Environmental Assessment

Cadia East Project

APPENDIX K

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CADIA EAST PROJECT
ABORIGINAL CULTURAL HERITAGE ASSESSMENT

COLIN PARDOE BIO-ANTHROPOLOGY & ARCHAEOLOGY

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TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

EXECUTIVE SUMMARY

Cadia Holdings Pty Limited, a wholly owned subsidiary of Newcrest Mining Limited, is the proponent for the development of the Cadia East Project (the Project). The Project is located at the Cadia Valley Operations, approximately 25 kilometres south-west of Orange, in the Central Tablelands of New South Wales.

The Cadia Valley has a long history of mining dating back to the discovery of gold and copper mineralisation in the 1850s. Since discovery, mining activity was intermittent and on a small scale compared with contemporary mining activities.

The Cadia Valley has also been substantially modified by mining activities associated with the approved Cadia Valley Operations. Major mine landforms include the Cadia Hill Open Pit, South and North Waste Rock Dumps, Northern and Southern Tailings Storage Facilities, the Ridgeway Subsidence Zone, Rodds Creek Water Holding Dam and Cadiangullong Creek Dam.

Aboriginal cultural heritage surveys previously undertaken within the Cadia Valley have found little evidence of Aboriginal cultural heritage and concluded that the likelihood of identifying significant Aboriginal sites in the vicinity of the Cadia Valley is limited due to the very low density of sites and objects in the region, and to disturbance associated with previous landuses.

Extensive consultation with the Aboriginal community has been undertaken for the Project. In summary, consultation has included:

- newspaper advertisements and correspondence with relevant authorities to provide the opportunity for Aboriginal stakeholders to register their interest in being consulted in regards to the Project;
- identification of the Orange Local Aboriginal Land Council (OLALC) as the appropriate and primary Aboriginal stakeholder;
- consultation with the Orange Local Aboriginal Land Council, as the identified Aboriginal stakeholder, in relation to the survey methodology;
- participation in field surveys by a representative of the Orange Local Aboriginal Land Council, as the identified Aboriginal stakeholder; and
- consultation with the Orange Local Aboriginal Land Council, as the identified Aboriginal stakeholder, in regards to the outcomes and recommendations contained in this Aboriginal Cultural Heritage Assessment.

Three archaeological surveys have been undertaken for discrete portions of the Project disturbance area by Colin Pardoe Bio-Anthropology & Archaeology and Kayandel Archaeological Services.

One Aboriginal cultural heritage site (a quartz flake fragment) was identified within the Project disturbance area during the surveys. Two scarred trees (one of probable Aboriginal origin) were also identified within the existing approved inundation area of the Southern Tailings Storage Facility.

In addition, three areas with some archaeological potential were identified within or immediately adjacent to Project disturbance areas that would require further investigation, prior to disturbance associated with the Project.

K1 INTRODUCTION

This report provides an Aboriginal Cultural Heritage Assessment of the Cadia East Project (the Project). Surveys for the Project were undertaken for discrete portions of the Project disturbance area by Colin Pardoe Bio-Anthropology & Archaeology and Kayandel Archaeological Services on behalf of Cadia Holdings Pty Limited (CHPL) for the Project Environmental Assessment (EA).

K1.1 CADIA EAST PROJECT OVERVIEW

CHPL is a wholly owned subsidiary of Newcrest Mining Limited (Newcrest) and is the proponent for the development of the Project. The Project is located at the Cadia Valley Operations, approximately 25 kilometres (km) south-west of Orange, in the Central Tablelands of New South Wales (NSW) (Figure K-1).

Mining at the Cadia Valley Operations commenced at the Cadia Hill Gold Mine in 1998. The Ridgeway Gold Mine commenced production in 2002. A significant extension of the Ridgeway Gold Mine, called Ridgeway Deeps, is currently under construction. The development and construction workforce for Ridgeway Deeps forms part of the current Cadia Valley Operations workforce, which consists of approximately 1,100 CHPL personnel and on-site contractors.

Approximately 24 million tonnes per annum (Mtpa) of ore is mined at the Cadia Valley Operations and in 2007/2008 approximately 716,000 ounces of gold and 61,000 tonnes (t) of copper was produced by Cadia Hill and Ridgeway Gold Mines. Mineral concentrate containing gold and copper is pumped some 30 km from the Cadia Valley Operations to the nearby town of Blayney, where it is dewatered and then loaded onto trains for transport to Port Kembla on the Eastern seaboard.

The Cadia Hill Gold Mine is scheduled to cease operation in 2013. With the Ridgeway Deeps extension, the Ridgeway Gold Mine is scheduled to cease operations in 2017.

In the mid 1990s CHPL's exploration program in the Cadia Valley identified a zone of low grade gold/copper mineralisation up to a distance of approximately 2.5 km east of the Cadia Hill open pit. The area of mineralisation is known as Cadia East and has been the subject of extensive exploration over the last decade and development planning over the past two years.

The Cadia East proposal would involve development of an underground mine to extract approximately 450 million tonnes (Mt) of ore over a period of 21 years. The ore contains gold, copper and some molybdenum. Development of the Project would occur in conjunction with ongoing operation of the existing Cadia Hill and Ridgeway Gold Mines, and if approved, the Project would extend the life of the Cadia Valley Operations to approximately 2030.

