APPENDIX H

Updated biodiversity offset strategy

Updated Biodiversity Offset Strategy

Cobbora Coal Project

Prepared for Cobbora Holding Company | 30 January 2013

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Updated Biodiversity Offset Strategy

Draft Report

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Executive Summary

ES1 Background

The Cobbora Coal Project (the Project) is an open cut coal mine proposed by the Cobbora Holding Company Pty Limited (CHC). Biodiversity offsets are required to compensate for impacts remaining after mitigation identified in the Environmental Assessment (EA) for the Project.

Avoidance, minimisation and mitigation measures have been undertaken in the design phase and have been recommended for the construction and operation phase, to reduce the potential impacts to terrestrial biodiversity as a result of the Project. Design changes have been made to avoid sensitive ecological features in the Project Application Area (PAA).

Despite these measures, some impacts are unavoidable and will be compensated by offsets. Vegetation will be cleared gradually within the disturbance area over the life of the mine. A total of 3,161 ha of native vegetation (including regenerating vegetation and native grasslands) will be directly impacted. This includes 242 ha of TSC Act-listed threatened ecological communities (TECs) comprising:

- 49 ha of Inland Grey Box Woodland and 34 ha of derived native grassland (DNG);
- 18 ha of Box Gum Woodland and 105 ha of DNG; and
- 14 ha of Fuzzy Box Woodland and 14 ha of DNG.

A total of 67 ha of these communities are also listed under the EPBC Act as threatened; 49 ha of Grey Box Grassy Woodland and 18 ha of Box Gum Woodland. Significant impacts from the Project after mitigation are also likely for three threatened flora species and a number of threatened bird and bat species. Indirect impacts may also occur for TECs and threatened species. Such impacts have been included in the consideration of the suitability of offsets proposed.

ES2 Objectives

The aim of this updated strategy is to provide commitments to Project offsets that will achieve a beneficial biodiversity outcome from the Project and the outcomes of the preliminary offset package. In line with the NSW and Commonwealth offset principles, the Project offsets will:

- provide a net improvement in the quantity and quality of biodiversity values within the region in the medium to long term through:
  - the rehabilitation and protection of woodland, particularly the Box Gum Woodland, Inland Grey Box Woodland and Fuzzy Box Woodland TECs; and
  - the protection of threatened flora and fauna habitat and habitat features (eg hollow-bearing trees).
- provide long-term protection for threatened flora and fauna and TECs;
- improve vegetation and habitat connectivity and extent for existing conservation areas within the locality;

- protect areas identified as key corridors within the Central West Catchment Action Plan (CW CMA, 2011) and as conservation priorities by the NSW National Parks and Wildlife Service (NPWS); and

- provide funding for research and management of threatened species in the region in line with recovery plan actions and in consultation with the Office of Environment and Heritage (OEH).

ES3 Secured offsets

The offset package is still being finalised. However, more than 5,046 ha have been secured as offset sites in four main areas that provide extensions of the reserve network in the locality. These areas provide known threatened species habitat and contain significant areas of TECs and vegetation types representative of the Project impact area.

The secured offsets have considered the recovery objectives and priority actions for TECs and threatened species significantly impacted by the Project. It is considered that the land-based offset commitments and possible management funding that will be determined with OEH and SEWPaC will aid in the recovery of these species and communities in the long-term.

ES4 Offset targets and outcomes

ES4.1 Land-based offsets

In line with the proposed offset strategy, the final offset package will provide as a minimum:

- threatened woodland ecological communities at an offset to impact ratio of 6:1;

- threatened derived native grassland ecological communities, other woodland vegetation and threatened species at an offset to impact ratio of 3:1; and

- where possible threatened flora at an offset to impact ratio of 3:1, or equivalent management funding in consultation with OEH and SEWPaC.

Further land parcels in addition to the secured offsets are currently being negotiated to ensure that these minimum requirements are met or exceeded by the offset package. It is anticipated that at a minimum, an additional 3,134 ha is required to meet the offset requirements of this offset strategy. This would include an additional 126 ha of Fuzzy Box Woodland and 320 ha of Grey Box Woodland.

An additional 2,500 ha of offset areas are being negotiated for addition into the offset strategy. These areas are yet to be surveyed for ecological values, however some known threatened species populations and threatened ecological communities are known to occur in these areas from the initial site surveys. CHC is committed to a minimum offset to impact ratio of 3:1 for vegetation and threatened species habitat in line with the strategy's objectives. It is considered that this minimum is achievable with the proposed additions to the offset package.

Offsets will be protected using formal conservation agreements and potential dedication to the reserve network. An Offset Management Plan will be prepared to ensure biodiversity values are protected and enhanced in the offset areas. The management and rehabilitation of lower quality vegetation within the offsets will deliver conservation gains within the region which would not have otherwise taken place under the current land use.

ES4.2 Management funding and research

If land-based offsets cannot be identified to match on a 'like for like' basis, additional vegetation types in the same vegetation formation will be identified and used as a surrogate in the offset package. CHC is committed to ensuring these offset requirements are met in the final offset package, which will be negotiated with OEH and SEWPaC to ensure the package suitably compensates for the Project impacts. If land-based offsets cannot be identified, indirect offsets will be investigated.

Where possible, habitat offsets for threatened species will aim to provide a minimum offset to impact ratio of 3:1. The additional offset areas currently being investigated will meet most of these requirements. However, these requirements may not be met for some of the threatened flora species and therefore indirect offsets and management funding of known populations may be required. Such measures will be developed in consultation with OEH and SEWPaC.

Some potential management and research funding projects may include:

- the establishment and management of new threatened flora populations in suitable habitat of the secured offset areas using seed, cuttings and translocation of plants from the Project area (note propagation trials for Ingram's Zieria and H*omoranthus darwinioides* are underway); or
- management funding for identified key flora populations in reserve areas or on private land including erecting rabbit, goat and stock-proof fences; or
- seed and soil collection for the NSW Seedbank; or
- funding for the Grassy Box Conservation Management Networks in NSW; or
- funding for the control of priority weeds; or
- funding for regional surveys into the abundance and distribution of microbat species;
- funding for research into restoration techniques and management of grassy box woodlands, particularly where these integrate agricultural practices.

Funding for existing conservation programs/projects or the provision of funds to address research knowledge gaps associated with the relevant ecological values will be negotiated with OEH and SEWPaC.

ES5 Offset adequacy

As noted above, the current offset package is still being added to. However, an assessment using the Biobanking Assessment Methodology for consideration of the OEH Offset Policy, and the Commonwealth Offset Calculator have been completed to determine the suitability of the proposed offset ratios in the Offset strategy and the outcomes of the likely final offset package.

It is considered that the Project will meet a Tier 3 outcome under the OEH Offset Policy. While this is considered to be a 'mitigated net loss outcome', the package will provide offsets at a minimum of three times the impact area for TECs and threatened species habitat. The offsets will improve the quality and quantity of habitat conserved in the locality and region and is therefore considered to constitute a net gain.

The current secured offsets do not meet the minimum 90% land-based offsets for most matters of National Environmental Significance (mNES) when using the Commonwealth Offset Calculator. However, additional land-based offsets are likely to improve this outcome for most of the mNES impacted by the Project. However, outstanding requirements may occur for threatened flora species. Offset measures such as propagating and planting these species into offset areas to supplement the local population and improve its viability in the long-term, are currently underway in consultation with OEH and SEWPaC.

ES6 Conclusion

The offset package has not been finalised but CHC is committed to ensuring that it provides the outcomes required in this updated Offset strategy. The secured offset sites provide a substantial contribution to the final offset package and include large areas of TECs and known populations of threatened flora and fauna. Offset additions have been identified and are being negotiated and when added to the offset package, are likely to meet most of the land-based offset requirements.

Land-based offsets will be managed for conservation to improve the quality and quantity of native vegetation and habitat in areas that would otherwise be subject to various agricultural disturbances and threats. Additional management funding and research initiatives are likely to be included in the offset package to meet offset requirements. These will be negotiated with and approved by SEWPaC and OEH and will be undertaken in accordance with recovery plans and priority actions for TECs and threatened species as required.

The final offset package will improve the connectivity of remnant habitat and conservation areas in the locality. The management measures and rehabilitation of lower quality vegetation in the offset areas will result in an improvement to the quality, quantity and protection of biodiversity within the region in the medium to long term.

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1 Introduction

1.1 Background

The Cobbora Coal Project (the Project) is an open cut coal mine proposed by the Cobbora Holding Company Pty Limited (CHC). An Environmental Assessment (EA) report has been prepared to support an application for the Project under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The need for an offset strategy was identified early in the planning phase of the Project, given the likely impacts on a number of significant ecological features. A draft biodiversity offset strategy was therefore provided as part of the Environmental Assessment (EA) for the Project. It provided a comprehensive framework for determining the appropriate level and scale of offsets required to compensate for Project impacts.

Since the public exhibition of the EA, additional offset investigations have been conducted and additional properties have been secured for inclusion as offsets. This report provides an update of the biodiversity offset strategy, with additional detail about how the final offset package will compensate for the impacts of the Project to threatened species, ecological communities and habitats.

1.2 Residual impacts to be offset

1.2.1 Loss of vegetation

Vegetation will be cleared gradually within the Project area over the life of the mine. Twelve vegetation communities have been identified and mapped within the disturbance area with a total of 3,161 ha of native vegetation (including regenerating vegetation and native grasslands) to be directly impacted**.**

A total of 242 ha of TSC Act-listed threatened ecological communities (TECs) are to be impacted by the Project comprising:

- forty-nine hectares (ha) of Inland Grey Box Woodland (Grey Box Woodland) endangered ecological community (EEC) and 34 ha of Grey Box Woodland EEC derived native grassland (DNG);
- eighteen hectares of White Box Yellow Box Blakely's Red Gum Woodland (Box Gum Woodland) EEC and 105 ha of Box Gum Woodland EEC DNG; and
- fourteen hectares of Fuzzy Box Woodland on alluvial soils EEC and 14 ha of Fuzzy Box Woodland EEC DNG.

A total of 67 ha of these communities are also listed under the EPBC Act as threatened; 49 ha of Grey Box Grassy Woodland and Derived Native Grasslands of South-Eastern Australia EEC; and 18 ha of White Box Yellow Box Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands critically endangered ecological community (CEEC).

1.2.2 Loss of threatened species and their habitat

Assessments were undertaken to determine the significance of Project impacts on threatened species recorded or considered likely to occur within the Project area. Significant impacts were considered likely for three flora species and 11 fauna species. A summary of the findings of the assessments is provided in Table 1.1. This offset strategy is focused on those species expected to be significantly impacted by the Project.

