

## New Berrima Clay/Shale Quarry

# Flora Assessment

Prepared by

Geoff Cunningham Natural Resource Consultants Pty Ltd

August 2010

Specialist Consultant Studies Compendium:  
Part 4





ABN: 52 000 005 550

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## Flora Assessment

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## **EXECUTIVE SUMMARY**

The flora of the wider study area that includes the proposed Austral Brick Company New Berrima Shale Quarry Project Site has been assessed in the field.

The overall area is highly cleared and what native tree vegetation that remains lacks a shrub layer. The ground cover over the whole study area is dominated by introduced weed and pasture species.

The Project Site is almost completely cleared, but two trees and some introduced planted shrubs would require removal.

A targeted survey for threatened flora species and ecological communities was carried out.

Finally, after undertaking a Seven-Part Test based on

- the flora surveys conducted over the project site and study area in August, 2008;
- the assessment of the data obtained from the DECCW and Commonwealth EPBC Act databases; and
- the details of endangered ecological communities provided by the NSW and Commonwealth Scientific Committees.

It is concluded that no threatened flora species, endangered or critically endangered ecological communities, endangered flora populations or critical habitat exist within the Project Site or study area.

The proposed development would not contravene the provisions of the Wingecarribee Tree Preservation Order.

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## 1 INTRODUCTION AND DESCRIPTION OF THE PROJECT

The area studied comprised a section of “Mandurama” property located southeast of Berrima township, east of New Berrima and south of (but adjoining) the Wingecarribee River. The study was carried out on behalf of the The Austral Brick Company Pty Limited (the Proponent).

The area which is the subject of an application for project approval (the “Project Site”) is approximately 51ha in area and located within the “Mandurama” property, namely Lot 1 DP 414246, 1 Berrima Road, New Berrima which is 100.2ha in area. The land is owned by The Austral Brick Company Pty Limited. The Project Site effectively incorporates the optimum clay/shale resource area on the “Mandurama” property and the access road between the property entrance and the extraction area.

The entrance to the “Mandurama” property is located on Berrima Road approximately 300m north of the intersection of Taylors Road and Berrima Road, New Berrima. **Figure 1.1** provides a topographic map presenting the local setting around the subject property.

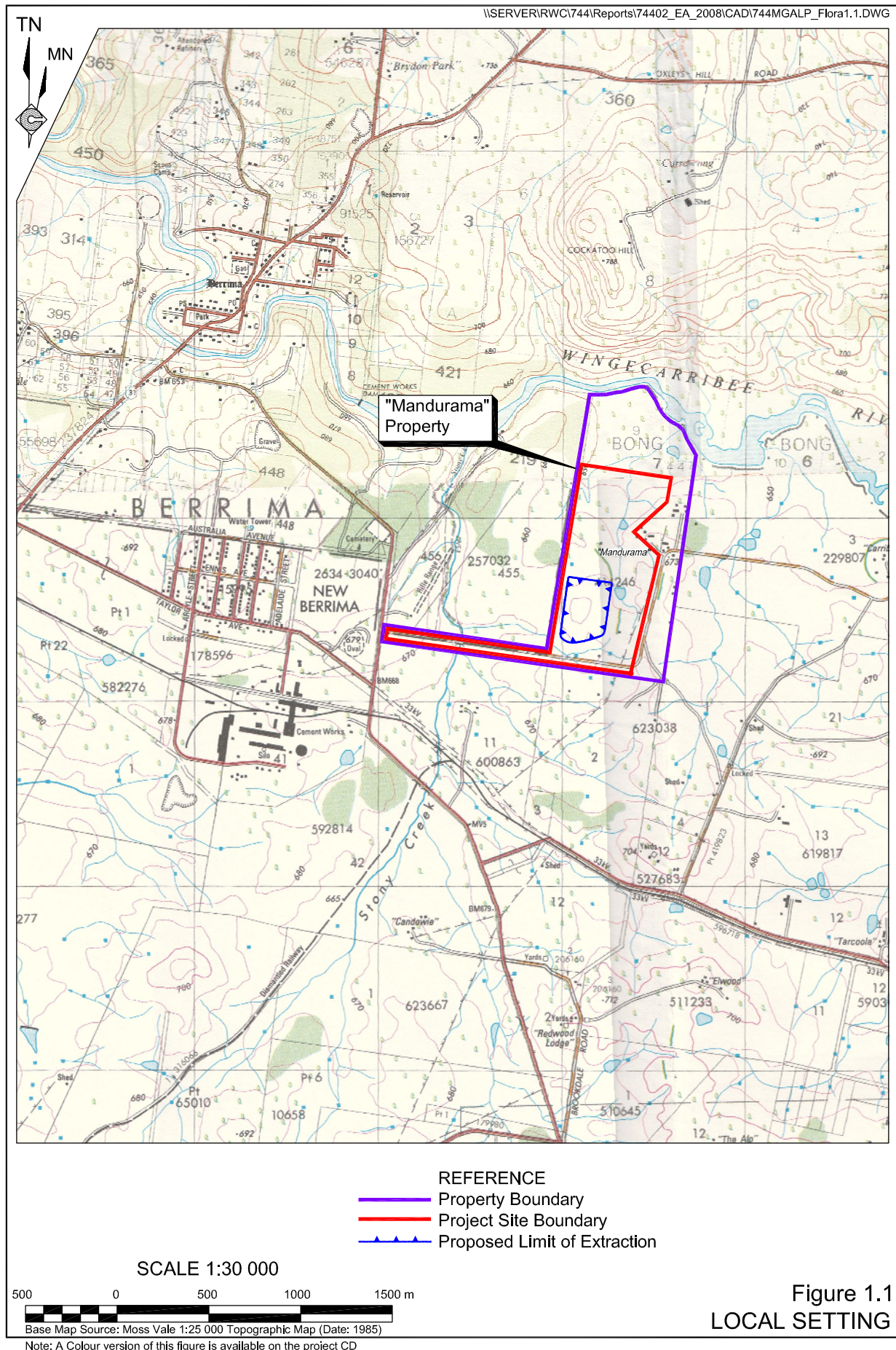
The study area for this flora study comprises the entire Project Site. It should be noted that the study area is larger than the extraction area and area to be disturbed, which comprises a small section of the overall study area and is located in its southwest corner.

The Proponent’s objectives for the development and operation of the proposed Berrima Shale Quarry are to:

- i) secure access to clay/shale resources that would ensure the continued provision of a range of dry pressed bricks to the Sydney and Southern Highlands and South Coast markets for a further 30 years;
- ii) maintain the level of production from the defined extraction area at approximately 120 000 tonnes per annum (tpa) to meet the supply demands of these markets particularly after clay/shale extraction ceases adjacent to the Bowral Brick Plant;
- iii) progressively rehabilitate disturbed areas to provide for future agricultural or other land uses at the completion of operations;
- iv) maintain local employment levels, particularly at the Bowral Brick Plant; and
- v) maximise the recovery of the natural resource.

