEnvStud, MECA (NSW)*
  16 years experience
- Samantha Vertucci, Consultant Ecologist: *BSc(Hons)*

5 years experience

- James Shepherd, Senior GIS Operator: *BA (Informatics) (Hons), Esri ArcGIS Desktop Associate certification*
  9 years experience

- Lauren Harley, GIS Operator: *BSc(Environmental Biology), BA (International Studies)*
  6 years experience

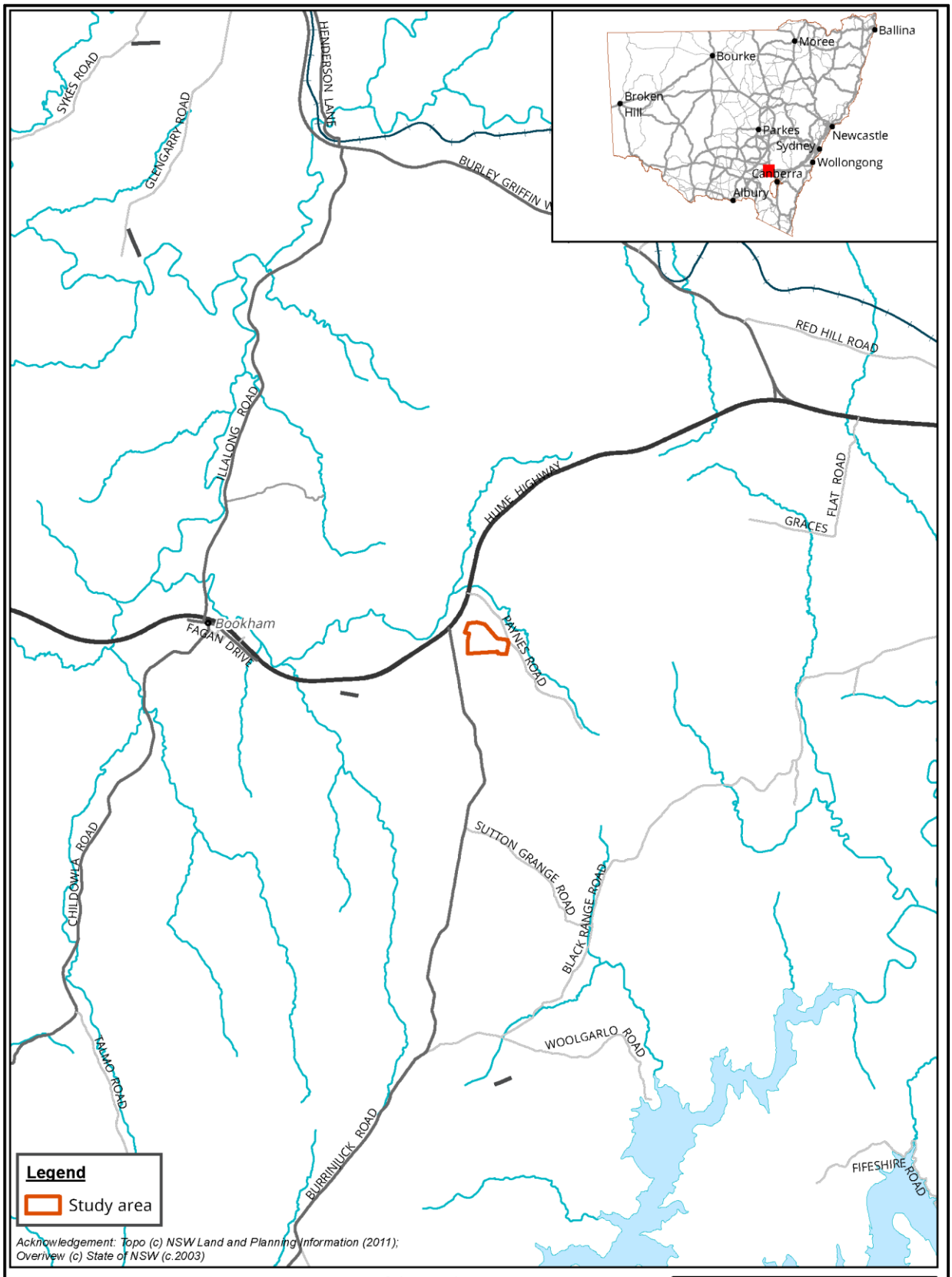


Figure 1: Location of the study area

Biosis Pty Ltd
Ballarat, Brisbane, Canberra, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong

Matter: 20779
Date: 10 November 2015,
Checked by: SR, Drawn by: LH, Last edited by: jshepherd
Location:P:\20700s\20779\Mapping\


Legend
Study area
Subject site
Figure 2: Study area and subject site
Metres
Scale: 1:3,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55
biosis
Biosis Pty Ltd
Ballarat, Brisbane, Canberra, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong
DP 851327
DP 876302
DP 753595
DP 1205646
Paynes Road
Acknowledgements: Imagery (c) LPI 2014; Basemap © Land and Property Information 2015
© Land and Property Information (a division of the Department of Finance and Services) 2015

2 Methods

2.1 Nomenclature

The flora taxonomy (classification) used in this report follows the most recent Flora of NSW (Harden 1990, Harden 1991, Harden 1992, Harden 1993, Harden 2002). Any questionable species names were verified with the on-line Australian Plant Name Index (Australian National Botanic Gardens 2007). Flora species, including threatened species and introduced flora species, are referred to by both their common and then scientific names when first mentioned. Subsequent references to flora species cite the common names only, unless there is no common name in which case the scientific name will be used. Common names, where available, have been included in threatened species tables and the complete flora list in Appendix 1.

Names of vertebrates follow the Census of Australian Vertebrates (CAVs) maintained by the Commonwealth *Department of Environment* (DoE) (DEWHA 2009a). In the body of this report vertebrates are referred to by both their common and scientific names when first mentioned. Subsequent references to these species cite the common name only. Common and scientific names are included in the fauna list in Appendix 2.

2.2 Literature and database review

In order to provide a context for the study area, information about flora and fauna from within ten kilometres (the 'locality') was obtained from relevant public databases. Records from the following databases were collated and reviewed:

- DoE Protected Matters Search Tool for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- NSW BioNet - *the database for the Atlas of NSW Wildlife*, Office of Environment and Heritage (OEH) (TSC Act).
- PlantNET The Royal Botanic Gardens and Domain Trust (RBGTD 2015).
- Australian Government's Bureau of Meteorology, Groundwater Dependent Ecosystems Atlas.

Other sources of biodiversity information:

- Relevant vegetation mapping, including:
  - OEH Vegetation Information System (VIS) Mapping through the Spatial Information eXchange (SIX) Vegetation Map Viewer: NSW VISMap No. 3848 Vegetation Mapping (Keith & Simpson 2010).

The following reports and information were also reviewed:

- *Threatened species impact assessment for the production increase at the Bogo Quarry near Bookham* (Ecotone Ecological Consultants 2010).
- NSW Scientific Committee final determinations for threatened biodiversity.
- Identification Guidelines for relevant NSW and Commonwealth listed ecological communities.

2.3 Site investigation

2.3.1 Flora assessment

A flora assessment within the study area was initially undertaken on 22 October 2008 (Ecotone Ecological Consultants 2010). Due to the very simplified habitat on the site, the surveys were undertaken on foot and took the form of a random meander or irregular transect within the study area, particularly in the western part of the study area where there are a few trees and the extraction area had not reached its approved limit.

A field survey was undertaken by Biosis on 30 September 2015. The Biosis ecologist thoroughly traversed the subject site and the surrounding parts of the study area. All trees within the subject site were visited to assess their habitat values.

General classification of native vegetation in NSW used in this report is based on the classification system in Keith (2004) which uses three groupings of vegetation: vegetation formation, vegetation class and vegetation type, with vegetation type the finest grouping. The grouping referred to in this report is vegetation type. The vegetation mapping study of Keith & Simpson (2010) (NSW VISMap 3848) was reviewed to ascertain locally occurring native vegetation communities.

A list of flora species was compiled for the study area.

The general condition of native vegetation was observed as well as the effects of current seasonal conditions. Notes were made on specific issues such as noxious weed infestations, evidence of management works, current grazing impacts and the regeneration capacity of the vegetation.

No targeted survey was undertaken for threatened flora. We note, however, that the thorough traverse of the subject site completed by the Biosis ecologist (a repeat of the survey undertaken by Ecotone in 2008) is likely to have been suitable for survey for the Yass Daisy *Ammobium craspedioides*.

2.3.2 Fauna assessment

A fauna assessment within the study area was initially undertaken on 22 October 2008 to document the fauna habitat types and the diurnal fauna within the Quarry Site boundary (Ecotone Ecological Consultants 2010). Visual searches for reptiles and birds and auditory detection of birds was carried out. Any hollow-bearing trees within the study area were inspected for scratch marks or chew marks, and the ground below them was searched for droppings or regurgitated pellets. Any opportunistic observations of fauna were recorded.

A field survey was undertaken by Biosis on 30 September 2015 to confirm the current habitat values for fauna within the study area and supplement the results from the earlier investigation. All species of fauna observed during the assessment were noted and active searching for fauna was undertaken. This included direct observation, searching under rocks, and identifying calls. Particular attention was given to searching for threatened biota and their habitats. Fauna species were recorded with a view to characterising the values of the site and the investigation was not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time. No targeted surveys were undertaken, since it was concluded than none were required.

Fauna records will be submitted to OEH for incorporation into the NSW BioNet Wildlife Atlas.

2.3.3 Permits and Licences

The flora and fauna assessment was conducted under the terms of Biosis' Scientific Licence issued by the Office of Environment and Heritage under the *National Parks and Wildlife Act 1974* (SL100758, expiry date 31 March 2016). Fauna survey was conducted under approval 11/355 from the NSW Animal Care and Ethics Committee (expiry date 31 January 2016).

2.4 Limitations

The following limitations are relevant to the flora and fauna assessment:

- Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as species dormancy, seasonal conditions, ephemeral status of waterbodies and migration and breeding behaviours of some fauna. In many cases, these factors do not present a significant limitation to assessing the overall biodiversity values of a site.
- The 2008 field surveys coincided with a period of strong winds that would have hampered the detection of birds by call and the detection of reptiles.
- The fauna field surveys were limited to daytime field habitat assessment and targeted searches for evidence of threatened fauna species or their habitat within the study area, so nocturnal species are unlikely to have been encountered.
- The current flora and fauna assessment was conducted in spring, which is an optimal time for survey, particularly for detection of the threatened species Yass Daisy (spring/early summer). However, the survey timing may not have allowed for detection of some common annual flora species with short flowering periods.
- Database searches, and associated conclusions on the likelihood of species to occur within the study area, are reliant upon external data sources and information managed by third parties.

Overall, it is considered that the survey effort to date has been sufficient to assess the general values of the study area. As a precautionary measure, all threatened species with potential to occur within the study area (subject species), have been addressed in Section 4.

2.5 Mapping

Aerial photography was supplied by Basemap © Land and Property Information 2015 and the current Site Layout plan (dated 30 October 2015) was supplied by RW Corkery & Co Pty Ltd.

Mapping was conducted using a hand-held (uncorrected) GPS unit (GDA94) and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files containing the relevant flora and fauna spatial data are available to incorporate into design concept plans. However this mapping may not be sufficiently precise for detailed design purposes.

3 Results

The ecological features of the study area are described below and mapped in Figure 3.

Species recorded during the flora and fauna assessment are listed in Appendix 1 (flora) and Appendix 2 (fauna). Unless of particular note, these species are not discussed further.

A list of threatened biota recorded or predicted to occur in the local area is also provided in those appendices, along with an assessment of the likelihood of the species occurring within the study area.

3.1 Landscape context

The study area is predominantly cleared of native vegetation with only scattered native trees remaining. Most of the cleared land within the study area consists of predominantly exotic pasture for cattle grazing.

