

# Mt Piper Power Station Extension

ENVIRONMENTAL ASSESSMENT

CHAPTER 6 – ECOLOGICAL IMPACTS

- September 2009



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## 6. Ecological Impacts

### *The Director-General's requirements:*

*The Environmental Assessment must include an assessment of the impacts on native vegetation, threatened species, populations, ecological communities and their habitats (including both terrestrial and aquatic ecology). The Environmental Assessment must include a screening of species, populations, ecological communities and habitats based on ecological significance and the potential for impact as a consequence of the project. For species, populations, ecological communities and habitats with high ecological significance and significant potential for impact, include sufficient information to demonstrate the likely impacts, consistent with Guidelines for Threatened Species Assessment (DEC & DPI, July 2005). The assessment must demonstrate a design philosophy of impact avoidance on ecological values, and in particular, ecological values of high significance and include a framework for the further consideration of ecological impacts at the project approval stage, and during detailed design of the project, including options for mitigation and/ or offset consistent with “improve or maintain” principles. Sufficient details must be provided to demonstrate the availability of viable and achievable options to offset the impacts of the project.*

### **6.1 Existing Environment**

#### **6.1.1 Previous Investigations**

Previous ecological surveys of the Mt Piper Power Station area were focused on the naturally vegetated perimeter lands of the power station, including some former mining and state forest lands but avoided existing disturbed and regenerating lands adjacent to plant infrastructure.

A study undertaken by Ecotone Ecological Consultants (1996) covered a broader range of topography and habitat types and a considerably larger area than the surveys for this assessment and included steeper forested lands to the east, south and west of the proposed extension area. Surveys for terrestrial flora and fauna were undertaken over four seasons from autumn 1995 to summer 1995/1996. Those surveys involved the identification and mapping of vegetation communities, transect and quadrat surveys for flora and targeted surveys for threatened plant species. Fauna surveys included live-trapping using Elliott, cage and pit traps as well as mist nests and harp traps for microchiropteran bats. Additional techniques included spotlighting, ultrasonic bat detectors, owl call playback, scat collection and analysis and searches for scratch-marks, tracks and other signs.

Ecological field surveys were also undertaken for the proposed Western Rail Coal Unloader (SKM 2007) to the south of the power station site.

### **Flora Assemblage**

A total of over 200 plant species was recorded within the perimeter lands. Vegetation communities identified from the perimeter lands are typical of those expected in the wider region and primarily linked to local geology and soil. Ecotone Ecological Consultants (1996) surveys identified the presence of one vulnerable plant species (*Eucalyptus cannonii*) scheduled under the *Threatened Species Conservation Act 1995* (TSC Act) within the perimeter lands. An additional species, *Pterostylis longicurva*, listed as a Rare or Threatened Australian Plant (ROTAP) by Briggs and Leigh (1996) could also potentially occur.

In the coal unloader study (SKM 2007), a total of 109 flora species were recorded within the two vegetation communities occurring in this area, including *E cannonii* which was recorded in relatively high abundance.

### **Faunal Assemblages**

A considerable amount of information is available on the vertebrate fauna of the perimeter lands and nearby Thompsons Creek dam, based on the seasonal surveys reported in Ecotone Ecological Consultants (1996). The results indicate a high faunal diversity comprising 11 amphibians, 26 reptiles, 104 birds and 34 mammals (three arboreal, eight terrestrial, 14 bat species and 9 introduced species).

This high diversity is a reflection of the size and diversity of habitat types present within the perimeter lands and represents considerably greater species richness than would be expected to occur within the proposed power station extension area.

Seven fauna species listed under the *Threatened Species Conservation Act 1995* have been recorded within the Mt Piper Power Station perimeter lands including the Spotted-tailed Quoll *Dasyurus maculata*, Eastern False Pipistrelle *Falsistrellus tasmaniensis*, Eastern Bent-wing Bat *Miniopterus schreibersii*, Gang Gang Cockatoo *Callocephalon fimbriatum*, Painted Honeyeater *Grantiella picta*, Brown Treecreeper *Climacteris picumnus* and Glossy Black Cockatoo *Calyptorhynchus lathami*. An additional two species were tentatively identified, including the Greater Broad-nosed Bat *Scoteanax rueppellii* and Powerful Owl *Ninox strenua*.

Ecology field surveys were also undertaken for the proposed coal unloader to the south and east of the Mt Piper Power Station site (SKM 2007). A total of 45 fauna species were recorded, comprising 31 bird species, 13 mammal species and two frogs.

