



Environmental Assessment
Cadia East Project

APPENDIX B

CADIA EAST PROJECT

APPENDIX B

FLORA ASSESSMENT



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EXECUTIVE SUMMARY

This report has been prepared by FloraSearch and Resource Strategies for Cadia Holdings Pty Limited as part of the Environmental Assessment (EA) for the Cadia East Project (the Project). CHPL is seeking approval for the Project under Part 3A of the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979* (EP&A Act).

The Project would be located 25 kilometres (km) south-west of Orange, NSW, adjacent to the existing Cadia Valley Operations (i.e. the Cadia Hill Gold Mine [Cadia Hill], the Ridgeway Gold Mine [Ridgeway], and the Blayney Dewatering Facility). The Project involves the development of the Cadia East deposit using underground mining methods.

The main Project components relevant to this assessment include the development of the Cadia East deposit using underground mining methods, extension of the existing Northern Tailings Storage Facility (NTSF) and Southern Tailings Storage Facility (STSF), re-alignment of Cadia Road and extension of the Rodds Creek Water Holding Dam and associated infrastructure.

A new CVO Dewatering Facility and a new concentrate pipeline from the Cadia Valley to the facility would also be constructed as part of the Project.

The purpose of this report is to provide an assessment of the potential flora impacts associated with the Project. The assessment has been conducted with consideration of the relevant State and Commonwealth legislations, policies and guidelines.

The Project was referred under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) in December 2006. In January 2007, the Commonwealth Minister for the Environment and Heritage declared the Project to be a controlled action under Section 75 of the EPBC Act, with the controlling provisions being threatened species and threatened ecological communities potentially present and listed under Sections 18 and 18A of the EPBC Act. In October 2008, CHPL requested to vary the Project, mainly in regard to the proposed change in mining method. Approval for the variation was granted in November 2008.

The Commonwealth of Australia and the State of NSW governments have signed a bilateral agreement (Bilateral Agreement) which accredits the NSW assessment regime under Part 3A of the EP&A Act. The Bilateral Agreement was enacted in January 2007 and applies to the actions that the Federal Minister has determined are controlled actions under the EPBC Act. As a result of the operation of the Bilateral Agreement, the Project EA will only be subject to the environmental assessment process under Part 3A of the EP&A Act, as opposed to the environmental assessment processes under both the EP&A Act and the EPBC Act.

Findings

The Cadia Valley has been predominantly cleared for agricultural activities but contains small mostly modified fragments of native forest and woodland vegetation communities. Remnant vegetation typically exists as scattered individual trees, isolated clumps in grazing paddocks and as riparian vegetation along some sections of the local watercourses. The more substantial remnants of native vegetation generally persist on sites unsuitable for agriculture.

The largest area of native vegetation within the Project area occurs adjacent to the existing Cadia Hill open pit. It is dominated by Red Stringybark/Long-leaved Box Open Forest and Red Box/Red Stringybark Open Forest. Copper Gully runs through the remnant and supports a riparian corridor of Ribbon Gum/Blackwood Forest. At the edges of the remnant, a patch of White Box Woodland and two patches of Long-leaved Box/Blakely's Red Gum/Yellow Box Tall Woodland occur which are representative of the White Box-Yellow Box-Blakely's Red Gum Woodland Endangered Ecological Community (Box-Gum Woodland EEC) listed under the NSW *Threatened Species Conservation Act, 1999* (TSC Act) and White Box–Yellow Box–Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community (Box-Gum Grassy Woodlands and Derived Native Grasslands CEEC) listed under the EPBC Act.

Other smaller patches of native vegetation occur with Project area comprising of Red Box/Red Stringybark Open Forest, Long-leaved Box/Blakely's Red Gum/Yellow Box Tall Woodland and Apple Box/Blakely's Red Gum/Yellow Box Tall Woodland.

The Canobolas State Forest occurs directly to the north and east of the Project area, and consists of plantations of introduced Monterey Pine (*Pinus radiata*).

The CVO Dewatering Facility and proposed concentrate pipeline are proposed within predominately cleared land with scattered trees.

No threatened flora species listed under the TSC Act or EPBC Act have been recorded, or are considered likely to occur, within the Project area.

Potential Impacts

Approximately 238 hectares (ha) of native vegetation communities would be disturbed for the Project. Native vegetation communities would be cleared through the proposed expansion of the tailing storage facilities, lost within the subsidence area as the rock and soil beneath it subsides or modified by surface cracking within the zone of influence surrounding the subsidence area.