3.1.1 Vegetation Formations of NSW – VISMap No. 3848

Available vegetation mapping for the study locality (Keith & Simpson 2010) shows the following native vegetation classes mapped in the vicinity of the study area:

- Southern Tablelands Grassy Woodlands (Grassy Woodlands Formation) which is mapped as occurring east of the study area; and
- Upper Riverina Dry Sclerophyll Forest (Southern Tablelands Grassy Woodlands Formation) which is mapped as occurring west of the study area.

The entire study area itself is mapped as cleared (not containing any native vegetation).

3.1.2 Habitat connectivity

The remnant native trees within the study area are tenuously connected to better quality habitat mainly to the west of the Hume Highway via creeklines and watercourses. The surrounding landscape has historically been modified for farming land and a major highway.

3.1.3 Topography and soils

The study area is undulating, with moderately steep slopes, flat areas, gullies and outcropping rocky areas.

The geology of the study area is mapped by Geological Survey of NSW (2013) as:

Mountain Creek Volcanics of the Early Devonian Black Range Group

Yellow-brown to brown-grey, fine- to coarse-grained, thin- to thick-bedded volcanoclastic sandstone and siltstone, and volcanic breccia, minor basal, polymeric pebble to cobble conglomerate and pebbly sandstone, generally high to very high magnetic susceptibility.

3.2 Flora and fauna

Species recorded during the flora assessment are listed in Table A.1 of Appendix 1 (flora). Unless of particular note, these species are not discussed further. A list of threatened biota recorded or predicted to occur in the local area is also provided in those appendices, along with an assessment of the likelihood of the species occurring within the study area.

During the site investigation one noxious weed species as defined by DPI for the Yass Valley LGA was recorded: Blackberry *Rubus fruticosus* aggregate species.

Species recorded during the fauna assessment are listed in Table A.4 of Appendix 2 (fauna). Unless of particular note, these species are not discussed further. A list of threatened biota recorded or predicted to occur in the local area is also provided in those appendices, along with an assessment of the likelihood of the species occurring within the study area.

3.3 Vegetation communities and fauna habitat

The vegetation and fauna habitat throughout the study area has been highly modified by past and ongoing disturbances which have included vegetation clearing, grazing and pasture improvement. The majority of the study area now consists of cleared, exotic pasture with scattered trees, remnants of the native vegetation community White Box Yellow Box Blakely's Red Gum that once covered the site, dams and the existing quarry infrastructure.

The subject site supports some ecological features including scattered remnant paddock trees, remnants of native grassland around the bases of and under the canopies of these trees, and minor rocky areas. The ecological features are outlined below, divided by the vegetation communities they occur in (refer also to Figure 3):

Table 2 Vegetation communities of the study area

1. White Box Yellow Box Blakely's Red Gum Woodland	
Extent within study area	Approximately 0.05 hectares of Box Gum Woodland TEC was recorded within the subject site comprising four of the identified habitat trees (Nos. 5, 6, 8 and 9) and the grassy ground layer immediately beneath and surrounding the tree canopies (Figure 3). These are the only parts of the subject site that have potentially support a predominantly native grassy ground layer that could respond to assisted natural regeneration. The community extends beyond the subject site into the study area as similar patches associated with remnant paddock trees.
Description including fauna habitat	Occurs in small, remnant patches throughout the study area. The tree species consist of Blakely's Red Gum *Eucalyptus blakelyi*, Red Box *E. polyanthemos*, Yellow Box *E. melliodora* and Brittle Gum *E. mannifera*. The ground layer is dominated by native grass species such as Weeping Grass *Microlaena stipoides*, Speargrass *Austrostipa* spp. and Three-Awn Grass *Aristida ramosa*. Within the subject site, the eucalypts provide foraging habitat (nectar, invertebrates etc.) for birds and bats, as well as potential nesting habitat, likely for common species only. The ground cover is non-diverse and supports a mix of native/exotic species. The ground cover provides some foraging habitat for common native species, although there is little structural diversity and no midstorey.
Condition	The community is generally in poor condition with low species diversity and heavy recruitment of exotic species due to surrounding land use and associated edge impacts.
Landscape position	This community is generally found on moderate slopes and ridgetops.
Threatened ecological community	Commonwealth EPBC Act: Not listed NSW TSC Act: Endangered Justification: Does not qualify under the EPBC Act according to the Policy Statement for the CEEC (DEH 2006). Marginally qualifies as the EEC Box-Gum Woodland under the TSC Act according to the Identification Guidelines (NPWS 2002). This is discussed in more detail in section 3.4 below.

1. White Box Yellow Box Blakely's Red Gum Woodland

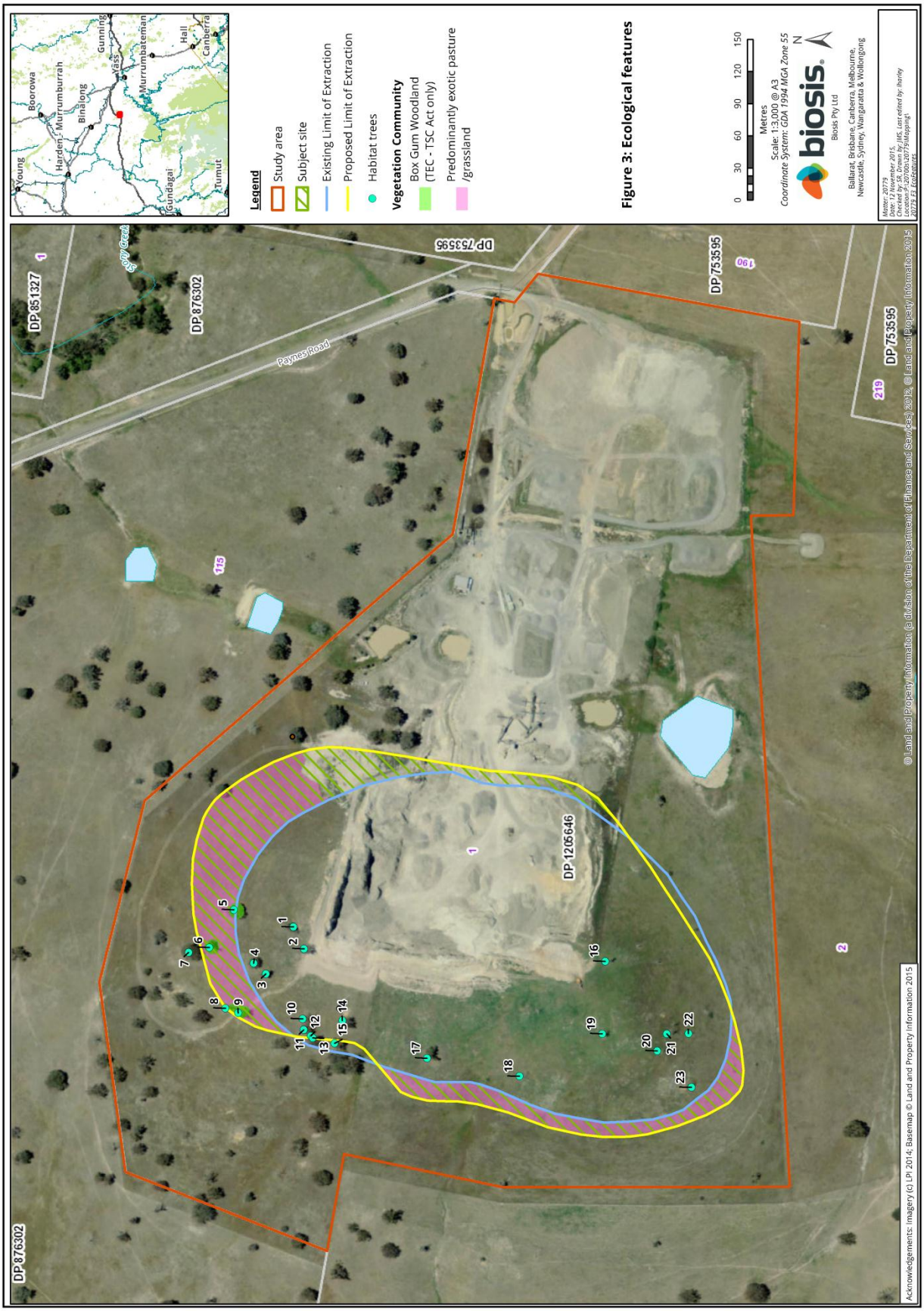

Plate 1 White Box Yellow Box Blakely's Red Gum Woodland within the Study Area

2. Predominantly Exotic Pasture/Grassland	
Extent within study area	Approximately 1.27 hectares of this community was recorded within the subject site in the areas where trees were absent (Figure 3). This is the dominant community within the subject site and is unlikely to respond to assisted natural regeneration. The community extends beyond the subject site into the study area.
Description including fauna habitat	This community is found on both slopes and in flatter areas within the subject site. Within the subject site, this community is dominated by exotic pasture species although it contains some scattered disturbance-tolerant native grasses and forbs. The exotic pasture species within the subject site are not tussocky and there is very little structural diversity (shrubs, logs etc.). Some rocks are present however these are predominantly deeply embedded. Fauna observed utilising this community during the field survey included Eastern Grey Kangaroos *Macropus giganteus*, Short-beaked Echidna *Tachyglossus aculeatus* and Olive Legless Lizard *Delma inornata*. Common Wombats *Vombatus ursinus* are also likely to occur. European Rabbit *Oryctolagus cuniculus* warrens are present within the study area and rabbits and Red Foxes *Vulpes vulpes* are likely to utilise this community within the subject site. Within the subject site, this community is likely to provide some foraging habitat for native birds, predominantly common species, as well as exotic birds such as European Starlings *Sturnus vulgaris*.
Condition	The community is in very poor condition and comprises predominantly exotic species due to land use. It contains a few scattered disturbance-tolerant native species.

2. Predominantly Exotic Pasture/Grassland	
Landscape position	The community occurs throughout the study area and is not associated with any particular landscape position.
Threatened ecological community	Commonwealth EPBC Act: Not listed NSW TSC Act: Not listed Justification: does not qualify under the EPBC Act according to the Policy Statement for the CEEC (DEH 2006), or the EEC under the TSC Act according to the Identification Guidelines (NPWS 2002). This is discussed in more detail in section 3.4 below.

Plate 2 Predominantly Exotic Pasture / Grassland

In addition to the two vegetation communities described above, Bogo Operations Pty Ltd have undertaken extensive planting of a range of locally native trees around the perimeter of the disturbance area. These currently perform a positive ecological function within the landscape and ultimately will provide roosting and nesting habitat for bird and arboreal mammal species.


Legend
Study area
Subject site
Existing Limit of Extraction
Proposed Limit of Extraction
Habitat trees
Vegetation Community
Box Gum Woodland
(TEC - TSC Act only)
Predominantly exotic pasture
/grassland
Figure 3: Ecological features
Metres
Scale: 1:3,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55
biosis
Biosis Pty Ltd
Ballarat, Brisbane, Canberra, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong
DP 876302
DP 851327
DP 753596
DP 753595
DP 1205646
Paynes Road
Young
Boorowa
Harden
Murrumburrah
Binalong
Gunning
Yass
Murrumbateman
Hall
Canberra
Gundagai
Tumut
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Acknowledgements: Imagery (c) LPI 2014; Basemap © Land and Property Information 2015

3.4 Threatened biota

Threatened biota includes all flora and fauna species, populations and ecological communities listed under the EPBC Act and TSC Act. Lists of threatened biota recorded or predicted to occur within ten kilometres of the study area are provided in Appendix 1 (flora) and Appendix 2 (fauna). Previous records of threatened biota within the locality are shown in Figure 4 (flora) and Figure 5 (fauna). An assessment of the likelihood of these species occurring in the study area, and an indication of where within the subject site (i.e. which habitats or features of relevance to the species), is included.

No areas of critical habitat for flora or fauna have been declared within the study area.

Habitat for the migratory species predicted to occur within the study area (Appendix 2, Table A.7) has been considered. The subject site is highly unlikely to constitute important habitat for any of the EPBC Act listed migratory species predicted to occur in the locality.