#### **6.1.2 Wildlife Databases**

Twenty-three threatened flora species have the potential to occur in the study area based on the species distribution and habitat requirements, where four of these species have previously been

recorded in the wider locality (refer to **Appendix B**). The presence of these species was targeted during field surveys carried out within the proposed extension area.

Thirty-five threatened fauna species have the potential to occur in the study area based on the species distribution and habitat requirements, where 18 of these species have previously been recorded in the wider locality (refer to **Appendix B**).

Of the eight vegetation communities identified from the Mt Piper Power Station perimeter lands in Ecotone Ecological Consultants (1996), none are currently listed as an endangered ecological communities under the schedules of the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) or the NSW TSC Act.

## **6.2 Site Assessment**

The methodology for the flora and fauna assessment at the Mt Piper Power Station site comprised:

- A literature and database review; and
- Field investigations, which focused on the vegetation, fauna habitats and species diversity present within the proposed plant extension area and potentially impacted upon by the proposal.

### **6.2.1 Vegetation Communities**

The quality of the vegetation communities present within and adjacent to the proposed extension areas is limited by the extent of previous clearing, as well as by the current maintenance techniques (ie mowing, slashing, etc.) utilised in large sections of the area. These maintenance practices are particularly obvious in the areas immediately adjacent to the existing power station.

Primarily, the vegetation of the study area comprised of either maintained grassland; planted and landscaped areas; and remnant woodland / open forest. For assessment purposes, the proposed extension lands were divided into five separate areas (refer to **Figure 6-1**) and the vegetation in each area is discussed below.

#### **Area 1**

Area 1 consists of a cleared paddock / field covering approximately three hectares, located adjacent to the existing power station. This area is regularly maintained, being mown to a low level.



■ **Figure 6-1 Site Assessment Areas**

As a result of this maintenance regime, there are no trees or shrubs present, and the vegetation community consists of grasses and small herbs, which are primarily non-native. There is an overall coverage of the field of introduced and native species in the vicinity of 50-80%, with native species representing less than 10% of cover. There are also some areas of bare earth present. The dominant species present in this area include *Cynodon dactylon* (Common Couch), *Pennisetum clandestinum* (Kikuyu), *Plantago lanceolata* (Plantain), *Hypochaeris radicata* (Cat's ear), *Gnaphalium* sp. (a Cudweed), *Cassinia arcuata* (Chinese Shrub) and *Austrodanthonia tenuior* (A Wallaby Grass).

Surrounding the maintained grassland area there are also landscaped and planted native gardens surrounding the perimeter of the maintained field. These landscaped grounds consist of a mix of locally indigenous and other native flora species, with a tree canopy layer of six to ten metres and foliage coverage of around 30%, additionally a shrub layer up to three metres, with an approximate coverage of 45% is also present. These landscaped / garden areas, which are well

maintained, are up to 20 metres wide and extend around north, west and southern perimeters of the maintained grassland area.

There are a number of tree species located in these planted areas, including *Eucalyptus radiata* (Narrow-leaved Peppermint), *Eucalyptus polyanthemos* (Red Box), *Eucalyptus bridgesiana* (Apple Box), *Eucalyptus rubida* subsp. *rubida* (Candlebark), *Eucalyptus globulus* (Southern Blue Gum) and *Eucalyptus viminalis* (Ribbon Gum). The shrub layer includes *Acacia rubida* (Red-stemmed Wattle), *Acacia cultriformis* (Knife-leaved Wattle), *Acacia dealbata* (Silver Wattle), *Cassinia arcuata* (Chinese Bush) and *Callistemon citrinus* (Crimson Bottlebrush).

As in the maintained grassland area, *Cynodon dactylon* (Couch), *Plantago lanceolata* (Plantain), *Austrodanthonia tenuior* (A Wallaby Grass) and *Microlaena stipoides* subsp. *stipoides* (Weeping Grass) are present. Also present are clumps of the noxious weed species *Hypericum perforatum* (St John's Wort). There are also several planted deciduous trees that are present along the fence line including *Acer* sp. (Maple trees).

## Area 2

This area is highly disturbed and in an ecologically poor condition having been cleared in the past. There is some scattered regrowth of native trees and shrubs over these areas (less than 5% of the total area). Regrowth includes *Eucalyptus bridgesiana* (Apple Box), *Eucalyptus rubida* subsp. *rubida* (Candlebark), *Cassinia arcuata* (Chinese Bush), *Acacia rubida* (Red-stemmed Wattle), *Acacia cultriformis* (Knife-leaved Wattle), *Acacia dealbata* (Silver Wattle) and *Astroloma pinifolium* (Native Cranberry).