Vegetation communities that would be lost or modified for the Project include:

- approximately 3 ha of White Box Woodland;
- approximately 24 ha of Long-leaved Box/Blakely's Red Gum/Yellow Box Tall Woodland;
- approximately 23 ha of Apple Box/Blakely's Red Gum/Yellow Box Tall Woodland;
- approximately 60 ha of Red Stringybark/Long-leaved Box Open Forest;
- approximately 126 ha of Red Box/Red Stringybark Open Forest; and
- approximately 2 ha of Ribbon Gum/Blackwood Forest.

Approximately 23.5 ha of the above communities represent the Box-Gum Woodland EEC (of which 23 ha meets the criteria for the Box-Gum Grassy Woodlands and Derived Native Grasslands CEEC) and would be lost or modified by the Project.

Impact Mitigation and Offset Measures

In addition to impact avoidance measures (e.g. vegetation clearance protocol) and mitigation measures (e.g. rehabilitation and flora management), an offset area is proposed which is located approximately 11 km to the west of Cadia Valley Operations, on Black Rock Range.

Long-term tenure security and management for conservation purposes would be provided for the offset area. The offset contains approximately 653 ha of remnant vegetation and approximately 173 ha of predominately cleared agricultural land, the later of which would be revegetated.

It is likely that the proposed offset measures, would constitute a suitable offset against residual flora impacts associated with the Project, given the anticipated improvement in the flora habitat value in the medium to long-term.

Conclusions

In summary the following conclusions were made:

- Vegetation clearance associated with the Project would result in a decrease in the diversity of flora in the local area. The enhancement and conservation measures proposed as part of the offset would help maintain (and possibly improve) the flora biodiversity values of a substantial area of vegetation outside of the Project area.
- The Project would not affect any listed threatened populations of flora species.
- The Project would result in the loss of approximately 23.5 ha of the Box-Gum Woodland EEC (of which 23 ha meets the criteria for the Box-Gum Grassy Woodlands and Derived Native Grasslands CEEC), however, it would not lead to the loss of the communities in the surrounding area. The offset measures, provide for the enhancement and conservation of 210 ha of Box-Gum Woodland EEC and 154 ha of Box-Gum Grassy Woodlands and Derived Grasslands CEEC. These measures are proposed to secure the long-term viability of a substantial area of the Box-Gum Woodland outside of the Project area.
- The Project is unlikely to lead to the extinction of any threatened flora species, population or ecological community or place any at risk of extinction.
- The Project is unlikely to adversely affect critical habitat as no critical habitats are known to occur within the vicinity of the Project area.

B1 INTRODUCTION

This report has been prepared by FloraSearch and Resource Strategies for Cadia Holdings Pty Limited (CHPL) as part of the Environmental Assessment (EA) for the Cadia East Project (the Project). CHPL is seeking approval for the Project under Part 3A of the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979* (EP&A Act).

The Project would be located approximately 25 kilometres (km) south-west of Orange, NSW, adjacent to the existing Cadia Valley Operations (i.e. the Cadia Hill Gold Mine [Cadia Hill], the Ridgeway Gold Mine [Ridgeway], and generally in the vicinity of the Blayney Dewatering Facility) (Figure B-1).

The main Project components relevant to this assessment include the development of the Cadia East deposit using underground mining methods, extension of the existing Northern Tailings Storage Facility (NTSF) and Southern Tailings Storage Facility (STSF), re-alignment of Cadia Road and extension of the Rodds Creek Water Holding Dam and associated infrastructure (Figure B-2). The Project general arrangement is shown in Figure B-2. The Project area shown on Figure B-2 includes the subsidence zone and zone of influence.