The study area and subject site are considered to contain one TEC. Approximately 0.05 hectares of the TSC Act – listed Endangered Ecological Community (EEC) *White Box Yellow Box Blakely's Red Gum Woodland* was identified as occurring within the subject site (see Figure 3). The four remnant trees and associated ground layer (Vegetation Community 1) are considered to marginally qualify as the EEC because of the presence of Blakely's Red Gum (and Yellow Box elsewhere), but White Box was not recorded in the study area. The grassy pasture areas without trees (Vegetation Community 2) were observed to comprise predominantly exotic grass species and weeds, unlikely to respond successfully to assisted natural regeneration (NPWS 2002) due to the long history of clearing, grazing and pasture improvement. Neither Vegetation Community is considered to constitute the equivalent Critically Endangered Ecological Community (CEEC) listed under the EPBC Act, because according to the flow chart in the Policy Statement for the CEEC (DEH 2006), insufficient native understorey species (excluding grasses) are present in Vegetation Community 1, and Community 2 is predominantly exotic.

A summary of the threatened biota with a medium or higher likelihood of occurring in the study area is provided in Table 3 below. Note that despite the lack of previous records of threatened micro-bats within 10km of the study area (Appendix 5 and Figure 5), several species of threatened micro-bats are likely to occur within the study area.

Table 3 Summary of threatened biota likely to occur in the subject site

Species name	Area of value within the subject site
EPBC Act listed biota	
Grey-headed Flying-fox	The mature trees within the subject site provide potential low-quality foraging habitat for this species. No roost sites are located within the study area.
Painted Honeyeater	The mature trees within the subject site provide potential foraging habitat for this species.
Regent Honeyeater	The mature trees within the subject site provide potential low-quality foraging habitat for this species.
Superb Parrot	The subject site is potential foraging habitat for the species. No hollow-bearing trees (i.e. potential breeding habitat) are located within the subject site, although some are located within the approved extent of extraction.
Swift Parrot	The mature trees within the subject site provide potential low-quality foraging habitat for this species.

Species name	Area of value within the subject site
TSC Act listed biota	
Box-Gum Woodland	The remnant native trees within the subject site represent suitable habitat for White Box Yellow Box Blakely's Red Gum Woodland.
Diamond Firetail	The subject site contains potential low-value foraging habitat for this species.
Flame Robin	The subject site is potential foraging habitat for this species.
Gang-gang Cockatoo	The mature trees within the subject site provide potential low-quality foraging habitat for this species.
Grey-headed Flying-fox	The mature trees within the subject site provide potential low-quality foraging habitat for this species. No roost sites are located within the study area.
Hooded Robin (south-eastern form)	The subject site is potential foraging habitat for this species. No nests were recorded during the field survey.
Little Eagle	The subject site contains foraging habitat for this species. No nests were recorded during the field survey.
Painted Honeyeater	The mature trees within the subject site provide potential foraging habitat for this species.
Regent Honeyeater	The mature trees within the subject site provide potential low-quality foraging habitat for this species.
Scarlet Robin	The subject site is potential foraging habitat for this species.
Spotted Harrier	The subject site contains potential foraging habitat for this species. No nests were recorded during the field survey.
Swift Parrot	The mature trees within the subject site provide potential low-quality foraging habitat for this species.
Superb Parrot	The subject site is potential foraging habitat for the species. No hollow-bearing trees (i.e. potential breeding habitat) are located within the subject site, although some are located within the approved extent of extraction.

3.5 Consideration of species listed in the OEH EARs

The species listed in the OEH EARs as requiring assessment were added to the Likelihood of Occurrence Assessment if they did not appear in the database searches. Of the species listed, the following were considered to have a moderate or higher likelihood of occurrence within the subject site:

- Swift Parrot
- Superb Parrot
- Diamond Firetail
- Gang-gang Cockatoo
- Hooded Robin

The following were considered to have a low likelihood of occurrence within the subject site:

- Little Whip Snake

- Brown Treecreeper
- Speckled Warbler
- Striped Legless Lizard
- Pink-tailed Worm-lizard
- Golden Sun Moth
- Yass Daisy

The assessments of Likelihood of Occurrence are included in Appendix 1 (flora) and Appendix 2 (fauna). We note that, although there is a low potential for occurrence within the subject site, the following species may occur elsewhere within the study area:

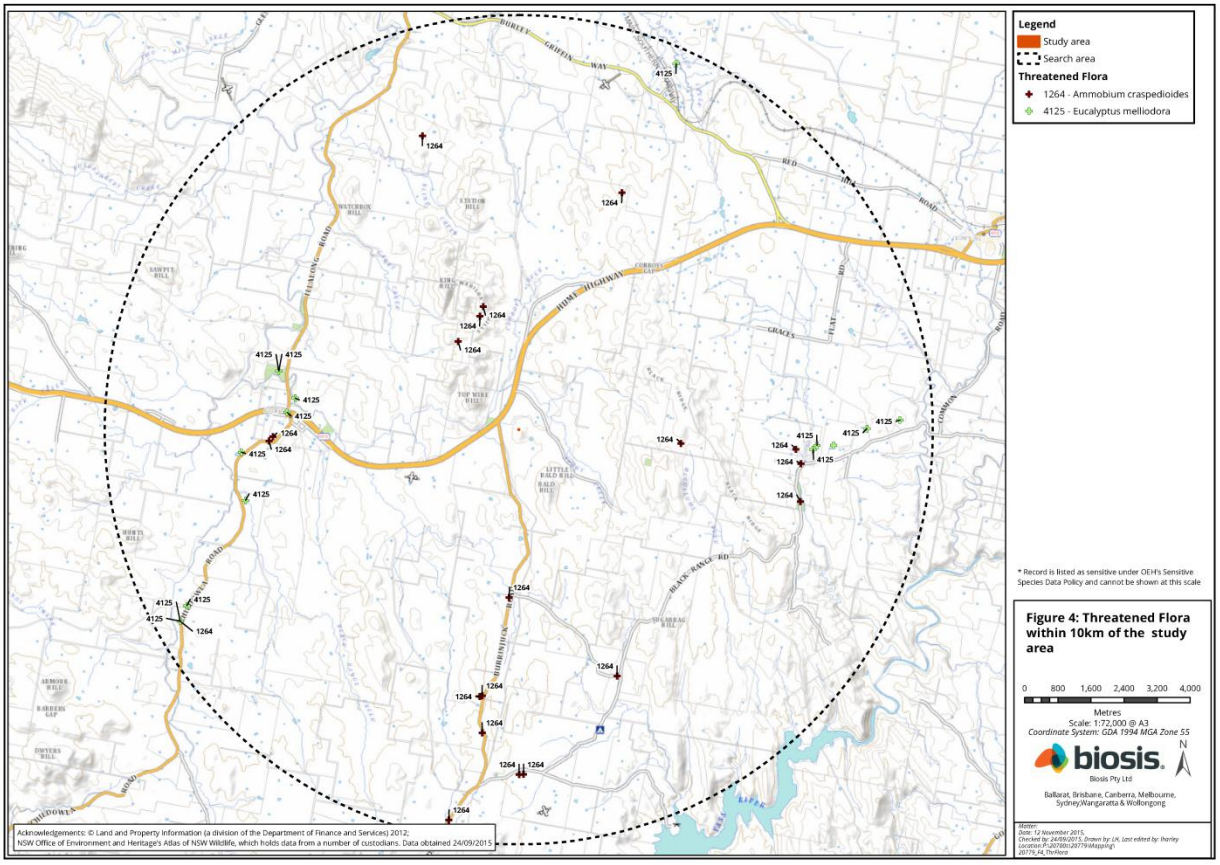
- Striped Legless Lizard
- Golden Sun Moth
- Pink-tailed Worm-lizard

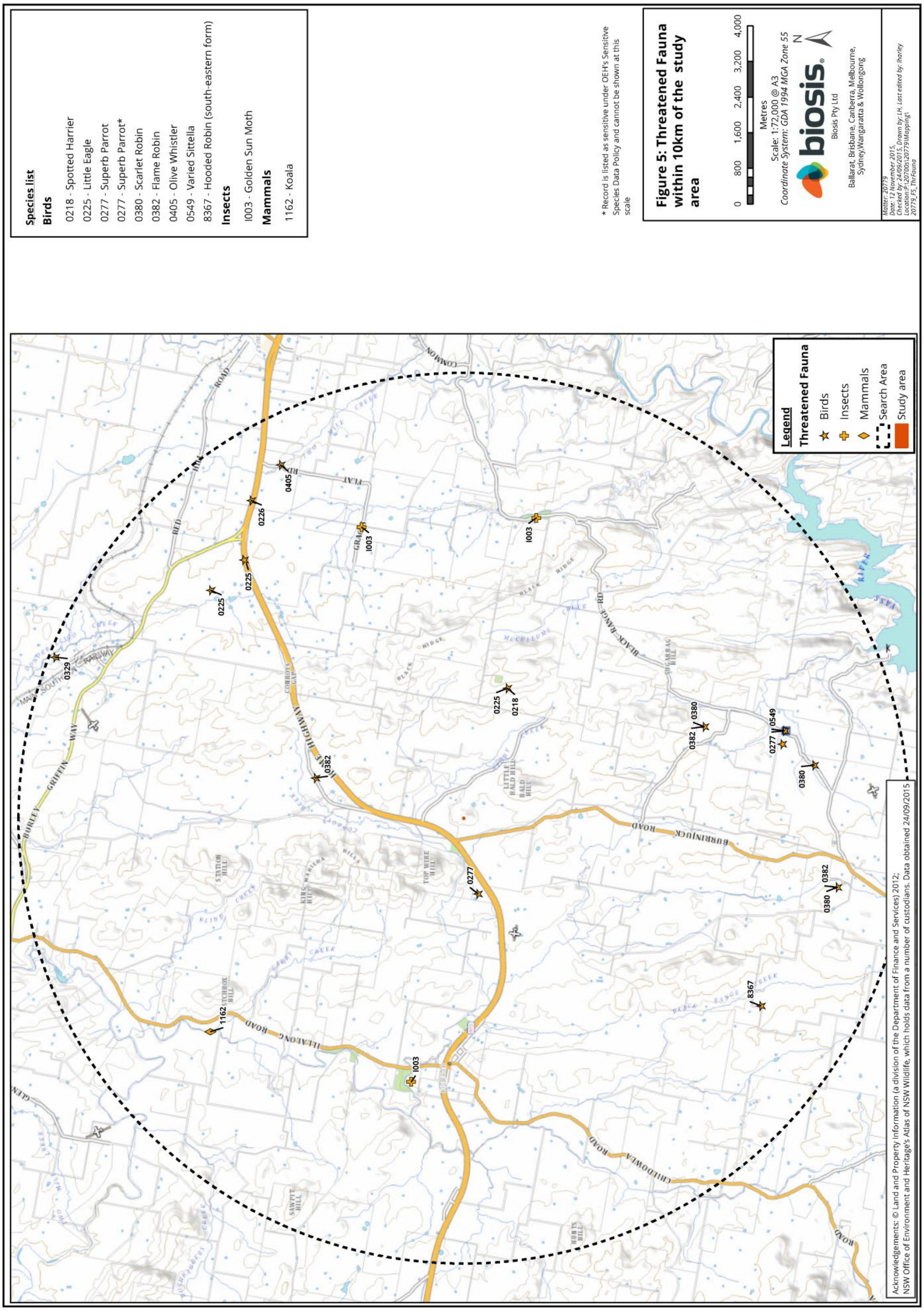
3.6 Groundwater Dependent Ecosystems

A review of the Atlas of Groundwater Dependent Ecosystems for the study area (Australian Government, Bureau of Meteorology 2015) revealed a small area of less than 0.1 hectare in area immediately adjacent to the Hume Highway (within the study area but not within the subject site) of the following vegetation community as 'reliant on subsurface groundwater':

- Northern Slopes Dry Grass Woodland (*Eucalytpus blakelyi, E. melliodora, Rytidosperma racemosum* and *Austrostipa scabra* subsp. *scabra*)

Although noted as a potential GDE, this community within the subject site is considered highly unlikely to be dependent on subsurface groundwater given the undulating topography of the site, which is steep and elevated in the subject site.