The coverage of the groundcover layer varies (from 25%-85%) and consists primarily of a diversity of introduced species, including, but not limited to, the noxious weed species *Hypericum perforatum* (St John's Wort), *Conyza* sp. (Fleabane), *Eragrostis curvula* (African Lovegrass), *Plantago lanceolata* (Plantain), *Cirsium vulgare* (*Spear Thistle*), *Rubus fruticosus* (Blackberry) and *Hypochaeris radicata* (Cat's Ear). Some native groundcovers are present including *Poa* (*Poa* sp.) and Speargrass (*Austrostipa* sp.).

The majority of the vegetation along the drainage line, which runs adjacent to the main access road, is linked to a revegetation program, and comprises both tree and shrub species which are native, but not necessarily locally indigenous. The trees in this area vary from five to 12 metres, with foliage coverage of around 35%. The overall composition is similar to the planted community of Area 1. Tree species along the drain area include *Eucalyptus radiata* (Narrow-leaved Peppermint), *Eucalyptus polyanthemos* (Red Box), *Eucalyptus bridgesiana* (Apple Box), *Eucalyptus rubida* subsp. *rubida* (Candlebark), *Eucalyptus globulus* (Southern Blue Gum) and *Eucalyptus viminalis* (Ribbon Gum). The shrub layer varies from 0.3-3m in height, with coverage of 45%, and consists of a number of species including *Acacia rubida* (Red-stemmed

Wattle), *Acacia decurrens* (Black Wattle), *Acacia dealbata* (Silver Wattle) and *Cassinia arcuata* (Chinese Bush).

Groundcover in this area is a diverse mix of primarily introduced species, with natives comprising less than 10% of all groundcovers. Introduced species cover around of 40% of the area, with various species from the adjacent cleared area present. Additionally, sections of bare earth are also exposed. Groundcover species in this area include, but are not limited to, *Plantago lanceolata* (Plantain), the Noxious *Hypericum perforatum* (St John's Wort), *Eragrostis curvula* (African Lovegrass), *Cynodon dactylon* (Couch), *Paspalum dilatatum* (Paspalum), *Centaureum spicatum* (Common Centaury), *Trifolium repens* (White Clover), *Conyza* sp. (Fleabane), *Lomandra longifolia* (Spiny-headed Mat-rush), *Juncus bufonius* (Toad Rush), *Cyperus* sp. (A sedge), *Austrodanthonia tenuior* (A Wallaby Grass) and *Typha domingensis* (Cumbungi).

### Area 3

This area is highly disturbed having been cleared and used for various activities in the past. There is some scattered regrowth of native trees and shrubs, but with coverage of less than 5% of the total area. The main patches of native vegetation include the planted mounds including similar species to planted vegetation in Areas 1 and 2.

Relatively intact patches of native forest are present along the northern border of Area 3 including a canopy dominated by *Eucalyptus rubida* subsp. *rubida* (Candlebark), *Eucalyptus bridgesiana* (Apple Box) and *Eucalyptus rossii* (Scribbly Gum). The understorey has been partially disturbed and is currently highly grazed by Eastern Grey Kangaroos (*Macropus giganteus*) and Rabbits (*Oryctolagus cuniculus*) which are abundant in this area. Dominant species in understorey include *Cassinia arcuata* (Chinese Bush), *Austrostipa* spp. (Speargrass) and *Austrodanthonia* spp. (Wallaby Grass).