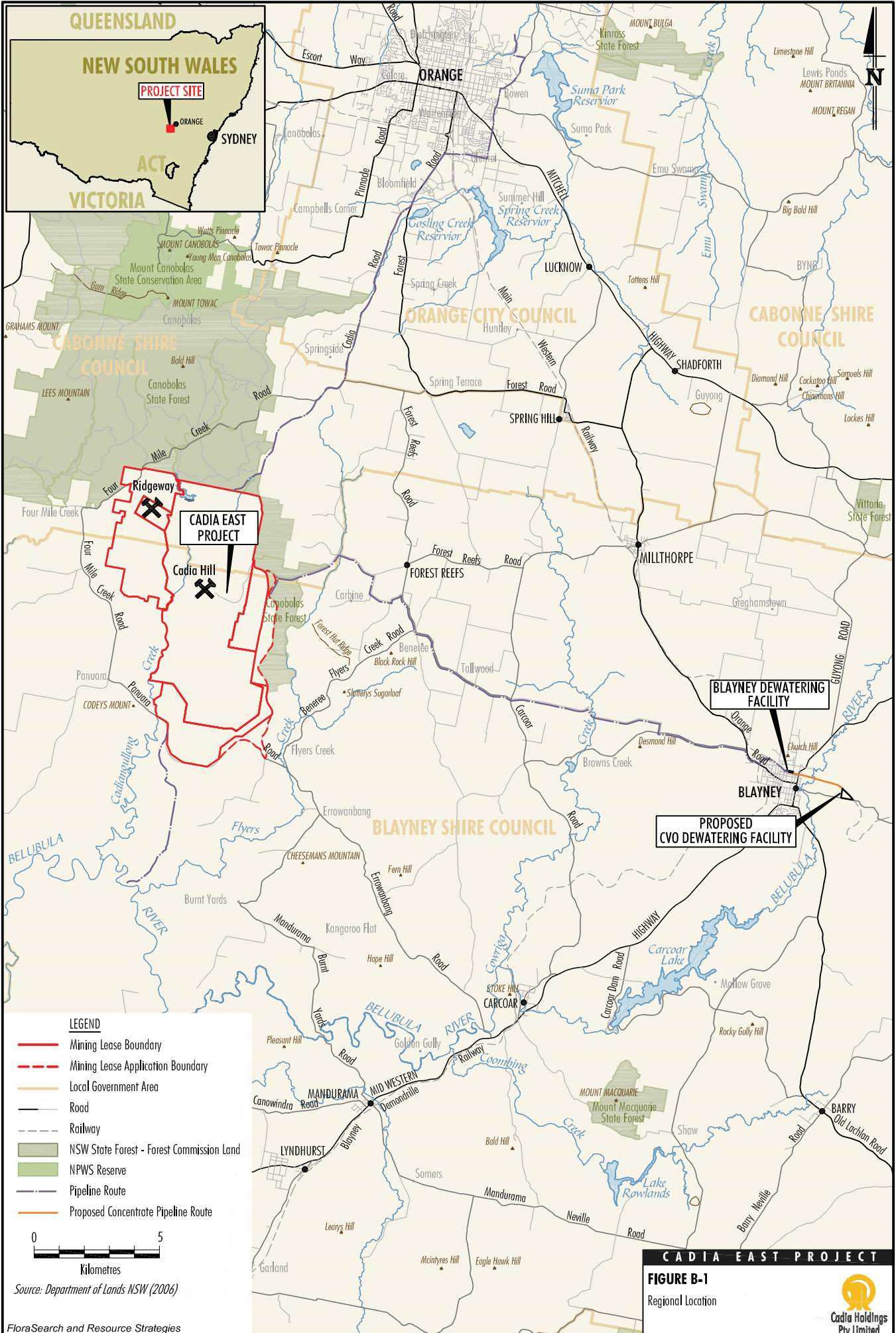
A new CVO Dewatering Facility and a new concentrate pipeline from the Cadia Valley to the facility would also be constructed as part of the Project as shown on Figure B-1. A detailed description of the Project is provided in Section 2 of the EA.

The purpose of this report is to provide an assessment of the potential flora impacts associated with the Project. The assessment has been conducted with consideration of the relevant State and Commonwealth legislation, policies and guidelines.

The Project was referred under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) in December 2006. In January 2007, the Commonwealth Minister for the Environment and Heritage declared the Project to be a controlled action under Section 75 of the EPBC Act, with the controlling provisions being threatened species and threatened ecological communities potentially present and listed under Sections 18 and 18A of the EPBC Act. In October 2008, CHPL requested to vary the Project, mainly in regard to the proposed change in mining method. Approval for the variation was granted in November 2008.

The Commonwealth of Australia and the State of NSW governments have signed a bilateral agreement (Bilateral Agreement) which accredits the NSW assessment regime under Part 3A of the EP&A Act. The Bilateral Agreement was enacted in January 2007 and applies to the actions that the Federal Minister has determined are controlled actions under the EPBC Act. As a result of the operation of the Bilateral Agreement, the Project EA will only be subject to the environmental assessment process under Part 3A of the EP&A Act, as opposed to the environmental assessment processes under both the EP&A Act and the EPBC Act.

An assessment of the controlled action in accordance with the *Guideline for Proponents Concerning Assessment of Controlled Actions under the EPBC Act* is provided in Appendix C of the EA. Matters of National Environmental Significance that are relevant to the flora assessment (e.g. threatened ecological communities) are assessed in this document.