The key Project extensions to the approved Cadia Valley Operations would include:

- underground mining of the Cadia East deposit using a panel caving mining method at a rate of up to 27 Mtpa and the development of an associated 200 hectare (ha) subsidence zone above the underground mining area;
- development of underground crushing, handling and incline conveyor systems to transfer ore and waste rock mined from the Cadia East orebody to the Cadia Valley Operations ore processing facilities;
- development of supporting infrastructure for the underground mine including multiple ventilation shafts, personnel and equipment access systems;

- upgrade of the existing Cadia Valley Operations ore processing facilities with an additional ore processing plant and associated stockpiles and materials handling equipment to accommodate the harder ore from Cadia East and enable a total Cadia Valley Operations ore processing rate of up to approximately 27 Mtpa;
- construction and operation of a molybdenum recovery plant with a capacity of up to 460,000 tonnes per annum (tpa) and trucking of molybdenum products off site;
- placement of additional waste rock produced by the Project (approximately 11.4 Mt) in the existing South Waste Rock Dump;
- raising of the existing Northern Tailings Storage Facility (NTSF) and Southern Tailings Storage Facility (STSF) embankments to accommodate approximately 450 Mt of tailings to be produced over the life of the Project;
- augmentation and upgrade of the existing Cadia Valley Operations water management/supply system including development of additional pipeline/pumping systems and raising of the Rodds Creek Water Holding Dam;
- obtaining additional Mining Leases to facilitate the Project extensions of the STSF, NTSF and Rodds Creek Water Holding Dam and relocation of the Cadia Hill access road;
- construction of a new concentrate dewatering facility to the east of Blayney (to be known as the CVO Dewatering Facility) and decommissioning of the existing Blayney Concentrate Dewatering Facility;
- installation of a new concentrate pipeline from the Cadia Valley Operations to the new concentrate dewatering facility to the east of Blayney;
- increased rail transportation of dewatered mineral concentrate from Blayney to the eastern seaboard;
- augmentation, relocation and upgrade of supplementary surface facilities including workshops, administration and site access roads; and
- other associated modifications to existing infrastructure, plant, equipment and activities to allow mining of the Cadia East deposit and integration with the approved Cadia Valley Operations.

CHPL is seeking approval for the Project from the Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act, 1979*.

K1.2 CADIA VALLEY OPERATIONS – KEY EXISTING FEATURES

The Cadia Valley has a long history of mining dating back to the discovery of gold and copper mineralisation in the 1850s (Kohen, 2000). Since discovery, mining activity was intermittent and on a comparatively small scale compared with contemporary mining activities.

Development of the Cadia Valley Operations has resulted in the modification of landforms within the Cadia Valley. Key components of approved mine infrastructure that have altered the topography within the Cadia Valley include:

- Cadia Hill Open Pit;
- North and South Waste Rock Dumps;
- NTSF and STSF;
- Ridgeway Subsidence Zone;
- Rodds Creek Water Holding Dam; and
- Cadiangullong Creek Dam.

In addition to the above, the Cadia Valley Operations comprises a range of ancillary roads, tracks, storage facilities, processing facilities, powerlines, water storages and other supporting infrastructure to facilitate the mining operations that have involved areas of land disturbance or localised alteration of drainage/landforms.

K1.3 DIRECTOR-GENERAL'S REQUIREMENTS AND GUIDELINES

The Project Aboriginal Cultural Heritage Assessment was conducted in consideration of the Director-General's Requirements and the relevant components of the *draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (Department of Environment and Conservation [DEC], 2005), *Ask First; A Guide to Respecting Indigenous Heritage Places and Values (Australian Heritage Commission, 2002)* and *Interim Community Consultation Requirements for Applicants* (DEC, 2004).

K1.4 DOCUMENT STRUCTURE

The remainder of this document is structured as follows:

Section K2: Provides background information; including a description of the existing natural environment within the vicinity of the Cadia Valley and Aboriginal occupation of the area.

Section K3: Provides descriptions of the previous surveys undertaken in the Cadia Valley and their key findings.

Section K4: Documents the stakeholder consultation and participation conducted for each of the Aboriginal cultural heritage surveys and in completion of this assessment.

Section K5: Describes each of the three Aboriginal cultural heritage surveys undertaken for the Project.

Section K6: Tabulates and describes the sites and areas of interest identified during each Project Aboriginal cultural heritage surveys.

Section K7: Describes the Aboriginal cultural heritage management strategies to be undertaken for the Cadia East Project in consultation with Aboriginal stakeholders.

Attachment KA: Orange Local Aboriginal Land Council Letter.

K2 CULTURAL HERITAGE BACKGROUND

The following sub-sections provide background information regarding the nature and extent of Aboriginal occupation and heritage within the Cadia Valley and surrounds.

K2.1 ENVIRONMENTAL CONTEXT

A description of the existing natural environment in the vicinity of the Project is provided in the following sub-sections.

K2.1.1 Climate

The climate of the Central West is considered temperate, with warm to hot summers and cool to cold winters.

The closest Bureau of Meteorology (BOM) weather stations to the Project area are located approximately 12 km east-northeast at Orange Airport Comparison (063231) and approximately 14 km north-east at Orange Agricultural Institute (063254).

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

Table K-1
Climate Statistics for Orange Agricultural Institute and Orange Airport Comparison Weather Stations

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
Orange Agricultural Institute (063254)													
Mean daily max temp (^{o}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 (^{o}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	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 (^{o}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 (^{o}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
Mean relative humidity (3.00 pm) (%)	45	49	51	55	64	70	70	65	61	56	54	46	57

Source: BOM (2009)

Mean recorded temperatures (Table K-1) indicate that the Project area experiences the warmest temperatures from November to March and the coolest from May to September. The highest average monthly temperatures at the Orange Airport Comparison and the Orange Agricultural Institute are recorded in January (25.9^{o} degrees centigrade [^{o}C] and 26.4^{o}C, respectively).

The lowest average monthly temperatures are recorded in the winter months. July experiences the lowest mean minimum temperatures for both locations (0.6^{o}C at the Orange Airport Comparison and 1.4^{o}C for Orange Agricultural Institute).

Relative humidity records at both stations indicate a seasonal difference with the highest humidity during winter and lower humidity during summer months.

K2.1.2 Topography and Geology

The Orange region is located on the western side of the Great Dividing Range. 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).

The dominant physiographic feature of the Project area is Cadia Valley, which is characterised by gently undulating hills, cleared open grassland and scattered native vegetation remnants. The Cadia Valley is bound by a series of rolling hills which form ridgelines to the east and west of Cadiangullong Creek. Mount Canobolas and Mount Towac form the topographic features to the north of the valley. To the south the valley opens out to gently undulating land extending to the Belubula River.