### Area 4

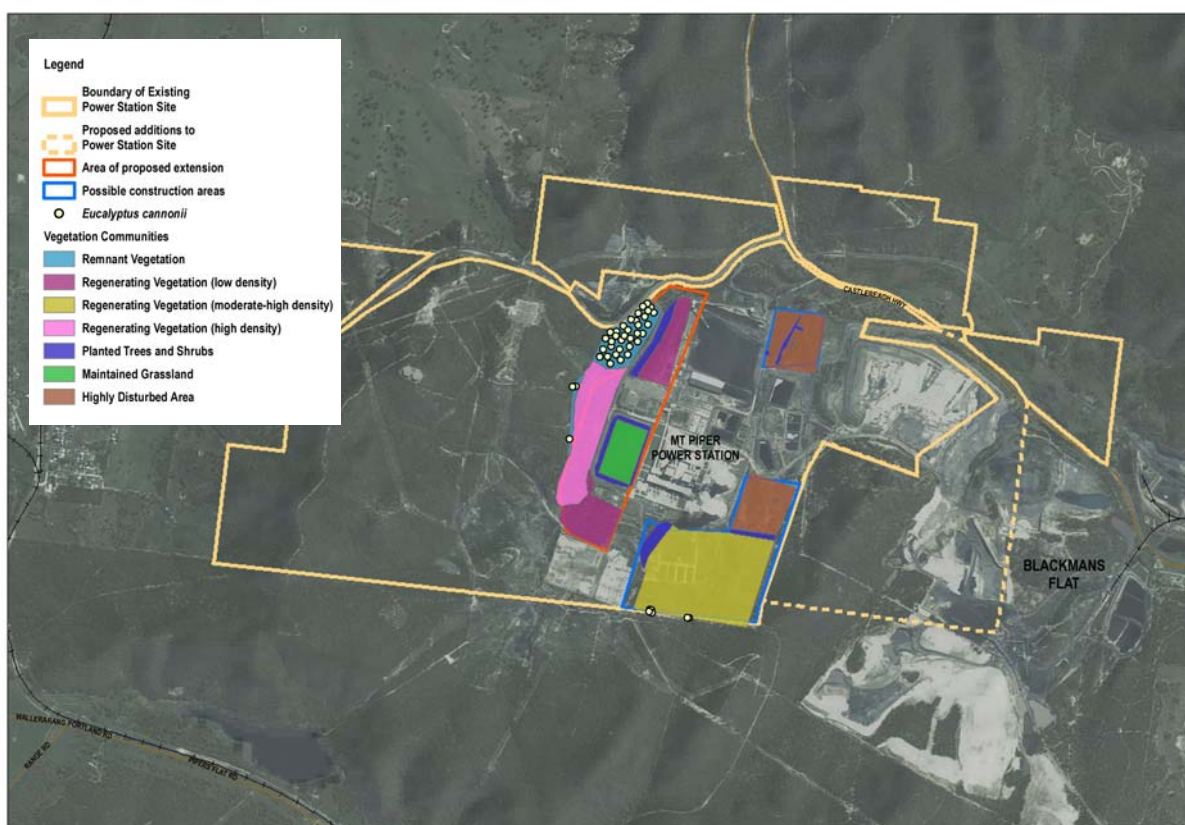
This area is relatively disturbed having been cleared and used for various activities in the past, with the most disturbed lands occurring within an actively used site at the northern end of Area 4 supporting very little native vegetation. However, the majority of Area 4 supports a dense cover (40-70%) of regenerating shrubs and trees, including a mix of natural regeneration and plantings.

Regenerating native trees and shrubs include *Eucalyptus rubida* subsp. *rubida* (Candlebark), *Eucalyptus mannifera* (Brittle Gum), Thin-leaved Stringybark (*Eucalyptus eugenioides*), *Eucalyptus bridgesiana* (Apple Box), *Cassinia arcuata* (Chinese Bush), *Acacia rubida* (Red-stemmed Wattle), *Acacia cultriformis* (Knife-leaved Wattle), *Acacia dealbata* (Silver Wattle) and *Acacia decurrens* (Black Wattle). The groundcover is dominated by exotic species

including *Plantago lanceolata* (Plantain), the Noxious *Hypericum perforatum* (St John’s Wort), *Conyza* sp. (Fleabane) and *Hypochaeris radicata* (Cat’s Ear).

There are several patches of planted trees and shrubs in Area 4 including artificially created mounds throughout the regenerating areas and older plantings of various *Eucalyptus* sp. near the access gate along the south-western border. These planted trees include a mix of indigenous and non-indigenous tree species.

The threatened flora species, *Eucalyptus cannonii* (Capertee Stringybark) is present along the southern boundary of this area in moderate abundance (refer to **Figure 6-2**). The trees mostly comprise regenerating juvenile trees with some mature and medium sized trees present. No individuals were found within regenerating vegetation of this area. *Eucalyptus cannonii* is restricted to southern boundary of Area 4 adjoining remnant vegetation where this species is abundant.



■ **Figure 6-2 Vegetation Communities and Threatened Flora**

## Area 5

This area comprises regenerating and remnant patches of vegetation on the western side of the access road to the power station. Intact patches of remnant forest are restricted to the sloping land at the northern end of this area and undisturbed slope along the western border of Area 5. The remaining land comprises regenerating shrubs and trees of various densities including natural regeneration and plantings. Land at the southern end of Area 5 is more open, supporting grassland and a low density of regenerating shrubs and trees.

Patches of intact forest support mature trees with an undisturbed understorey of native shrubs and groundcovers. The canopy is dominated by a mix of species including *Eucalyptus mannifera* (Brittle Gum), *Eucalyptus cannonii* (Capertee Stringybark), *Eucalyptus rubida* subsp. *rubida* (Candlebark), *Eucalyptus bridgesiana* (Apple Box) and *Eucalyptus pauciflora* (Snow Gum). Understorey species include a diversity of shrubs and groundcovers including *Dillwynia sericea* (Showy Parrot-pea), *Acacia rubida* (Red-stemmed Wattle), *Derwentia perfoliata* (Diggers Speedwell), *Acacia dealbata* (Silver Wattle), *Lomandra filiformis* (Wattle Mat-rush) and Speargrass (*Austrostipa* sp.).