These broad objectives would be achieved by:

- a) planning and removing the clay/shale resource in a manner that maximises the quality and quantity of materials removed;
- b) undertaking all activities in an environmentally responsible manner that enables compliance with all relevant statutory requirements;
- c) planning and operating all activities in consultation with surrounding residents and the wider community; and
- d) monitoring and reviewing the environmental performance of all activities.



The dry pressed bricks produced as a result of the extraction of the clay/shale from the project site would contribute significantly towards meeting the ongoing market demand for dry pressed bricks throughout the Sydney Metropolitan Area, Southern Highlands and the South Coast.

The Applicant is proposing to extract and transport an average of approximately 120 000tpa shale, weathered shale, brick clay and some friable sandstone, with an upper limit of 150 000tpa, for a period of 30 years. The upper limit of 150 000tpa is being sought to allow for fluctuations in the demand for the product as determined by the production levels at the Bowral Brick Plant. The operation would employ approximately five part-time personnel for the duration of the project.

Extraction of the resource would be undertaken in six stages principally to reduce the area of disturbance at any one time and to facilitate progressive rehabilitation of disturbed areas. The Proponent's principal raw material requirement at its Bowral Brick Plant is for the shale material within the defined extraction area.

While the overlaying weathered shale, clay and sandstone has uses in the manufacture of bricks, the Proponent anticipates at this time, that only small quantities of these materials would be extracted and transported to the Bowral Brick Plant and potentially other Austral brick plants in the Sydney area and other sites requiring fill materials. For the purposes of this project, the materials transported from the extraction area are referred to as "product clay/shale".

The main features of the extraction operations would be:

- campaign stripping of topsoil and subsoil for use in the construction of amenity bunds and progressive site rehabilitation;
- progressive construction of amenity bunds;
- two or three extraction campaigns per year, each involving the excavation and stockpiling of the product clay/shale on the floor of the extraction area; and;
- a water management system to manage water collected in the pit and runoff from disturbed areas.
- full-time transportation of the product clay/shale to the Bowral Brick Plant.

This proposal has been designed cognizant of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 and its intent to ensure that mineral, petroleum and extractive material resources are properly developed and managed for the purpose of promoting the social and economic welfare of the State.

The staging has been designed to avoid sterilisation of the total resource and to maximise its potential extraction at a later date. The staging would also allow early and progressive rehabilitation, thereby reducing the impacts on visual amenity.



## 2 SURVEY METHODOLOGY

Field sampling within the study area was carried out on 8th August, 2008. A total of nine sample sites were described. At these selected sites, quadrats 40m x 40m in area were examined to record the occurrence of all groundcover and tree species present. At each of these sites the species composition data was recorded.

**Figure 2.1** shows the locations of the flora quadrats. The different vegetation communities at the site were identified during the field survey and sampled to ascertain the variation in species density and composition.

## 3 PREVIOUS BOTANICAL STUDIES

### 3.1 WINGECARRIBEE SHIRE VEGETATION COMMUNITY MAPPING

Wingecarribee Shire Council staff supplied a copy of the vegetation map held by Council that shows the study area. The remnant native vegetation community within the study area is not mapped although adjacent Lots show the presence of Mittagong Sandstone Woodland and the Southern Highlands Shale Woodland Endangered Ecological Community.

### 3.2 BURRAGORANG 1:100 000 MAP SHEET VEGETATION

The study area lies within the area covered by the Burragorang 1:100 000 map sheet. The vegetation of the Burragorang area was mapped by Fisher, Ryan and Lembit (1995).

Again, the remnant vegetation within the study area has not been mapped by these authors although they show the occurrence of Mittagong Sandstone Woodland in nearby locations. This community is not present at the study area as the characteristic tree species are absent.

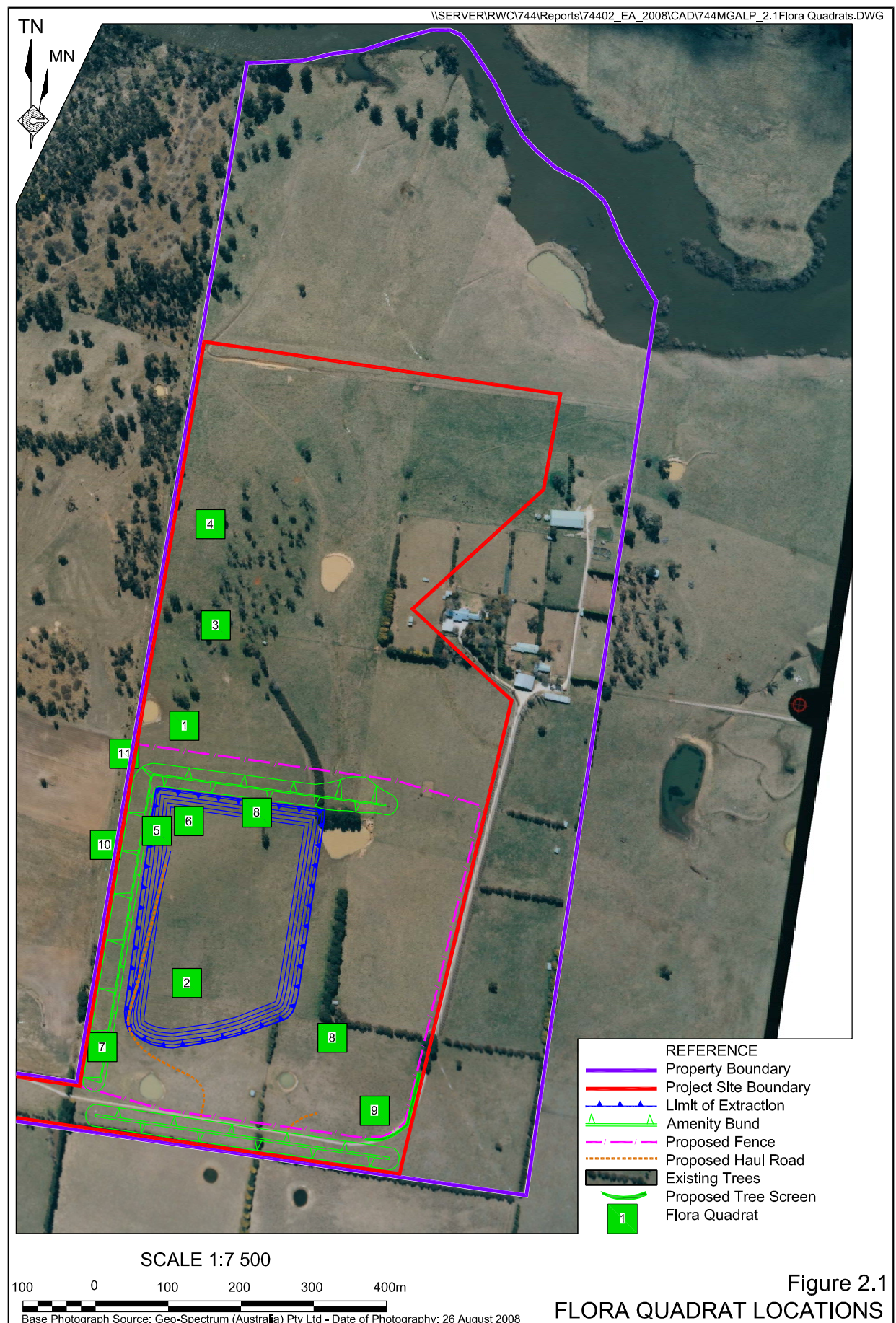
## 4 THE PRESENT STUDY

### 4.1 DESCRIPTION OF THE STUDY AREA

The study area comprises a section of the western part of the "Mandurama" property. The landform comprises undulating terrain sloping from the south towards the Wingecarribee River in the north.