Table 1.1 Summary of significance of mitigated impacts to threatened species and communities recorded or likely to occur within the study area

Species or community	Status		Recorded within the study area?	Impact description	Significant impact?
	TSC Act	EPBC Act			
Homoranthus darwinioides	V	V	Yes	Removal of 227 individuals from 1 sub-population	Yes
Ingram's Zieria	E	E	Yes	Removal of 727 individuals within 8 sub-populations	Yes
Tylophora linearis	V	E	Yes	Removal of 9 individuals, representing the local known population (within the study area)	Yes
Acacia ausfeldii	V	-	Yes	Removal of 200 individuals in one sub-population	No
Barking Owl	V	-	Yes	Removal of 1,500 ha of foraging and breeding habitat and 1,560 ha of foraging regrowth and grassland habitat	No
Brown Treecreeper	V	-	Yes	Removal of 1,500 ha of foraging and breeding woodland habitat	Yes
Diamond Firetail	V	-	Yes	Removal of 1,500 ha of foraging and breeding woodland habitat	Yes
Glossy Black-Cockatoo	V	-	Yes	Removal of 1,500 ha of woodland habitat	Yes
Grey-crowned Babbler	V	-	Yes	Removal of 1,500 ha of woodland habitat	Yes
Hooded Robin	V	-	Yes	Removal of 1,500 ha of woodland habitat	Yes
Large-eared Pied Bat	V	V	Yes	Removal of 1,500 ha of foraging and 16.7 km of cliff line (roosting and potential breeding habitat)	Yes
Little Pied Bat	V	-	Yes	Removal of 1,500 ha of foraging habitat and 16km of cliff line habitat	Yes
Masked Owl	V	-	Yes	Removal of 1,500 ha of foraging and breeding habitat and 1,560 ha of foraging regrowth and grassland habitat	No
Powerful Owl	V	-	Yes	Removal of 1,500 ha of foraging and breeding habitat and 1,560 ha of foraging regrowth and grassland habitat	No
Southern Long-eared Bat	V	V	Yes	Removal of 1,500 ha of foraging and breeding habitat	Yes

Table 1.1 Summary of significance of mitigated impacts to threatened species and communities recorded or likely to occur within the study area

Species or community	Status		Recorded within the study area?	Impact description	Significant impact?
	TSC Act	EPBC Act			
Speckled Warbler	V	-	Yes	Removal of 1,500 ha of foraging and breeding habitat	Yes
Varied Sittella	V	-	Yes	Removal of 1,500 ha of foraging and breeding habitat	Yes
Yellow-Bellied Sheathtail Bat	V	-	Yes	Removal of 1,500 ha of woodland and 1,560 ha of regrowth and grassland habitat	Yes

1.3 Strategy overview

The aim of this updated strategy is to provide the outcomes of the preliminary offset package and commitments to Project offsets designed to achieve a beneficial biodiversity outcome. In line with the NSW and Commonwealth offset principles, the Project offsets will:

- provide a net improvement in the quantity and quality of biodiversity values within the region in the medium to long term through:
  - the rehabilitation and protection of woodland, particularly Box Gum Woodland, Inland Grey Box Woodland and Fuzzy Box Woodland TECs; and
  - the protection of threatened flora and fauna habitat and habitat features (eg hollow-bearing trees).
- provide long-term protection for threatened flora, fauna and TECs;
- improve vegetation and habitat connectivity and extent for existing conservation areas within the locality;
- protect areas identified as key corridors within the Central West Catchment Action Plan (CW CMA, 2011) and as conservation priorities by the NSW National Parks and Wildlife Service (NPWS); and
- provide funding for research and management of threatened species and TECs in the region in line with recovery plan actions and in consultation with the Office of Environment and Heritage (OEH).

Measures to compensate for the identified impacts remaining after mitigation include:

- provision of land-based offsets containing TECs;
- provision of land-based offsets containing known populations of threatened species that are likely to be significantly impacted by the Project;
- provision of land-based offsets that contain similar vegetation, habitat features and are in a similar condition to the Project area; and
- management and research funding for threatened species and TEC recovery in the region.

2 Impact Mitigation

2.1 Avoidance

Design changes have resulted in the avoidance of a number of ecological features within the Project area. These include:

- the diversion of creeks to accommodate the mine has been avoided by reducing and reconfiguring the mining area, which has minimised the clearing of riparian vegetation, impacts to large areas of TECs and threatened species habitat;
- the removal of a proposed coal conveyor and minimising clearing of vegetation (particularly a large local population of Ingram's Zieria) and maintaining a wildlife corridor that will be further enhanced as part of this biodiversity offset strategy;
- relocation of infrastructure and emplacement areas to avoid impacts to a large sub-population of Ingram's Zieria; and
- the redesign of road diversions to avoid clearing of roadside vegetation, where possible, which consists mainly of TECs.

2.2 Mitigation

Mitigation measures will minimise the potential impacts of the Project on biodiversity. Specific measures have been outlined in the terrestrial ecology impact assessment (TEIA). Management plans will detail methods for the implementation of mitigation measures during construction, progressive clearing works and mine operation. More than 1,900 ha of the disturbance area will be progressively rehabilitated over the life of the Project to woodland indicative of the vegetation types that are currently present. A further 1,630 ha of land will be returned to grazing pasture as part of the rehabilitation strategy for the Project.

2.2.1 Additional mitigation from Project refinements

Mitigation measures will be instated to improve the movement of fauna across mine related infrastructure in identified current and future wildlife corridors. Three drainage structures are being designed to incorporate requirements to allow for dry fauna passage in the vicinity of the Goodiman SCA and the offset areas along the rail spur. In addition, a dedicated fauna crossing structure is proposed in the vegetated corridor to the north of the Goodiman SCA to minimise the barrier effect of the rail spur.

Fauna crossing structures have been shown to be effective for a range of fauna species (Bond and Jones, 2008; Hays and Goldingay, 2009). Underpasses will be designed to allow movement of large macropods, but will also accommodate the movement of a range of other species. The proposed overpass near Goodiman SCA will be vegetated to promote the movement of small woodland birds and other fauna species.

2.3 Offset approach

This updated offset strategy follows the framework of the biodiversity offset strategy as exhibited for the Project as part of the EA.

Vegetation communities have been used as a surrogate for biodiversity habitat, with the exception of threatened flora and where threatened fauna have specific habitat requirements (eg cave-dwelling microbats). Offset to impact ratios have been determined according to the ecological significance of the features to be offset, and recent regional project approvals.

In addition, a Biobanking assessment was undertaken to calculate required offset credits and the Commonwealth offset calculator was used to determine the adequacy of the proposed offsets to matters of NES.

3 Land-based offset strategy

3.1 Methods

3.1.1 Identification of potential offset sites

Offset areas were targeted via the following methods:

- Biobanking EOI register for ecosystem and species credits;
- consultation with OEH and local NPWS staff regarding priority additions to the NPWS estate;
- aerial photograph interpretation and spatial analysis; and
- site visits to confirm vegetation types, condition and habitat values.

Offsets were located with a preference for existing CHC-owned properties where there was no, or unviable coal resources (defined by local geological data and agreed with the Department of Resources and Energy) or areas likely to contain similar vegetation types and habitat values to the Project area.

3.1.2 Survey of offset areas

Ecological surveys undertaken for the EA (see methods section of the TEIA) included some of the identified offset sites. Further dedicated offset surveys have been completed since the initial surveys and further surveys are planned in potential offset additions in February 2013. The following section provides an overview of the methods used to date to identify significant ecological features of the offset sites.

i Flora

Flora surveys, habitat assessments and vegetation mapping of the offset sites were carried out by EMM during the main Project survey events and also in July, October and November 2012. Flora survey methods in the offset areas comprised:

- vegetation mapping and Biobanking plot based surveys;
- rapid assessment plots;
- assessment of vegetation types according to the Biometric Vegetation Types (BVT) database; and
- targeted threatened flora surveys.

ii Fauna

Systematic fauna surveys were undertaken within the eastern offset sites (see the TEIA). Additional targeted microbat and bird surveys were completed in July 2012 and late October 2012 in some of the identified offset sites. A number of species were also recorded opportunistically during all survey periods. Fauna surveys in the offset sites included:

- habitat assessments and searches for signs of use;

- targeted surveys for threatened species including:
    - harp trapping and call detection for microbats;
    - diurnal bird surveys;
    - infrared camera surveys;
    - ground and arboreal hair tubes;
    - active searches for reptiles and frogs; and
    - call playback and spotlighting for owls, nocturnal mammals and frogs.
- incidental records of fauna species during other survey work.

3.1.3 Biobanking calculator

Version 2 of the Biobanking calculator was applied to the impact area and secured offsets (as exhibited in the EA). An average of the credit requirements for each of the Biometric Vegetation Types (BVTs) for both the impact and offset areas was used to recalculate the likely credit requirements generated as a result of the Project refinements and changes to the offset sites. The calculator was not re-run with this information due to time constraints and given the difficulty encountered previously for the Project due to the size of inputs required. This will be re-run when the offsets have been finalised.

Equations 13 and 14 of the Biobanking assessment methodology (BBAM) were used to calculate the threatened species credits for the refined Project.

3.2 Secured offset sites

Secured offset sites have been established in areas surrounding the Project area. These have been chosen for their biodiversity values and also their proximity to the local reserve network. All secured offset sites are located in areas that have nil or low potential coal resources or areas that would be unviable to mine, such as those close to NPWS estate or with long haul distances to mining infrastructure areas. In addition, the offset sites have been discussed with the Department of Resources and Energy and no objections have been raised (letter received October 2012).

3.2.1 Location and tenure

A total of 5,046 ha have been secured as offset sites for the Cobbora Coal Project. Four main areas of offset lands have been secured (Figure 3.1).

i Eastern link areas

These offset sites aim to link three local reserves (Tucklan State Forest, Goodiman SCA and Yarrobil National Park) and protect significant populations of threatened flora and fauna that will be impacted by the Project in other areas (Figure 3.1). A total of 3,750 ha of native vegetation (including native grasslands) occurs in this area, including more than 680 ha of TECs. This includes more than 620 ha of Box Gum Woodland, of which 25% is DNG which can be improved, and 61 ha of Grey Box Woodland, of which a small percentage is DNG (13%).

The link areas are all owned by CHC and are currently leased for agricultural (mainly grazing) purposes.

The eastern link areas contain extensive patches of native vegetation with extensive cliff-line habitats. A number of threatened species have been recorded in the eastern link areas including the Eastern Cave Bat and Eastern Bentwing Bat. The eastern link areas also provide known habitat for a range of threatened woodland bird species, including an important area for the Glossy Black Cockatoo, which was repeatedly recorded in this area.

ii Zieria patch

This area of Dwyer's Red Gum/Blue-leaved Ironbark Woodland was intentionally avoided by the Project as it contains a significant population of Keith's Zieria (totalling 340 individuals). The patch is approximately 43 ha in size and has been subject to previous cattle grazing.

iii Dapper NR additions

This patch contains significant habitat for woodland birds and provides an extension to the existing Dapper Nature Reserve. This area is approximately 374 ha, of which 11 ha is Box Gum Woodland and 5 ha is Grey Box Woodland. There is the potential for additional areas of DNG at this site, as detailed grassland surveys have not been undertaken. The threatened Grey-crowned Babbler was recorded in this area and it is likely that other threatened woodland birds occur there.