The Project is located in the eastern Lachlan Fold Belt of NSW. The Lachlan Fold Belt is divided into northerly trending metamorphic, volcanic and sedimentary belts. These belts were folded and intruded by numerous igneous rocks such as porphyries and granitoids and then uplifted during a series of tectonic events extending from the Silurian to the Early Carboniferous. The rocks of the belt are primarily of Ordovician (500 to 430 million years ago) to Devonian age (400 to 350 million years ago). The outcrops seen today in the north and south of the Orange and Blayney area are a result of these tectonic events (Scott, 2003 in Kayandel, 2008b).

During the late Tertiary, lavas from Mount Canobolas (situated to the north of the Project area [Figure K-1]) blanketed the landscape, commonly covering pre-Miocene weathering profiles. Subsequently, alluvium has been deposited, especially in gullies, and Aeolian deposits have formed, particularly on topographic rises (Scott, 2003 in Kayandel, 2008b).

K2.2 ABORIGINAL OCCUPATION

K2.2.1 Pre-European Contact

Before European settlement, the Central West was located within the territory of the Wiradjuri-speaking people, who occupied an extensive tract of land along the western side of the Great Dividing Range south beyond the Murrumbidgee and Lachlan Rivers. The local clan names of the Wiradjuri-speaking people in the vicinity of the Project are not known.

Traditional occupation is known to have varied in response to resources, population, density and season. Kohen (1995) noted that the area around the Cadia Valley Operations would have been relatively rich in bioresources for Aboriginal people. The Cadia Valley would have been covered with open forest and woodland vegetation (Colin Pardoe Bio-Anthropology and Archaeology, 2005) and the area is still known to support populations of kangaroos, wallaroos, wallabies, snakes, lizards and birds (Ross, 1981).

Several microenvironments occur within the Cadia Valley, including high ridge lines and spurs, steep valley walls with small incised creeks, rock pools and platforms and flats where valleys widen out, terracing where stream flow decreases. The area is also on the edge of a more gently rolling countryside to the south, which contains riparian floodplain, basal slopes and sandy deposits (Lance, 1985; Navin Officer, 1996; Colin Pardoe Bio-Anthropology and Archaeology, 2005). The micro-environments in the study area were generally small in area, allowing people to move between them for particular resources (Colin Pardoe Bio-Anthropology and Archaeology, 2005). This indicates that central residences may have been expected in more favourable locations, including areas with the following features (Pearson, 1981; Witter, 1992; Navin Officer, 1996):

- level ground and good drainage;
- land slightly above the cold air of the valley floor; and
- junctions of microenvironments with access to water.

Ross (1981) also suggested that the steeply dissected hills in the Cadia Valley would not have been suitable for open campsites, and most sites would likely be restricted to the river flats. Pearson (1979) further suggested that because rock shelters did not occur in the area, Aboriginal sites were likely to be found in four major zones on:

- flat or gently sloping ridges;
- gentle slopes in undulating country;
- creek banks; and
- river flats.

K2.2.2 Post-European Contact

Several land development practices have taken place in the study area over the last 150 years that may affect the integrity of sites and features. These areas are described below:

- Historical mining areas (e.g. Little Cadia Copper Mine and Wire Gully Gold Diggings), including excavated areas, deposited material in mullock heaps and building ruins.
- Deforested areas with substantial regrowth evident on slopes.
- Road graded areas and exploration drill pads throughout the Project area.
- Erosion and soil loss as a result of tree clearance.
- Monterey Pine plantation areas which feature tracks, graded areas and a covering of pine needles on the ground.
- Agricultural areas which have been subject to tree clearance, ploughing and/or grazing and fencing.

K3 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Aboriginal Cultural Heritage research in the Cadia Valley and surrounds includes Pearson (1979); Ross (1981); Haglund (1984a, 1984b); Kohen (1991, 1995, 1996, 2000); Colin Pardoe Bio-Anthropology and Archaeology (2005, 2007a, 2007b); and Kayandel Archaeological Services (2008a; 2008b).

Previous research has established that Aboriginal sites are rare in the Orange area. Haglund (1984a; 1984b) identified small artefact scatters and one archaeological deposit on the south side of the Mitchell Highway north-west of Orange, and Pearson (1979) found sites south-east of Orange in the Lewis Ponds-Browns Creek area north of the Mitchell Highway.

Ross (1981) found two isolated finds during a preliminary inspection of the Cadia area, and Kohen (1991) found one site and three isolated finds, all close to Cadiangullong Creek. The site, Cadia 1, located during the 1991 survey, consisted of seventeen artefacts exposed on a hill slope close to the junction of Cadia Creek and Cadiangullong Creek, to the east of Ridgeway. An additional site was subsequently identified on Rodds Creek (Cadia 2) on flatter open ground, and as a result, sub-surface testing on the slopes was carried out to determine if artefacts were below the surface (Kohen, 1995, 1996). No artefacts were found and it was concluded that due to previous disturbance associated with mining, grazing and forestry, the likelihood of identifying significant Aboriginal sites in the vicinity of Cadia was severely limited (Kohen, 1995).

Further sites were identified on Hoares Creek and Copper Gully Creek, which were collected in accordance with a permit obtained under the *National Parks and Wildlife Act, 1974* (NPW Act). Analysis of the artefacts indicated that blade production was a major activity in the area (Kohen, 2000).

An archaeological survey was conducted by Kohen in 1999 for the Ridgeway Environmental Impact Statement (EIS) within the pine plantation and creek lines which make up the headwaters of Rodds Creek. This survey found no artefacts in these areas and concluded that the likelihood of finding undisturbed Aboriginal sites in the pine plantation was negligible and, although the most likely locations for sites would be along creek lines, extensive grass cover and previous clearing has reduced the archaeological potential of the area to very low (Kohen, 2000). The 1999 Kohen survey (Kohen, 2000) also found an artefact scatter during the survey of Ridgeway Hill, outside of proposed disturbance areas.