QUEENSLAND

NEW SOUTH WALES

PROJECT SITE

SYDNEY

ACT
VICTORIA

ORANGE

ORANGE CITY COUNCIL

CABONNE SHIRE COUNCIL

CABONNE SHIRE COUNCIL

CADIA EAST PROJECT

Cadia Hill

BLAYNEY SHIRE COUNCIL

BLAYNEY DEWATERING FACILITY

PROPOSED CVO DEWATERING FACILITY

BLAYNEY

LEGEND

- Mining Lease Boundary
- - - Mining Lease Application Boundary
- Local Government Area
- Road
- - - Railway
- NSW State Forest - Forest Commission Land
- NPWS Reserve
- Pipeline Route
- Proposed Concentrate Pipeline Route

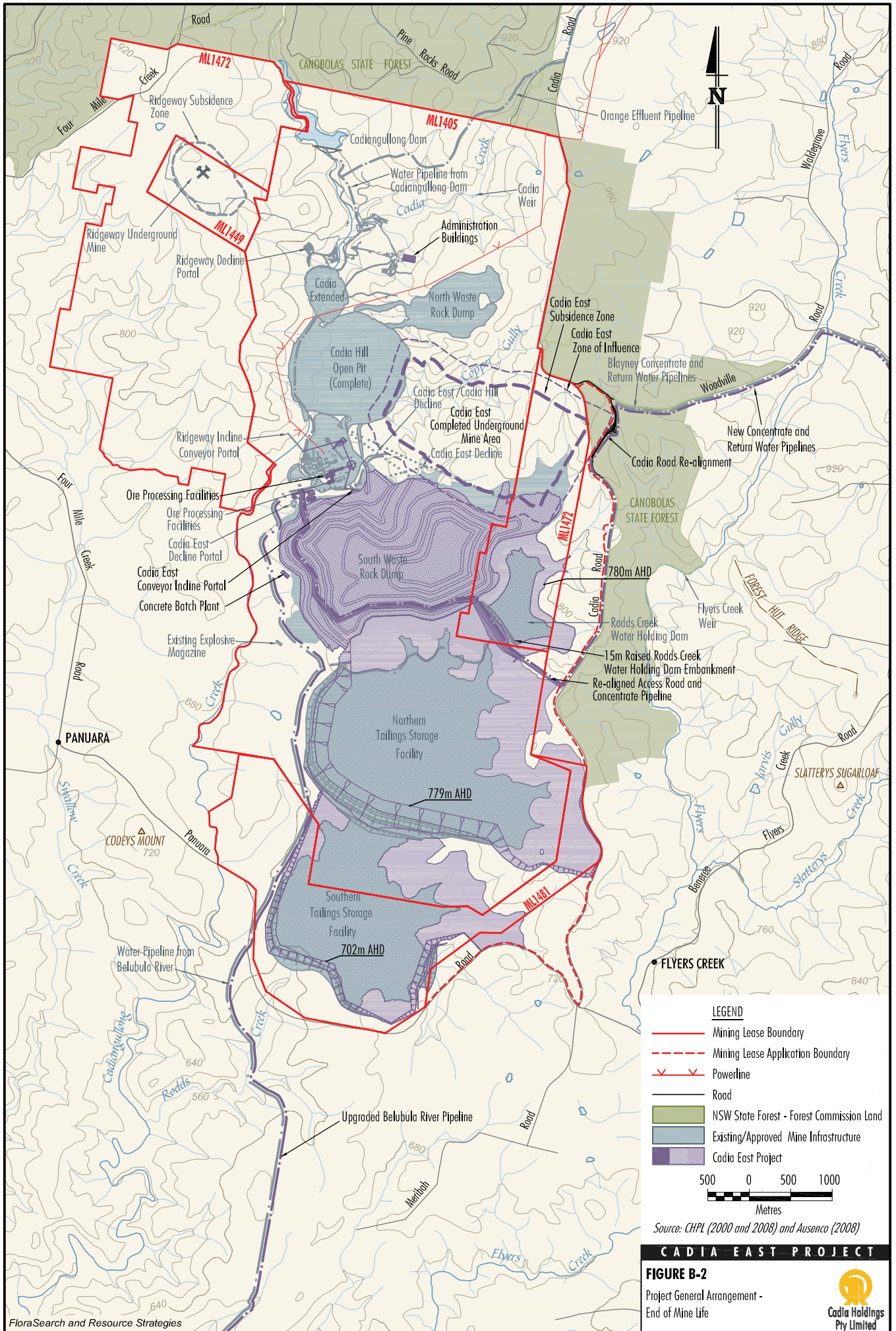


Source: Department of Lands NSW (2006)