Most of the study area is open pasture land that has been cleared for many years. Much of the open pasture country appears to have been sown to improved pastures such as *Dactylis glomerata*\* (Cocksfoot), *Phalaris aquatica*\* (Phalaris), *Trifolium subterraneum*\* (Subterranean Clover) and *Lolium sp.*\* (Ryegrass). Note: \*denotes an introduced species. In addition to the sown pasture species, a range of weed species was evident in the ground cover over the whole study area.





In the centre of the study area an open woodland remnant of generally highly debilitated eucalypts is present. Trees are spaced from 5 to 30m apart and, at the time of inspection, there was evidence of recent wind storm damage to some trees and dieback was present in others.

The eucalypt species present included *Eucalyptus mannifera* (Brittle Gum), *Eucalyptus dives* (Broadleaf Peppermint) and *Eucalyptus pauciflora* (Snow Gum). No native shrub-layer species were recorded.

A number of planted linear windbreaks and clumps, comprised of introduced trees and shrubs, were evident within the study area and in the areas surrounding the homestead and improvements.

## 4.2 VEGETATION COMMUNITIES

The present field study identified two separate vegetation communities within the study area.

These are:

- **Community 1** – Cleared Pastureland Community
- **Community 2** – Remnant Open Woodland Community

Details of the location of each quadrat (GPS easting / northing) and the tree and shrub species present at each quadrat are contained in **Table 4.1**.

**Table 4.1**  
**Tree Species Recorded in the Vegetation Communities within the Study Area**

QUADRAT	EASTING / NORTHING	SPECIES RECORDED
1	257197E; 6178949N	T3-10 <i>Eucalyptus dives</i> (Broadleaf Peppermint)
2	257199E; 6178595N	Two trees of <i>Eucalyptus botryoides</i> (Bangalay) in a <i>Cotoneaster sp.*</i> (Cotoneaster) planting
3	257240E; 6179087N	Trees absent
4	257232E; 6179226N	Trees absent
5	257158E; 6178805N	Trees absent
6	257202E; 6178819N	T5-10 <i>Eucalyptus</i> <i>adiata</i> (Narrow-leaf Peppermint)
7	257084E; 6178508N	Trees absent
8	267295E; 6178330N	Trees absent
9	257353E; 6178230N	Trees absent
10	257087E; 6178786N	T10-20 Narrow-leaf Peppermint, Broadleaf Peppermint, <i>Eucalyptus mannifera</i> (Brittle Gum)
11	257114E; 6178911N	T10-20 Narrow-leaf Peppermint, Broadleaf Peppermint
<b>NOTE</b> – numbers after the symbol 'T' denotes the average spacings (in metres) of trees at each site No native shrub species were recorded.		

A complete list of all species recorded at the study area is contained in **Appendix 1**.

#### 4.2.1 Community 1 – Cleared Pastureland

This community is almost completely cleared of trees and shrubs and has been sown to *Lolium sp.\** (Ryegrass).

In addition, introduced weeds such as *Arctotheca calendula\** (Capeweed), *Bromus catharticus\** (Prairie Grass), *Capsella bursa-pastoris\** (Shepherd's Purse), *Cirsium vulgare\** (Spear Thistle), *Conyza sp.\** (Fleabane), *Eleusine tristachya\** (Goose Grass), *Hypochaeris radicata\** (Flatweed), *Lepidium africanum\** (Peppercress), *Malva parviflora\** (Small-flowered Mallow), *Modiola caroliniana\** (Red-flowered Mallow) and *Plantago lanceolata\** (Ribwort) were common. There were few native groundcover species present.

The area occupied by this community supports a number of planted windbreaks of introduced trees and shrubs, as well as some trees that are not native to the Berrima area, including two trees of *Eucalyptus botryoides* (Bangalay) which is a more coastal species.

A complete listing of the species recorded in the quadrats within this community is contained in **Table 4.2**.

**Table 4.2**  
**Ground Cover Species Recorded In Quadrats Within the Study Area**

SPECIES	QUADRAT								
	1	3	4	5	7	8	9	10	11
<i>Arctotheca calendula</i> * (Capeweed)	-	P	P	P	-	-	-	-	-
<i>Bromus catharticus</i> * (Prairie Grass)	-	P	P	P	-	-	-	P	P
<i>Capsella bursa-pastoris</i> * (Shepherd's Purse)	-	-	-	-	P	-	-	P	-
<i>Centella asiatica</i>	-	P	P	-	-	-	-	-	-
<i>Cerastium glomeratum</i> * (Mouse-ear Chickweed)	-	-	-	P	-	-	-	-	-
<i>Cirsium vulgare</i> * (Spear Thistle)	P	P	P	P	-	P	P	P	-
<i>Conyza sp.</i> * (Fleabane)	P	P	P	P	-	-	-	P	P
<i>Dactylis glomerata</i> * (Cocksfoot)	P	P	P	P	P	P	P	P	-
<i>Eleusine tristachya</i> * (Goose Grass)	-	P	P	-	-	-	-	-	-
<i>Geranium sp.</i> (Storksbill)	-	P	P		P	-	-	P	-
<i>Gnaphalium sp.</i> (Cudweed)*	-	-	P		-	-	-	-	-
<i>Hypochaeris radicata</i> * (Flatweed)	-	P	P	-	P	-	-	-	-
<i>Lepidium africanum</i> * (Peppercress)	-	P	P	-	-	-	-	P	-
<i>Lolium sp.</i> * (Ryegrass)	-	-	-	-	P	-	-	-	P
<i>Malva parviflora</i> * (Small-flowered Mallow)	-	-	-		P	-	-	-	-
<i>Modiola caroliniana</i> * (Red Flowered Mallow)	-	P	P	-	-	-	-	-	-
<i>Phalaris aquatica</i> * (Phalaris)	-	-	-	P	-	-	-	P	
<i>Plantago lanceolata</i> * (Ribwort)	P	P	P	P	-	-	-	-	P
<i>Trifolium subterraneum</i> * (Subterranean Clover)	P	P	P	P	P	P	P	-	-
'P' denotes present.									
<b>NOTE:</b> no groundcover species observations are available for quadrats 2 and 6.									