Legend
Study area
Search area
Threatened Flora
1264 - Ammobium craspedioides
4125 - Eucalyptus melliodora
* Record is listed as sensitive under OEH's Sensitive Species Data Policy and cannot be shown at this scale
Figure 4: Threatened Flora within 10km of the study area
0 800 1,600 2,400 3,200 4,000
Metres
Scale: 1:72,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55
biosis
Biosis Pty Ltd
Ballarat, Brisbane, Canberra, Melbourne, Sydney,Wangaratta & Wollongong
Acknowledgements: © Land and Property Information (a division of the Department of Finance and Services) 2012;
NSW Office of Environment and Heritage's Atlas of NSW Wildlife, which holds data from a number of custodians. Data obtained 24/09/2015


Species list
Birds
0218 - Spotted Harrier
0225 - Little Eagle
0277 - Superb Parrot
0277 - Superb Parrot*
0380 - Scarlet Robin
0382 - Flame Robin
0405 - Olive Whistler
0549 - Varied Sittella
8367 - Hooded Robin (south-eastern form)
Insects
I003 - Golden Sun Moth
Mammals
1162 - Koala
* Record is listed as sensitive under OEH's Sensitive Species Data Policy and cannot be shown at this scale
Figure 5: Threatened Fauna within 10km of the study area
0 800 1,600 2,400 3,200 4,000
Metres
Scale: 1:72,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55
N
biosis
Biosis Pty Ltd
Ballarat, Brisbane, Canberra, Melbourne, Sydney,Wangaratta & Wollongong
Legend
Threatened Fauna
Birds
Insects
Mammals
Search Area
Study area
Acknowledgements: © Land and Property Information (a division of the Department of Finance and Services) 2012;
NSW Office of Environment and Heritage's Atlas of NSW Wildlife, which holds data from a number of custodians. Data obtained 24/09/2015
BURRINJUCK ROAD
ILLALONG ROAD
CHILDOWLA ROAD
BLACK RANGE RD
GRIFFIN WAY

4 Biodiversity legislation and government policy

This section provides an assessment of the proposal against key biodiversity legislation and government policy.

This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

4.1 Commonwealth

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (NES) protected under the Act.

An EPBC Act Protected Matters Report for the locality was produced on 24 September 2015 (see Appendix 4). Matters of NES relevant to the proposal are summarised in Table 4 with Appendix 4 outlining Significant Impact Criteria assessments against the *Matters of National Environmental Significance - Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999* (DoE 2013) for matters of NES likely to be impacted by the proposal.

Table 4 Assessment of the proposal against the EPBC Act

Matter of NES	Site specifics	Significant Impact Criteria assessment findings
Threatened species (flora and fauna)	Five flora species and 17 fauna species have been recorded or are predicted to occur in the locality. An assessment of the likelihood of these species occurring in the subject site is provided in Appendix 1 (flora) and Appendix 2 (fauna).	Most of these species are not likely to occur within the study area and development is unlikely to constitute a significant impact. The following five fauna species are considered to have a medium or greater likelihood of occurring within the study area: • Regent Honeyeater • Painted Honeyeater • Swift Parrot • Superb Parrot • Grey-headed Flying-fox A significant impact to any of the above species is considered highly unlikely. No further assessment is considered warranted for impacts upon these species.
Threatened ecological communities	There are no EPBC Act TECs within the study area.	N/A
Migratory species	Thirteen migratory species have been recorded or are predicted to occur in the locality (Appendix 2).	While some of these species would be expected to use the study area on occasions, some may do so regularly and others may be resident, the study area does not provide important habitat for an ecologically significant proportion of any of these species.

Matter of NES	Site specifics	Significant Impact Criteria assessment findings
Wetlands of international importance (Ramsar sites)	Four Ramsar sites are listed as occurring within the same catchment as the study area, being: • Banrock Station Wetland Complex • Hattah-Kulkyne Lakes • Riverland • The Coorong, and Lakes Alexandrina and Albert wetland	The study area is between 500 km and 900 km upstream from these sites. The activities proposed within the subject site are unlikely to have adverse affects on any of these wetlands.

Currently there are 21 Key Threatening Processes (KTPs) listed under the EPBC Act. The only KTP that could be relevant in relation to the proposed activities in the subject site due to proposed clearing is 'Land Clearance'. However, given the degraded condition of the habitat together with the minimal removal of native trees and ground layer, the proposal would not increase the operation of this KTP to a significant degree.

On the basis of criteria outlined in the relevant *Significant Impact Guidelines* (DEWHA 2009b), it is considered unlikely that a significant impact on a Matter of NES would result from the proposed action.

4.2 State

4.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act was enacted to encourage the proper consideration and management of impacts of proposed development or land-use changes on the environment (both natural and built) and the community. The Act is administered by the NSW Department of Planning and Environment. The proposal is being assessed under Part 4 of the Act.

Sections of the EP&A Act of primary relevance to the natural environment are considered further below in relation to the current proposal.

Assessment of Significance (Section 5A)

Section 5A of the EP&A Act requires proponents and consent authorities to consider if a development will have a significant effect on threatened species, populations or communities listed under the TSC Act and FM Act. Section 5A (and Section 9A of the TSC Act) outlines seven factors that must be taken into account in an Assessment of Significance (also known as the "7-part test"). Where any Assessment of Significance (AoS) determines that a development will result in a significant effect to a threatened species, population or community a Species Impact Statement (SIS) is required. Table 5 and Table 6 summarise the potential for the proposed development to have a significant effect on the threatened biota deemed to have a medium or greater likelihood of occurrence within the study area (refer to Section 3.4) and determines the need for an AoS under Part 5A of the EP&A Act.

4.2.2 Threatened Species Conservation Act 1995

The TSC Act provides for the protection and conservation of biodiversity in NSW through the listing of threatened biota; key threatening processes; and critical habitat for threatened biota.

The trees and ground layer within the subject site are considered to constitute a TEC and the subject site contains some low-quality habitat for threatened species. Impacts to the threatened biota must be assessed through the AoS process under Section 5A of the EP&A Act. Refer to Table 5 and/or Table 6 below as well as Appendix 2 for AoS undertaken in relation to the proposal.

While several threatened micro-bat species may well occur within the study area, there are few habitat trees present and none were identified as containing visible hollows. Therefore the study area is only likely to provide foraging habitat for threatened micro-bats.

Habitat critical to the survival of an endangered or critically endangered species, population or ecological community can be identified under the TSC Act and listed on the Register of Critical Habitat kept by the OEH. The study area does not contain declared 'critical habitat'.

Currently there are 38 Key Threatening Processes (KTPs) listed under the TSC Act. The only KTP that could be relevant in relation to the proposed activities in the subject site due to the trees proposed to be removed is 'Land Clearance'. However, given the degraded condition of the habitat together with the minimal removal of native trees and ground layer, the proposal would not increase the operation of this KTP to a significant degree.

Table 5 Potential for impacts to threatened biota listed on the EPBC Act and/or TSC Act

Name	EPBC Act	TSC Act	Habitat Values within subject site	Assessment of Impacts on Threatened Species* Is there potential for the proposed action to:			Impact Assessment Required?
				Adversely affect stages of the lifecycle of the species?	Loss or disturbance of limiting foraging or breeding resources?	Fragmentation of limiting habitat?	
Diamond Firetail	-	V	Potential foraging habitat. Similar to the extensive foraging habitat in the locality.	No	No	No	No
Flame Robin	-	V	Potential foraging habitat. Similar to the extensive foraging habitat in the locality.	No	No	No	No
Gang-gang Cockatoo	-	V	Potential foraging habitat. Similar to the extensive foraging habitat in the locality.	No	No	No	No
Grey-headed Flying-fox	V	V	Some potential foraging habitat in the few mature trees. No roosting habitat.	No	No	No	No
Hooded Robin (south-eastern form)	-	V	Potential foraging habitat. No signs of breeding within the subject site.	No	No	No	No
Little Eagle	-	V	Foraging habitat. No breeding activity (nests etc.) recorded.	No	No	No	No
Painted Honeyeater	VU	V	Some potential foraging habitat in the few mature trees.	No	No	No	No
Regent Honeyeater	CE	E4A	Some potential foraging habitat in the few mature trees.	No	No	No	No
Scarlet Robin	-	V	Potential foraging habitat. Similar to the extensive foraging habitat in the locality.	No	No	No	No

Name	EPBC Act	TSC Act	Habitat Values within subject site	Assessment of Impacts on Threatened Species* Is there potential for the proposed action to:			Impact Assessment
Spotted Harrier	-	V	Foraging habitat. No breeding activity (nests etc.) recorded.	No	No	No	No
Superb Parrot	VU	V	Some potential foraging habitat in the few mature trees.	No	No	No	No
Swift Parrot	EN	E1	Some potential foraging habitat in the few mature trees.	No	No	No	No

*This table has been adapted from the *Threatened Species Assessment Guidelines – The Assessment of Significance* (DECC 2007)

Notes to table:

EPBC Act: CE – Critically Endangered EN – Endangered VU – Vulnerable	**TSC Act:** E1 – endangered species (Part 1, Schedule 1) E2 – endangered population (Part 2, Schedule 1) E3 – endangered ecological community (Part 3, Schedule 1) E4 – presumed extinct (Part 4, Schedule 1) E4A – critically endangered V – vulnerable (Part 1, Schedule 2) *Codes identify the Legal Status of threatened biota within NSW under the TSC Act and the OEH Sensitive Species Data Policy (SSDP).*

Table 6 Potential for impacts to threatened ecological communities listed on the EPBC Act and/or TSC Act

Name	EPBC Act	TSC Act	Habitat Values within study area	Assessment of Impacts on Threatened Ecological Communities*			Impact Assessment Required?
				Adversely affect the extent of the ecological community?	Adversely affect the composition of the ecological community?	Fragment or isolate the ecological community?	
White Box Yellow Box Blakely's Red Gum Woodland	N/A	E3	Subject site contains 0.05 hectares of this TEC which extends into the study area.	Incrementally	No	No	Yes, on a precautionary basis

*This table has been adapted from the *Threatened Species Assessment Guidelines – The Assessment of Significance* (DECC, 2007)

Notes to table:

EPBC Act:	TSC Act:
N/A – not applicable	E3 – endangered ecological community (Part 3, Schedule 1) *Codes identify the Legal Status of threatened biota within NSW under the TSC Act and the OEH Sensitive Species Data Policy (SSDP).*

An AoS has been prepared for the one threatened entity (Box Gum Woodland) that is deemed likely to be subject to minor negative impacts and is provided in Appendix 3. It indicates that a significant impact is not likely to result from the proposal. A Species Impact Statement is therefore not required.

4.2.3 State Environmental Planning Policies (Part 3 Division 2)

State Environmental Planning Policies (SEPPs) outline policy objectives relevant to state wide issues. No SEPPs referencing ecological issues are relevant to the proposal.

4.2.4 Water Management Act 2000

The *Water Management Act 2000* (WM Act) provides for the sustainable and integrated management of the state's water for the benefit of both present and future generations based on the concept of ecologically sustainable development.

Under the WM Act, an approval is required to undertake controlled activities on waterfront land, unless that activity is otherwise exempt (WM Act, section 91E). Waterfront land is the bed of any river, lake or estuary and any land within 40 metres of the highest bank of the river, the lake shore or the mean high water mark of the estuary.

Since the proposed works are not within 40 metres of the highest bank of any river or lake shore, the provisions of the Act do not apply.

4.2.5 Native Vegetation Act 2003

The NV Act provides for, encourages and promotes the management of native vegetation on a regional basis. Under the NV Act, no clearing of native vegetation is allowed except in accordance with prior development consent from the relevant Council or under a Property Vegetation Plan (PVP) approved by the relevant Catchment Management Authority.

Although the proposal will involve a small amount of native vegetation removal in an LGA and zone to which the Act applies, being designated development under Part 4 of the EP&A Act the NV Act is unlikely to apply. The Applicant is advised to confirm that is the case with the Local Land Services Office.