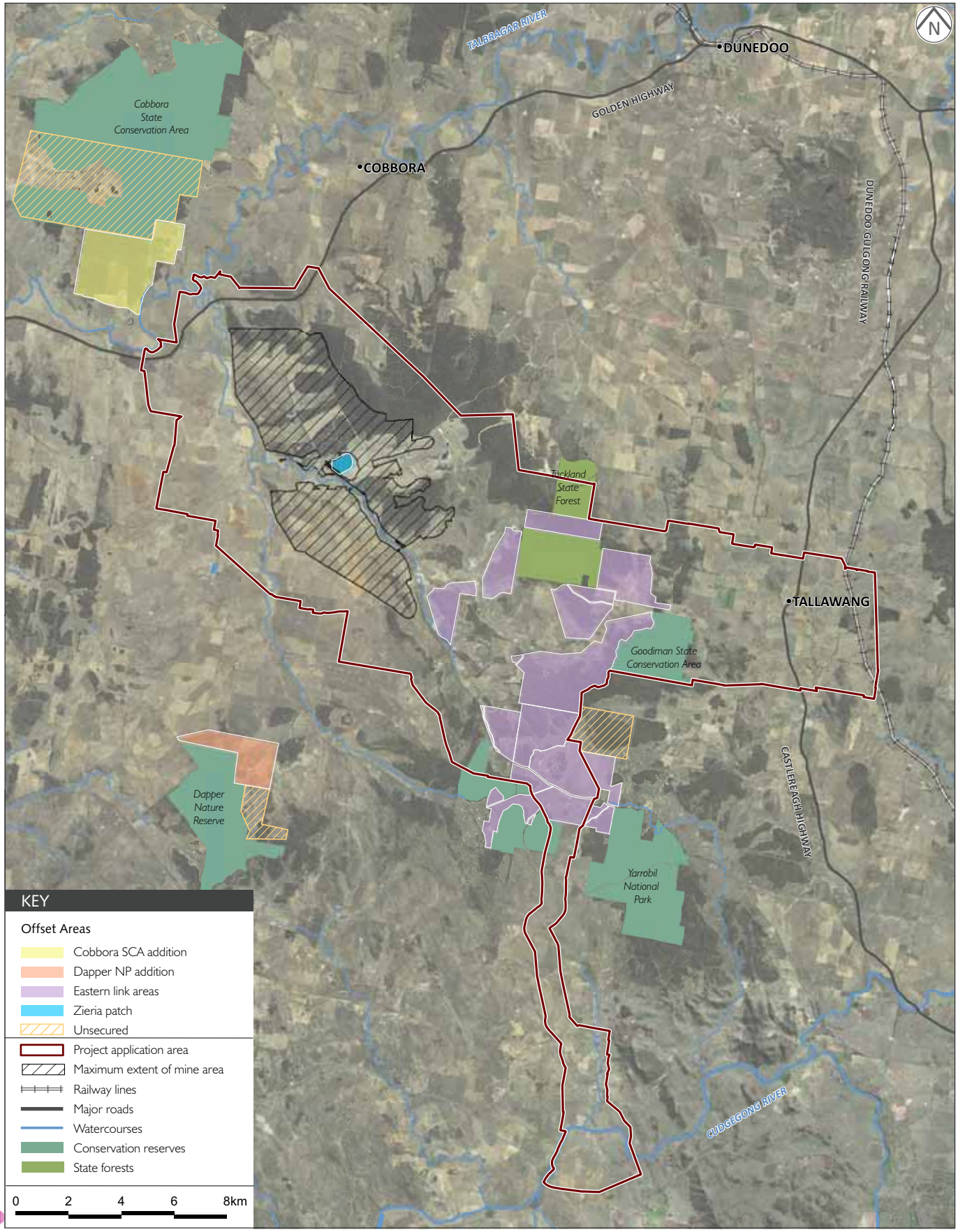
iv Cobbora SCA additions

Ultimately this link will increase the Cobbora SCA significantly by providing a large patch of remnant native vegetation that provides habitat for a range of threatened species. This area also provides protection for areas associated with the Talbragar River and large patches of TECs. Negotiations are still underway for the property bordering the Cobbora SCA and the property-owned by CHC (approximately an additional 2,020 ha), but when this is secured, this addition will form a continuous patch to the SCA.

The CHC-owned offset site is approximately 880 ha, of which 250 ha is Box Gum Woodland (including DNG) and 12 ha is Grey Box Woodland (including DNG) (Figure 3.1). While no significant cliff lines were recorded, the Eastern Cave Bat and Eastern Bentwing Bat have both been recorded in this area. Such habitat was recorded in the adjacent property. It is likely that it also provides significant habitat for the Large-eared Pied Bat.

3.2.2 Vegetation of the secured offset areas

A total of 13 vegetation types, according to the BVT database, have been identified in the secured offset areas. Of these, three constitute Box Gum Woodland EEC and one constitutes Grey Box Woodland.



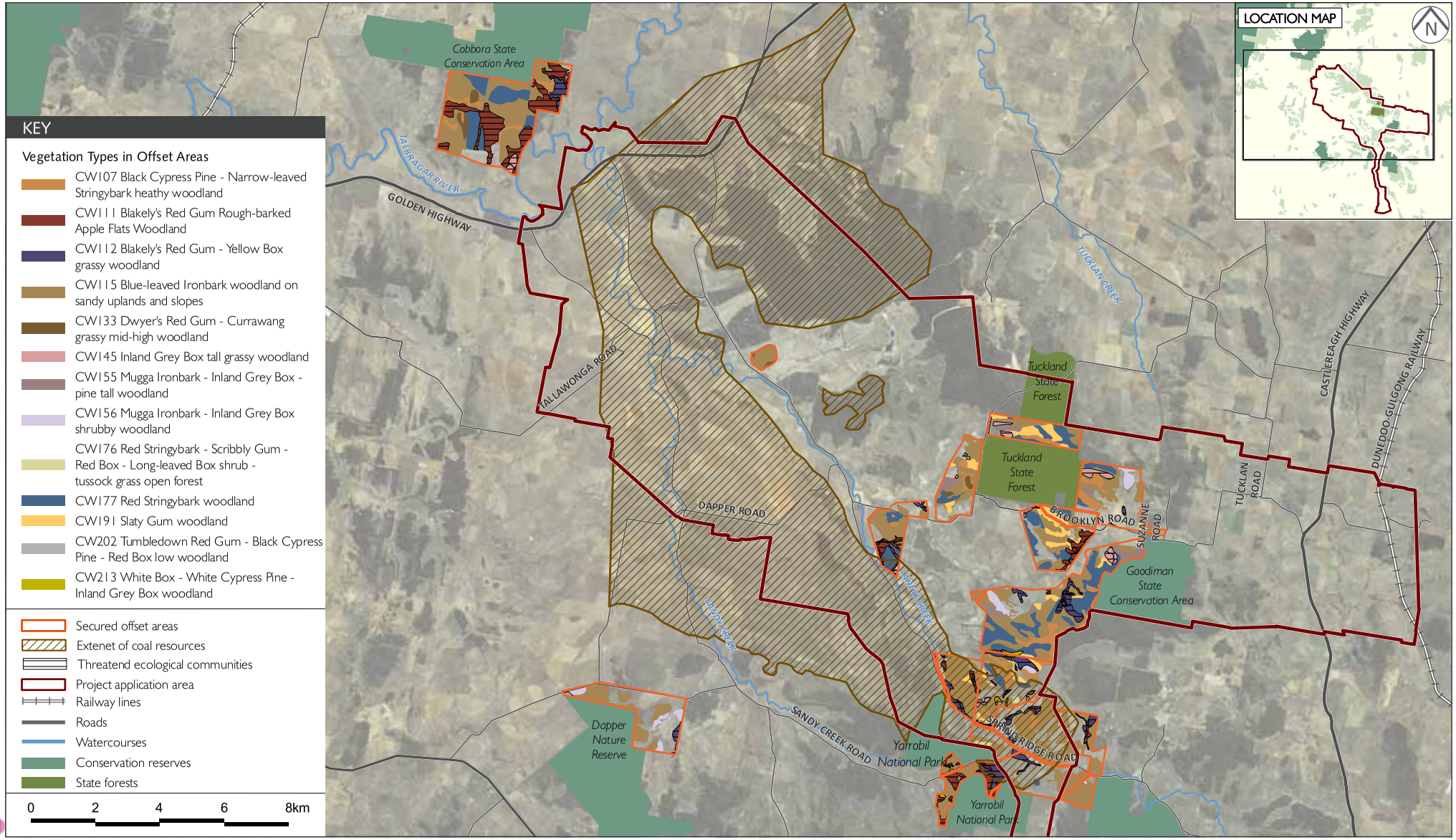
Secured Offset Areas

Cobbora Coal Project - Updated Biodiversity Offset Strategy

Figure 3.1

Table 3.1 Vegetation types by secured offset area

BVT	TEC	Area in secured offsets (ha)				
		Cobbora SCA addition	Dapper NP addition	Eastern link areas	Zieria patch	Total
CW107 Black Cypress Pine - Narrow-leaved Stringybark heathy woodland		49		208		257
CW111 Blakely's Red Gum Rough-barked Apple Flats Woodland	Box Gum Woodland	222		117		339
CW111 Blakely's Red Gum Rough-barked Apple Flats Woodland DNG	Box Gum Woodland			31		31
CW112 Blakely's Red Gum - Yellow Box grassy woodland	Box Gum Woodland		11	74		85
CW112 Blakely's Red Gum - Yellow Box grassy woodland DNG	Box Gum Woodland	28		123		152
CW115 Blue-leaved Ironbark woodland		287	116	666	37	1,106
CW115 Blue-leaved Ironbark woodland Grassland		5		358	3	365
CW115 Blue-leaved Ironbark woodland Regrowth		46	0	328		374
CW133 Dwyer's Red Gum - Currawang grassy mid-high woodland		27		13	4	44
CW145 Inland Grey Box tall grassy woodland	Grey Box Woodland	8	5	53		66
CW145 Inland Grey Box tall grassy woodland DNG	Grey Box Woodland	5		8		13
CW155 Mugga Ironbark - Inland Grey Box - pine tall woodland				81		81
CW156 Mugga Ironbark - Inland Grey Box shrubby woodland			30	56		86
CW176 Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest				16		16
CW177 Red Stringybark woodland		143		445		588
CW191 Slaty Gum woodland				176		176
CW202 Tumbledown Red Gum - Black Cypress Pine - Red Box low woodland				14		14
CW213 White Box - White Cypress Pine - Inland Grey Box woodland	Box Gum Woodland			17		17
Total		**819**	**162**	**2,785**	**43**	**3,809**



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Vegetation Types in the Secured Offsets

Cobbora Coal Project - Updated Biodiversity Offset Strategy

Figure 3.2

a. CW107 Black Cypress Pine - Narrow-leaved Stringybark heathy woodland

This community was dominated by Black Cypress Pine (*Callitris endlicheri*), with a cover abundance of greater than 70%. This vegetation type occurred on low rises with rocky substrate, typically on the mid to upper slope. Associated overstorey species included Dwyer's Red Gum (*E. dyweri*), *Allocasuarina* sp., ironbarks (*E. nubila, E. crebra* and *E. sideroxylon*) and Red Stringybark (*E. macroryhncha*), which were all recorded as scattered individuals within the community. CW107 was characterised by a low cover abundance of forbs (typically less than 5%) consisting of species such as Slender Rice Flower (*Pimelea linifolia*). It was also characterised by low percent shrub cover, usually dominated by Common Fringe-myrtle (*Calytrix tetragona*) (height of 1.2 m and cover of 15% or less).

The Cypress Pine canopy reached to 20 m in height with emergent Ironbarks reaching to 30 m. There was usually a dense leaf litter present, formed from the Cypress Pine, with an abundance of small rock, lichen and woody debris. Regeneration was either absent or sparse. This community graded into the Ironbark/Stringybark communities on hill slopes, or into box communities on the lower elevation parts of the offset areas. Disturbances recorded within the Cypress Pine Woodland included grazing by domestic and feral animals. Exotic flora species were not common.

Some areas of this community were dominated by Narrow-leaved Stringybark, often at the top of rocky outcrops, grading into other stringybark and ironbark communities.

b. CW112 Blakely's Red Gum - Yellow Box grassy woodland

CW112 was characterised by Yellow Box (*E. melliodora*) with Blakely's Red Gum (*E. blakelyi*) and a grassy understorey. It occurred along roadsides, in low-lying parts of the study area and along drainage depressions (see

Figure 3.2). Other associated canopy species included Grey Box (*E. microcarpa*), Fuzzy Box (*E. conica*) and Rough-barked Apple (*Angophora floribunda)* with the canopy reaching 30 m in height. In areas, the canopy has been removed but the understorey remains, forming derived native grassland.

Dominant grass species recorded included Wallaby Grasses (*Austrodanthonia* sp.), Speargrasses *(Austrostipa* sp.) and Three-awn Grasses (*Aristida* sp.). Forbs present included *Calotis* sp., *Wahlenbergia* sp., *Dichondra* sp. and the creepers *Glyicne* sp. and *Desmodium* sp. CW112 graded into other box-type woodlands on the floodplains and lower elevation areas of the offsets. Disturbances present included domestic animal grazing, weed invasion and feral animal grazing.