In mid-2002, five additional Aboriginal heritage artefacts (stone flakes) were identified during a programme of European heritage test excavations at the lower Cadia Village site being conducted in consultation with the NSW Heritage Office. In accordance with the NPW Act, CHPL's consultant archaeologist obtained a permit from National Parks and Wildlife Service (NPWS) (now part of the Department of Environment and Climate Change [DECC]) to remove the artefacts. In accordance with this permit, the artefacts were collected in consultation with the Orange Local Aboriginal Land Council (OLALC) and retained by them for safekeeping.

Other types of Aboriginal relics could potentially occur in the region. Ross (1981) identified a possible scarred tree, but according to Roland Williams, the Aboriginal Sites Officer for the Wiradjuri Regional Land Council, who inspected the area in 1991, the scar was natural (Kohen, 1991). However, scarred trees and carved trees have been reported from Wiradjuri language areas, including the Orange-Wellington region (Beek, 1999; Etheridge, 1918). A scarred tree was also identified by Kohen (2000) south of the Project area on a ridge to the north-east of the junction of the Belubula River and Flyers Creek.

More recently, Kayandel Archaeological Services noted a potential archaeological deposit along Cadiangullong Creek, between the Cadiangullong Creek diversion and Cadiangullong Dam (which was assessed to have moderate potential due to the flat topography and proximity to the creek line) (Kayandel Archaeological Services, 2008a).

K4 STAKEHOLDER CONSULATION

The Aboriginal consultation process undertaken for the Project is detailed in the following sub-sections.

K4.1 REGISTRATION OF INTERESTS

A search request of the Native Title Tribunal database was conducted in February 2005 and May 2007. No registered Native Title claims, unregistered claimant applications, or registrations of Indigenous Land Use Agreements were listed for the Blayney or Cabonne local government areas, within which the Project is located.

The OLALC has been an ongoing stakeholder at the Cadia Valley Operations since the inception of Cadia Hill Gold Mine. CHPL provided the opportunity for other stakeholders, in addition to the OLALC, to be consulted in regard to the Project via a Public Notice published in the *Central Western Daily* and *Blayney Chronicle* in February 2007. Letters of Notification were also sent to the following recipients:

- Registrar of the NSW *Aboriginal Land Rights Act, 1983*;
- Local Government (i.e. Blayney Shire Council, Cabonne Shire Council and Orange City Council);
- DEC (now the DECC);
- NTS Corp (previously New South Wales Native Title Services Ltd); and
- the OLALC.

The OLALC was the only group that registered an interest in being consulted in relation to the Project.

K4.2 CONSULTATION REGARDING CULTURAL HERITAGE ASSESSMENT METHODOLOGY

The proposed methodology for the Cadia East Project cultural heritage assessment was developed and forwarded to the OLALC for review in March 2007. The OLALC indicated that they were satisfied with the proposed methodology.

K4.3 SURVEY PARTICIPATION

The OLALC has been involved in the surveys undertaken for the Project. The OLALC representatives who participated in the Project Aboriginal Cultural Heritage Assessment are listed in Table K-2.

Table K-2
Participation of the Orange Local Aboriginal Land Council in the Project Aboriginal Cultural Heritage Assessment

Survey and Assessment	OLALC Representative
Cadia East Subsidence Area Survey	James Williams and Cecil Ebsworth
Tailings Storage Facilities Survey	James Williams and Chad Morgan
Concentrate Pipeline Route and Cadia Valley Operations Dewatering Facility Survey	James Williams[1]

[1] James Williams was unable to accompany the survey team, but stated that he supported the conduct of the survey provided that the report was provided to the OLALC for review.

K4.4 DEVELOPMENT OF MANAGEMENT MEASURES AND FINALISATION OF ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT

Prior to finalisation of the draft Cadia East Project Aboriginal Cultural Heritage Assessment report, CHPL met with the OLALC on 19 November 2008 to discuss the findings of the Aboriginal cultural heritage surveys, obtain feedback on proposed Project Aboriginal heritage management measures (Section K7) and to discuss the process for obtaining OLALC feedback on the draft report so it could be finalised.

Following the 19 November 2008 meeting, OLALC advice received at the meeting was considered in the finalisation of the draft report and it was then issued to the OLALC for review.

The OLALC's formal response to the draft report is provided in Attachment KA and this response indicated that the OLALC has no concerns in regards to the Aboriginal Cultural Heritage Assessment.

K5 PROJECT ABORIGINAL CULTURAL HERITAGE SURVEYS

The three surveys that have been conducted for the Project Aboriginal Cultural Heritage Assessment are described in the following reports:

- *Cadia East Study Area Cultural Heritage Survey* (2005) (herein referred to as the Cadia East Subsidence Area Survey). Prepared by Colin Pardoe Bio-Anthropology & Archaeology.
- *Cadia East Project Cultural Heritage Assessment of Extension to the Northern and Southern Tailings Storage Facilities* (2007) (herein referred to as the Tailings Storage Facilities Survey). Prepared by Colin Pardoe Bio-Anthropology & Archaeology.
- *Cadia East Project Aboriginal Cultural Heritage Assessment – Concentrate Pipeline Route and East Blayney Dewatering Facility* (2008b) (herein referred to as the Concentrate Pipeline Route and Cadia Valley Operations Blayney Dewatering Facility Survey). Prepared by Kayandel Archaeological Services.

A summary description of the surveys is provided in the following sub-sections. The findings of the surveys are presented in Section K6.

K5.1 CADIA EAST SUBSIDENCE AREA SURVEY

The Cadia East Subsidence Area Survey was undertaken on 17 to 20 January 2005. The study area was approximately 445 ha in area and included the Cadia East open pit (a component of the Project which is no longer proposed) and Cadia East mine subsidence zone and zone of influence. The survey was conducted by Dr Colin Pardoe, accompanied by Mr James Williams and Mr Cecil Ebsworth of the OLALC.