4.2.6 Noxious Weeds Act 1993

The NW Act was enacted to provide for the identification, classification and control of noxious weeds. Plants declared as noxious weeds are currently listed under Weed Control Order No. 28 Declaring Certain Plants to be Noxious Weeds published in the New South Wales Government Gazette No. 97 (Department of Premier and Cabinet 2011).

The study area includes one Class 4 noxious weed listed under Noxious Weed (Control Order) 2014 for the Yass Valley LGA:

- Blackberry *Rubus fruiticosus*

These plants are Class 4, "Locally Controlled Weeds" which requires that "the growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction".

Recommendations for treatment for key noxious weeds are provided by NSW Department of Primary Industries.

5 Ecological impacts and recommendations

This section identifies the potential impacts of proposed development on the ecological values of the study area. Following the current field survey, RW Corkery & Co. Pty Ltd and Bogo Operations Pty Ltd have redesigned aspects of the original proposal on the basis of preliminary advice from Biosis ecologists. As a result, the size of the subject site has been reduced and consequently the extent of impacts on potential threatened species habitat minimised.

The cumulative impacts of the proposal together with the impacts from the area of habitat that has already been approved for extraction have been considered. The approved area that is yet to be cleared and quarried is substantially larger than the proposed area of extraction. The proposed extension area (the subject site) is 1.32 hectares in area and is mostly a narrow strip (typically about 20 metres for most of its length but up to 60 metres at the northern end) of the previously approved extraction limit. In two areas, small areas of habitat, one containing a habitat tree with a medium hollow, have been excluded from the existing approved extraction area and will now be retained. However, the net effect of the modifications is an incremental increase in the overall area proposed for extraction by 1.32 hectares, all but 0.05 hectares of which consists of predominantly weedy grassland currently utilised for grazing. Overall, this represents a minor increase in the area of the TEC to be removed by the proposal as a whole. This incremental area of habitat loss has been determined to be insignificant by the Assessment of Significance undertaken for the ecological community.

Recommendations to assist the Applicant to avoid, minimise and mitigate impacts on biodiversity are also included. The principal means to reduce impacts on biodiversity values within the study area will be to minimise removal of native vegetation and habitat and protect retained habitat from indirect impact. Under the current proposal, an additional 0.05 hectares of native vegetation is proposed to be removed to that already approved.

A summary of potential implications of development within the study area and recommendations to minimise impacts during the design and operation phase of the proposal is provided in Table 7 below.

Table 7 Ecological values, impacts and recommendations

Ecological value (Figure 3)	Impacts	Recommendations	
		Avoid	Minimise and mitigate
Native vegetation including trees	0.05 ha of native vegetation in the form of Box-Gum Woodland (a TEC under the NSW TSC Act) will be cleared as part of the current proposal. The TEC extends beyond the subject site within the study area which presents some risk of accidental impact.	Risk of impacts to the TEC can be managed by implementing appropriate safeguards in further planning and carrying out the construction works including: • Carefully defining and marking the limits of the impact area on the ground as a first step to preventing accidental intrusions of vehicles and equipment into areas containing the TEC	• Identifying the locations where the TEC adjoins and extends beyond the subject site (Figure 3) as 'No Go' zones in a project CEMP or similar. • Referring to and explaining the purpose of the 'No Go' zones during site inductions. This should include discussion of the implications of the TSC Act should there be an incident that impacts on the TEC. • Install appropriate exclusion fencing to the boundary of the TEC and any construction areas where there is some potential for accidental encroachment. Include appropriate signage such as 'No Go Zone' or 'Environmental Protection Area'.
Hollow-bearing trees	Four habitat trees, not all with visible hollows, occur within the subject site and a number of others occur in close proximity (see Figure 3).	Protect habitat trees in the near vicinity of the subject site that are at risk of indirect damage from the works as the extraction area progresses.	• A wildlife ecologist experienced in fauna rescue should be present when any of the trees shown in Figure 3 are felled. • The importance of habitat tree protection should be included as

Ecological value (Figure 3)	Impacts	Recommendations	
			part of the site inductions.
Waterways (creeks, dams, etc.)	Runoff from the extraction area resulting in potential sedimentation / siltation of waterways and waterbodies.	• Install sediment barriers where required.	• Ensure that a current best practise sedimentation / siltation prevention strategy is developed to manage runoff from the quarry, and is properly integrated with the measures that are currently in use for the existing quarry operations. This could include detention basins, sediment barriers and prompt mulching/revegetation of bare areas using locally native species.
Weeds	At least one species of listed noxious weed and numerous environmental weed species occur in the study area.	• Take care not to spread weed parts, particularly seeds and propagules, into new areas during vegetation clearing or other site operations.	• Noxious weeds must be treated by law within the property according to the class of weed (see section 4.2.6). • Environmental weeds should be suppressed wherever possible and prevented from spreading.

6 Conclusion

This report is an assessment of the potential impact of a minor modification involving a slight net extension (by 1.32 hectares) of the Bogo Quarry, via Bookham, on biodiversity values within the subject site in accordance with the EP&A Act, the TSC Act and the EPBC Act. This report has addressed the biodiversity assessment requirements as set out in the SEARs from NSW Department of Planning, particularly the included EARs from OEH. The bulk of the area as yet to be quarried has already been approved. This assessment specifically addresses the small additional area proposed for extraction, and considers its cumulative effect when added to the area already approved for quarrying.

No flora species or endangered populations listed under the EPBC Act or TSC Act were recorded during the field surveys.

One vegetation community mapped by Biosis within the subject site is consistent with the final determination for the *White Box Yellow Box Blakelys Red Gum Woodland* EEC under the TSC Act. The community does not qualify as the equivalent *White Box-Yellow Box-Blakelys Red Gum Woodland and Derived Native Grasslands* CEEC as listed under the EPBC Act because of the tighter identification criteria and thresholds defining its presence. A total of approximately 0.05 hectares of low quality Box Gum Woodland (listed under the TSC Act only) will be removed by the proposed works.

Following field investigations, five EPBC Act listed threatened fauna species, and an additional seven species also listed under the TSC Act were determined to have a moderate or higher likelihood of occurrence within the study area. Given the fragmented landscape and the presence of threats (i.e. pest fauna species), the majority of these species are highly mobile and likely to use the study area for dispersal and foraging purposes only. Given the confirmed occurrence of one TEC within the study area an assessment of significance was undertaken for the following:

- Box Gum Woodland

Throughout the preparation of this flora and fauna assessment, RW Corkery & Co, Bogo Operations Pty Ltd and Biosis have worked together to design a proposal that largely avoids impacts to significant biodiversity features. Namely, the project design minimises impacts to the TEC listed under the TSC Act, and avoids specific habitat areas for potentially occurring threatened fauna. This has also resulted in the subsequent avoidance of impacts to threatened fauna habitats. Following this process, the resulting impacts to biodiversity include:

- Removal of 0.05 hectares constituting the Box Gum Woodland in poor condition to accommodate the area of proposed quarry extension.
- Removal of four habitat trees which are large and mature but do not appear to contain hollows.
- Removal of 1.27 hectares of predominantly exotic grazed pasture / grassland.
- Possible indirect impacts to retained habitat trees adjacent to the subject site due to runoff or other indirect effects.

The current development application represents an incremental and narrow extension to the substantially larger area that is already approved for extraction, and is situated mostly on cleared and predominantly weedy pasture. As part of the design modification, a small area of habitat that occurs in the area approved for extraction will now be retained. This area includes one habitat tree with a medium hollow. When considered together with the area already approved for extraction, the extension area represents an incremental cumulative increase in the overall area of habitat, including habitat trees and TEC, that would be cleared. This

incremental increase has been found to be insignificant by the Assessment of Significance process carried out in this report.

To mitigate the above impacts of the proposal, recommendations have been included in Section 5 of this report, including exclusion fencing, sediment control, weed control, supervision of habitat clearance and information on biodiversity values to be included in site inductions (refer to Table 6 for full details regarding proposal safeguards).

Overall, the proposal is considered unlikely to result in a significant impact to any threatened species, populations or communities listed under the EPBC or TSC Acts. A referral to the Commonwealth Minister of the Environment or preparation of a Species Impact Statement are not required.

References

Australian National Botanic Gardens 2007. *On-line Australian Plant Name Index*. Australian National Botanic Gardens, Canberra, ACT.

DEC 2004. *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft November 2004*. Department of Environment and Conservation (NSW).

DECCW 2007. *Threatened species assessment guidelines: The assessment of significance*. Department of Environment, Climate Change and Water (NSW).

DEH 2006. *White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands. Nationally threatened species and ecological communities.* EPBC Policy Statement. Department of the Environment & Heritage. Australian Government, Canberra.

DEWHA 2009a. *Census of Australian Vertebrates.* Department of Sustainability Environment, Water, Population and Communities.

DEWHA 2009b. *Matters of National Environmental Significance. Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999*. Department of the Environment, Water, Heritage & the Arts. Australian Government, Canberra.

DoE 2013. *Matters of National Environmental Significance, Significant Impact Criteria Guidelines 1.1 Environmental Protection and Biodiversity Conservation Act 1999.* Department of the Environment.

Ecotone Ecological Consultants 2010. *Threatened species impact assessment for the production increase at the Bogo Quarry near Bookham.* Prepared for RW Corkery & Co Pty Ltd.

Geological Survey of NSW 2013. *Yass 1:100 000 Geological Sheet 8628.* NSW Trade & Investment, Resources & Energy - NSW Geological Survey, Maitland, NSW.

Harden G 1992. *Flora of New South Wales Volume 3.* NSW University Press. Kensington.

Harden G 1993. *Flora of New South Wales Volume 4.* NSW University Press. Kensington.

Harden G 2000. *Flora of New South Wales Volume 1 (Revised Edition).* NSW University Press. Kensington

Harden G 2002. *Flora of New South Wales Volume 2 (Revised Edition).* NSW University Press. Kensington

Keith, DA and Simpson, CC 2010. *Vegetation Formations of NSW (version 3.0): A seamless map for modelling fire spread and behaviour*. Report to the Rural Fire Service. NSW Department of Environment & Climate Change October 2010.

NPWS 2002. *Identification Guidelines for Endangered Ecological Communities: White Box Yellow Box Blakely's Red Gum Woodland (Box-Gum Woodland)* . NSW National Parks and Wildlife Service, Hurstville.

RBGDT 2015. *PlantNET - The Plant Information Network System of The Royal Botanic Gardens and Domain Trust, Sydney, Australia (Version 2).* Office of Environment and Heritage (OEH) NSW, Sydney.