Regenerating vegetation comprises a moderate to dense cover (50-80%) of shrubs and trees which are more advanced than other areas. These sites are dominated by *Acacia rubida* (Red-stemmed Wattle), *Acacia dealbata* (Silver Wattle), *Acacia cultriformis* (Knife-leaved wattle) and *Acacia decurrens* (Black Wattle) 3-6 m high. Tree species are also present including *Eucalyptus radiata* (Narrow-leaved Peppermint), *Eucalyptus polyanthemos* (Red Box), *Eucalyptus bridgesiana* (Apple Box) and *Eucalyptus rubida* subsp. *rubida* (Candlebark). The ground layer supports a mix of native and exotic species such as *Plantago lanceolata* (Plantain), the Noxious *Hypericum perforatum* (St John's Wort), *Eragrostis curvula* (African Lovegrass), *Cynodon dactylon* (Couch), and the native grass species including *Poa* sp. and *Austrostipa* sp.

The threatened flora species, *Eucalyptus cannonii* (Capertee Stringybark) is present within the remnant forest at the northern end of Area 5 and on the slopes along the western edge. *Eucalyptus cannonii* occurs as a co-dominant species within the remnant vegetation, although the closely related *Eucalyptus macrorhyncha* (Red Stringybark) was also recorded and it is likely there is some hybridisation between the two species. No individuals were found within the regenerating zones of Area 5, being restricted to the northern and western boundary of this area adjoining patches of remnant vegetation where *Eucalyptus cannonii* is abundant. Considering the presence of a relatively undisturbed understorey in these areas there is potential for other threatened flora species to be present such as *Diuris aequalis* (Buttercup Doubletail).

### 6.2.2 Floristic Diversity / Condition

In total, 84 different plant taxa from 31 families were represented. This total comprised 19 species of monocotyledons and 63 species of dicotyledons. Of this total, 13 introduced species

are present, comprising 15% of the total species recorded. Of the introduced species, five species declared as Noxious were recorded, with St John's Wort being the most prevalent. A list of all flora species recorded on the site is presented in **Appendix B**.

The majority of vegetation of the proposed extension area is of a disturbed nature consisting of existing formed roads, dirt tracks, modified and maintained areas, landscaped areas and the constructed drains. Patches of remnant vegetation are present at the northern end of Area 5 which are in good condition supporting a high diversity of flora species.

### 6.2.3 Threatened Flora

The threatened flora species *Eucalyptus cannonii* (Capertee Stringybark) was recorded in Area 4 and 5, within or adjacent to areas of remnant vegetation. This species was not recorded in any areas of regenerating vegetation. It occurs in relatively high abundance within areas of remnant vegetation (density up to 150 per hectare) being a co-dominant with other eucalypt species. However the closely related *Eucalyptus macrorhyncha* (Red Stringybark) is also present in the study area and it is likely there is some hybridisation between the two species in the study area.

The southern boundary of Area 4 supports 12 regenerating, 10 medium and two mature individuals of *Eucalyptus cannonii*. Impacts to these individuals could be avoided considering they are on the edge of this area and there are large areas of disturbed and regenerating areas which can be utilised. *Eucalyptus cannonii* is abundant to the south in areas of remnant forest adjoining this area.

*Eucalyptus cannonii* is present within the remnant forest areas on elevated areas at the northern end of this area, and on the slopes along the western edge. There is a relatively undisturbed understorey in these areas, and therefore, there is potential for other threatened flora species to be present such as *Diuris aequalis* (Buttercup Doubletail). Considering the relatively large areas of disturbed, maintained, landscaped and regenerating vegetation in the study area, these patches of high value vegetation could be avoided.

Previous studies (SKM, 2007 and Ecotone, 1996) noted the widespread distribution of this species throughout the Mt Piper perimeter lands and in the wider local area. During field surveys for the proposed coal unloader (SKM 2007), a high abundance of this species was recorded. Field investigations for other options for a coal conveyor for Mt Piper Power Station between Baal Bone (to the north of the study area) and Mt Piper found *Eucalyptus cannonii* to be relatively abundant within Ben Bullen State Forest (SKM 2008).

#### **6.2.4 Fauna Habitats**

Habitat for fauna within the proposed extension areas is limited by the extent of previous clearing. The habitat values of each area of the five areas shown on **Figure 6-1** are discussed below.