#### 4.2.2 Community 2 – Remnant Open Woodland

This community is comprised of scattered trees (usually 10-20 metres apart) of mainly *Eucalyptus radiata* subsp. *radiata* (Narrow-leaved Peppermint) and *Eucalyptus dives* (Broadleaf Peppermint) with some *Eucalyptus mannifera* (Brittle Gum) and an occasional *Eucalyptus pauciflora* (Snow Gum) (not recorded in formal quadrats). There is no native shrub layer present although on large *Acacia melanoxylon* (Blackwood) “tree” was noted.

The groundcover is comprised of a mixture of the ground cover species listed for Community 1. Again, there were few native groundcover species present.

A complete listing of the tree species recorded in the quadrats within this community is contained in **Table 4.1**.

## 5 INTRODUCED PLANT SPECIES AND NOXIOUS WEED CONSIDERATIONS

### 5.1 INTRODUCED PLANT SPECIES

Of the nineteen groundcover species recorded at sites within the study area, only two were native species.

The introduced pasture and weed species, therefore account for about 90% of the number of groundcover species present but they occur in such abundance that they account for almost 100% of the total ground cover.

### 5.2 NOXIOUS WEED PRESENCE

There were no noxious weed species recorded within the study area. This assessment is based on perusal of the schedule of Noxious Weeds for the Wingecarribee Shire contained on the Industry and Investment NSW (Agriculture) website. (date of search 11<sup>th</sup> November, 2009).

## 6 KOALA HABITAT CONSIDERATIONS

Circular B35 issued to Councils by the Department of Planning provides information on State Environmental Planning Policy No 44 - Koala Habitat Protection (SEPP 44).

The study area is situated within Wingecarribee Shire.

Schedule 1 of SEPP 44 lists the Wingecarribee Shire as a local government area to which the Policy applies.

SEPP 44 requires the identification of any “potential koala habitat” within the study area.

However in section 1.5 of the 'Explanation of the Policy' it is noted that ..."In relation to affected DAs it is the intention of the policy that investigations for 'potential' and 'core' koala habitats be limited to those areas in which it is proposed to disturb habitat.

Potential koala habitat is an area ".....of native vegetation where trees of the types listed in Schedule 2 (of SEPP 44) constitute at least 15% of the total number of trees in the upper and lower components of the tree component."

Because of the lack of 'Koala feed trees' present on the study area this issue does not warrant further consideration

## 7 THREATENED SPECIES ISSUES

Prior to the field survey, a request was made to the NSW Department of Environment, Climate Change and Water's (DECCW) 'Atlas of NSW Wildlife' database for details of occurrence, within a 20km x 20km square surrounding the centre of the study area, of any threatened flora species listed in Schedules 1 and 2 of the Threatened Species Conservation Act, any endangered ecological communities, any endangered flora populations and any critical habitat. (date of search 31 August 2010)

### 7.1 THREATENED FLORA SPECIES

#### 7.1.1 The 'Atlas of NSW Wildlife' Database

The database yielded details of 53 collections of seven threatened flora species within the 20km x 20km square

These species are:

- *Acacia bynoena* (Bynoe's Wattle) (**endangered**) (2 records)
- *Diuris aequalis* (Buttercup Doubletail) (**endangered**) (one record)
- *Eucalyptus aggregata* (Black Gum) [**vulnerable**] (8 records)
- *Eucalyptus macarthurii* (Camden Woollybutt) (**vulnerable**) (21 records)
- *Kunzea cabbagei* (Cabbage's Kunzea) (**vulnerable**) (6 records)
- *Persoonia glaucescens* (Mittagong Geebung) (**endangered**) (14 records)
- *Phyllota humifusa* (Dwarf Phyllota) (**vulnerable**) (5 records)
- *Pomaderris sericea* (Silky Pomaderris) (**endangered**) (4 records)

These species and their habitats are described and the likelihood of their occurrence at the subject area assessed in **Table 7.1**.

### 7.1.2 Commonwealth Environment Protection and Biodiversity Conservation Act 1997 (EPBC Act) Online Database Threatened Species Listing

A search of the Commonwealth Environment Protection and Biodiversity Conservation Act Online Database (Protected Matters Report) revealed that eight plant species listed as threatened species under this Act were likely to occur within a 10km radius of the centre of the study area. (date of search 31 August 2010).

These species are:

- *Caladenia tessellata* (Daddy Long-legs) (**vulnerable**)
- *Dillwynia tenuifolia* (**vulnerable**)
- *Kunzea cabbagei* (**vulnerable**)
- *Persoonia glaucescens* (Mittagong Geebung) (**vulnerable**)
- *Phyllota humifusa* (Dwarf Phyllota) (**vulnerable**)
- *Pomaderris brunnea* (Rufous Pomaderris) (**vulnerable**)
- *Thelymitra* sp. Kangaloon (D.L.Jones 18108) (Kangaloon Sun Orchid) (**critically endangered**)
- *Thesium australe* (Austral Toadflax) (**vulnerable**)

These species and their habitats are described and the likelihood of their occurrence at the subject area assessed in **Table 7.1**.

**Table 7.1**  
**Assessment of the Likelihood of Occurrence of Threatened Flora Species**

Page 1 of 3

SPECIES	ASSESSMENT
<i>Acacia bynoena</i> (Bynoe's Wattle) (endangered)	NSW Conservation Status: Endangered; National Conservation Status: Vulnerable; semi-prostrate shrub to 1m high; occurs in heath or dry sclerophyll forest in open often slightly disturbed sites; associated canopy species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple; recorded from Morisset to the Southern Highlands and west to the Blue Mountains (NSW Threatened Species Database). The species was not recorded during field inspection even though suitable habitat possibly occurs at the site. There are no records of its presence at the site in the past. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>
<i>Caladenia tessellata</i> (Daddy Long-legs) (vulnerable)	A terrestrial orchid. Found in sheltered moist places in forests and scrubs, especially on stony laterites on coastal tops. Occurs in the Woronora River area, also uncommonly north of the harbour (Middle Harbour, Berowra). Usually only seen after fire. Range Sydney area, southern coast and ranges; Flowers September – October (Harden, 1993). The species was not recorded during field inspection and there are no records of its presence at the site in the past and it would be outside its normal range if it occurred at the study area. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>