This vegetation type qualifies as White Box Yellow Box Blakely's Red Gum Woodland endangered ecological community under the TSC Act and White Box Yellow Box Blakeley's Red Gum Grassy Woodland and Derived Native Grasslands critically endangered ecological community under the EPBC Act.

c. CW115 Blue-leaved Ironbark Woodland

CW115 in the study area was dominated by Blue-leaved Ironbark (*Eucalyptus nubila*), typically with a small tree layer of Black Cypress Pine. Red Stringybark, Dwyer's Red Gum or Slaty Gum (*E. dawsonii*) were also common. It typically occurred on rocky substrates on gentle slopes. She-oaks (*Allocasuarina* sp.) were locally common in some areas. Where ironbarks occurred with a small tree layer of Cypress Pine, there was low ground cover and low diversity; where they occurred on lower foot slopes, the ground cover became grassy and there was an increase in species diversity.

The community graded into Stringybark communities on steeper hillslopes, or into areas dominated by Slaty Gum or box communities on the lower elevations. The understorey was characterised by the dominant shrub Common Fringe Myrtle, with Sifton Bush, Hoary Guinea Flower (*Hibberita obtusifolia)*, Forest Goodenia (*Goodenia hederacea)* and Purple Burr-daisy (*Calotis cuneifolia),* all commonly occurring small shrubs. There was usually greater than five grass species present, with Red Anther Wallaby Grass (*Joycea pallida*) being commonly recorded. Disturbances recorded within this community include logging and grazing by domestic and feral animals. Exotic flora species were not common within this vegetation type.

'Regrowth' CW115 was recorded in areas that had been cleared and grazed in the recent past. Coloniser species (predominantly Sifton Bush) were dominant in regrowth areas, indicating that the areas were at an early successional stage. This also explained the low species diversity observed.

Native pastures were also typed back to this community, where surrounding vegetation contained and therefore these areas were likely to have contained ironbarks and stringybarks, as it was the dominant community throughout the offset areas.

d. CW145 Inland Grey Box tall grassy woodland

CW145 typically occurred as monotypic stands of Grey Box trees up to 25 m high. Other occasional canopy species included Fuzzy Box and Blakely's Red Gum. When it occurred in low-lying areas, the community graded into other box woodlands and occurred at the foot slopes of the Blue-leaved Ironbark Woodlands. Most remnants had been subject to high levels of disturbance such as logging, grazing (cattle and sheep), sheep camps and exotic species invasion. Small areas of grassland derived from this community were also present in the offset areas.

CW145 was characterised by a grassy understorey with a sparse to absent shrub cover. Species recorded included Cough Bush (*Cassinia laevis*) and Sifton Bush. There was usually a dense leaf litter present, with low cover of rock, mosses and lichen. Regeneration was recorded in remnants not impacted by grazing.

This vegetation type qualifies as Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions endangered ecological community under the TSC Act and Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia endangered ecological community under the EPBC Act.

e. CW177 Red Stringybark Woodland

CW177 occurred as a grassy/shrubby woodland up to 20 m high dominated by Red Stringybark, with Ironbarks, Black Cypress Pine and red gums (Dwyer's and Slaty) also occurring at varying densities. In some areas, shrub cover was absent. Where shrubs occurred, Sifton Bush dominated. The common ground cover species recorded were Mat Rushes (*Lomandra longifolia, L. filiformis*) Hoary Guinea Flower and Thyme Spurge (*Phyllanthus hirtellus)*.

CW177 was recorded on mid to upper slopes, usually with rocky outcropping. It was also recorded in saddles in the landscape, between Cypress Pine and ironbark communities. Disturbances present included agricultural and feral animal (goats, rabbits) grazing.

f. CW191 Slaty Gum Woodland

CW191 typically occurred as monotypic stands of tall Slaty Gum trees (up to 25 m in height). Other canopy species rarely occurred within this community. In some instances where this vegetation type occurred within a matrix of other communities or graded into Ironbark communities, it was mapped as Slaty Gum Woodland but exhibited characteristics of Ironbark communities. For example, some Slaty Gum Woodland remnants mapped within the study area contained a shrub layer that included She-oak, a species not characteristic of the Slaty Gum community.

Where CW191 occurred as a monotypic stand of Slaty Gum trees, this vegetation type was characterised by a very sparse ground cover of forbs and grasses consisting of species such as Purple Burr-daisy, Three-Awn Grass, Wallaby Grass and Speargrass. Shrub cover was generally sparse to absent, but where it occurred it consisted of *Acacia* and C*assinia* species. There was usually a dense leaf litter present, with sparse layer of small rocks, lichen and woody debris. Regeneration was generally absent.

g. CW133 Dwyer's Red Gum - Currawang grassy mid-high woodland

CW133 was recorded as small remnants predominantly in flat, sandy areas. It commonly occurred as a mallee type community, with a high cover of small shrubs including Sifton Bush and Violet Kunzea (*Kunzea parvifolia*). Grasses and grass-like plants were also relatively diverse when compared to other vegetation types within the study area. It was not clear whether this community was a naturally occurring mallee/heath type community, or whether it was a successional stage of a mature Red Gum Woodland.

h. CW155 Mugga Ironbark - Inland Grey Box - pine tall woodland

CW115 occurred as small remnants grading into other ironbark or box communities. It was characterised by Mugga Ironbark and Grey Box as co-dominants, with a shrubby understorey. Species recorded included White Cypress Pine (*Callitris glaucophylla*), *Melaleuca erubsecens*, Sifton Bush and Cough Bush.

i. CW111 Blakely's Red Gum - Rough-Barked Apple flats woodland

CW111 was dominated by Rough-barked Apple in very small patches, either along drainage depressions or at the foot slopes of ironbark/stringybark communities. This vegetation type typically occurred as monotypic stands of Rough-barked Apple trees, often in grazed areas, being impacted by cattle, sheep, sheep camps and weed invasion. Rough-barked Apple trees observed within the offsets were usually mature, with little to no regeneration occurring, and commonly were paddock trees surrounded by cultivated and improved pasture.

In other areas, this community was dominated by Blakely's Red Gum with a grassy/shrubby understorey. Species recorded included *Melaleuca erubescens*, Seven Dwarfs Grevillea (*Grevillea floribunda*), Sifton Bush and Cough Bush. This vegetation type was recorded within, or adjacent to, ironbark and stringybark communities, commonly in drainage depressions.

This vegetation type qualifies as White Box Yellow Box Blakely's Red Gum Woodland endangered ecological community under the TSC Act and White Box Yellow Box Blakeley's Red Gum Grassy Woodland and Derived Native Grasslands critically endangered ecological community under the EPBC Act.

j. CW176 Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest

CW176 was recorded in two small areas in the offsets near Spring Ridge Road to the south of the Project. This vegetation type was uncommon within the study area, with Inland Scribbly Gum (*E. rossii*) only being recorded within this remnant. Scribbly Gum Open Forest was recorded on rocky sandstone hillslopes with Red Stringybark as a scattered subdominant.

k. CW202 Tumbledown Red Gum - Black Cypress Pine - Red Box low woodland

CW202 was recorded on low rises where it graded into Mugga Ironbark Woodland and Red Stringybark Woodland. It was uncommon in the offset areas.

l. CW213 White Box - White Cypress Pine - Inland Grey Box woodland

CW213 was recorded along Spring Ridge Road where it graded into ironbark woodland and other box communities. It was dominated by White Box (*E. albens*) with a small tree layer of Black Cypress Pine.

This vegetation type qualifies as White Box Yellow Box Blakely's Red Gum Woodland endangered ecological community under the TSC Act and White Box Yellow Box Blakeley's Red Gum Grassy Woodland and Derived Native Grasslands critically endangered ecological community under the EPBC Act.

3.2.3 Threatened ecological communities

More than 700 ha of TECs have been identified in the currently proposed offset areas. This includes over 500 ha of woodlands in moderate-good condition and 200 ha of derived native grasslands which are in lower condition. No areas of Fuzzy Box Woodland have been identified by surveys in the secured offset areas, however landscapes which may have contained this community have been identified and may be subject to rehabilitation efforts.

More than 440 ha of Box Gum Woodland which meets the description of the TSC Act and EPBC Act occur in the secured offsets, with an additional 180 ha of derived native grasslands which only meet the description of the TSC Act listed community.

Surveys have identified approximately 80 ha of Grey Box Woodland, of which 66 ha meet the listed community under the TSC Act and EPBC Act and a further 13 ha of DNG meets the TSC Act listed community only (

Figure 3.2).

3.2.4 Threatened species in secured offsets

i Threatened flora

Several populations of threatened flora species have been identified in the secured offset sites. This includes populations of three of the species to be impacted by the Project for which a residual impact occurs after mitigation.

a. Ausfeld's Wattle

A large sub-population of Ausfeld's Wattle was recorded in regrowth vegetation, where it was the dominant species, adjacent to Goodiman SCA in the offset link area. The sub-population in this area was estimated at 55,000 individuals, based on 10 m by 10 m plots recording 100 plants. A smaller population occurs to the west of this population in regrowth (approximately 200 individuals) and another occurs adjacent to Yarrobil National Park (approximately 1,000 individuals).

b. Ingram's Zieria

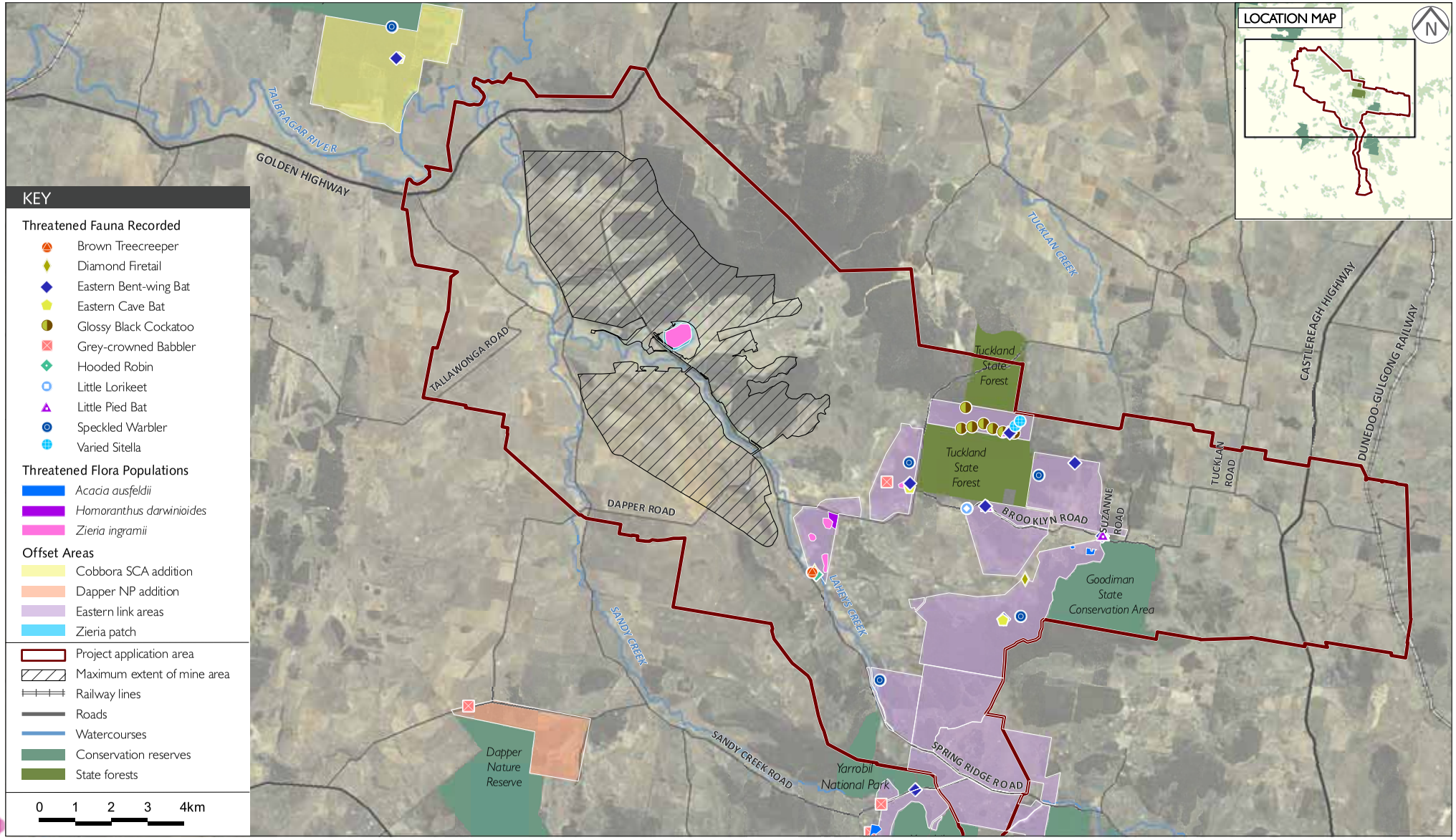
Five sub-populations of this species were identified in the offset areas. A total of 486 plants have been recorded in these areas (see Table 3.2).