##### **Area 1**

Area 1 is a cleared open field of grass, with no tree or shrub cover, and subsequently fauna occurring in this area are restricted to transient species using the field for temporary foraging, basking and resting. This includes mostly birds, including insectivores such as the Australian Magpie, Magpie Lark and Masked Lapwing, and granivores such as the Eastern Rosella and aerial foragers such as the Welcome Swallow and Fairy Martin. Evidence of grazing by Rabbits and Hares was noted. The perimeter fence restricts access by Eastern Grey Kangaroos. However, evidence of foraging was noted from grass areas outside the fence within Area 2.

Area 1 also includes landscaped and planted native gardens around the perimeter of the enclosed open field. All trees are planted (currently to 12 metres in height), with shrubs (about 1.5m) forming a dense understorey that is uncharacteristic of the typical surrounding natural bushland. The dense nature of the vegetation favours some smaller passerine bird species including the Yellow-rumped Thornbill and the presence of flowering shrubs providing a food resource for honeyeaters including the Red Wattlebird and White-eared Honeyeater.

##### **Area 2**

This area has been previously cleared of vegetation and replanted/seeded in an attempt to regenerate the land with native plant species. Given the shallow nature and poor quality of the soil, regeneration has been largely unsuccessful and most of these areas consist of stunted Wattle species (*Acacia* sp.), open bare soil and exotic grasses and weeds. Several areas of open rocky soil occur along with some larger boulders providing habitat for common reptile species. There is evidence of rabbits, wombats and kangaroos using the disturbed habitats for grazing.

Where vegetation is present, it comprises predominately dense areas of planted and regrowth Wattle (*Acacia* spp.), patches of eucalypts and some exotic pines. Dense cover is created by the regenerating Wattle and is favoured by smaller birds such as thornbills, fairy wrens and finches. Whilst artificially created, the drains provide habitat for frogs and some reptiles. Some persistent pools occur and areas of natural sedges and rushes. The habitat is suitable to common frog species which are tolerant to modified habitats as well as several bird species which favour shallow swamps and creeks in open areas.

### **Area 3**

The planted and open disturbed areas provide some habitat for common bird species. Eastern Grey Kangaroos and Rabbits are relatively abundant in this area and a high level of grazing was observed. Areas of high-quality fauna habitats are present to the north of this area within areas of remnant vegetation.

Given the extent of modification present in this area comprising disturbed and regenerating vegetation, these habitat types are of a reduced value for native fauna and are unlikely to represent important habitat for the life-cycle of any fauna in particular threatened fauna species known from the locality.

### **Area 4**

Dense areas of shrubs provide habitat for smaller bird species such as thornbills, fairy wrens and finches. There is evidence of rabbits and kangaroos using these disturbed habitats within Area 4 for grazing.

The planted trees, comprising a mix of indigenous and non-indigenous tree species are likely to be used by local bird species particularly foraging for nectivorous birds when these trees are flowering. No hollow-bearing trees were recorded in this area.

### **Area 5**

Dense areas of regenerating shrubs and trees provide habitat for smaller bird species such as thornbills, fairy wrens and finches, and open bare and grassed areas provide some habitat for common bird species such as Magpies and Eastern Rosellas. There is evidence of rabbits, wombats and kangaroos using these regenerating habitats within Area 5 for grazing.

The intact remnant forest in Area 5 provides the highest value fauna habitats in the study area being more structurally and biologically diverse, and supporting important habitat attributes such as hollow trees and fallen timber. Hollow-bearing trees are relatively abundant in the areas of remnant vegetation. These hollows are suitable for a range of fauna species to roost and nest in including threatened species, such as arboreal mammals, tree-dwelling microbat species and woodland birds which may utilise these hollows as nest sites. Fallen timber is also abundant in these areas and provides important habitat for a range of fauna species. These areas of remnant vegetation support the highest value habitats for threatened flora and fauna species in the study area.

#### **6.2.5 Fauna Species**

A total of 26 terrestrial fauna species were recorded within the proposed plant extension areas, in addition to 1 crustacean. This list comprised 20 bird species, 5 mammal species and one frog species. This total represents approximately 20% of the fauna species known from the Mt Piper

power station perimeter lands (Ecotone 1996) and is expectably low diversity reflecting the lack of natural vegetation in the proposed extension areas, the proximity to the power station infrastructure and associated noise and lights and the relatively small size of the proposal area compared to the extensive naturally vegetated buffer lands surrounding the power station.