The survey was carried out using pedestrian survey techniques. Land with slopes less than approximately 10 degrees was examined by walking along ridge-tops and valley floors. Most of the study area had a slope of much greater than 10 degrees.

K5.2 TAILINGS STORAGE FACILITIES SURVEY

The Tailings Storage Facilities Survey was undertaken on 19 to 21 June 2007. The study area was approximately 370 ha in area and comprised the future inundation areas of the NTSF and STSF.

The survey was undertaken using pedestrian and vehicular survey techniques. The survey was conducted by Dr Colin Pardoe, accompanied by Mr James Williams and Mr Chad Morgan of the OLALC.

K5.3 CONCENTRATE PIPELINE ROUTE AND CADIA VALLEY OPERATIONS DEWATERING FACILITY SURVEY

The Concentrate Pipeline Route and Cadia Valley Operations Dewatering Facility Survey was undertaken by Kayandel Archaeological Services under the direction of Dr Colin Pardoe on 17 and 18 March 2008. A further inspection was undertaken by Kayandel Archaeological Services on 8 October 2008. The study area consisted of the CVO Dewatering Facility site located approximately 1.5 km east of the current facility, and the 33 km concentrate pipeline route from Cadia Valley Operations to Blayney and to the CVO Dewatering Facility site (Figure K-1).

The study area was inspected using vehicular and pedestrian survey techniques involving topographic traverses and opportunistic transects across the survey area. Topographic traverses involved team members inspecting the ground, creek-lines and slopes. Opportunistic transects were undertaken to inspect areas of particular topographic sensitivity within the study area. All old growth trees within and adjacent to the study area were inspected for cultural modification.

K6 IDENTIFIED CULTURAL HERITAGE SITES AND AREAS OF INTEREST

K6.1 PROJECT DISTURBANCE AREAS

The three surveys were focussed on the three major components of the Project that would involve extension of the approved Cadia Valley Operations disturbance areas (i.e. the Cadia East mine subsidence zone; the extension of the STSF, NTSF and Rodds Creek Water Holding Dam; and construction of the new concentrate pipeline and dewatering facility in Blayney).

Key potential impacts of the Project on Aboriginal heritage include:

- subsidence of the land surface, alteration of topography and drainage (and long term restrictions on futures access to land) within the Cadia East subsidence zone;
- soil stripping activities, construction of secondary embankments and inundation of the STSF and NTSF extension areas with mine tailings;
- raising of embankments and periodic inundation of the Rodds Creek Water Holding Dam extension area with contained water;
- disturbance along the existing concentrate pipeline route to Blayney associated with construction of the new concentrate pipeline;
- land disturbance associated with the extension of the concentrate pipeline route and construction of the CVO Dewatering Facility to the east of Blayney; and
- land disturbance associated with the relocation, expansion or development of supporting infrastructure for the Cadia Valley Operations over the life of the Project (e.g. relocation of access roads).

K6.1.1 Aboriginal Heritage Sites Identified in the Surveys

Lithic Items

One isolated object, a quartz flake fragment was identified within the Project disturbance area during the Project Aboriginal cultural heritage surveys. This object was registered as Aboriginal cultural heritage site Woodville 1. Woodville 1 comprises a single quartz flake fragment located along the concentrate pipeline route, approximately 200 m from the intersection of Cadia Road and Woodville Road.

A description of this object is presented in Table K-3 and the site location is shown on Figure K-2.

Table K-3
Identified Aboriginal Site

Survey	Site	Description[1]
2008[1]	Quartz Flake Fragment (Woodville 1)	A quartz flake fragment that exhibits typical characteristics of being conchoidally fractured. It shows flake scar ridges on the dorsal surface typical of previous flakes being removed.

[1] *Cadia East Project Aboriginal Cultural Heritage Assessment – Concentrate Pipeline Route and East Blayney Dewatering Facility* (Kayandel Archaeological Services, 2008b).

Culturally Modified Trees

The Tailings Storage Facilities Survey identified one scar tree south of the STSF, and a second tree within the approved Ridgeway Gold Mine STSF inundation area. These trees were identified as Culturally Modified Tree (CMT) 1 and 2, respectively. One of these trees (CMT2) was identified as being of probable Aboriginal origin.

Dr Colin Pardoe, CHPL and the OLALC considered that salvage of CMT2 should be undertaken prior to inundation of the tree by tailings by the approved STSF. CHPL prepared an application for a Section 90 consent under the *National Parks and Wildlife Act, 1974* (NPW Act) to salvage CMT2. The application was lodged with the DECC on 1 May 2008 and consent was granted on 4 August 2008. Salvage of the tree was subsequently undertaken by CHPL for relocation to a site to be agreed with the OLALC.

CMT1 is located to the west of the Belubula River pipeline and is not considered to be of Aboriginal origin. The location of the tree is shown on Figure K-1.

At the meeting with the OLALC on 19 November 2008 Mr James Williams and CHPL agreed to conduct an inspection of an additional scarred tree that had been observed in the approved STSF inundation area during the salvage of CMT2. During a subsequent inspection on 5 December 2008 by Kayandel Archaeological Services and Mr James Williams of the OLALC it was concluded that the scarred tree was of natural origin, and was not the result of cultural modification by previous Aboriginal inhabitants of the area (Kayandel Archaeological Services, 2008c). As the scarred tree would be inundated by tailings, the OLALC requested that a section of the tree be relocated for use by the OLALC for education of younger members of the Aboriginal community (i.e. as an example of a scarred tree of natural origin) and CHPL agreed to this request.

K6.1.2 Areas Considered to Have Some Archaeological Potential

In addition to Woodville 1 and culturally modified trees, areas of interest were identified within or immediately adjacent to Project disturbance areas that may have some potential for deposited archaeological material. These areas are described in Table K-4.