Table 3.2 Ingram's Zieria sub-populations in the secured offset areas

Population	Number of Individuals	Description of sub-population	Vegetation community
3	340	Located on a small grassy hill surrounded by paddocks. Small rock outcrops occur throughout with the plants generally below these areas on flatter ground. The sub-population ranges from north-facing slopes to south-east facing slopes and flat ground. Open woodland with a high percentage of bare ground. Individuals had set seed in November 2011 in this area.	Blue-leaved Ironbark Woodland and Dwyer's Red Gum Woodland
11	28	On an eastern-facing slope in open woodland.	Blue-leaved Ironbark Woodland, Dwyer's Red Gum Woodland and Cypress Pine Woodland
12	70	On a relatively flat area to north-facing gentle slope. Adjacent to a population of *Homoranthus darwinioides*. It occurs in a rocky area where there is a low percent canopy cover and a high proportion of open ground. The sub-population contained some older plants and seedlings.	Blue-leaved Ironbark Woodland and Cypress Pine Woodland
13	25	Plants were predominantly located on the midslope with some plants recorded at the base of gentle slopes.	Blue-leaved Ironbark Woodland
14	23	Plants recorded on the upper parts of south to south east facing slopes. The sub-population contained some older plants and seedlings in open woodland with a low sparse shrub layer and scattered grass tussocks.	Blue-leaved Ironbark Woodland
Total	**486**		

c. *Homoranthus darwinioides*

One of the two sub-populations of this species is within the eastern link offset area. This sub-population was estimated at greater than 200 individuals (using counts from this study, Irvin and Bartus (2007) and ERM (2012)). This sub-population is located in Blue-leaved Ironbark Woodland. The dominant shrub species was Common Fringe-myrtle. Other species recorded included Silver-leaved Ironbark (*E. melanophloia*), Black Cypress Pine, *Allocasuarina gymanthera, Acacia triptera, Philotheca ciliata, Lomandra filiformis filiformis* and *Platysace linearifolia*.



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EMM

Cobbora Holding Company Pty Limited

Threatened Species Records in the Secured Offsets

Cobbora Coal Project - Updated Biodiversity Offset Strategy

Figure 3.3

ii Threatened fauna

The proposed secured offset areas provide habitat for a range of threatened species that were identified in the Project area. Important habitat features identified in the secured offsets for threatened species include:

- approximately 28 km of cliff lines providing habitat for cave-roosting bats;
- hollow-bearing trees;
- known feeding resources such as large patches of *Allocasuarina* spp for the Glossy Black Cockatoo;
- fallen timber;
- dams and ephemeral creeks; and
- shrubby and regenerating areas.

Table 3.3 provides an overview of the threatened fauna recorded in the secured offset areas and the presence of suitable habitat for species recorded in the Project area. The Eastern Cave Bat (*Vespadelus troughtoni)* was recorded in a number of the offset areas, however was only predicted to occur in the Project area as it was not recorded during the Project surveys.

Table 3.3 Threatened fauna records and habitat in secured offset areas

	Status[1]		Offset sites[2]			
Common name	**TSC Act**	**EPBC Act**	**Zieria patch**	**Dapper NR**	**Cobbora SCA additions**	**Eastern link areas**
Birds						
Australasian Bittern	E	E	-	-	-	FH
Barking Owl	V	-	-	FH	FH, BH	FH, BH
Brown Treecreeper	V	-	FH	FH, BH	FH, BH	R, FH, BH
Diamond Firetail	V	-	FH	FH, BH	FH, BH	R, FH, BH
Glossy Black-Cockatoo	V	-	-	-	FH, BH	R, FH, BH
Grey-crowned Babbler	V	-	-	R, FH, BH	FH, BH	R, FH, BH
Hooded Robin	V	-	-	FH	FH, BH	R, FH, BH
Little Lorikeet	V	-	FH	FH, BH	FH, BH	R, FH, BH
Malleefowl (disused nests)	E	E, Mi	-	-	FH	FH
Masked Owl	V	-	-	FH	FH, BH	FH, BH
Powerful Owl	V	-	-	FH	FH, BH	FH, BH
Speckled Warbler	V	-	FH	FH, BH	R, FH, BH	R, FH, BH
Superb Parrot	V	V	-	FH	FH	FH, BH
Turquoise Parrot	V	-	-	FH	FH, BH	FH, BH
Varied Sittella	V	-	-	FH	FH, BH	R, FH, BH
White-fronted Chat	V	-	-	-	-	FH
Bats						
Eastern Bent-wing Bat	V	-	-	FH	R, FH	R, FH, BH
Eastern Cave Bat	V	-	-	-	R, FH	R, FH, BH
Large-eared Pied Bat	V	V	-	-	FH	FH, BH

Table 3.3 Threatened fauna records and habitat in secured offset areas

	Status[1]		Offset sites[2]			
Common name	**TSC Act**	**EPBC Act**	**Zieria patch**	**Dapper NR**	**Cobbora SCA additions**	**Eastern link areas**
Little Pied Bat	V	-	-	-	FH	R, FH, BH
Southern Long-eared Bat	V	V	-	-	FH, BH	FH, BH
Yellow-bellied Sheathtail Bat	V	-	-	FH	FH, BH	FH, BH

Notes: *1. TSC Act–Threatened Species Conservation Act 1995, EPBC Act –Environment Protection and Biodiversity Conservation Act 1999, Mi-migratory, V-vulnerable, E-endangered.*

2. R – recorded, FH – foraging habitat, BH- breeding habitat.

4 Research and management

4.1 Management and research funding

If each of the affected threatened species, TECs and other vegetation types are not found in the potential and unsecured offset sites, management and research funding may be used to form outstanding offset requirements. Such measures may include investment in key projects aimed at threatened species and TEC management in the region.

Some potential management and research funding projects may include:

- the establishment and management of new, and increasing the viability of existing, threatened flora populations in suitable habitat of the secured offset areas using seed, cuttings and translocation of plants from the Project area (note propagation trials for Ingram's Zieria and *Homoranthus darwinioides* are underway); or
- management funding for identified key flora populations in reserve areas or on private land including erecting rabbit, goat and stock-proof fences; or
- seed and soil collection for the NSW Seedbank; or
- funding for the Grassy Box Conservation Management Networks in NSW; or
- funding for the control of priority weeds; or
- funding for regional surveys into the abundance and distribution of microbat species; or
- funding for research into restoration techniques and management of grassy box woodlands, particularly where these integrate agricultural practices.

Funding for existing conservation programs/projects or the provision of funds to address research knowledge gaps, will be negotiated with and approved by OEH and SEWPaC.

Biobanking agreements would be drafted or used to determine the management costs for offset areas that are not transferred back to NPWS Estate. CHC will provide funding for the long-term management of these offset sites. Management funds will be supplied to OEH for the ongoing management of transferred offset areas. The amount for each property will be determined in consultation with OEH. Conversely, CHC may manage offset sites to improve the condition and suitability of the offset areas for inclusion in the NPWS Estate prior to transfer of the properties.

4.2 Monitoring and management of the offsets

4.2.1 Secure tenure for offsets

Offset areas will be dedicated in perpetuity under one of the following mechanisms:

- reservation of the offset areas to the national park estate under the *National Parks and Wildlife Act 1974* (NPW Act); or
- the establishment of Biobanking sites with Biobanking Agreements under the TSC Act; or

- entering into a conservation agreement pursuant to s69B of the NPW Act; or
- register offset areas under a public positive covenant and/or restriction on the use of the land against the title.

4.3 Offset management plan

An offset management plan will be devised that will detail the measures to be implemented in the short, medium and long term to achieve the offset objectives. It will include procedures to be applied for the management of the offset properties, the arrangements for conservation in perpetuity and rehabilitation works to be undertaken. This would include the procedures for:

- implementing revegetation and regeneration in the offset areas, including establishment of canopy, understorey and groundcover;
- investigating the feasibility of seed and cutting collection, propagation, establishment and relocation of threatened flora species from the Project area to offset areas;
- the introduction of hollow-bearing habitat features and bat roosting structures;
- controlling weeds and feral pests;
- areas for additional flora and fauna surveys in the offset areas to targeted threatened flora and fauna;
- managing grazing and agriculture, excluding livestock grazing from existing treed areas and TECs; and
- bushfire management.

The offset management plan will also identify and provide procedures for further research and survey for threatened flora and fauna within the offset areas. It will also provide management actions to reduce known threats for the threatened species, populations and communities recorded.

4.3.1 Offset monitoring

An offset monitoring program will be included within the offset management plan. The purpose of the program will be to survey the offset sites for the presence of threatened species and monitor any changes to the condition of these areas to:

- assess any indirect impacts from the Project; and
- determine the success of the management actions implemented.

Specifically, the monitoring program will target the condition and extent of threatened species, populations and communities identified in the offset area. In particular, the success of any relocation of threatened flora species will be monitored.

An adaptive approach will be taken for monitoring. This will involve the development of triggers for action over the various monitoring parameters. Measures of health will employ the benchmark data as outlined in the Biobanking Methodology for comparison. The maintenance of signs of ecosystem function (eg maintenance of flowering) will also be monitored. Specific triggers will be determined to ensure that an adaptive approach to management is used for the Project, whereby indirect impacts and failure of management actions can be measured and corrective actions developed. It is likely that the following will be monitored in the offset areas:

- condition of remnant vegetation and how this changes over time as a result of management actions;
- rehabilitation efforts and success;
- natural regeneration success;
- weed presence, distribution and abundance;
- the impacts of land use; and
- diversity and abundance of significant ecological features such as threatened species and TECs.

For the areas to be transferred to NPWS estate, a set of actions to be completed prior to transfer will be identified with OEH. Management and monitoring activities will be undertaken for a period of up to five years. The condition will be assessed at this time and then appropriate funding will be determined to provide OEH for the long-term management of the sites.