**Table 7.1 (Cont'd)**  
**Assessment of the Likelihood of Occurrence of Threatened Flora Species**

Page 2 of 3

SPECIES	ASSESSMENT
<i>Dillwynia tenuifolia</i> (vulnerable)	An erect shrub, 60cm to 1m high. Found in the Castlereagh Woodlands and shales on the Cumberland Plain. Range Sydney area and NSW north coast. Flowers Spring. (Harden, 2002) - grows in dry sclerophyll woodland on sandstone, shale or laterite; recorded from Cumberland Plain, Blue Mountains to Howes Valley area. The species was not recorded during field inspection and there are no records of its presence at the site in the past. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>
<i>Diuris aequalis</i> (Buttercup Doubletail) (endangered)	A terrestrial orchid, with two linear leaves 10-20cm long, flowerhead 20-45cm high. Flowers October - December; grows among grass in sclerophyll forest, recorded mainly in the ranges and tablelands; chiefly from Braidwood to Kanangra and Liverpool (Harden, 1993)  This species was not recorded during field inspection and there are no records of its presence at the site in the past. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>
<i>Eucalyptus aggregata</i> (Black Gum)	A tree to 18m high but usually smaller; recorded from moist alluvial sites along creeks and in cold, poorly drained flats and hollows. Most populations are now located on private land with a few stands in conservation reserves. The species is recorded from within a 10km radius of the study area with some records within close proximity [1-2km]. The species was not recorded during field inspection and there are no records of its presence at the site in the past. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>
<i>Eucalyptus macarthurii</i> (Camden Woollybutt) (vulnerable)	A tall tree to 40m high with fibrous bark persistent on the trunk and larger branches; occurs in grassy woodlands on relatively fertile soils on broad cold flats; currently occurs mainly on private lands as isolated stands or individual paddock trees; conserved in Kanangra Boyd National Park (NSW Threatened Species Database). The species was not recorded during field inspection and there are no records of its presence at the site in the past. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>
<i>Kunzea cabbagei</i> (Cambage's Kunzea) (vulnerable)	A groundcover species forming tangled mats of thick woody stems that grow about 1 metre tall; has sweetly scented leaves and cream to yellowish flowers; occurs mainly in the Yerranderie – Mt Werong area in the Blue Mountains and at Medway near Berrima; restricted to damp sandy soils in wet heath or open mallee scrub at higher altitudes on sandstone outcrops or Silurian sediments. Flowers September to November. (NSW Threatened Species Database). The species was not recorded during field inspection and there are no records of its presence at the site in the past. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>
<i>Persoonia glaucescens</i> (Mittagong Geebung) (vulnerable)	An erect shrub to 3m tall with a mottled stem and brownish – red branches; young leaves are waxy; flowers in late summer to autumn; grows in woodland to dry sclerophyll forest on clayey to gravelly laterite; prefers ridgetops, plateaux and upper slope locations and appears to grow well on the margins of disturbance; killed by fire and recruits from seed. (NSW Threatened Species Database). It was not recorded during field inspection and there are no records of its presence at the site in the past. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>

**Table 7.1 (Cont'd)**  
**Assessment of the Likelihood of Occurrence of Threatened Flora Species**

Page 3 of 3

SPECIES	ASSESSMENT
<i>Phyllota humifusa</i> (Dwarf Phyllota) (vulnerable)	A prostrate shrub with thread-like leaves; pea-like flowers are orange - yellow and reddish brown coloured; flowers in late spring and summer; recorded in the southern Blue Mountains and from Joadja and Penrose; occurs in dry sclerophyll forest, sometimes near swamps in deep sandy soils or gravelly loams over sandstone; often associated with <i>Eucalyptus mannifera</i> , <i>Eucalyptus radiata</i> or <i>Eucalyptus piperita</i> . (NSW Threatened Species Database) The species was not recorded during field inspection and there are no records of its presence at the site in the past. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>
<i>Pomaderris brunnea</i> (Rufous Pomaderris) (vulnerable)	A shrub to 3m tall with distinctively hairy stems; leaves to 4cm long and 1.5cm wide with toothed margins; leaves hairless on the upper surface, hairy below; flowers yellowish, lacking petals and occurring at the ends of the branches; limited in occurrence to an area around the Nepean and Hawkesbury Rivers, including Bargo and also found at Walcha; grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines; flowers in September and October. (NSW Threatened Species Database) The species was not recorded during field inspection and there are no records of its presence at the site in the past. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>
<i>Pomaderris sericea</i> (Silky Pomaderris) (endangered)	A low growing shrub to 2m tall; new growth with shining brown hairs; leaves elliptical with hair on the lower surface; flowers cream in clusters at the branch ends; known in NSW only from Morton National Park near Bundanoon and from Wollemi National Park; flowers in October; only 2 records from NSW so habitat preferences are poorly known; recorded from open forest on sandstone with the Bundanoon record from a cliff base. (NSW Threatened Species Database) The species was not recorded during field inspection and there are no records of its presence at the site in the past. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>
<i>Thelymitra</i> sp. Kangaloon (D.L.Jones 18108) (Kangaloon Sun Orchid)	A terrestrial orchid up to 56cm high, with a green or purplish flower stem, one narrow fleshy leaf to 15-35cm long and 5-20mm wide; has large blue flowers 15-32mm across with darker longitudinal veins; flowers in October and early November; recorded from three locations near Robertson all of which are swampy areas; its estimated area of occurrence is 10 square km (DEWHA website) to recorded during field inspection and there are no records of its presence at the site in the past. Suitable habitat is not present at the site. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>
<i>Thesium australe</i> (Austral Toadflax) (vulnerable)	A straggling herb to 40cm tall; leaves pale green to yellow green, 1-4cm long and about 1mm wide; flowers minute and white; flowers in summer; found in small scattered populations in the coastal and tableland regions; occurs in grassy woodlands, often in damp situations with Kangaroo Grass; a root parasite that takes water and some nutrients from other plants especially Kangaroo Grass. The species was not recorded during field inspection and there are no records of its presence at the site in the past. <b>IT IS CONCLUDED THAT THIS SPECIES IS NOT PRESENT AT THE SITE.</b>



## 7.2 ENDANGERED AND CRITICALLY ENDANGERED ECOLOGICAL COMMUNITIES

### 7.2.1 New South Wales Threatened Species Conservation Act 1995

#### 7.2.1.1 Critically Endangered Ecological Communities

The 'Atlas of NSW Wildlife' Database report indicates that the *Bluegum High Forest in the Sydney Basin Bioregion* and the *Kincumber Scribbly Gum Forest in the Sydney Basin Bioregion* critically endangered ecological communities may potentially occur within the boundaries of the Burratorang and Moss Vale 1: 100 000 scale map sheet areas.

#### 7.2.1.2 Endangered Ecological Communities

**Table 7.2** lists those Endangered Ecological Communities which are identified in The 'Atlas of NSW Wildlife' Database report as having potential to occur within the boundaries of the Burratorang and Moss Vale 1: 100 000 scale map sheet areas, along with an assessment of their presence.