CADIA EAST PROJECT

FIGURE B-1
Regional Location





B1.1 ASSESSMENT OBJECTIVES

The objectives of this flora assessment were to:

- assess potential impacts on flora in consideration of the Director-General's Environmental Assessment Requirements (EARs), Draft *Guidelines for Threatened Species Assessment* (NSW Department of Environment and Conservation [DEC] and NSW Department of Primary Industries [DPI], 2005) and the *Commonwealth EPBC Act Guide to Implementation in NSW* (State of NSW, 2007);
- identify the magnitude, nature and significance of impacts from the Project on flora species including threatened species, populations and ecological communities listed under the NSW *Threatened Species Conservation Act, 1995* (TSC Act) and EPBC Act;
- propose impact avoidance and mitigation measures to address the potential impacts of the Project; and
- propose offset measures to address the residual potential impacts of the Project.

B1.2 REGIONAL SETTING

The Project area is located in the Central Western Region of NSW and lies within the Central Tablelands botanical region and close to the boundary of the Central Western Slopes botanical region (Harden, 1990; Bower and Resource Strategies, 2000).

Elevations generally range from approximately 600 metres (m) Australian Height Datum (AHD) to 1,000 m AHD, falling away to the west and south towards the Belubula River. Areas of higher elevation in the region include Mount Canobolas (1,396 m AHD) and Mount Towac (1,136 m AHD) to the north and the Black Rock Range (780 m AHD) to the west.

The region is predominantly characterised by undulating hills, cleared open grassland, scattered native vegetation remnants and State Forest plantations of Monterey Pine (*Pinus radiata*). State Forests within the region include Glenwood and Canobolas State Forests directly to the north and east of the Project area.

B1.3 BOTANICAL/BIOGEOGRAPHICAL REGIONS

As stated previously, the Project area is close to the western edge of the NSW Central Tablelands botanical division (Anderson, 1968; Harden, 1990) and within 20 km of the Central Western Slopes botanical division which is located to the west. The Project area also lies near the boundary of the South Eastern Highlands Bioregion and the NSW South Western Slopes Bioregion as defined in the *Interim Biogeographic Regionalisation of Australia* (Thackway and Cresswell, 1995; Environment Australia, 2000; Commonwealth Department of the Environment, Water, Heritage and the Arts [DEWHA], 2009a).

Given the Project area is situated close to the boundaries of major botanical and biogeographical regions, it is considered likely that the flora in the Project area would contain a blend of species characteristic of both sets of regions.

B1.4 DESCRIPTION OF THE PROJECT AREA AND SURROUNDS

A description of the Project area and surrounds is provided below.

B1.4.1 Landforms

The dominant topographic feature of the Project area is the Cadia Valley, which is characterised by undulating hills, cleared open grassland and scattered native vegetation remnants. The Cadia Valley is bounded by a series of rolling hills which form ridgelines to the east and west of Cadiangullong Creek. Mount Canobolas and Mount Towac form the dominant topographic features to the north of the Cadia Valley. To the south, the Cadia Valley opens out to generally gently undulating land extending to the Belubula River, with occasional steeply sided gullies in the lower portion of the catchment.

Cadiangullong Creek is the major watercourse in the valley, rising within Canobolas State Forest, extending through Mining Lease (ML) 1405 in a generally southerly direction and then discharging into the Belubula River. Tributaries of Cadiangullong Creek within the Cadia Valley include Rodds Creek, Cadia Creek, Copper Gully and Hoares Creek. All of these creeks have been affected to some degree by development of the Cadia Valley Operations.

Elevations within the planned Project disturbance areas that are not currently disturbed by Cadia Valley Operations activities range from approximately 930 m AHD (on Sharpe's Ridge to the east of the Cadia Hill open pit) to approximately 750 m AHD at Copper Gully. Elevations at Rodds Creek range from approximately 930 m AHD at the head of Rodds Creek to approximately 640 m AHD at the junction between Rodds Creek with Cadiangullong Creek.