Table K-4
Identified Areas of Interest with Some Archaeological Potential

Survey	Area	Description[1]
2005[1]	Southern Sloping Plain (Figure K-2)	• This area is represented by creek flats, low valley areas and terraces where residential areas might be expected and possibly covered by recent sediments (i.e. sediments of the last 150 years or so).
	Flat Ground Suitable for Residence (Terraces) (Areas 48 and 62 on Figure K-2)	• Four lower areas suitable for residence were examined in detail. Two of these (areas 35 and 48 on Figure K-2) are within Project disturbance areas. Area 62 is outside of the subsidence zone but immediately adjacent to the associated 'zone of influence'. Within the zone of influence some cracking may occur but the ground is not expected to subside. • These areas were located at creeks where the land widens out and flattens. Terraces have developed along the creeks, but it is unclear how much of the soil might be recent overburden eroded down slope after forest clearance. During the survey it was possible to examine stratigraphic sections of two of these terraces where the creeks had exposed the profile. Grades of brown soil to gravel at both locations were observed and no evidence of cultural modification was found. It is therefore likely that these terraces are of recent origin. The examined terraces are considered unlikely to contain any archaeological evidence below this overburden. • Stratigraphic sections of two of the terraces (48 and 62 on Figure K-2) were not examined and therefore it is possible that artefacts may exist under the surface. If artefacts were present, they would be of the same general nature as those seen on the surface (i.e. lithic origin) and of those found in previous surveys.

[1] *Cadia East Study Area Cultural Heritage Survey* (Colin Pardoe Bio-Anthropology and Archaeology, 2005)

K6.2 PROXIMAL SITES

K6.2.1 Project Surveys

Three lithic items (scatter) (sites 12, 15, 18 on Figure K-2) were also found during the Cadia East Subsidence Area Survey outside the proposed Project disturbance area. These were isolated finds (approximately 65 m apart) on the ridge top to the north of the proposed Cadia East underground mine subsidence zone (Figure K-2). It is not anticipated that these items would be disturbed by the Project.

In addition, a potential archaeological deposit (PAD) was also identified to the immediate south of the STSF. It is not anticipated that this PAD would be disturbed by the Project.

K6.2.2 Previous Surveys

The Ridgeway EIS surveys conducted by Kohen (2000) included coverage of the Belubula River pipeline and extraction point. This pipeline would be duplicated and the pumping infrastructure would be upgraded as part of the Project.

A CMT was identified by Kohen during the 1999 survey for items of Aboriginal significance within and surrounding the Belubula River extraction point and pipeline (Kohen, 2000). The CMT (FC/1) is located south of the Project area on a ridge to the north-east of the junction of the Belubula River and Flyers Creek *(ibid.*). The site is approximately 120 m from the existing pipeline from the Belubula River and is considered to be of high significance to the local Aboriginal people (*ibid.*). The CMT was not disturbed by the development of the Ridgeway pipeline and pumping systems.

The location of FC/1 is shown on Figure K-1.

The Cadia East additional pipeline and pumping infrastructure would be located adjacent to the existing Belubula River pipeline and pumping infrastructure, and the CMT (FC/1) would not be impacted by the Project.

K6.3 CULTURAL SIGNIFICANCE ASSESSMENT

The OLALC has been involved in the survey and assessment process and has provided feedback on assessment, management of identified sites and providing advice on the cultural significance of the Project area and identified Aboriginal sites to the contemporary Aboriginal community (Attachment KA). The OLALC states that:

> *It should be noted that all of the land is of cultural significance to the Aboriginal people of Australia. Although some areas hold more significance to others the land was formed as party of the "dreamtime" the creation period. Non Aboriginal people need to recognise the importance of the Dreamtime and what it means to Aboriginal people.*

It is important to point out that the Orange community and descendents of the Wiradjuri Nation believe that Aboriginal objects and sites are significant to them, and that descendents of this community may have been related to the people who inhabited this area before colonisation. We believe that as caretakers and custodians of this country that the objects and sites are a valuable resource to this community. Educationally tool making practices and techniques used are rarely seen by individuals. Scarred trees and how they were made and utilised as a natural resource is not a common practice used today. Culturally it is important to Aboriginals that nothing is destroyed and these artifacts (objects) are a glimpse into our culture and heritage, it also dispels the myths relating to the colonisation of Aboriginal Australia.

Little is known by the local Aboriginal community regarding any significance of the areas where Cadia Valley operations are located, but with open lines of communication and Aboriginal involvement in future development or operational procedures, would ensure that the operations will continue without threat to any area of significance.

K7 MANAGEMENT AND MITIGATION

This section presents strategies for the management of the Aboriginal sites and areas of interest that have been identified in the Project disturbance area.

Due to the limited amount of cultural heritage material identified in the Project area, and in accordance with the advice of the OLALC, it is not proposed that an Aboriginal Cultural Heritage Management Plan would be prepared for the Project.

Proposed Aboriginal cultural heritage management measures are outlined below and would be detailed in the main text of the Environmental Assessment. These measures would be integrated with existing CHPL heritage management measures, where relevant.

K7.1 GENERAL MANAGEMENT MEASURES

While only a limited number of Aboriginal artefacts have been identified to date at the Cadia Valley Operations, it is possible that additional artefacts or sites may be identified during the development of the Project.

The following provides a general approach to management of Aboriginal cultural heritage during the life of the Project:

- Consultation with the Aboriginal stakeholders would be ongoing over the life of the Project. Appropriate Aboriginal representation would occur during archaeological fieldwork (e.g. test pitting or collection of artefacts prior to construction).
- CHPL would provide opportunities for Aboriginal community members to access identified Aboriginal sites located on CHPL owned land (e.g. for personal reasons or as part of scheduled field activities) in accordance with Occupational Health and Safety Requirements.
- Any new sites which may be identified during the development of the Project would be registered with the DECC in consultation with registered Aboriginal stakeholders.
- A record of known Aboriginal heritage sites, their status and location would be maintained by CHPL.
- Where practicable, known Aboriginal sites would be avoided during Project construction works at the Cadia Valley Operations, and demarcation of known Aboriginal sites would be undertaken where works are required in close proximity, to avoid accidental damage.
- In the event that avoidance of known sites is not practicable, artefacts would be collected for safekeeping by an archaeologist in consultation with registered Aboriginal stakeholders.
- It is anticipated that registered Aboriginal stakeholders would continue to provide advice on the storage of collected artefacts, management of artefacts at the completion of Project activities (e.g. artefact replacement onto the post mining landscape) and the implementation of management measures for salvaged CMTs.