**Table 7.2**  
**Endangered Ecological Communities Likely to Occur Within the Study Area**

Page 1 of 3

ENDANGERED ECOLOGICAL COMMUNITY	PRESENT / ABSENT
Agnes Banks Woodland in the Sydney Basin Bioregion	ABSENT
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	ABSENT
Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion	ABSENT
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	ABSENT
Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion	ABSENT
Duffys Forest Ecological Community in the Sydney Basin Bioregion	ABSENT
Eastern Suburbs Banksia Scrub in the Sydney Basin Bioregion	ABSENT
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	ABSENT
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	ABSENT
Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	ABSENT
Hunter Valley Vine Thicket in the NSW North Coast and Sydney Basin Bioregions	ABSENT
Hunter Valley Weeping Myall Woodland of the Sydney Basin Bioregion	ABSENT
Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion	ABSENT
Illawarra Subtropical Rainforest in the Sydney Basin Bioregion	ABSENT
Kurri Sand Swamp Woodland in the Sydney Basin Bioregion	ABSENT

**Table 7.2 (Cont'd)**  
**Endangered Ecological Communities Likely to Occur Within the Study Area**

Page 2 of 2

ENDANGERED ECOLOGICAL COMMUNITY	PRESENT / ABSENT
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	ABSENT
Lower Hunter Spotted Gum - Ironbark Forest in the Sydney basin Bioregion	ABSENT
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	ABSENT
Melaleuca armillaris Tall Shrubland in the Sydney Basin Bioregion	ABSENT
Milton Ulladulla Subtropical Rainforest in the Sydney Basin Bioregion	ABSENT
Moist Shale Woodland in the Sydney Basin Bioregion	ABSENT
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	ABSENT
Mount Gibraltar Forest in the Sydney Basin Bioregion	ABSENT
Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion	ABSENT
O'Hares Creek Shale Forest	ABSENT
Quorrobolong Scribbly Gum Woodland in the Sydney Basin Bioregion	ABSENT
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	ABSENT
Robertson Basalt Tall Open-forest in the Sydney Basin Bioregion	ABSENT
Robertson Rainforest in the Sydney Basin Bioregion	ABSENT
Shale gravel Transition Forest in the Sydney Basin Bioregion	ABSENT
Shale/Sandstone Transition Forest	ABSENT
Southern Highlands Shale Woodlands in the Sydney Basin Bioregion	ABSENT
Southern Sydney Sheltered Forest on transitional sandstone soils in the Sydney Basin Bioregion	ABSENT
Sun Valley Cabbage Gum Forest in the Sydney Basin Bioregion	ABSENT
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	ABSENT
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	ABSENT
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	ABSENT
Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	ABSENT
Themeda Grasslands on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	ABSENT
Umina Coastal Sandplain Woodland in the Sydney Basin Bioregion	ABSENT
Warkworth Sands Woodland in the Sydney Basin Bioregion	ABSENT
Western Sydney Dry Rainforest in the Sydney Basin Bioregion	ABSENT
White Box Yellow Box Blakely's Red Gum Woodland	ABSENT

### 7.2.2 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The Protected Matters report, generated on 11th November, 2009, indicates that only one EPBC Act-listed threatened ecological community is likely to occur within the vicinity of the study area.

This is the critically endangered White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland. This community was not identified in the survey at the subject area.

## 7.3 ENDANGERED FLORA POPULATIONS

No endangered flora populations are recorded from the Burratorang and Moss Vale 1:100 000 scale map sheet areas.

## 7.4 CRITICAL HABITAT

No critical habitat is recorded from from the Burratorang and Moss Vale 1:100 000 scale map sheet areas.

## 7.5 FIELD SURVEY DATA

### 7.5.1 Threatened Plant Species

The Threatened plant species likely to occur in the general region of the study area were targeted during the field survey.

No Threatened plant species were recorded within the study area.

### 7.5.2 Endangered Ecological Communities

After considering the structure and composition of the vegetation communities present it has been determined that the study area **does not contain** any endangered ecological communities.

### 7.5.3 Endangered Flora Populations

There are no endangered flora populations present within the study area.

### 7.5.4 Critical Habitat

There are no areas of critical habitat listed for the study area or its environs.

### 7.5.5 Key Threatening Processes

The 'Atlas of NSW Wildlife' identifies a number of Key Threatening Processes [NSW TSC Act] that are likely to be operating within the study area. These are listed in **Table 7.3** along with an assessment of their applicability to the study area.

It should be noted that only one listed Key Threatening Process - *Clearing of Native Vegetation* that is listed as a key threatening process under the NSW TSC Act is in any way likely to be operating. A similar Key Threatening Process - *Land Clearing* is listed under the Commonwealth EPBC Act.

The study area and project site comprise highly cleared agricultural land on which the ground cover is almost completely dominated by introduced species.

Three trees (one introduced *Pinus sp.\** and two planted eucalypts (*Eucalyptus botryoides* – Bangalay) that are not native to the Berrima area. In addition, a number of planted, introduced shrubs are proposed for removal. Consequently there would be no clearing of vegetation native to the study area or project site and so this Key Threatening Process would not be of concern.

**Table 7.3**  
**Key Threatening Processes Likely to be Operating at the Study Area**

Page 1 of 2

KEY THREATENING PROCESS	PRESENT OR ABSENT
Alteration of habitat following subsidence due to longwall mining	ABSENT
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	ABSENT
Anthropogenic Climate Change	ABSENT
Bushrock removal	ABSENT
Clearing of native vegetation	<b>ABSENT*</b>
Competition and grazing by the feral European Rabbit, <i>Oryctolagus cuniculus</i> (L.)	ABSENT
Competition and habitat degradation by Feral Goats, <i>Capra hircus</i> Linnaeus 1758	ABSENT
Competition from feral honey bees, <i>Apis mellifera</i> L.	ABSENT
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	ABSENT
Herbivory and environmental degradation caused by feral deer	ABSENT
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	ABSENT
Importation of Red Imported Fire Ants <i>Solenopsis invicta</i> Buren 1972	ABSENT
Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	ABSENT
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	ABSENT

\* see text of section 7.5.5

**Table 7.3 Cont'd**  
**Key Threatening Processes Likely to be operating at the Study Area**

Page 2 of 2

KEY THREATENING PROCESS	PRESENT OR ABSENT
Infection of native plants by <i>Phytophthora cinnamomi</i>	ABSENT
Introduction of the Large Earth Bumblebee <i>Bombus terrestris</i> (L.)	ABSENT
Invasion and establishment of exotic vines and scramblers	ABSENT
Invasion and establishment of Scotch Broom ( <i>Cytisus scoparius</i> )	ABSENT
Invasion and establishment of the Cane Toad ( <i>Bufo marinus</i> )	ABSENT
Invasion of native plant communities by <i>Chrysanthemoides monilifera</i>	ABSENT
Invasion of native plant communities by exotic perennial grasses	ABSENT
Invasion of the Yellow Crazy Ant, <i>Anoplolepis gracilipes</i> (Fr. Smith) into NSW	ABSENT
Invasion, establishment and spread of Lantana ( <i>Lantana camara</i> L. sens. Lat)	ABSENT
Loss of Hollow-bearing Trees	ABSENT
Loss or degradation (or both) of sites used for hill-topping by butterflies	ABSENT
Predation and hybridisation by Feral Dogs, <i>Canis lupus familiaris</i>	ABSENT
Predation by <i>Gambusia holbrooki</i> Girard, 1859 (Plague Minnow or Mosquito Fish)	ABSENT
Predation by the European Red Fox <i>Vulpes Vulpes</i> (Linnaeus, 1758)	ABSENT
Predation by the Feral Cat <i>Felis catus</i> (Linnaeus, 1758)	ABSENT
Predation, habitat degradation, competition and disease transmission by Feral Pigs, <i>Sus scrofa</i> Linnaeus 1758	ABSENT
Removal of dead wood and dead trees	ABSENT

## 8 SUMMARY OF THE FEATURES OF THE EXTRACTION AREA AS OPPOSED TO THE STUDY AREA

### 8.1 LOCATION

The Extraction Area is located in the southwest corner of the study area.