B1.4.2 Soils

The main soil types within the Project area comprise of alluvial soil, yellow podzolic, red podzolic, krasnozem, red earth, yellow earth, euchrozem and lithosol (Kovac *et al.*, 1990 in CHPL, 2000). These soils are representative of the Towac, Panuara, Borenore-Lynhurst, Vittoria-Blayney, Canobolas and Quarry landscapes (Kovac *et al.*, 1990 in CHPL, 2000). The yellow earths belong to the Quarry and Towac soil landscapes and are of limited occurrence. Lithosols, or shallow stony soils, occur on the steep slopes and ridges of the Panuara soil landscape, and are particularly dominant on Sharpes Ridge and Cadia Hill. The gentler slopes of the Panuara soil landscape comprise mainly red podzolic soils. Yellow podzolic soils are confined to the Quarry and Panuara soil landscapes and are limited in extent.

B1.4.3 Landuse

Landuse in the Cadia Valley comprises mining and a range of rural industry including forestry, beef, sheep and wool production, recreation and conservation. Mount Canobolas State Conservation Area is located approximately 12 km to the north of the Project area and is separated by the Canobolas State Forest pine plantation.

An area of vegetation within ML 1405 is conserved as part of the South Waste Rock Dump approval, which was provided in 2004 as a modification to the Cadia Hill and Ridgeway Development Consents (DA 44/95 and DA 134-04-00) (CHPL, 2004). The vegetation consists of the White Box (*Eucalyptus albens*), Yellow Box (*E. melliodora*) and Blakely's Red Gum (*E. blakelyi*) Woodland Endangered Ecological Community (Box-Gum Woodland EEC).

B1.4.4 Climate

The closest Bureau of Meteorology (BOM) weather stations to the Project area are located approximately 12 km east-northeast at Orange Airport Comparison and approximately 14 km north-east at Orange Agricultural Institute.

The mean annual rainfall in the Project area is approximately 922.7 millimetres (mm) at Orange Agricultural Institute and approximately 884.5 mm at Orange Airport Comparison (Table B-1). The lowest mean monthly rainfall occurs in autumn (i.e. 52.0 mm in April for Orange Agricultural Institute and approximately 50.4 mm in March at Orange Airport Comparison) and the highest mean monthly rainfall occurs in August for both stations (98.3 mm and 91.7 mm, respectively) (BOM, 2009).

Table B-1
Climate Statistics for Orange Agricultural Institute (063254)
and Orange Airport Comparison (063231) Weather Stations

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Orange Agricultural Institute (063254)													
Mean daily max temp (°C)	26.4	25.8	22.8	18.5	14.2	10.5	9.3	10.9	14.0	17.6	20.9	24.4	17.9
Mean daily min temp (°C)	13.2	13.1	10.6	7.2	4.7	2.5	1.4	2.1	4.1	6.6	9.0	11.3	7.1
Mean rainfall (mm)	89.3	75.3	56.9	52.0	69.6	70.3	90.5	98.3	79.3	85.9	77.9	77.4	922.7
Highest monthly rainfall (mm)	300.7	285.0	174.4	329.0	249.1	178.6	207.7	270.8	196.8	223.1	204.3	213.6	1,514.2
Lowest monthly rainfall (mm)	7.5	0.0	0.0	0.0	4.2	0.8	11.2	3.1	9.0	0.2	7.0	0.4	324.0
Mean relative humidity (9.00 am)	67	71	69	70	79	83	82	75	70	66	68	64	72
Orange Airport Comparison (063231)													
Mean daily max temp (°C)	25.9	25.2	22.4	18.3	13.9	10.4	9.3	10.7	13.6	17.2	20.3	23.9	17.6
Mean daily min temp (°C)	12.1	12.2	9.6	6.1	3.6	1.5	0.6	1.4	3.2	5.7	7.8	10.0	6.2
Mean rainfall (mm)	87.6	81.8	50.4	52.9	63.7	66.4	87.4	91.7	78.1	77.7	74.7	72.5	884.5
Highest monthly rainfall (mm)	320.6	289.3	137.0	288.7	193.8	163.4	208.6	251.8	165.0	255.1	163.8	193.0	1,393.0
Lowest monthly rainfall (mm)	7.4	6.9	0.0	4.2	4.0	2.4	15.1	4.5	9.2	0.8	7.0	0.8	364.2
Mean relative humidity (9.00 am)	67	73	73	74	83	88	86	80	74	68	70	65	75

Source: BOM (2009).

Mean recorded temperatures indicate the Project area experiences the warmest temperatures from November to March and the coolest from May to September (Table B-1). The highest average maximum daily temperatures are recorded in January (26.4 degrees Celsius (°C) at the Orange Agricultural Institute and 25.9°C at the Orange Airport Comparison) (Table B-1) (BOM, 2009).