The majority of bird species present were common species of urban and modified landscapes with the most abundant including the Magpie (*Gymnorhina tibicen*), Magpie Lark (*Grallina cyanoleuca*), Crimson Rosella (*Platycercus elegans*) and Galah (*Cacatua roseicapilla*). These species are adapted to cleared and modified landscapes and frequent open grassy habitats as is present in Areas 1, 2 and 3. The diversity of species is limited by the lack of forested habitat and consequently common forest and tree dwelling species were found to be absent, with the exception of the Superb Blue Fairy Wren (*Malurus cyaneus*) and Willy Wagtail (*Rhipidura leucophrys*) which used the screening planted vegetation and dense regrowth along the drainage areas. Other species using the cover along drains included the Brown Thornbill and White-eared Honeyeater. Several additional bird species were observed utilising habitats within the remnant forest areas including White-throated Treecreeper (*Cormobates leucophaeus*), Common Bronzewing (*Phaps chalcoptera*) and a pair of Wood Ducks (*Chenonetta jubata*) was observed nesting in a hollow-tree.

Numerous wombat burrows are present within the area of remnant vegetation at the northern end of Area 5 and there is potential for native arboreal mammals such gliders and possums to be present in these areas considering the presence of hollow trees and connectivity to relatively large areas of habitat. Arboreal mammal species are not expected in the regenerating and disturbed areas of the proposed extension areas due to a lack of tree cover.

Surveys for insectivorous bats were not carried out and a number of species may occur in the area (Ecotone 1996). The habitat within all areas including regenerating, planted and landscaped vegetation, open disturbed areas and along the artificial drains would be used by insectivorous bats for foraging only. Hollow-bearing trees at the northern end of Area 5 potentially provide roosting habitat for tree-dwelling microbat species. The native small mammal species, Brown Antechinus (*Antechinus stuartii*) was recorded in the power station perimeter lands (Ecotone, 1996). This species is not expected to occur in the regenerating and disturbed habitats of the proposed extension area due to a lack of natural understory and logs. However there is an abundance of habitat in remnant vegetation areas surrounding the study area and at the northern end of Area 5.

The Red-groined Toadlet (*Uperoleia laevigata*) frog species was identified from calls from the artificial drainage area along the eastern side of the entry road to the power station. Additional species including *Crinia signifera*, *Limnodynastes peroni* and *Litoria verreauxii*, recorded by

Ecotone (1996), would also be expected to utilise the artificial drain habitats in the works area. These species are relatively tolerant of degraded and modified habitats.

### **6.2.6 Threatened Fauna**

No threatened fauna species (TSC Act or EPBC Act) were identified from the field surveys, although several species were identified from the Mt Piper Power Station perimeter lands (Ecotone 1996). These species may occasionally utilise the site.

## **6.3 Impact Assessment**

### **6.3.1 Vegetation Clearance**

No remnant natural vegetation would be directly cleared to accommodate the proposed extension works. Areas of remnant vegetation at the northern end of Area 5 would be avoided. To allow for appropriate avoidance and mitigation, additional targeted surveys may, during the detailed design phase, need to be undertaken in the remnant vegetation areas along the edge of Area 4 to ensure these areas are avoided.

### **6.3.2 Fauna Habitat**

There is only one area of high value for fauna located at the northern end of Area 5, which would not be impacted on by the proposal. Impacts to potential fauna habitat would be restricted to small isolated patches of planted and regrowth Eucalypts and Acacias. The majority of the proposed extension area comprises cleared and modified lands having very little conservation value for fauna species.

Besides the area of remnant vegetation at the northern end of Area 5, the site provides minimal habitat value to a small diversity of native fauna adapted to cleared and modified habitats as evidenced by the findings of this study. This includes a range of common birds, reptiles and frogs, kangaroos and wombats. Such habitat occurs widely throughout the locality including the perimeter lands and is not restricted to the proposed extension area. Impacts on local populations of these species would not be significant or lead to an increased risk of extinction.

### **6.3.3 Threatened Species**

One plant species listed as threatened under both the TSC Act and the EPBC Act, *Eucalyptus cannonii* (Capertee Stringybark) was observed in areas of remnant vegetation (described in Areas 4 and 5 of **Section 6.2.1** and **Section 6.2.3**). All individuals of *Eucalyptus cannonii* would be avoided as there are adequately large areas of disturbed lands which can be utilised for the proposed development. There is a potential for cryptic flora species such as threatened orchids to be present within the undisturbed understory of the areas of remnant vegetation.

No threatened fauna species (TSC Act or EPBC Act) were identified on the site during the field surveys. The results of the field survey and habitat assessment indicate that the large majority of habitat is not suitable for threatened fauna species that are known to occur in the area, based on the lack of natural vegetation and degree of modification and impacts from surrounding infrastructure. The small area of remnant vegetation present at the northern end of Area 5 (**Figure 6-2**) may provide potential habitat for threatened fauna including foraging habitats for microbats, arboreal mammals and woodland bird species. However, this habitat would not be affected by the project.