### 8.2 VEGETATION OF THE PROJECT SITE

The extraction area supports only one vegetation community – the Cleared Pastureland Community – which is a degraded community that has been used for agriculture and grazing for many years. The vegetation community within the extraction area comprises almost completely introduced pasture and weed species.

Locally native tree and shrub vegetation is absent from the project site but there would be a need to remove two trees associated with a planted *Cotoneaster*\* shrub windbreak in the northeastern quadrant of the project site and probably a need to remove a single *Pinus sp.*\* from a planted windbreak near the southwestern corner of the project site. The two trees that would need to be removed from the northeastern quadrant of the project site are *Eucalyptus botryoides* (Bangalay), a coastal species that has obviously been planted in the windbreak in the past.

Removal of these trees and shrubs would not cause any significant impact on the flora of the Project Site.

### **8.3 NOXIOUS WEED ISSUES**

No noxious weeds are present within the extraction area.

### **8.4 KOALA HABITAT ISSUES**

No Koala habitat is present within the extraction area.

### **8.5 THREATENED FLORA SPECIES ISSUES (NSW TSC ACT)**

No threatened flora species listed in the Schedules of the Act have been recorded from the extraction area in the past or during the field survey.

### **8.6 THREATENED FLORA SPECIES ISSUES (COMMONWEALTH EPBC ACT)**

No threatened flora species listed under the Act have been recorded from the extraction area in the past or during the field survey.

### **8.7 ENDANGERED / CRITICALLY ENDANGERED ECOLOGICAL COMMUNITIES ISSUES (TSC ACT AND EPBC ACT)**

No endangered or critically endangered ecological communities have been recorded from the extraction area in the past or during the field survey.

### **8.8 THREATENED FLORA POPULATIONS ISSUES**

No threatened flora populations have been recorded from the extraction area in the past or during the field survey.

### **8.9 CRITICAL HABITAT ISSUES**

No critical habitat is present in the extraction area.

### **8.10 APPLICABILITY OF SEVEN-PART TEST TO THE PROJECT SITE**

Because the extraction area comprises part of the overall study area, and supports a lesser degree of native flora species than the study area as a whole, the two areas have been assessed in a single Seven-Part Test in Section 9.

## 9 SEVEN-PART TEST RELATING TO THE STUDY AREA AND EXTRACTION AREA

The likelihood of the occurrence of the threatened flora species that were potentially likely to found within the study area has been assessed in **Table 7.1** above. Most of the study area has been highly modified from its original condition and habitat values as a consequence of previous agricultural and grazing use including removal of much of the tree cover and complete clearing for grazing and pasture establishment.

The extraction area is a segment of the overall study area and supports only one vegetation community - Cleared Pastureland Community – which is a degraded community that has been used for agriculture and grazing for many years. The vegetation community at the project site comprises almost completely introduced pasture and weed species

There is no suitable habitat present within the study area or extraction area for many of the threatened flora species likely / predicted to occur there.

Field observations have failed to record any threatened flora species and there are no past records of any threatened flora species within the study area or extraction area.

*The outcome of the assessments and field survey observations has been the conclusion that none of the threatened flora species recorded or predicted to occur in the wider region around Berrima occurs at the site.*

For the purposes of the Environmental Planning and Assessment Act 1979 the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats:

- a) each of the factors listed in the following paragraph; and;
- b) any assessment guidelines.

The following factors must be taken into account in making a determination of the likely significance of an action on threatened species, populations or communities or their habitats.

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

No threatened flora species have been recorded from the study area or project site in the past and none were recorded during field survey. Consequently it is concluded that there would be no adverse affect from the proposed development on the life cycle of any threatened flora species such that a viable local population of the species is likely to be placed at risk of extinction.

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

No endangered flora populations have been recorded from the study area or project site in the past and none were recorded during field survey. Consequently it is concluded that there would be no adverse affect from the proposed development on the life cycle of any flora species that constitutes an endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

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

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.**

No endangered or critically endangered ecological communities (listed in the Schedules of the NSW TSC Act or under the Commonwealth EPBC Act) were recorded at the study area or project site. Consequently the proposed development will not have an adverse effect on the extent of the ecological community or substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

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

No critical habitat is present within or near the study area or project site. Consequently, it is concluded that the proposed development would not have any effect on any critical habitat.

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

There are no threatened species recorded for the study area and so there are no actions specified in a species recovery plan that must be considered in relation to the proposed development.

Clearing of Native Vegetation is listed as a key threatening process under the NSW TSC Act and Land Clearing is similarly listed under the Commonwealth EPBC Act.

The study area and project site comprise highly cleared agricultural land on which the ground cover is almost completely dominated by introduced species.

Three trees (one introduced *Pinus sp.\** and two planted eucalypts (*Eucalyptus botryoides* – Bangalay) and a number of planted and introduced shrubs are proposed for removal and there would be no significant extent of clearing of vegetation native to the study area or project site and it is not relevant to discuss this issue further.



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

As previously noted, Clearing of Native Vegetation is listed as a key threatening process under the NSW TSC Act and Land Clearing is similarly listed under the Commonwealth EPBC Act.

The study area and project site comprise highly cleared agricultural land on which the ground cover is almost completely dominated by introduced species.

Three trees (one introduced *Pinus sp.\** and two planted eucalypts (*Eucalyptus botryoides* – Bangalay) and a number of planted and introduced shrubs are proposed for removal and there would be no significant extent of clearing of vegetation native to the study area or project site and it is not relevant to discuss this issue further.

## **10 THREATENED SPECIES OVERVIEW**

- a) There are no existing records of threatened flora species contained in the 'Atlas of NSW Wildlife' database for the project site or study area.
- b) No threatened flora species were recorded from project site or the study area during field survey, despite predictions and records that indicated that a number of threatened flora species might be likely to occur. The likely occurrence of these species has been assessed in **Table 7.1**.
- c) Much of the project site and study area has been invaded (often heavily) by introduced and native weed species.
- d) No endangered or critically endangered ecological communities are present at the project site or within the overall study area.
- e) There are no endangered flora populations listed for the project site and study area in the Schedules of the Threatened Species Conservation Act or under the Commonwealth Environment Protection and Biodiversity Conservation Act.
- f) There is no Critical Habitat listed for the project site or the study area.
- g) It is concluded that there will be no significant impact on threatened flora species, endangered or critically endangered ecological communities, endangered flora populations or critical habitat as a consequence of the proposed development.