5 Offset adequacy

5.1 Offset outcomes using ratios

5.1.1 Vegetation outcomes

An offset to impact ratio of 6:1 is considered to be appropriate for the Project for woodland TECs, given recent Project approvals in the region and when comparing the Project Biobanking outcomes. A minimum offset ratio of 3:1 has been determined for all other vegetation, including TEC DNG. Non-TEC vegetation within the Project area provides habitat for a number of threatened species and this level of offset is required to ensure an improvement in the quality and quantity of threatened species habitat in the long-term. Where possible, non-TEC vegetation offsets will aim to provide 'like for like' offsetting.

Proposed offset ratios have been determined in consideration of recent regional coal project approvals in NSW, including:

- Continued Operations Project for Ulan Coal Mine approved by the NSW Land and Environment Court in 2011 requiring 3.4:1 for Box Gum Woodland (also approved by SEWPaC), with a total ratio of 2.5:1 for native vegetation;
- Boggabri Coal Continuation Project approved by the NSW Planning Assessment Commission in 2012 requiring 2.7:1 for Box Gum Woodland;
- Wilpinjong Coal Project approved by the Minister for Planning in 2007 requiring 7:1 for Box Gum Woodland and 2:1 for derived native grasslands; and
- Moolarben Coal Project Stage 1 approved by the Minister for Planning in 2007 requiring 2:1 for Box Gum Woodland, with additional rehabilitation of Box Gum Woodland in offset areas resulting in a ratio of 5:1 (also approved by SEWPaC).

Native pasture (with the exception of TEC DNG) of approximately 1,048 ha, and exotic pasture/disturbed/cleared areas have not been included in the impact calculations. In addition, these have not been included in the offset calculations, with the exception of TEC DNG. This is considered to be appropriate for the Project given the following:

- historical grassland management has included pasture improvement by introducing clovers and lucerne to the native grasslands. Typically, farmers in the area rotate their paddocks based on a five year cycle, commencing with spraying or burning, ploughing, lime and super spreading and then reseeding (Rod Single *pers comm*. (local farmer)). Over the years native grasses dominate and the process starts again. These areas, whilst not in low condition due to the dominance of grazing tolerant native grasses, are considered to be highly disturbed;
- the native pasture areas provide limited habitat for common fauna species and no potential habitat for threatened flora species such as orchids given their disturbance history;
- more than 1,630 ha of native pastures will be progressively rehabilitated in the Project area over the life of the mine and will provide similar habitat values to the existing areas of degraded native pasture;

- threatened species such as forest owls, microbats and raptors that rely on native pasture habitat for hunting prey species are highly mobile and can forage in the vast similar habitats of the PAA and its surrounds; and

- the native pasture in the secured offset areas have not been included in the calculations for this strategy, however these areas will provide additional foraging habitat.

Using the proposed offset ratios, an additional 3,143 ha of offset areas (to those already secured) are required to meet the objectives of the Offset strategy (Table 5.1). These need to contain, or be rehabilitated to contain, 126 ha of Fuzzy Box Woodland and 320 ha of Grey Box Woodland. An additional 2,865 ha of non-TEC woodland vegetation that is representative of the vegetation types, condition and habitat values provided in the Project area, is also required to meet the offset strategy objectives.

Table 5.1 Vegetation outcomes with secured offsets

Vegetation type	Impact area (ha)	Offset area (ha)	Offset ratio with secured offsets	Offset ratio required to meet strategy objectives	Area (ha) required to meet objectives[2]	Combined TEC areas (ha) required[2]
Box Gum Woodland	22	441	20:1	6:1	-309	-177
Box Gum Woodland DNG	105	183	2:1	3:1	132	-
Fuzzy Box Woodland	14	0	0	6:1	84	126
Fuzzy Box DNG	14	0	0	3:1	42	-
Grey Box Woodland	49	63	1:1	6:1	231	320
Grey Box DNG	34	13	0	3:1	89	-
Sub-total TECs	**238**	**700**	**3:1**	**-**	**269**	-
Non-TEC native vegetation	1,875	2,760	2:1	3:1	2,865	-
Total	**2,113**	**3,460**	**2:1**	**-**	**3,134**	-

Note: 1. Does not include areas of native pasture or exotic/cleared/disturbed areas. 2. Negative numbers relate to an excess of area required.

5.1.2 Additional land-based offsets required

Surveys in the secured offset areas have not identified any areas of Fuzzy Box Woodland TEC. Additional Grey Box Woodland TEC and areas of other non-TEC vegetation are also required to meet the proposed offset ratios (Table 5.1). These requirements could be met through a combination of protection and management of land-based offsets containing these communities, and the rehabilitation and restoration of identified habitat areas which have been disturbed by agricultural activities in secured or additional offset areas.

An additional 2,500 ha of offset areas are being negotiated for addition into the offset strategy (Figure 3.1). These areas are yet to be surveyed for ecological values, however some threatened species populations and threatened ecological communities are known to occur in these areas. These areas will be surveyed in February 2013 and results will be discussed with OEH and SEWPaC. Further additions have been identified in areas adjoining NPWS estate in the locality. The addition of these areas to the offset package is currently being investigated.

If land-based offsets cannot be identified to match on a 'like for like' basis, additional vegetation types in the same vegetation formation will be identified and used as a surrogate in the offset package. For TECs, this will aim to be other TECs that occur in similar positions in the landscape and are of the same vegetation formation. Proposed offset additions will be located in the same CMA, preferably close to the Project area to ensure that local populations of fauna species will benefit from the improvements and management of the offset sites.

CHC is committed to ensuring these offset requirements are met in the final offset package, which will be negotiated with OEH and SEWPaC to ensure the package suitably compensates for the Project impacts. If land-based offsets cannot be identified, indirect offsets will be investigated.

5.1.3 Threatened species outcomes

The proposed offset areas contain habitat for all threatened species to be impacted by the Project. In general, when considering only the secured offsets, the offset to impact ratio for threatened species is 2:1 (Table 5.2). However, the offset requirements for threatened flora will require additional offset measures.

Table 5.2 Threatened species offset outcomes with secured offsets

Species or community	Status		Impact	Offset outcome (direct land-based offsets)	Offset ratio	Additional measures
	TSC Act	EPBC Act				
Homoranthus darwinioides	V	V	227 individuals	200 individuals	1:1	Additional offset surveys during flowering period Additional habitat additions Management and research funding
Ingram's Zieria	E	E	706 individuals	486 individuals	0	Additional offset surveys during flowering period Additional habitat additions Management and research funding
Tylophora linearis	V	E	9 individuals	0 individuals	0	Additional offset surveys during flowering period Additional habitat additions Management and research funding
Acacia ausfeldii	V	-	200 individuals	56,200 individuals	n/a	Offsets significantly exceed impact
Barking Owl	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions Additional offset surveys
Brown Treecreeper	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions
Diamond Firetail	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions
Glossy Black-Cockatoo	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions
Grey-crowned Babbler	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions
Hooded Robin	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions

Table 5.2 Threatened species offset outcomes with secured offsets

Species or community	Status		Impact	Offset outcome (direct land-based offsets)	Offset ratio	Additional measures
	TSC Act	EPBC Act				
Large-eared Pied Bat	V	V	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions that contain cliff lines
			16 km cliffline	28 cliffline	2:1	Additional offset surveys
Little Pied Bat	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions that contain cliff lines
			16 km cliffline	28 cliffline	2:1	Additional offset surveys
Masked Owl	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions Additional offset surveys
Powerful Owl	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions Additional offset surveys
Southern Long-eared Bat	V	V	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions Additional offset surveys
Speckled Warbler	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions
Varied Sittella	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions
Yellow-Bellied Sheathtail Bat	V	-	1,800 ha habitat	3,600 ha known habitat	2:1	Additional habitat additions Additional offset surveys

Where possible, habitat offsets for threatened species will aim to provide a minimum offset to impact ratio of 3:1. The additional offset areas currently being investigated will meet most of these requirements. However, these requirements may not be met for some of the threatened flora species and therefore indirect offsets and management funding of known populations may be required. Such measures will be developed in consultation with OEH and SEWPaC and will be developed in accordance with relevant recovery plans and priority recovery actions.

5.2 Assessment under the OEH Interim Offset Policy

An assessment using the Biobanking Assessment Methodology has been completed to determine the suitability of the proposed offset ratios in the offset strategy and the outcomes of the resultant likely final offset package.

5.2.1 Ecosystem credit outcomes

A total of 124,354 ecosystem credits are required for the Project to compensate for the development impacts (Table 5.3). To date 35,664 credits have been generated for the offset areas (Table 5.3), not including native pasture and disturbed areas in the secured offsets (which could be rehabilitated to provide credits).

Three TECs will be impacted by the Project; Box Gum Woodland, Grey Box Woodland and Fuzzy Box Woodland. An additional 5,360 credits are required to meet the Biobanking requirements for TECs impacted by the Project (Table 5.3). This would represent a Tier 2 outcome under the OEH Policy, with all ecosystem credit requirements matched by credits at the identified offset areas.

Table 5.3 Combined TEC and other vegetation credit outcomes using Biobanking

TEC	Credits required	Credits achieved	Outcome[1]
Box Gum Woodland (includes DNG)	5,917	6,026	109
Grey Box Woodland (includes DNG)	1,638	0	-1,638
Fuzzy Box Woodland (includes DNG)	5,020	1,188	-3,832
Other woodland vegetation	111,779	28,449	-83,330
Total	**124,354**	**35,664**	**-88,690**

Notes: 1. Negative values occur where additional credits are required to meet requirements.

Table 5.4 Ecosystem credit outcomes for the refined Project and secured offset areas

			Impact ecosystem credits		Offset ecosystem credits			
BVT	Vegetation Formation	Vegetation Class	Impact area (ha)[2]	Credits required[1]	Offset area (ha) (secured only)	Credits created[1]	Outcome (negative values represent deficit)	Outcome for combined BVTs
CW107 Black Cypress Pine - Narrow-leaved Stringybark heathy woodland of the southern Brigalow Belt South Bioregion	Dry sclerophyll forests (shrubby sub-formation)	Western Slopes Dry Sclerophyll Forests	0	0	258	2,647	2,647	2,647
CW111 Blakely's Red Gum Rough-barked Apple Flats Woodland	Grassy woodland	Western Slopes Grassy Woodlands	9	702	339	3,132	2,430	2,696
CW111 Blakely's Red Gum Rough-barked Apple Flats Woodland DNG	Grassy woodland	Western Slopes Grassy Woodlands	0	0	31	266	266	
CW112 Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion	Grassy woodland	Western Slopes Grassy Woodlands	13	910	85	1,223	313	-2,802
CW112 Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion DNG	Grassy woodland	Western Slopes Grassy Woodlands	105	4,305	152	1,190	-3,115	
CW115 Blue-leaved Ironbark woodland on sandy uplands and slopes of the Darling Riverine Plains Bioregion	Dry sclerophyll forests (shrubby sub-formation)	Western Slopes Dry Sclerophyll Forests	1043	68,838	1,106	11,856	-56,982	-124,951
CW115 Blue-leaved Ironbark woodland on sandy uplands and slopes of the Darling Riverine Plains Bioregion regrowth	Dry sclerophyll forests (shrubby sub-formation)	Western Slopes Dry Sclerophyll Forests	450	29,700	374	2375	-27,325	
CW133 Dwyer's Red Gum - Currawang grassy mid-high woodland of central NSW	Semi-arid Woodlands (shrubby sub-formation)	Inland Rocky Hill Woodlands	67	4,355	44	275	-4,080	-4,080
CW138 Fuzzy Box on loams in the Nandewar Bioregion and northern Brigalow Belt South Bioregion	Grassy woodland	Western Slopes Grassy Woodlands	14	1,064	0	0	-1,064	-1,638
CW138 Fuzzy Box on loams in the Nandewar Bioregion and northern Brigalow Belt South Bioregion DNG	Grassy woodland	Western Slopes Grassy Woodlands	14	574	0	0	-574	