Additional specific management measures are described below.

K7.2 LITHIC ITEMS

Proposed management strategies for site Woodville 1 (quartz flake fragment) (refer Figure K-2) are provided below:

- The artefact at Woodville 1 would be collected prior to construction of the new concentrate pipeline in consultation with the OLALC.
- The artefact would be stored on-site at the Cadia Valley Operations in a locked cabinet or suitably secure location for the duration of construction works on the pipeline.
- In general accordance with the wishes of the OLALC, the artefact would be placed within close proximity to its present location, after the completion of pipeline construction activities.

No specific management measures are proposed for the artefact scatters located to the north of the Cadia East mine subsidence area (sites 12, 15 and 18 on Figure K-2) which are not expected to be disturbed by the Project. However the location of these finds would be noted on relevant CHPL drawings and diagrams to reduce the risk of accidental disturbance during ongoing Cadia Valley Operations land management activities.

K7.3 CULTURALLY MODIFIED TREES

As described in Section K6.1.1, CHPL has salvaged CMT2 in accordance with DECC approvals.

As described in Section K6.1.1, a section of a scarred tree of natural origin that will be inundated with tailings will also be removed for use in education by the OLALC (as an example of a scarred tree of natural origin).

In the event that any additional scarred trees of probable Aboriginal origin are identified in Project disturbance areas during the life of the Project, salvage of a section of the tree, or other suitable management measures would be implemented in consultation with registered Aboriginal stakeholders.

A suitable location for the storage (and/or display) of the salvaged sections of CMTs at the Cadia Valley Operations would be identified and managed in consultation with registered Aboriginal stakeholders.

K7.4 AREAS CONSIDERED TO HAVE SOME ARCHAEOLOGICAL POTENTIAL

Management strategies for the areas of identified archaeological potential within the Cadia East mine subsidence zone and immediate surrounds are detailed below. These measures would be implemented prior to the commencement of mine subsidence in consultation with the OLALC:

- Test pit examination of the Southern Sloping Plain and Terraces 48 and 62 would be undertaken in order to determine whether there is any evidence of archaeological materials or deposits.
- Test pits may be dug by hand or mechanically (using an excavator or similar). If evidence of archaeological materials or deposits is found, hand excavation would be used.
- Test pits would be approximately 1 m x 0.5 m in area. Depth of excavation would be determined by the sediments, but from field inspection it is unlikely that excavation would exceed 0.5 m depth.

- An indicative test pit programme would include (subject to consultation with the OLALC):
  - Terrace 62 – up to 10 test pits;
  - Terrace 48 – up to four test pits; and
  - Southern Facing Plain - up to 20 test pits distributed on higher ground, along drainage lines and around lower ground to the south;
- A portion of the excavated materials from the test pits would be sieved. It may be necessary to wet sieve, in which case provisions would be made to contain the sediment slurry (e.g. with the use of downstream sediment fences). Test pits would be backfilled on completion (with the slurry, if wet sieving is used).
- Should cultural deposits, objects or features be found and particle size analysis be considered necessary, a sediment analysis of particle size would be carried out where cultural deposits are found. Particle size analysis provides a breakdown of the distribution of grain sizes and is used to study conditions of deposition. Particle size analysis may identify sources of materials in anthropogenic deposits and whether there is a mixture of materials. If undertaken, particle sizing would be undertaken in an Earth Sciences laboratory.
- Should cultural deposits, objects or features found during test pitting warrant further excavation (i.e. to determine the extent and contents of the deposit) further works would be determined by the Archaeologist in consultation with the OLALC. The number of excavation squares would be guided by the size and density of deposit, but standard excavation practices would be adhered to, with appropriate sieving, soil and artefact collection. If appropriate, up to six Accelerator Mass Spectrometry radiocarbon samples per area would be collected and submitted to allow dating of the material.
- Any finds would be analysed to a degree compliant with the requirements of the DECC and in consultation with the OLALC.
- A brief report detailing the methodology and findings of the test pitting activity would be prepared following completion of works. Reporting would require section diagrams, artefact description, and photo documentation as required.
- A summary of the findings of any salvage works undertaken would be provided in the Cadia Valley Operations Annual Environmental Monitoring Report (AEMR).
- On the basis of past studies in the Cadia Valley, it is not expected that a large amount of cultural material would be recovered. Cultural material recovered from the test pitting programme and any subsequent salvage excavations would be stored in a suitable secure location (e.g. locked cabinet) at the Cadia Valley Operations, or a suitable alternative location as determined in consultation with the OLALC.
- At the cessation of the Project, the return of the cultural material to a location proximal to its source (or suitable alternative location) would be determined in consultation with the OLALC.

K7.5 REPORTING

Reporting of site excavation works, collection and storage of artefacts (and where relevant replacement of artefacts) would be undertaken in accordance with DECC requirements.

Where relevant, a summary of Aboriginal heritage management activities at the Project would be the regularly provided in the Cadia Valley Operations AEMR.