## **11 WINGECARRIBEE SHIRE COUNCIL TREE PRESERVATION ORDER IMPLICATIONS**

### **11.1 GENERAL**

The Wingecarribee Local Environmental Plan 2010 is the principal environmental planning instrument governing land use within the Wingecarribee LGA. The aim of the Wingecarribee LEP is to provide for appropriate planning and environmental control over the use and development of land within the shire, in order to uphold and promote the objectives of the Environmental Planning and Assessment Act, 1979.

The proposed clay/shale quarry is situated in Zone E3 (Environmental Management). The objectives of this zone are:

- to protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values;
- to provide for a limited range of development that does not have an adverse effect on those values;
- to encourage the retention of the remaining evidence of significant historic and social values expressed in existing landscape and land use patterns;
- to minimise the proliferation of buildings and other structures in these sensitive landscape areas;
- to prevent the further clearing of remnant native vegetation and further modification of the natural landform except in a limited number of prescribed circumstances;
- to provide for a restricted range of development and land use activities that provide for rural settlement, sustainable agriculture, other types of economic and employment;
- development, recreation and community amenity in identified drinking water catchment areas;
- to protect significant agricultural resources (soil, water and vegetation) in recognition of their value to Wingecarribee's longer term economic sustainability;
- to conserve and enhance the quality of potentially valuable environmental assets, including waterways, riparian land, wetlands and other surface and groundwater resources, remnant native vegetation and fauna movement corridors as part of all new development and land use;

The Tree Preservation Order specifically states that it applies to land zoned Zone E3 (Environmental Management) however the proposed development will result in the removal of three trees, all of which are ***not native to the Berrima area and could not be considered to be significant specimens of their species***, and so the provisions of the Order do not apply.

## 11.2 RARE TREE SPECIES

Two species of eucalypt, Mountain Swamp Gum (*Eucalyptus aquatica*) and Paddy's River Box (*Eucalyptus macarthurii*), have been noted as possibly occurring on the study area. These species are listed as rare trees in the Wingecarribee Tree Preservation Order.

These species were not recorded during the field survey.

## 12 OVERVIEW

On the basis of a Seven-Part Test based on.

- the flora surveys conducted over the project site and study area in August, 2008;
- the assessment of the data obtained from the DECCW and Commonwealth EPBC Act databases; and
- the details of endangered ecological communities provided by the NSW and Commonwealth Scientific Committees.

It is concluded that no threatened flora species, endangered or critically endangered ecological communities, endangered flora populations or critical habitat exist within the Project Site or study area.

The proposed development would not contravene the provisions of the Wingecarribee Tree Preservation Order.

## 13 ADDRESSING THE GUIDELINES FOR THREATENED SPECIES ASSESSMENT

Step 5 of the *Guideline for Threatened Species Assessment*. has been addressed in this report in Sections 7, 8, 9, 10 and 12.

## 14 ADDRESSING THE DIRECTOR-GENERAL'S REQUIREMENTS

The Director-General's Requirements as conveyed by the Department of Environment, Climate Change and Water are addressed in **Table 14.1**.

**Table 14.1**  
**Director-General's Requirements and Where they are Addressed**

Page 1 of 2

Government Authority	Paraphrased Requirement	Relevant EA Section
<b>ECOLOGY</b>		
Department of Environment and Climate Change (03/10/08)	A field survey of the site should be conducted in accordance with the draft Threatened Biodiversity Survey and Assessment Guidelines. The report must include a map of the areas surveyed. Areas not included in the survey should be accompanied by reasons for their omission.	5.4, 5.5
	Likely impacts on threatened species and their habitat need to be assessed, evaluated and reported on.	5.4, 5.5
	Flora surveys should include, but not necessarily be limited to the following species: Small flower Grevillea      Mittagong Geebung Bynoe's Wattle                Camden Woollybutt Cambage Kunzea              Silky Pomaderris	5.4
	A description of any remnant endangered ecological communities (EEC) on site should be provided including a description of their condition, disturbance history and recovery capacity. This report must clearly map and quantify the area of any EEC proposed to be removed and/or modified.	5.4

**Table 14.1 (Cont'd)**  
**Director-General's Requirements and Where they are Addressed**

Page 2 of 2

Government Authority	Paraphrased Requirement	Relevant EA Section
<b>ECOLOGY</b>		
Department of Environment and Climate Change (03/10/08)	There is potential for Southern Highlands Shale Woodland and the White Box Yellow Box Blakely's Red Gum Woodland listed EECs under the <i>Threatened Species Conservation Act 1995</i> (NSW) to occur within the vicinity of the development. Consideration should also be given to any EECs listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth).	5.4
	A description should also be included of any other ecological communities on site that will be impacted as a result of the proposal. This should include an assessment of the habitat value of the community for threatened species.	5.4
	A description should be provided of the actions that will be taken to avoid or mitigate impacts or compensate for unavoidable impacts of the project on threatened species and their habitat. The EA should also assess any impacts, including measures to avoid and mitigate impacts on any threatened species associated with the sitting and construction of any access roads and infrastructure provision. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.	5.4.4, 5.54
	The EA needs to clearly state whether it meets each of the key thresholds set out in Step 5 of the draft <i>Guideline for Threatened Species Assessment</i> .	7, 8, 9, 10, 12

## 14 REFERENCES

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31<sup>st</sup> August, 2010

# Appendix 1

## List of Flora Species Recorded at the Study Area

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## List of Flora Species Recorded at the Study Area

*Acacia melanoxylon* (Blackwood)  
*Arctotheca calendula*\* (Capeweed)  
*Bromus catharticus*\* (Prairie Grass)  
*Capsella bursa-pastoris*\* (Shepherd's Purse)  
*Centella asiatica*  
*Cerastium glomeratum*\* (Mouse-ear Chickweed)  
*Cirsium vulgare*\* (Spear Thistle)  
*Conyza sp.*\* (Fleabane)  
*Dactylis glomerata*\* (Cocksfoot)  
*Eleusine tristachya*\* (Goose Grass)  
*Eucalyptus botryoides* (Bangalay)  
*Eucalyptus dives* (Broadleaf Peppermint)  
*Eucalyptus mannifera* (Brittle Gum)  
*Eucalyptus pauciflora* (Snow Gum)  
*Eucalyptus radiata* subsp. *radiata* (Narrow-leaf Peppermint)  
*Geranium sp.* (Storksbill)  
*Gnaphalium sp.* (Cudweed)\*  
*Hypochaeris radicata*\* (Flatweed)  
*Lepidium africanum*\* (Peppercress)  
*Lolium sp.*\* (Ryegrass)  
*Malva parviflora*\* (Small-flowered Mallow)  
*Modiola caroliniana*\* (Red-flowered Mallow)  
*Phalaris aquatica*\* (Phalaris)  
*Plantago lanceolata*\* (Ribwort)  
*Trifolium subterraneum*\* (Subterranean Clover)

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