Table 5.4 Ecosystem credit outcomes for the refined Project and secured offset areas

			Impact ecosystem credits		Offset ecosystem credits			
BVT	**Vegetation Formation**	**Vegetation Class**	**Impact area (ha)[2]**	**Credits required[1]**	**Offset area (ha) (secured only)**	**Credits created[1]**	**Outcome (negative values represent deficit)**	**Outcome for combined BVTs**
CW145 Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	Grassy woodland	Western Slopes Grassy Woodlands	49	3,626	63	1,092	-2,534	-3,832
CW145 Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions DNG	Grassy woodland	Western Slopes Grassy Woodlands	34	1,394	13	96	-1,298	
CW155 Mugga Ironbark - Inland Grey Box - pine tall woodland of the NSW South Western Slopes Bioregion	Dry sclerophyll forests (shrubby sub-formation)	Western Slopes Dry Sclerophyll Forests	1	77	119	2,647	2,570	2,570
CW156 Mugga Ironbark - Inland Grey Box shrubby woodland of the Brigalow Belt South Bioregion	Dry sclerophyll forests (shrubby sub-formation)	Western Slopes Dry Sclerophyll Forests	0	0	48	664	664	664
CW176 Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest the NSW South Western Slopes Bioregion	Dry sclerophyll forests (shrub/grass sub-formation)	Upper Riverina Dry Sclerophyll Forests	5	380	15	231	-149	-149
CW177 Red Stringybark woodland of the dry slopes of the South Western Slopes Bioregion	Dry sclerophyll forests (shrub/grass sub-formation)	Upper Riverina Dry Sclerophyll Forests	20	1,460	606	6175	4,715	4,715
CW191 Slaty Gum woodland of the slopes of the southern Brigalow Belt South Bioregion	Dry sclerophyll forests (shrubby sub-formation)	Southern Tableland Dry Sclerophyll Forests	101	6,969	176	1457	-5,512	-5,512

Table 5.4 Ecosystem credit outcomes for the refined Project and secured offset areas

BVT	Vegetation Formation	Vegetation Class	Impact ecosystem credits		Offset ecosystem credits		Outcome (negative values represent deficit)	Outcome for combined BVTs
			Impact area (ha)[2]	Credits required[1]	Offset area (ha) (secured only)	Credits created[1]		
CW202 Tumbledown Red Gum - Black Cypress Pine - Red Box low woodland of hills of the South Western Slopes	Dry sclerophyll forests (shrubby sub-formation)	Western Slopes Dry Sclerophyll Forests	0	0	14	123	123	123
CW213 White Box - White Cypress Pine - Inland Grey Box woodland on the western slopes of NSW	Grassy woodland	Western Slopes Grassy Woodlands	0	0	17	216	216	216
Total			**1,925**	**124,354**	**3,460**	**35,664**	**-88,690**	**-88,690**

Notes: 1. Calculated using original credit outcomes per hectare impacted and offset (including rehab where required). 2. Includes calculations for woodland only as per the original assessment.

5.2.2 OEH Offset Policy outcomes

To meet the Tier 2 criteria for TECs, an estimated additional 109 ha of Fuzzy Box Woodland and 256 ha of Grey Box Woodland in moderate-good condition are required. The Tier 2 requirements for Box Gum Woodland have been met by the existing secured offsets.

Outstanding TEC requirements will be the target for offset additions (see Section 5.1.2). However, it is unlikely that a Tier 2 target will be met given the lack of large stands of TECs on available private land in the locality and region. Therefore it is unlikely that the offsets will result in a Tier 2 outcome for TECs under the OEH Offset Policy.

The Project will, at a minimum based on the identified offset ratios in Section 5.1.1, result in a Tier 3 outcome according to the OEH Offset Policy for ecosystem credits for TECs. The Tier 3 variation criteria have been considered in the following section as relevant to the Project for TECs.

As with TEC outcomes, the ecosystem credit shortfalls for other woodland and pasture vegetation would require additional offset areas to be identified, with 'like for like' credits for each of the BVTs impacted, to meet a Tier 2 outcome. Given that this would require additional areas with a combination of 12 different BVTs, roughly equating to an additional 11,093 ha, this is not considered feasible or warranted.

i Are credits required by the calculator available on the market?

Credits for Fuzzy Box Woodland or Grey Box Woodland are not available on the Biobanking public credit registers. The Biobanking credit report allowed these impacts to be offset with the following vegetation types for Grey Box Woodland:

- Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) (MR566); or
- Inland Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions (Benson 76) (MU555).

There are currently no credits available for these communities in the Biobanking registers.

ii Are alternative offset sites (other than credits) available on the market?

The Biobanking expression of interest register was searched for Fuzzy Box Woodland and Grey Box Woodland. One site was identified as potentially containing an area of Fuzzy Box Woodland, however no ecological surveys have been completed at the site and this is speculative only.

Other expressions of interest of 'grassy woodland' vegetation in the Catchment Management Area (CMA) were advertised. Further investigation of these sites identified potential areas of Box Gum Woodland but little potential for Grey Box Woodland or Fuzzy Box Woodland.

Credits for TECs and other vegetation types required have been advertised on the Biobanking list of wanted credits for over a year. While some areas are potentially available despite the lack of contact by landowners, these would generally not meet the 'like for like' requirements of offsets or other allowances in the credit calculations as most of the areas are greater than 50 km from the site. Therefore these would not meet the Tier 2 requirements.

Additional offsets are being investigated for inclusion into the offset package including those shown on Figure 3.1 and others in the locality. It is considered that the additional offset areas surrounding the Project area that are being investigated will be more suitable compensatory areas, given their proximity to known threatened species populations and the similarities of the vegetation to that being impacted. While these will reduce the ecosystem credit requirements somewhat, it is unlikely that the required additional 11,000 ha will be met, as only an additional 2,865 ha of non-TEC woodland vegetation is required to meet the proposed offset ratios.

iii Are the overall costs of the offsets reasonable given the circumstances?

The cost for acquisition and then management of offset sites is approximated at up to $1,500 per hectare (determined on current land value in the region and likely management costs). If the additional required 11,000 ha is required, approximately $16.5 million will need to be spent on additional offset sites. This is considered unreasonable as the proposed mine has already made considerable financial contributions to offsets, and these large costs would affect the viability of the Project in the long-term.

Given the above, it has been demonstrated that a Tier 2 outcome is not available for the Project offsets. Therefore the variation criteria under Tier 3 can apply to the point that:

- suitable offset sites can be found within a reasonable timeframe;
- the costs of offsetting is brought within a reasonable range; and
- an offset to clearing ratio of at least 2:1 vegetated to cleared hectares is achieved.

Under the Tier 3 requirements, the minimum offset to impact ratio will be exceeded by the secured offsets and proposed offset additions. The following ratios are proposed in line with Section 5.1.1:

- 6:1 for woodland TECs;
- 3:1 for derived native grassland TECs; and
- 3:1 for other woodland vegetation types.

These ratios have been compared with the requirements under the Biobanking assessment methodology (BBAM) (Table 5.5). Offset requirements according to the BBAM range from 20:1 for Box Gum Woodland to 4:1 for Fuzzy Box Woodland. The required offset area using the Biobanking tool is more than twice that required by the offset strategy ratios. However in general, the proposed ratios for this strategy exceed regional offset ratio precedents significantly, particularly for non-TEC vegetation.

Table 5.5 Combined TEC and other vegetation credit outcomes using Biobanking

TEC	Impact area (ha)	Offset area (secured and likely additions required)[1]	Average credits generated per hectare in offsets	Offset to impact ratio required by Biobanking	Offset to impact ratio recommended in this strategy
Box Gum Woodland	22	440	10	20:1	6:1
Box Gum Woodland DNG	105	525	8	5:1	3:1
Grey Box Woodland	14	154	7	11:1	6:1
Grey Box Woodland DNG	14	84	7	6:1	3:1
Fuzzy Box Woodland	49	196	17	4:1	6:1
Fuzzy Box Woodland DNG	34	204	7	6:1	3:1
Other woodland vegetation	1,875	13,125	10	7:1	3:1
Total	**2,113**	**14,728**	**-**	**7:1**	**-**

Notes: 1. Based on the average credits generated per hectare in the secured offset sites from Biobanking calculator results from the original proposal.

CHC is committed to ensuring the recommended offset ratios are met to compensate for the Project impacts on vegetation and threatened species habitat. If land-based offsets cannot be identified, indirect offsets will be investigated.

5.2.3 Species credit outcomes

Species credits were generated for the Project for four threatened flora species and three fauna habitat values (Table 5.6). A Tier 2 outcome is met for the Large-eared Pied Bat (breeding habitat) and *Acacia ausfeldii*, and is also likely to be met for Large-eared Pied Bat (breeding habitat) and for the Australasian Bittern habitat with the proposed additions to the offsets. However, the requirements for threatened species credits to meet a Tier 2 outcome for threatened flora are unlikely to be met, given the nature of threatened species distribution in the locality and region.

As with the ecosystem credits, no threatened species credits are available for the outstanding credit requirements and land-based offsets are unlikely to be found with suitable population numbers. Therefore the variation criteria can be applied to threatened species credits to result in a Tier 3 outcome for the Project.

Using the variation criteria, the excess of 321,200 credits for *Acacia ausfeldii* could be used to offset requirements for *Tylophora linearis* and *Homoranthus darwinioides* if additional land-based offsets are not identified. However outstanding requirements would still need to be met for Ingram's Zieria.

Table 5.6 Threatened species outcomes using the BBAM

Species	Status TSC Act	Impact	Credits required	Offset	Credits achieved	Outcome[1]
Zieria ingramii	E	706 individuals	10,862	486 individuals	876	1,324 individuals
Tylophora linearis	V	9 individuals	720	0 individuals	0	120 individuals
Homoranthus darwinioides	V	227 individuals	3,363	227 individuals	1,362	334 individuals
Acacia ausfeldii	V	200 individuals	16,000	56,200 individuals	337,200	Exceeds required
Large-eared Pied Bat (breeding)	V	2 ha	160	28 ha	168	Exceeds required
Large-eared Pied Bat (foraging)	V	1800 ha	24,000	3,600 ha	21,600	400 ha
Australasian Bittern	E	9 ha	120	5 ha	30	15 ha
Total			**55,225**		**361,236**	

Notes: 1. Using equation 14 of the BBAM

The offset strategy approach for threatened species is provided in Section 5.1.3. The final offset package for threatened species will be finalised in consultation with OEH and SEWPaC where relevant. Consultation is already underway with OEH to determine indirect offset methods to compensate for impacts on threatened flora and seed collected in the impact area is being propagated to be planted in the offset areas in suitable habitat.

5.3 Commonwealth Offsets Calculator

The EPBC Act offset calculator was applied to matters of National Environmental Significance (mNES) for which Project impacts remain after mitigation. The calculation outcomes are provided in Table 5.7.

As the offset package is yet to be finalised, the offsets for a number of mNES do not meet the minimum offset requirements. Proposed additions to the offset package will increase the percent of impacts offset for the Project, particularly for the threatened bat species and TECs. However outstanding requirements are still likely for the threatened flora species.

Translocation of threatened plants to the offset areas and the propagation and planting of individuals into the offset sites to supplement known populations will improve the adequacy of the offsets, however the success of such strategies is unknown and therefore confidence in results is low. Consultation is being undertaken with SEWPaC and OEH threatened species officers to determine the best approach to meeting these offset requirements.