Appendices

Appendix 1 Flora

A1.1 Flora species recorded from the study area

Notes to tables:

EPBC Act: CE – Critically Endangered EN – Endangered VU – Vulnerable # - species predicted to occur by the DoE database (not recorded on other databases)	**TSC Act:** E1 – endangered species (Part 1, Schedule 1) E2 – endangered population (Part 2, Schedule 1) E3 – endangered ecological community (Part 3, Schedule 1) E4 – presumed extinct (Part 4, Schedule 1) E4A – critically endangered V1 – vulnerable (Part 1, Schedule 2) *Codes identify the Legal Status of threatened biota within NSW under the TSC Act and the OEH Sensitive Species Data Policy (SSDP).*
Non-indigenous species ** – noxious weed species declared under the Noxious Weeds Act	**Noxious weed status:** Regionally restricted species (Class 4)

Table A.1 Flora species recorded from the study area

Status	Scientific name	Common name
	NATIVE	
	Acaena ovina	Sheep's Burr
	Aristida ramosa	Thee-awn Grass
	Austrostipa bigeniculata	Tall Speargrass
	Austrostipa scabra	Corkscrew
	Bothriochloa macra	Redleg Grass
	Carex appressa	Tall Sedge
	Cheilanthes sp.	Rock Fern
	Drosera peltata	Tall Sundew
	Eucalyptus blakelyi	Blakely's Red Gum
	Eucalyptus mannifera	Brittle Gum
	Eucalyptus melliodora	Yellow Box
	Eucalyptus polyanthemos	Red Box
	Hypoxis hygrometrica	Golden Weather-grass
	Lomandra longifolia	Spiny-headed Mat-rush
	Juncus subsecundus	Finger Rush
	Juncus usitatus	Common Rush

Status	Scientific name	Common name
	Microlaena stipoides	Weeping Grass
	Oxalis sp.	native oxalis
	Senecio quadridentatus	Cotton Fireweed
	Stypandra glauca	Nodding Blue Lily
	Wurmbea dioica	Early Nancy
	EXOTIC	
	Acetocella vulgaris	Sheep Sorrel
	Arctotheca calendula	Capeweed
	Avena sp.	Wild Oats
	Bromus spp.	Brome Grasses
	Cirsium vulgare	Spear Thistle
	Cyperus eragrostis	
	Echium plantagineum	Paterson's Curse
	Galium aparine	Goosegrass, Cleavers
	Holcus lanatus	Yorkshire Fog
	Hordeum sp.	Barley Grass
	Hypochaeris radicata	Cat's Ear
	Petrorhagia nanteuilii	Proliferous Pink
	Phalaris aquatica	Phalaris
	Romulea rosea	Onion Grass
	Rosa rubiginosa	Sweet Briar
**	*Rubus fruticosus*	Blackberry
	Rumex crispus	Dock
	Silybum marianum	Variegated Thistle
	Trifolium spp.	Clover species

A1.2 Threatened flora species and ecological communities

The following table includes a list of the threatened flora species and ecological communities that have potential to occur within the study area. The list of species is sourced from the NSW BioNet Wildlife Atlas and the Protected Matters Search Tool (DoE); accessed on 24/09/2015.

Examples of criteria for determining the likelihood of occurrence for threatened biota as a guide for writing the rationale for likelihood have been listed below.

Likelihood of occurrence	Potential criteria
High	• Species/ecological communities recorded in study area during current or previous assessment/s. • Aquatic species recorded from connected waterbodies in close proximity to the study area during current or previous assessment/s. • Sufficient good quality habitat is present in study area or in connected waterbodies in close proximity to the study area (aquatic species). • Study area is within species natural distributional range (if known). • Species has been recorded within 10 kilometres or from the relevant catchment/basin.
Medium	• Records of terrestrial biota within 10 kilometres of the study area or of aquatic species in the relevant basin/neighbouring basin. • Habitat limited in its capacity to support the species due to extent, quality, or isolation.
Low	• No records within 10 kilometres of the study area or for aquatic species, the relevant basin/neighbouring basin. • Marginal habitat present (low quality & extent). • Substantial loss of habitat since any previous record(s).
Negligible	• Habitat not present in study area • Habitat for aquatic species not present in connected waterbodies in close proximity to the study area. • Habitat present but sufficient targeted survey has been conducted at an optimal time of year and species wasn't recorded.

Table A.2 Threatened flora species recorded / predicted to occur within ten kilometres of the study area

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Ammobium craspedioides	Yass Daisy	VU	V	2010/#	Low	Marginal habitat is present, but the species was not recorded during targeted spring field surveys and the habitat is probably too modified and degraded for the species.	Perennial with simple, single-headed stems, usually 30-60 cm high; stems unbranched, scarcely winged, ± woolly. Flowering: summer. Grows in sclerophyll woodland, forest and on roadsides, rare, confined to the Yass district. NSW subdivisions: ST, SWS.
Caladenia concolor	Crimson Spider Orchid	VU	E1	#	Negligible	Habitat unsuitable.	Regrowth woodland on granite ridge country with a high diversity of plant species, including other orchids. Known from the Nail Can Hill Crown Reserve near Albury and from a small Crown land site north-west of Wagga Wagga. The listing incorporates two populations which have each been described as separate species. One of these populations comprises a few hundred plants on private property near Bethungra and the other of about 100 plants occurs in Burrinjuck Nature Reserve.
Prasophyllum petilum	Tarengo Leek Orchid	EN	E1	#	Low	Suitable habitat and commonly associated species are absent.	Known from two sites in the NSW Southern Tablelands; at Boorowa and Captains Flat; and at Hall in the Australian Capital Territory. Plants can be very cryptic when growing in small numbers and within tall grasses. Grows in open sites within Natural Temperate

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							Grassland at the Boorowa site. Also grows in grassy woodland in association with River Tussock *Poa labillardieri* Black Gum *Eucalyptus aggregata* and tea-trees *Leptospermum* spp. at Captains Flat and within the grassy groundlayer of Box-Gum Woodland at Hall. Flowers in October at Boorowa and December at Captains Flat. Population density at the Boorowa site is higher in the open grassland dominated by wallaby grasses *Austrodanthonia* spp., compared to that within the denser stands of Kangaroo Grass *Themeda australis*. Known from two sites in the NSW Southern Tablelands; at Boorowa and Captains Flat; and at Hall in the Australian Capital Territory. Highly colonial, with very large numbers present and very conspicuous at the Boorowa site, but cryptic at the Captains Flat site where low numbers are recorded.
Prasophyllum sp. *Wybong*	A Leek Orchid	CE		#	Low	Habitat is marginal to unsuitable and site is remote from nearest records.	Leek orchids are generally found in shrubby and grassy habitats in dry to wet soil. *Prasophyllum* sp. *Wybong* is known to occur in open eucalypt woodland and grassland. *Prasophyllum* sp. *Wybong* is endemic to NSW. It is known from seven populations in eastern NSW near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell and Tenterfield. *Prasophyllum* sp. *Wybong* occurs within the Border Rivers (Gwydir, Namoi, Hunter), Central Rivers and Central West

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							Natural Resource Management Regions. The species occurs within the Sydney Basin, New England Tablelands, Brigalow Belt South and NSW South Western Slopes Interim Biogeographic Regionalisation for Australia Bioregions.
Thesium australe	Austral Toadflax	VU	V	#	Low	Marginally suitable habitat may be present, but not recorded in the locality.	Found in very small to large populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. *Thesium australe* is a root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass. It is often found in damp sites in association with *Themeda australe*, but also found on other grass species at inland sites. Occurs on clay soils in grassy woodlands or coastal headlands.

* - habitat descriptions have been adapted by qualified ecologists from the DoE Species Profile and Threats (SPRAT) Database, OEH Threatened Species online profiles and the NSW Scientific Committee final determinations for listed species, references within the above table are provided within the report reference list.

Table A.3 Threatened ecological communities recorded / predicted to occur within ten kilometres of the study area

Threatened Ecological Community	Common Name	Conservation Status		Other Sources	Likely Occurrence in study area
		EPBC	TSC		
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Grey Box Grassy Woodlands	EN	-		Medium
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	White Box-Yellow Box-Blakely's Red Gum Woodland	CE	-		High
Coolac-Tumut Serpentinite Shrubby Woodland in the NSW South Western Slopes and South Eastern Highlands Bioregions	Coolac-Tumut Serpentinite Shrubby Woodland	-	E3		Low
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	Fuzzy Box Woodland	-	E3		Low
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Inland Grey Box Woodland	EN	E3		Medium
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South	Montane Peatlands	EN	E3		Negligible

Threatened Ecological Community	Common Name	Conservation Status		Other Sources	Likely Occurrence in study area
		EPBC	TSC		
Eastern Highlands and Australian Alps bioregions					
Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory	Natural Temperate Grassland	EN	-		Low
Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions	Tablelands Grassy Woodland	-	E3		Negligible
White Box Yellow Box Blakely's Red Gum Woodland	Box-Gum Woodland	-	E3		High
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	White Box-Yellow Box-Blakely's Red Gum Woodland	CE	-		Medium

Appendix 2 Fauna

Fauna species in these tables are listed in alphabetical order within their taxonomic group.

A2.1 Fauna species recorded from the study area

Below is a list of fauna species recorded from the study area during the current assessment and a list of significant fauna species recorded or predicted to occur within ten kilometres of the study area.

Notes to table:

EPBC Act:	**TSC Act:**
EX - Extinct	C1 – critically endangered
CR - Critically Endangered	E1 – endangered species (Part 1, Schedule 1)
EN - Endangered	E2 – endangered population (Part 2, Schedule 1)
VU - Vulnerable	E4 – presumed extinct (Part 4, Schedule 1)
CD - Conservation dependent	V1 – vulnerable (Part 1, Schedule 2)
* - introduced species	

Table A.4 Vertebrate fauna recorded from the study area (current assessment)

Status	Scientific name	Common name
Birds		
	Coracina novaehollandiae	Black-faced Cuckoo-shrike
	Cracticus tibicen	Australian Magpie
	Eolophus roseicapillus	Galah
	Falco cenchroides	Nankeen Kestrel
	Grallina cyanoleuca	Magpie-lark
	Pardalotus striatus	Striated Pardalote
	Petrochelidon nigricans	Tree Martin
	Rhipidura leucophrys	Willie Wagtail
	Sturnus vulgaris	Common Starling
Mammals		
	Vombatus ursinus	Common Wombat
	Macropus giganteus	Eastern Grey Kangaroo
	Tachyglossus aculeatus	Echidna
*	*Bos taurus*	Cow
Reptiles		
	Pseudonaja textilis	Eastern Brown Snake

Status	Scientific name	Common name
	Delma inornata	Olive Legless Lizard

A2.2 Habitat and hollow bearing trees

Table A.5 Habitat and hollow bearing trees in the study area (current assessment)

Tree ID & grid reference (Zone 55)	Photo	Tree Species	Tree Height (m)	DBH (cm)	# of small hollows <50mm	# of medium hollows 50-150mm	# of large hollows 150-250mm	Comments / other features
1 655113 E, 6146663 N		Dead Stag	8	60	0	2	0	
2 655092 E, 6146653 N		Brittle Gum *Eucalyptus mannifera*	11	70	0	1	0	Mistletoe

Tree ID & grid reference (Zone 55)	Photo	Tree Species	Tree Height (m)	DBH (cm)	# of small hollows <50mm	# of medium hollows 50-150mm	# of large hollows 150-250mm	Comments / other features
3 655059 E, 6146689 N		Blakely's Red Gum *Eucalyptus blakelyi*	11	60	0	0	0	
4 655079 E, 6146700 N		Blakely's Red Gum *Eucalyptus blakelyi*	11	70	0	0	0	Mistletoe

Tree ID & grid reference (Zone 55)	Photo	Tree Species	Tree Height (m)	DBH (cm)	# of small hollows <50mm	# of medium hollows 50-150mm	# of large hollows 150-250mm	Comments / other features
5 655129 E, 6146718 N		Blakely's Red Gum *Eucalyptus blakelyi*	12	110	0	0	0	Mistletoe
6 655094 E, 6146741 N		Blakely's Red Gum *Eucalyptus blakelyi*	13	80	0	0	0	Mistletoe

Tree ID & grid reference (Zone 55)	Photo	Tree Species	Tree Height (m)	DBH (cm)	# of small hollows <50mm	# of medium hollows 50-150mm	# of large hollows 150-250mm	Comments / other features
7 655089E, 6146761 N		Red Box *Eucalyptus polyanthemos*	12	100	0	0	0	Mistletoe. Tree surrounded by small patch of native groundcover.
8 655037 E, 6146726 N		Red Box *Eucalyptus polyanthemos*	11	70	0	0	0	

Tree ID & grid reference (Zone 55)	Photo	Tree Species	Tree Height (m)	DBH (cm)	# of small hollows <50mm	# of medium hollows 50-150mm	# of large hollows 150-250mm	Comments / other features
9 655032 E, 6146714 N		Red Box *Eucalyptus polyanthemos*	13	60	0	0	0	
10 655027 E, 6146654 N		Red Box *Eucalyptus polyanthemos*	11	70	0	0	0	