The open nature of the site and presence of natural open forest and woodland habitat in the surrounding areas provides some habitat value to a small diversity of native fauna species as evidenced by the findings of this study. This includes a range of common birds, reptiles and frogs.

The drainage habitats also support a variety of insect life which provides prey for several insectivorous bat species which can be encountered in disturbed landscapes. A number of these species are listed as threatened on the TSC Act and include the cave-roosting Large Bentwing-bat *Miniopterus schreibersii*, and the tree-roosting species; Greater Broad-nosed Bat *Scoteanax rueppellii*, and Eastern False Pipistrelle *Falsistrellus tasmaniensis*. Each of these species could potentially forage over land within the proposed extension areas. These microchiropteran bats are aerial foragers which are capable of hunting for insects over a very wide range of natural and modified landscapes including urban and industrial areas. Aspects of their life-cycle most at risk from development include the removal of trees containing hollow cavities suitable for roosting and hibernation. The impacts on potentially foraging habitat are not considered critical to the life-cycle of regional populations of bats and continued foraging throughout the area can be expected following the extension and development of the site. The area of remnant vegetation in Area 5 support hollow-trees suitable for threatened fauna species and are critical for the survival of hollow-dependant fauna species, therefore this area needs to be avoided.

Of the 16 nationally threatened species listed under the EPBC Act that have distributional ranges which include the study area, two species, the Bathurst Copper Butterfly and the Grey-headed Flying-fox are considered to occur potentially in the study area and one species, *Eucalyptus cannonii*, recorded in Area 4 and 5 generally on the edges of the proposed development area. The habitat of the study area is not considered suitable for the remaining listed threatened species and as a result, these species are unlikely to be impacted upon by the proposal.

The guidelines within the EPBC Act were used to assess the potential impacts on the Bathurst Copper Butterfly, the Grey-headed Flying-fox and *Eucalyptus cannonii* (refer to **Appendix B**).

This assessment concluded that nationally threatened species and migratory species would not be significantly disrupted or affected as a result of the proposed works.

#### **6.4 Avoidance and Mitigation Measures**

The majority of the proposed extension infrastructure would occur within cleared and modified lands with some areas supporting regenerating vegetation. It is appropriate to consider the retention and conservation of high quality remnant vegetation which is present throughout the Mt Piper power station perimeter lands and at the northern end of Area 5. The following avoidance measures would be implemented for the project:

- Protection of remnant vegetation at the northern end of Area 5 is highly important to avoid impacts to critical habitat features for threatened fauna species and *Eucalyptus cannonii* present in this area. Any actions that require clearing of vegetation in this area would require additional targeted surveys to be undertaken to determine the presence of threatened flora and fauna species, the significance of impacts associated with the action and the provision of appropriate avoidance and mitigation measures. Following targeted surveys all specimens which may potentially be affected by construction works will be tagged or otherwise delineated to ensure they are not accidentally removed;
- The specimens of *Eucalyptus cannonii* along the southern boundary of Area 4 would be avoided as this species generally occurs on the edges of the proposed impact area. Again, all specimens which may potentially be affected by construction works will be tagged or otherwise delineated to ensure they are not accidentally removed; and
- Where possible regenerating and planted vegetation would be retained within the project area with pruning of branches preferred over full removal.

Weed management would be implemented during the construction phase of the project to limit the spread of exotic weed species particularly the noxious species *Hypericum perforatum* (St Johns Wort).

To mitigate impacts to local fauna species the following measures would be implemented:

- The loss of dense shrub cover in regenerating areas would be minimised and ameliorated by the retention of felled vegetation in adjacent areas to augment some of the habitat being removed.
- Any fallen logs encountered within the works area would be pushed aside and retained in their natural state where possible. Any timber felled for clearing would be retained on the ground as cover for terrestrial fauna in areas adjacent to the project.

A Flora and Fauna Sub-plan would be prepared as part of the Construction Environmental Management Plan. The sub-plan would include appropriate measures to protect the existing

specimens of *Eucalyptus cannonii* on the site and identify measures to minimise impacts on ground fauna by retention of ground cover, logs etc.

Also, as part of the sub-plan all construction personnel would be inducted and made aware of their environmental responsibilities. Construction personnel would inspect the trunk, foliage and limbs of any trees that require removal to prevent fauna mortality. If fauna species are present, these would be given the opportunity to move away from the construction zone prior to felling. Any animal injured during construction should be appropriately handled and transported to an animal care authority for attention.