K8 REFERENCES

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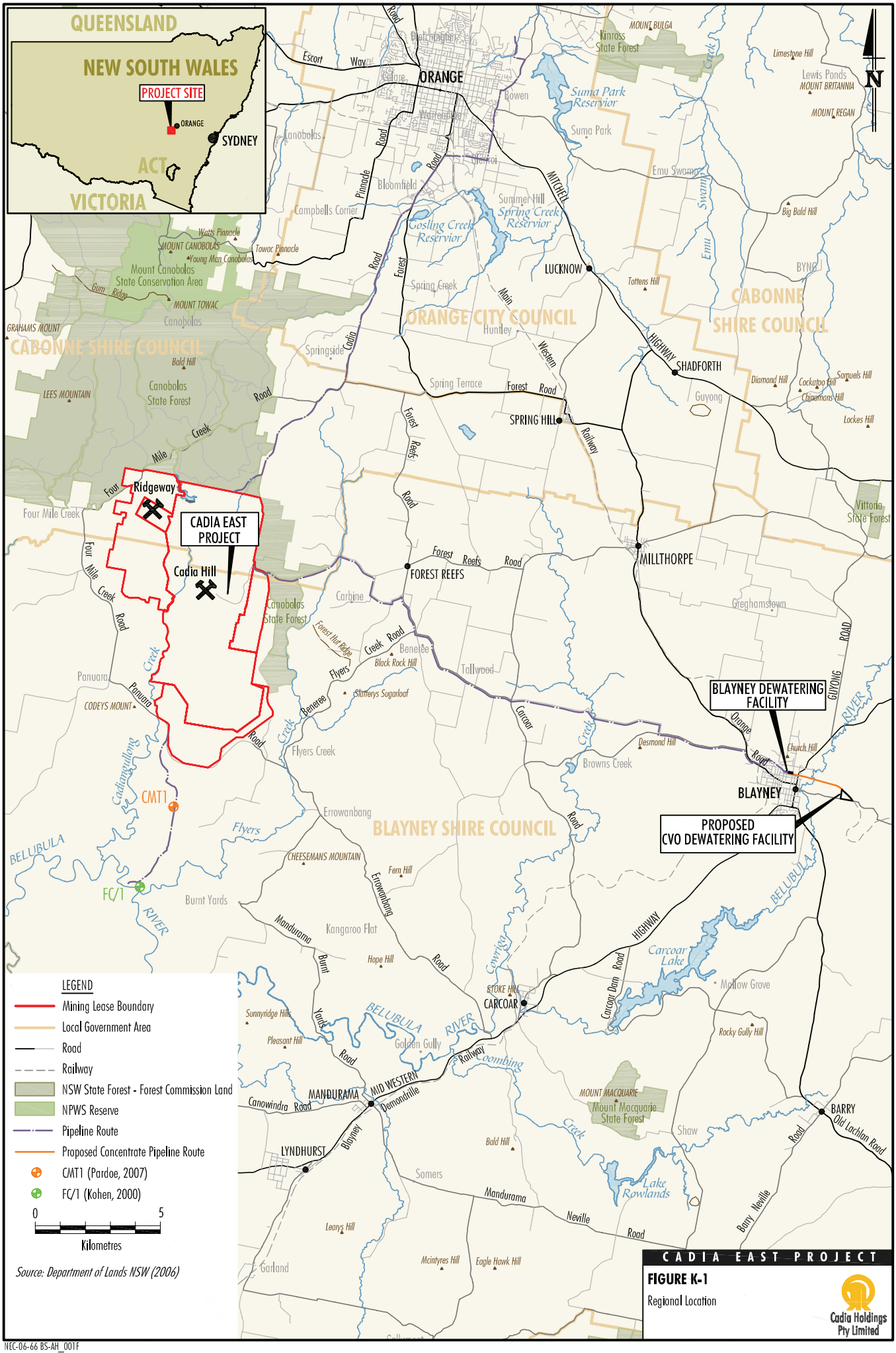
FIGURES



NEC-06-66 BS-AH_001F

Source: CHPL (2000 and 2008); Ausenco (2007) Pardoe (2005, 2007); Kayandel (2008) and Aerial Photograph CHPL (July 2008)

CADIA EAST PROJECT

FIGURE K-2

Relevant Aboriginal Cultural Heritage Sites and Areas of Interest

Cadia Holdings Pty Limited

NEC-06-66 BS-AH_103K

ATTACHMENT KA

ORANGE LOCAL ABORIGINAL LAND COUNCIL LETTER

ORANGE LOCAL ABORIGINAL LAND COUNCIL

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Nedra Burns
Community Relations Manager
Cadia Valley Operations

Re: Cadia East Project – Draft Aboriginal Cultural Heritage Assessment

Dear Nedra

Thank you for the opportunity to comment regarding the proposed methodology for the Cadia East Aboriginal Cultural Heritage Assessment.
After our meeting in November and having read the draft report that you have provided. I have no concerns regarding the methodology contained in the report. It covers all areas discussed and allows further input if required at a later date. The Orange Local Aboriginal Land Council is available in the future to have further involvement regarding any developments or Cultural Heritage management issues.

Thanking you

JWilliams

James Williams
CEO OLALC
16/1/2009

ORANGE LOCAL ABORIGINAL LAND COUNCIL

LAND HOUSING ENTERPRISE

42 DALTON STREET,
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Nedra Burns
Community Relations Manager
Cadia Valley Operations

Re: Cadia East Project – Draft Aboriginal Cultural Heritage Assessment
Cultural Significance Assessment

Dear Nedra

Thank you for the opportunity to comment regarding the cultural significance of the Cadia East project area.

It should be noted that all of the land is of cultural significance to the Aboriginal people of Australia. Although some areas hold more significance to others the land was formed as part of the "dreamtime" the creation period. Non Aboriginal people need to recognize the importance of the Dreamtime and what it means to Aboriginal people.

It is important to point out that the Orange community and descendants of the Wiradjuri Nation believe that Aboriginal objects and sites are significant to them, and that descendants of this community may have been related to the people who inhabited this area before colonization. We believe that as caretakers and custodians of this country that the objects and sites are a valuable resource to this community. Educationally tool making practices and techniques used are rarely seen by individuals. Scarred trees and how they were made and utilized as a natural resource is not a common practice used today. Culturally it is important to Aboriginals that nothing is destroyed and these artifacts (objects) are a glimpse into our culture and heritage, it also dispels the myths relating to the colonization of Aboriginal Australia.

Little is known by the local Aboriginal community regarding any significance of the area where Cadia Valley operations are located, but with open lines of communication and Aboriginal involvement in future development or operational procedures, would ensure that the operations will continue without threat to any area of significance.

Thanking you

James Williams
CEO OLALC
16/1/2009