Tree ID & grid reference (Zone 55)	Photo	Tree Species	Tree Height (m)	DBH (cm)	# of small hollows <50mm	# of medium hollows 50-150mm	# of large hollows 150-250mm	Comments / other features
11 655017 E, 6146653 N		Red Box *Eucalyptus polyanthemos*	13	60	0	0	0	Mistletoe
12 655011 E, 6146646 N		Yellow Box *Eucalyptus melliodora*	9	40	0	0	0	12 & 13 close together

Tree ID & grid reference (Zone 55)	Photo	Tree Species	Tree Height (m)	DBH (cm)	# of small hollows <50mm	# of medium hollows 50-150mm	# of large hollows 150-250mm	Comments / other features
13 655009 E, 6146645 N		Blakely's Red Gum *Eucalyptus blakelyi*	10	50	0	0	0	12 & 13 close together
14 655025 E, 6146617 N		Blakely's Red Gum *Eucalyptus blakelyi*	10	50	0	0	0	
15 655004 E, 6146624 N		Blakely's Red Gum *Eucalyptus blakelyi*	8	60	0	1	0	

Tree ID & grid reference (Zone 55)	Photo	Tree Species	Tree Height (m)	DBH (cm)	# of small hollows <50mm	# of medium hollows 50-150mm	# of large hollows 150-250mm	Comments / other features
16 655081 E, 6146371 N		Red Box *Eucalyptus polyanthemos*	4	30	0	0	0	Dieback - covered in beetles
17 654990 E, 6146538 N		Blakely's Red Gum *Eucalyptus blakelyi*	8	90	0	1	0	Hollow occupied by honeybees
18 654973 E, 6146451N		Dead Stag	10	30	1	0	0	

Tree ID & grid reference (Zone 55)	Photo	Tree Species	Tree Height (m)	DBH (cm)	# of small hollows <50mm	# of medium hollows 50-150mm	# of large hollows 150-250mm	Comments / other features
19 655013 E, 6146373 N		Red Box *Eucalyptus polyanthemos*	7	80	1	2	1	Severe dieback
20 654997 E, 6146322 N		Dead Stag	7	40	1	2	0	

Tree ID & grid reference (Zone 55)	Photo	Tree Species	Tree Height (m)	DBH (cm)	# of small hollows <50mm	# of medium hollows 50-150mm	# of large hollows 150-250mm	Comments / other features
21 655013 E, 6146313 N		Dead Stag	8	50	2	2	0	
22 655013 E, 6146293 N		Dead Stag	8	80	0	0	0	Crack – suitable for microbats?

Tree ID & grid reference (Zone 55)	Photo	Tree Species	Tree Height (m)	DBH (cm)	# of small hollows <50mm	# of medium hollows 50-150mm	# of large hollows 150-250mm	Comments / other features
23 654963 E, 6146290 N		Dead Stag	4	70	0	0	0	

A2.3 Threatened fauna species

The following table includes a list of the significant fauna species that have potential to occur within the subject site. The list of species is sourced from the NSW BioNet Wildlife Atlas, BirdLife Australia data search and the Protected Matters Search Tool (DoE; accessed on 24/ 09 /2015).

Notes to table:

#	species predicted to occur by the DoE database (not recorded on other databases)
##	species predicted to occur based on natural distributional range and suitable habitat despite lack of records in the databases searched
Year	recorded on databases listed above

Likelihood of occurrence	Potential criteria
High	• Species recorded in study area during current or previous assessment/s. • Aquatic species recorded from connected waterbodies in close proximity to the study area during current or previous assessment/s. • Sufficient good quality habitat is present in study area or in connected waterbodies in close proximity to the study area (aquatic species). • Study area is within species natural distributional range (if known). • Species has been recorded within ten kilometres or from the relevant catchment/basin.
Medium	• Records of terrestrial species within ten kilometres of the study area or of aquatic species in the relevant basin/neighbouring basin. • Habitat limited in its capacity to support the species due to extent, quality, or isolation.
Low	• No records within ten kilometres of the study area or for aquatic species, the relevant basin/neighbouring basin. • Marginal habitat present (low quality & extent). • Substantial loss of habitat since any previous record(s).
Negligible	• Habitat not present in study area • Habitat for aquatic species not present in connected waterbodies in close proximity to the study area. • Habitat present but sufficient targeted survey has been conducted at an optimal time of year and species wasn't recorded.

Table A.6 Threatened fauna species recorded, or predicted to occur, within ten kilometres of the subject site

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Amphibians							
Litoria booroolongensis	Booroolong Frog	EN	E1	#	Negligible	There is no potential habitat for this species within the subject site or the study area.	The species is restricted to NSW and north-eastern VIC, predominantly along the western-flowing streams of the Great Dividing Range. The most recent records occur on the south-west slopes of NSW. The species is found in upland rivers, montane creeks and lowland rivers and creeks, particularly in permanent rocky western-flowing streams and rivers on the slopes and tablelands of NSW, with some fringing vegetation cover such as ferns, sedges or grasses. The Booroolong Frog is often found in daylight on rocks by the waters edge or sheltering under rocks or amongst vegetation. Breeding occurs in spring and early summer when eggs are laid in submerged rock crevices. Tadpoles develop in slow-flowing connected or isolated pools and metamorphose in late summer to early autumn.
Litoria raniformis	Southern Bell Frog	VU	E1	#	Negligible	There is no potential habitat for the species within the subject site or the study area.	In NSW the species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. Usually found in or around

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							permanent or ephemeral swamps or billabongs with an abundance of bulrushes and other emergent vegetation along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. Outside the breeding season animals disperse away from the water and take shelter beneath ground debris such as fallen timber and bark, rocks, grass clumps and in deep soil cracks.
Birds							
Anthochaera phrygia	Regent Honeyeater	CE	E4A	#	Medium	The species may be an occasional transient visitor to the subject site to forage.	A semi-nomadic species occurring in temperate eucalypt woodlands and open forests. Most records are from box-ironbark eucalypt forest associations and wet lowland coastal forests. 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, C. 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. Regent Honeyeaters usually nest in horizontal branches

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							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.
Botaurus poiciloptilus	Australasian Bittern	EN	E1	#	Negligible	The species may visit the farm dams within the study area to forage however there are no records of the species in the locality and no foraging habitat within the subject site.	The Australasian Bittern is distributed across south-eastern Australia. Often found in terrestrial and estuarine wetlands, generally where there is permanent water with tall, dense vegetation including *Typha* spp. and *Eleoacharis* spp. Typically this bird forages at night on frogs, fish and invertebrates, and remains inconspicuous during the day. The breeding season extends from October to January with nests being built amongst dense vegetation on a flattened platform of reeds.
Callocephalon fimbriatum	Gang Gang Cockatoo	-	V		Moderate	There is the potential for this species to visit the subject site to forage. Did not come up in database search but specified in OEH EARs as requiring consideration.	In summer generally found in tall mountain forests and woodlands, particularly mature wet sclerophyll forests. In winter may occur in drier more open eucalypt forests and woodlands. Nests in hollows in trunk, limb or dead spout of large living eucalypt, usually near water.
Circus assimilis	Spotted Harrier	-	V	2005	Medium	The species may occur within	The Spotted Harrier is found throughout

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
						the subject site and has been recorded in the locality.	Australia but rarely in densely forested and wooded habitat of the escarpment and coast. Preferred habitat consists of open and wooded country with grassland nearby for hunting. Habitat types include open grasslands, acacia and mallee remnants, spinifex, open shrublands, saltbush, very open woodlands, crops and similar low vegetation. The Spotted Harrier is more common in drier inland areas, nomadic part migratory and dispersive, with movements linked to the abundance of prey species. Nesting occurs in open or remnant woodland and unlike other harriers, the Spotted Harrier nests in trees.
Chthonicola sagittata	Speckled Warbler	-	V		Low	Unlikely to occur within due to high degree of tree clearance and lack of midstorey. Did not come up in database search but specified in OEH EARs as requiring consideration.	Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies.
Climacteris picumnus victoriae	Brown Treecreeper	-	V		Low	The study area is too highly disturbed and modified for this species. Did not come up in database search but specified in OEH EARs as	Found in eucalypt woodlands and dry open forest, usually with an open grassy understorey.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
						requiring consideration.	
Daphoenositta chrysoptera	Varied Sittella	-	V	2006	Low	The subject site constitutes poor quality potential habitat for the species due to the history of disturbance and modification.	The Varied Sittella is a sedentary species which inhabits a wide variety of dry eucalypt forests and woodlands, usually with either shrubby understorey or grassy ground cover or both, in all climatic zones of Australia. Usually inhabit areas with rough-barked trees, such as stringybarks or ironbarks, but also in mallee and acacia woodlands, paperbarks or mature Eucalypts. The Varied Sittella feeds on arthropods gleaned from bark, small branches and twigs. It builds a cup-shaped nest of plant fibres and cobweb in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.
Grantiella picta	Painted Honeyeater	VU	V	#	Medium	The species may visit the subject site to forage.	Found mainly in dry open woodlands and forests, where it is strongly associated with mistletoe. Often found on plains with scattered eucalypts and remnant trees on farmlands.
Hieraaetus morphnoides	Little Eagle	-	V	2014	High	The species is known to occur within the locality and is likely to include the subject site within a broad hunting	The Little Eagle is most abundant in lightly timbered areas with open areas nearby providing an abundance of prey species. It has often been recorded foraging in grasslands, crops, treeless dune fields, and recently logged

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
						territory.	areas. The Little Eagle nests in tall living trees within farmland, woodland and forests.
Lathamus discolor	Swift Parrot	EN	E1	#	Medium	This species may visit the subject site to forage.	The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. 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 Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	-	V	2012	Moderate	The species may visit the subject site to forage.	This species lives in a wide range of temperate woodland habitats, and a range of woodlands and shrublands in semi-arid areas.
Pachycephala olivacea	Olive Whistler	-	V	2010	Low	The species is unlikely to occur within the subject site although periodically visit to	Found in a range of habitats including alpine thickets, wetter rainforest/woodlands, riparian

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
						forage.	vegetation and heaths.
Pandion cristatus	Osprey	-	V	#	Negligible	There is no potential habitat for this species within the subject site.	Found in coastal waters, inlets, estuaries and offshore islands. Occasionally found 100 km inland along larger rivers. It is water-dependent, hunting for fish in clear, open water. The Osprey occurs in terrestrial wetlands, coastal lands and offshore islands. It is a predominantly coastal species, generally using marine cliffs as nesting and roosting sites. Nests can also be made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.
Petroica boodang	Scarlet Robin	-	V	2008	High	The species is likely to visit the subject site to forage on occasion.	During the breeding season the Scarlet Robin is found in eucalypt forests and temperate woodlands, often on ridges and slopes. During autumn and winter it moves to more open and cleared areas. It has dispersive or locally migratory seasonal movements. The Scarlet Robin forages amongst logs and woody debris for insects which make up the majority of its diet. The nest is an open cup of plant fibres and cobwebs, sited in the fork of a tree (often a dead branch in a live tree, or in a dead tree or shrub) which is usually more than 2 m above the ground. It is conspicuous in open and suburban