The lowest average minimum daily temperatures are recorded in the winter months. July experiences the lowest mean minimum temperatures for both locations (i.e. 1.4°C for Orange Agricultural Institute and 0.6°C at the Orange Airport Comparison) (Table B-1) (BOM, 2009).

Relative humidity records at both stations indicate a seasonal difference with the highest humidity during winter and lower humidity during summer months (Table B-1) (BOM, 2009).

B2 METHODS

The methodology used in this flora assessment report was developed in consideration of the Draft *Guidelines for Threatened Species Assessment* (DEC and DPI, 2005). The information sources used included database searches, together with a review of site-specific data.

A summary of the databases searched and the methodology undertaken during site-specific flora surveys is provided in Section B2.1 and Section B2.2, respectively.

B2.1 DATABASE SEARCHES

Threatened flora species listed under the TSC Act and EPBC Act previously recorded in the Project area and wider region were identified using the following database searches:

- the NSW Department of Environment and Climate Change (DECC) (DECC, 2008a) Atlas of NSW Wildlife (Molong [8631], Orange [8731], Blayney [8730], Cowra [8630] and Bathurst [8831] 1:100,000 map sheets);
- the Sydney Royal Botanic Gardens (SRBG) database (SRBG, 2008) (using a search area of approximately 1,250 square kilometres (km²) surrounding the Project area); and
- the EPBC Act on-line database (DEWHA, 2009b) (using a search area of approximately 1,250 km² surrounding the Project area).

The results of these database searches were incorporated into this flora assessment.

B2.2 FLORA STUDIES IN THE PROJECT AREA AND SURROUNDS

Numerous flora studies have been undertaken in the Project area and surrounds in the past. Many of these studies were associated with previous assessments for Cadia Hill and Ridgeway, including the original Environmental Impact Statements (EISs). A review of relevant studies in the area was undertaken as part of the flora assessment and included (but was not limited to) the following (in order of relevance):

- FloraSearch (2005) *Cadia East Study Area Flora Assessment*. This report is provided as Attachment BA.
- FloraSearch (2008) *Flora Survey of the Cadia to Blayney Slurry Pipeline Route and the Blayney Dewatering Plant Site*. This report is provided as Attachment BB.
- Resource Strategies (2002a) *Ridgeway Gold Mine Remnant Woodland Enhancement Programme Wire Gully Baseline Monitoring Survey*.
- Resource Strategies (2002b) *Southern Remnant Flora and Fauna Survey*.
- Resource Strategies (2002c) *Cadia Extended Modification Flora and Fauna Assessment*.
- Bower and Resource Strategies (2000) *Ridgeway Project Flora Survey and Assessment Report*.
- Bower (1999) *Flora Survey - Flyers Creek and Belubula River and Rodds Creek Study Sites*.
- Bower *et al.* (1998) *Flora Survey of the Ridgeway Trial Development Application Area and Surrounds*.
- Bower and Medd (1995) *Flora Report for Newcrest Mining on the "Cadia Project"*.

The methodology of the flora surveys and assessments is provided in the following sub-sections.

B2.2.1 Cadia East Study Area Flora Assessment

A flora survey was conducted by FloraSearch within the northern portion of the Project area (i.e. the proposed Cadia East subsidence zone and zone of influence) in 2004. The full report is provided as Attachment BA.

The survey was undertaken over two seasonal periods, in autumn, from late March to early April and in the following spring, in October and November.

Vegetation sampling was based on preliminary vegetation community mapping of the Project area, which had not been previously surveyed. Vegetation survey techniques included quadrat samples, spot samples and targeted searches for threatened flora species considered possible occurrences within the Project area or immediate surrounds.

B2.2.2 Flora Survey of the Cadia to Blayney Slurry Pipeline Route and the Blayney Dewatering Facility

FloraSearch undertook a flora survey of the route of the proposed concentrate pipeline and site of the previously proposed East Blayney Dewatering Facility in August 2007 and March 2008. The full report is provided as Attachment BB.

The survey involved carrying out flora observations at 83 sites along the route and at the East Blayney Dewatering Facility site including 35 spot sample sites at which all flora species present were recorded. Tree associations in adjacent paddocks were also noted. The flora surveys also comprised targeted searches for threatened plant species considered possible occurrences within the Project area or immediate surrounds.

B2.2.3 Wire Gully Baseline Monitoring Survey

A flora survey and assessment was conducted by Orchid Research in remnant woodland south of the NTSF inside the Project area on November 2002 (Resource Strategies, 2002a).