Table 5.7 Offset calculator outcomes for matters of National Environmental Significance

Threatened ecological community/ threatened species	Percent of impact offset	Minimum (90%) direct offset requirement met?	Likely additional land-based offset requirements[1]
Box Gum Woodland CEEC	110%	Yes	n/a
Grey Box Woodland EEC	17%	No	272 ha of Grey Box Woodland EEC or an additional 315 ha of lower condition derived native grasslands
Homoranthus darwinioides	39%	No	400 individuals
Ingram's Zieria	66%	No	Increase in 650 plants in offsets
Tylophora linearis	10%	No	38 individuals
Large-eared Pied Bat	79%	No	600 ha of foraging habitat
Southern Long-eared Bat	79%	No	600 ha of foraging habitat

Notes: 1.Calculated using the offset calculator

5.4 Consideration of offset principles

5.4.1 NSW offset principles

The OEH principles for offsetting in NSW have been considered in the formulation of the offset strategy. Table 5.8 details the consideration of these principles.

Table 5.8 Compliance with NSW offset principles

	Principle	Compliance
1	Impacts must be avoided first by using prevention and mitigation measures	The Project has aimed to avoid potential impacts where possible. Refer to Section 2.1 and 2.2.
2	All regulatory requirements must be met	The Project will meet all regulatory requirements.
3	Offsets must never reward ongoing poor performance	The Project will implement best practice environmental management, rehabilitation and mitigation. The final offset package will be developed according to relevant offsetting policies and with approval of relevant government agencies.
4	Offsets will complement other government programs	Corridor mapping, OEH priorities and the Central West Catchment Action Plan (CW CMA, 2011) have been incorporated into the identification of potential offsets sites.
5	Offsets must be underpinned by sound ecological principles	The strategy detailed in this document has been undertaken using appropriate guidelines and has been drafted in consideration of the OEH Offset Policy and Commonwealth offset calculator, which are both based on sound ecological principles.
6	Offsets should aim to result in a net improvement in biodiversity over time	The offsets will ensure a net improvement in biodiversity as a result of the Project in the long term through rehabilitation and conservation management of offset sites, and the provision of indirect offsets where land-based offsets are not feasible. The offsets sites are currently subject to agricultural disturbance activities and associated threats such as feral species. Land-based offsets have been provided at a minimum of three times the disturbance area, which will increase the area of threatened species habitat under conservation arrangements in the locality and region in the long-term.
	Offsets must be enduring and they must offset the impact of the development for	Offset sites will be protected into the future through secure land tenure for ongoing conservation management through an

Table 5.8 Compliance with NSW offset principles

	Principle	Compliance
	the period that the impact occurs	appropriate legal instrument. Offset areas will be conserved in perpetuity, well beyond the mine life.
	Offsets should be agreed prior to the impact occurring	The offset package will be finalised and agreed with government agencies prior to removal of significant vegetation (TECs).
	Offsets must be quantifiable and the impacts and benefits must be reliably estimated	The Biobanking calculator was used to quantify the potential biodiversity impacts of the Project in consultation with OEH.
	Offsets must be targeted	Offset areas have targeted the vegetation communities, TECs and threatened species habitats to be impacted by the Project.
	Offsets must be located appropriately	Offsets will aim to improve connectivity of remnant vegetation and protected areas. These will be located in appropriate areas where potential socio-economic impacts are minimised. Offsets have been located outside important agricultural areas and areas that have been identified as containing potential future coal resources.
7	Offsets must be supplementary	Offset areas are not already part of the reserve system and are therefore supplementary areas for the protection and enhancement of biodiversity values.
	Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract	All offset areas will be secured under appropriate mechanisms under the NPW Act, TSC Act, NCT Act or NV Act.

5.4.2 Commonwealth offset principles

The Commonwealth offset principles have been considered in the formulation of the offset strategy. Table 5.9 details the consideration of these principles.

Table 5.9 Compliance with Commonwealth offset principles

	Principle	Compliance
1	Environmental offsets should be targeted to the matter protected by the EPBC Act that is being impacted	Offsets identified have targeted the TECs and threatened species habitats which will be impacted by the Project.
2	A flexible approach should be taken to the design and use of environmental offsets to achieve long-term and certain conservation outcomes which are cost effective for proponents	Corridor mapping, OEH priority areas and the Central West Catchment Action Plan have been reviewed as part of the identification of potential offsets sites. Offsets aim to improve connectivity of remnant vegetation and protected areas in the long-term within the locality. Where possible, offsets have been identified within land already owned by CHC. Where land-based offsets cannot be identified for the values to be offset, SEWPaC will be consulted to determine appropriate indirect measures to be implemented.
3	Environmental offsets should deliver a real conservation outcome	Offset areas are not already part of the reserve system and are therefore supplementary areas of protection and enhancement of biodiversity values. The offsets sites are currently subject to agricultural disturbance activities and associated threats such as feral species. Land-based offsets have been provided at a minimum of three times the disturbance area, which will increase the area of threatened species habitat under conservation arrangements in the locality and region in the long-term.

Table 5.9 Compliance with Commonwealth offset principles

	Principle	Compliance
4	Environmental offsets should be developed as a package of actions, which may include both direct and indirect offsets	Where possible, a minimum of 90% of offsets will be land-based and these will be managed for conservation in perpetuity. Where land-based offsets cannot be identified for the values to be offset, SEWPaC will be consulted to determine appropriate indirect measures to be implemented.
5	As a minimum, environmental offsets should be commensurate with the magnitude of the impacts of the development and ideally deliver outcomes that are 'like for like'.	The proposed offset areas provide a minimum of 3:1 offset to impact ratio for vegetation types. All proposed offset areas have been identified adjacent to, or in close proximity to the proposed impact areas and therefore contain similar ecological characteristics as the Project area. In general TECs will be offset on a 'like for like' basis, with other non-TEC vegetation offset with vegetation that is within the same vegetation formation and contains the same values as the Project area. For threatened species, a minimum of 'like for like' will be achieved via land-based offsets and where this is not feasible, through the funding of management and research within the region for the target species.
6	Environmental offsets should be located within the same general area as the development activity	All proposed offset areas have been identified adjacent to, or in close proximity to the proposed impact areas.
7	Environmental offsets should be delivered in a timely manner and be long lasting	Offsets will be secured prior to removal of significant vegetation within the Project area. Offset sites will be protected in perpetuity which goes well beyond the proposed mine life.
8	Environmental offsets should be enforceable, monitored and audited.	An appropriate monitoring program will be developed for offset sites in accordance with the management of these areas.

6 Conclusion

Biodiversity offsets are required to compensate for the impacts remaining after mitigation resulting from the Cobbora Coal Project (the Project) on biodiversity. Remaining impacts to be compensated include the loss of TECs, threatened flora and threatened flora and their habitat, and associated indirect impacts on these ecological features in surrounding areas.

This updated offset strategy provides commitments to Project offsets that will achieve a beneficial biodiversity outcome from the Project and the outcomes of the preliminary offset package. The final offset package will provide as a minimum:

- threatened woodland ecological communities at an offset to impact ratio of 6:1;
- threatened derived native grassland ecological communities, other woodland vegetation and threatened species at an offset to impact ratio of 3:1; and
- where possible threatened flora at an offset to impact ratio of 3:1 or equivalent management funding in consultation with OEH and SEWPaC.

More than 5,046 ha have been secured as offset sites in four main areas that provide extensions of the reserve network in the locality. These areas provide known threatened species habitat and contain significant areas of TECs and vegetation types representative of the Project impact area.

Additions to the secured offsets are currently being negotiated to ensure that these minimum requirements are met or exceeded by the offset package. It is anticipated that at a minimum, an additional 3,134 ha is required to meet the offset requirements of this offset strategy. This would include an additional 126 ha or Fuzzy Box Woodland and 320 ha of Grey Box Woodland.

If land-based offsets cannot be identified to match on a 'like for like' basis, additional vegetation types in the same vegetation formation will be identified and used as a surrogate in the offset package.

CHC is committed to ensuring these offset requirements are met in the final offset package, which will be negotiated with OEH and SEWPaC to ensure the package suitably compensates for the Project impacts. If land-based offsets cannot be identified, indirect offsets will be investigated in consultation with and approval by OEH and SEWPaC.

As noted, the current offset package is still being added to. However, an assessment using the Biobanking Assessment Methodology for consideration of the OEH Offset Policy, and the Commonwealth Offset Calculator have been completed to determine the suitability of the proposed offset ratios in the offset strategy and the outcomes of the resultant likely final offset package.

It is considered that the Project will meet a Tier 3 outcome under the OEH Offset Policy. While this is considered to be a 'mitigated net loss outcome', the package will provide offsets at a minimum of three times the impact area for TECs and threatened species habitat. The offsets will improve the quality and quantity of habitat conserved in the locality and region and is therefore considered to constitute a net gain.

The current secured offsets do not meet the minimum 90% land-based offsets for most matters of National Environmental Significance (mNES) when using the Commonwealth Offset Calculator. However, additional land-based offsets are likely to improve this outcome for most of the mNES impacted by the Project. Outstanding requirements may still occur for threatened flora species. Offset measures such as propagating and planting these species into offset areas to supplement the local population and improve its viability in the long-term, are currently underway in consultation with OEH and SEWPaC.

The offset package has not been finalised but CHC is committed to ensuring that it provides the outcomes required in this updated offset strategy. The secured offset sites provide a substantial contribution to the final offset package and include large areas of TECs and known populations of threatened flora and fauna. Offset additions have been identified and are being negotiated and when added to the offset package, are likely to meet most of the land-based offset requirements.

Land-based offsets will be managed for conservation to improve the quality and quantity of native vegetation and habitat in areas that would otherwise be subject to various agricultural disturbances and threats. Additional management funding and research initiatives are likely to be included in the offset package to meet offset requirements. These will be negotiated with and approved by SEWPaC and OEH and will be undertaken in accordance with recovery plans and priority actions for TECs and threatened species as required.

The final offset package will improve the connectivity of remnant habitat and conservation areas in the locality. The management measures and rehabilitation of lower quality vegetation in the offset areas will result in an improvement to the quality, quantity and protection of biodiversity within the region in the medium to long term.

References

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Appendix A

EPBC Credit calculations

Details on the condition assessments for the Project area and offsets have been completed in accordance with the guidance material for the Commonwealth Offset Calculator. These are provided below for the EPBC Act listed TECs.

Table A.1 Quality calculations for Box Gum Woodland

Key considerations	Score			
	Project area	**Offsets before**	**Without offset**	**Offsets after**
Structure and condition of the vegetation on the site (2 points)	1	1	0.8	1.2
Diversity of relevant habitat species present (including both endemic and non-endemic) (2 points)	1	1	0.8	1.2
Relevant habitat features on the site (2 points)	1	1	0.8	1.2
Connectivity with other suitable/known habitat or remnants (2 points)	1	1	0.5	1.5
Importance of the site in relation to the occurrence of the ecological community (1 point)	0.4	0.4	0.4	0.4
Threats on or near the site (1 point)	0.2	0.2	0.1	0.5
Total score	**4.6**	**4.6**	**3.4**	**6**

Notes: 1.Type any additional notes or Sources.

Table A.2 Quality calculations for Grey Box Woodland

Key considerations	Score			
	Project area	**Offsets before**	**Without offset**	**Offsets after**
Structure and condition of the vegetation on the site (2 points)	1	1	0.8	1.2
Diversity of relevant habitat species present (including both endemic and non-endemic) (2 points)	1	1	0.8	1.2
Relevant habitat features on the site (2 points)	1	1	0.8	1.2
Connectivity with other suitable/known habitat or remnants (2 points)	1	1	0.5	1.5
Importance of the site in relation to the occurrence of the ecological community (1 point)	0.4	0.4	0.4	0.4
Threats on or near the site (1 point)	0.2	0.2	0.1	0.5
Total score	**4.6**	**4.6**	**3.4**	**6**

Notes: 1.Type any additional notes or Sources.