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							habitats.
Petroica phoenicea	Flame Robin	-	V	2002	High	The species is likely to visit the subject site to forage on occasion.	Flame Robins are found in a broad coastal band from southern Queensland to just west of the South Australian border. The species is also found in Tasmania. The preferred habitat in summer includes moist eucalyptus forests and open woodlands, whilst in winter prefers open woodlands and farmlands. It is considered migratory. The Flame Robin breeds from about August to January.
Polytelis swainsonii	Superb Parrot	VU	V	2010/#	Medium	The species is likely to seasonally forage within the subject site. No hollow-bearing trees (i.e. potential breeding habitat) are located within the subject site.	Found mainly in open, tall riparian River Red Gum forest or woodland. Often found in farmland including grazing land with patches of remnant vegetation. Breeds in hollow branches of tall Eucalypt trees within 9 km of feeding areas
Rostratula australis	Australian Painted Snipe	EN	E1	#	Negligible	There is no potential habitat within the subject site. The species may visit the farm dams within the study area however there are no records in the locality.	Usually found in shallow inland wetlands including farm dams, lakes, rice crops, swamps and waterlogged grassland. They prefer freshwater wetlands, ephemeral or permanent, although they have been recorded in brackish waters.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
Stagonopleura guttata	Diamond Firetail	-	V		Moderate	This species may venture in the study area (and perhaps occasionally the subject site) to forage. Did not come up in database search but specified in OEH EARs as requiring consideration.	Found in grassy eucalypt woodlands, also occurs in open forest and native grassland. Often associated with riparian areas.
Fish							
Maccullochella peelii	Murray Cod	VU	-	#	Negligible	There is no potential habitat for this species within the subject site or study area.	The Murray Cods natural distribution extends throughout the Murray-Darling basin ranging west of the divide from south east Queensland, through NSW into Victoria and South Australia. It is found in the waterways of the Murray–Darling Basin in a wide range of warm water habitats that range from clear, rocky streams to slow flowing turbid rivers, billabongs and large deep holes. Murray Cod is entirely a freshwater species and will not tolerate high salinity levels.
Macquaria australasica	Macquarie perch	EN	-	#	Negligible	There is no potential habitat for this species within the subject site or study area.	Macquarie Perch are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments. Macquarie perch are found in both

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							river and lake habitats, especially the upper reaches of rivers and their tributaries
Insects							
Synemon plana	Golden Sun Moth	CE	E1	2000/#	Low	No potential habitat for this species was recorded within the subject site (or approved extraction area) during the field survey. Some areas of native ground cover (potentially including feed species) occur within the broader study area and have the potential to support the species.	The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by wallaby grasses of the genus Rytidosperma. It is believed that the females lay up to 200 eggs at the base of the tussocks. After hatching, the larvae tunnel underground where they remain feeding on the roots. Also feeds upon the introduced species Chilean Needle Grass *Nassella neesiana*.
Mammals							
Dasyurus maculatus	Spotted-tailed Quoll	EN	V	#	Negligible	There is no potential habitat for this species within the subject site as it is too highly modified.	Occurs along the east coast of Australia and the Great Dividing Range. Uses a range of habitats including sclerophyll forests and woodlands, coastal heathlands and rainforests. Occasional sightings have been made in open country, grazing lands, rocky outcrops and other treeless areas. Habitat requirements include suitable den

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							sites, including hollow logs, rock crevices and caves, an abundance of food and an area of intact vegetation in which to forage. Seventy per cent of the diet is medium-sized mammals, and also feeds on invertebrates, reptiles and birds. Individuals require large areas of relatively intact vegetation through which to forage. The home range of a female is between 180 and 1000 ha, while males have larger home ranges of between 2000 and 5000 ha. Breeding occurs from May to August.
Nyctophilus corbeni	Corben's Long-eared Bat	VU	V	#	Low	There is no potential habitat within the subject site or broader study area.	Restricted to the Murray-Darling basin and western slopes. Found in a range of habitats including tall Eucalypt forests, mallee, open savanna and Black Box woodland, preferring habitats with a distinct canopy and cluttered, dense understorey. Roost in tree hollows and fissures and under exfoliating bark.
Phascolarctos cinereus	Koala	VU	V	2006/#	Low	There is no potential habitat (feed trees) within the subject site and the subject site and broader study area is too heavily modified to support the species.	Pittwater LGA and Hawks nest: In NSW the Koala mainly occurs on the central and north coasts with some populations in the western region. Koalas feed almost exclusively on eucalypt foliage, and their preferences vary regionally. Primary feed trees include *Eucalyptus robusta, E. tereticornis, E. punctata, E. haemostoma* and *E.*

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
							signata. They are solitary with varying home ranges. In high quality habitat home ranges may be 1-2 ha and overlap, while in semi-arid country they are usually discrete and around 100 ha.
Pteropus poliocephalus	Grey-headed Flying-fox	VU	V	#/#	Medium	The species is likely periodically forage on flowering eucalypts within the subject site.	Occurs along the NSW coast, extending further inland in the north. This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Roosts in large colonies (camps), commonly in dense riparian vegetation. Bats commute daily to foraging areas, usually within 15 km of the day roost although some individuals may travel up to 70 km.
Reptiles							
Aprasia parapulchella	Pink-tailed Worm-lizard	VU	V	#	Low	There are no areas of rocky habitat with native-dominated ground cover within the subject site. Some rock scatter occurs however the rocks are mostly deeply embedded. Native ground cover species are sparse within the subject site and approved extraction area. There is a low-Medium	Fossorial species, which lives beneath surface rocks and occupies ant burrows. It feed on ants, particularly their eggs and larvae. Thought to lay eggs within the ant nests under rocks that it uses as a source of food and shelter. Key habitat features are a cover of native grasses, particularly Kangaroo Grass *Themeda australis*, sparse or no tree cover, little or no leaf litter, and scattered small rock with shallow embedment in

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
						potential for this species to occur elsewhere within the study area.	the soil surface.
Delma impar	Striped Legless Lizard	VU	V	#	Low	The species is unlikely to occur within the subject site due to the steep topography and paucity of suitable native and/or exotic tussocky species. It may occur in more low-lying areas within the broader study area. A related species, the Olive Legless Lizard *Delma inornata* was recorded during the current field survey. This common species is more widely distributed with less specific habitat requirements, although sometimes overlaps with the Striped Legless Lizard.	Generally occurs in lowland native grasslands occurring on gently undulating plains having soils of basaltic origin. Ground cover is dominated by perennial, tussock-forming grasses such as *Themeda triandra*, *Austrostipa* spp. and *Austrodanothonia* spp. Inhabits secondary grasslands only when they occur within 2km of primary grassland. Can occur in exotic grassland where suitable tussock-forming species are present (e.g. Phalaris) and where disturbance (e.g. ploughing) has not recently occurred.
Suta flagellum	Little Whip Snake	-	V		Low	Species may occur however presence is unlikely due to high degree of modification and exotic groundcover.	Occurs in Natural Temperate Grasslands and grassy woodlands, including those dominated by Snow Gum Eucalyptus pauciflora or Yellow Box E. melliodora. Also occurs in secondary

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in subject site	Rationale for likelihood ranking	Habitat description*
		EPBC	TSC				
						There are no records in the locality, however the species was included in the OEH EARs as requiring consideration.	grasslands derived from clearing of woodlands. Found on well drained hillsides, mostly associated with scattered loose rocks. Most specimens have been found under rocks or logs lying on, or partially embedded in the soil.

* - habitat descriptions have been adapted by qualified ecologists from the DoE Species Profile and Threats (SPRAT) Database, OEH Threatened Species online profiles and the NSW Scientific Committee final determinations for listed species, references within the above table are provided within the report reference list.

A2.4 Migratory species (EPBC Act listed)

Includes records from the following sources:

- NSW BioNet Wildlife Atlas (refer to Section 2.1)
- DoE database (accessed on 24/09/2015)
- BirdLife Australia data search
- Current survey

Bold denotes species recorded in the study area during the current assessment.

Table A.7 Migratory fauna species recorded or predicted to occur within ten kilometres of the study area

Scientific Name	Common Name	Conservation Status		Most recent record
		EPBC	TSC	
Anthochaera phrygia	Regent Honeyeater	CE	E4A	#
Apus pacificus	Fork-tailed Swift			#
Ardea ibis	Cattle Egret			#
Ardea modesta	Eastern Great Egret			#
Gallinago hardwickii	Latham's Snipe			#
Haliaeetus leucogaster	White-bellied Sea-Eagle			2005
Hirundapus caudacutus	White-throated Needletail			#
Merops ornatus	Rainbow Bee-eater			2009/#
Motacilla flava	Yellow Wagtail			#
Myiagra cyanoleuca	Satin Flycatcher			#
Pandion haliaetus	Osprey		V	#
Rhipidura rufifrons	Rufous Fantail			#
Rostratula australis	Australian Painted Snipe	EN	E1	#

* - habitat descriptions have been adapted by qualified ecologists from the DoE Species Profile for listed migratory species.

Appendix 3 Assessment of Significance

The following section provides for an Assessment of Significance according to the seven factors outlined in Section 5A of the EP&A Act for the only ecological entity assessed as requiring an AoS:

White Box Yellow Box Blakely's Red Gum Woodland

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

Not applicable.

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

Not applicable.

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

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

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

An incremental area of 0.05 hectares of Box-Gum Woodland consisting of four individual trees and immediately surrounding ground layer will be removed from three small patches in one broad area in the north of the subject site. A substantially larger area of similar or better habitat for Box-Gum Woodland occurs in the form of small patches of trees with associated ground layer in the study area and beyond that would not be affected by the current proposal. Being limited to such a restricted area, the action proposed will not adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

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

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

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

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

The extent of habitat of Box-Gum Woodland to be removed for the proposed quarry extension is 0.05 hectares as three small patches, which represents an incremental increase in the area approved for removal and a small fraction of the habitat known to occur in the study area that would be retained. Removal of this habitat will not disrupt any corridor or connecting link and will not therefore result in further fragmentation or isolation of habitat than is currently the case. The additional habitat to be removed has little importance to the long-term survival of the ecological community in the locality.

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

Not applicable – no gazetted critical habitat occurs in the vicinity of the study area.

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

No Recovery Plan has been prepared for Box-Gum Woodland to date. However, a targeted strategy for managing this ecological community has been developed under the 'Saving Our Species' program. The program is not targeting sites such as the study area , therefore the action proposed is not inconsistent with the objectives and actions of the strategy.

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

The proposed action will represent an incremental and insignificant increase in the key threatening process 'Clearing of native vegetation'.

Appendix 4 EPBC Act Protected Matters Report

Australian Government
Department of the Environment

EPBC Act Protected Matters Report

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

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

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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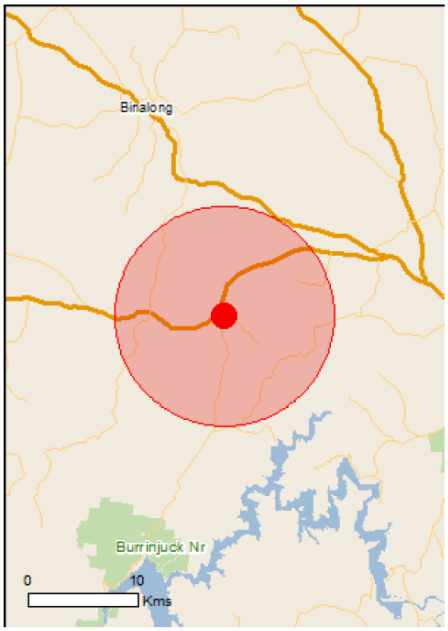

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Coordinates
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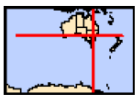

Summary

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.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	22
Listed Migratory Species:	10

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. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

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.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	13
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	1
Invasive Species:	31
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Banrock station wetland complex	700 - 800km upstream
Hattah-kulkyne lakes	500 - 600km upstream
Riverland	700 - 800km upstream
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream

Listed Threatened Ecological Communities		[Resource Information]
For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.		
Name	Status	Type of Presence
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Breeding known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		

Name	Status	Type of Presence
Litoria booroolongensis		
Booroolong Frog [1844]	Endangered	Species or species habitat may occur within area
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat may occur within area
Insects		
Synemon plana		
Golden Sun Moth [25234]	Critically Endangered	Species or species habitat known to 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 corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Ammobium craspedioides		
Yass Daisy [20758]	Vulnerable	Species or species habitat likely to occur within area
Caladenia concolor		
Crimson Spider-orchid, Maroon Spider-orchid [5505]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum petilum		
Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269)		
a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Aprasia parapulchella		
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area
Delma impar		
Striped Legless Lizard [1649]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species

Name	Threatened	Type of Presence
		habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to 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
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [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.

Name
Commonwealth Land - Australian Telecommunications Commission

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to 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

Name	Threatened	Type of Presence within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat likely to 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
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
Southern RFA	New South Wales

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
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		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 likely to occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to 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 reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to 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 and National Heritage properties, Wetlands of International and National 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

-34.81197 148.69464

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:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian 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
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

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

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

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