Four survey sites were established to monitor the effectiveness of the enhancement initiatives being implemented at Wire Gully, two of which were reference sites at Triangle West property (Resource Strategies, 2002a). Several methods were used to assess plant species diversity and abundance including absolute counts of all individuals and species, counts of all stags, stumps and logs and percentage cover estimates of ground cover species (Resource Strategies, 2002a).

B2.2.4 Southern Remnant Flora and Fauna Survey

A flora survey was conducted by Orchid Research within the remnant woodland between the South Waste Rock Dump and the NTSF inside the Project area in November 2002 (Resource Strategies, 2002b).

Techniques used included quadrat sampling and targeted searches for threatened plant species (Resources Strategies, 2002b). Habitat complexity was also assessed using a variety of habitat characteristic parameters.

B2.2.5 Cadia Extended Modification Flora and Fauna Assessment

A flora assessment was conducted for the Cadia Extended study area (situated just north of the Cadia Hill open pit) in August 2002 by Resource Strategies (2002c).

The assessment consisted of systematically mapping vegetation associations within the area and formulating a complete list of vascular plants species observed (Resource Strategies, 2002c). A targeted search was also undertaken for threatened plant species and the Box-Gum Woodland EEC.

B2.2.6 Ridgeway Project Flora Surveys and Assessment

A flora assessment was conducted for the Ridgeway EIS by Bower and Resource Strategies (2000 in CHPL, 2000). The assessment was based on the results of surveys which included Bower (1999), Bower *et al.* (1998) and Bower and Medd (1995). These are discussed in Sections B2.2.7 to B2.2.9.

All areas supporting native tree cover were assessed, all plant species observed were recorded and the vegetation association mapped (Bower and Resource Strategies, 2000). Targeted searches for threatened plant species listed in the schedules of the TSC Act and EPBC Act were conducted.

B2.2.7 Flora Survey - Flyers Creek and Belubula River and Rodds Creek Study Sites

Bower (1999) undertook a flora survey in a smaller area along the lower portions of Flyers Creek, Belubula River and Rodds Creek in 1999. All areas supporting native tree cover were identified to species and the vegetation association mapped (Bower, 1999). Targeted searches for threatened species listed in the national list, *Rare or Threatened Australian Plants* (Briggs and Leigh, 1996) and the schedules of the TSC Act were conducted.

B2.2.8 Flora Survey of the Ridgeway Trial Development Application Area and Surrounds

Bower *et al.* (1998) undertook a flora survey of the Ridgeway Trial Development to the north-east of the Project area. Flora species recorded during the survey are considered in this report (e.g. the threatened species *Eucalyptus canobolensis* was recorded during this survey and is discussed in Section B3.5.1).

B2.2.9 Flora Report for Newcrest Mining on the Cadia Project

Bower and Medd (1995) as part of the Orange Field Naturalists and Conservation Society undertook surveys of flora within the Project area and surrounds over at least 12 field trips between 1987 and 1995. A list of plant species observed was formulated and the vegetation associations described.

B2.2.10 Cadia Road Re-alignment Survey

FloraSearch undertook an additional flora survey on the 24 March 2009 within the gully to the east of the subsidence zone and within the proposed Cadia Road re-alignment. During the survey five representative spot samples were conducted, vegetation communities were mapped, and the area searched for potential threatened species.

B3 RESULTS

This section provides a summary of the results from the various flora studies in relation to the Project.

B3.1 VEGETATION COMMUNITIES IN THE PROJECT AREA

This section describes the occurrence of the remnant native vegetation communities within the Project area, while Section B3.3 describes the occurrence of other derived or artificial vegetation assemblages within the Project area. Natural vegetation communities are groups of plant species that commonly associate with each other, through a shared ability to survive and reproduce on certain physical sites under specific climatic conditions.

The *Predicted Vegetation Cover in the Central Lachlan Region* report prepared by Austin *et al.* (2000) provides a vegetation classification scheme based on flora data collected in the wider region around the Project area. Austin *et al.* (2000) classified the vegetation communities for the area between Orange and Condobolin on the western Central Tablelands and Central Western Slopes of NSW.

Various reports on Cadia Valley vegetation have been prepared since 1995. The classification of communities in these reports is not always consistent in terms of both the naming of the communities and their composition. For example, the communities are determined more narrowly in some reports than others. Generally, the studies which focused on small areas tend to have resulted in a finer division of communities than the larger scale studies, which is true of most vegetation survey work. Table B-2 shows the various community names assigned in studies on land owned by CHPL standardised against the names of the best fitting communities recognised in the *Predicted Vegetation Cover in the Central Lachlan Region* report (Austin *et al.*, 2000).