APPENDIX 5

Archaeology

archaeological risk assessment services

Aboriginal Cultural Heritage & Archaeological Assessment

for

Moolarben Coal Project
Stage 1 Rail Loop Modification Project
In support of a Section 75w (2) Approval

A Report to Moolarben Coal Operations Pty Ltd

by

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1. INTRODUCTION & BACKGROUND

Archaeological Risk Assessment Services Pty Ltd has been engaged by Moolarben Coal Operations Pty Ltd to conduct an Aboriginal Cultural Heritage assessment as part of a Section 75W (2) approval for a project modification of Moolarben Coal Project Stage 1 Rail Loop Configuration.

The modification involves a re-configuration of its "Figure 8" rail loop design to a "Balloon" rail loop design. As a result of this design modification, an additional area of rail corridor has to be assessed for likely impacts on Aboriginal Sites and Objects not previously assessed in the MCP Stage 1 Environmental Approval. The study area covers approximately 8 hectares (0.08km^2) of land (*see* Figure 1: Appendix 1.).

1.1 Project Description

The land to be developed is rural in character and has been previously developed for grazing. The area to be impacted covers a construction corridor 50m wide. The construction method will also excavate an area to build a 6-7 metre high rail bund (*see* Figure 2: Appendix 1).

1.2 Aims of the Assessment

The purpose of undertaking an Aboriginal Cultural Heritage and Archaeological Assessment is to carry out an assessment of the project, with the involvement of the Aboriginal community, to confirm the Aboriginal heritage values of the study area and define any constraints and opportunities in carrying out a project modification.

It is necessary for the current project to identify matters which are relevant in assessing whether a project, to which Part 3A of the Environmental Planning and Assessment Act 1979 applies, is likely to have an impact on Aboriginal cultural heritage. In order to comply with the above requirement, a proponent should consider the following when making an assessment:

- Justification for any likely impact(s), including any alternatives considered for the proposal;
- Any measures which will be implemented to avoid, mitigate or offset the likely impact(s); and
- Demonstration that the input by affected Aboriginal communities has been considered when determining and assessing impacts, developing options, and making final recommendations to ensure that Aboriginal cultural heritage outcomes can be met by the proposed development.

The aims of the study were to:

- Review any relevant existing Aboriginal Cultural Heritage information and relevant databases;
- Carry out an archaeological assessment to identify likely Aboriginal heritage issues on the ground and make an assessment of likely Aboriginal heritage potential;
- Advise on the appropriate level of Aboriginal consultation that may be required;
- Determine whether the proposed activity is likely to cause any additional damage to Aboriginal Objects other than any that may have occurred already;
- Provide advice as to the likely land use restrictions posed by Aboriginal Heritage Objects or potential Aboriginal Heritage Objects; and
- Provide recommendations for any further Aboriginal Cultural Heritage work at the development.

2. ABORIGINAL CULTURAL HERITAGE ISSUES & BACKGROUND RESEARCH

A review of the NSW Department of Environment and Climate Change (DECC) Aboriginal Heritage Information Management System to determine if any known Aboriginal Sites were registered for the land proposed for development was undertaken. The results of the register search show there are registered Aboriginal Sites or Objects located near the land proposed for development (*see* Figure 2: Appendix 1). These sites have been previously recorded by Hamm (2006 & 2008) as part of the Moolarben Coal Project Stage 1 & 2 Assessments.

Table 1 Known Aboriginal sites located within or near the study area within a 3–5km radius

*= located within the Stage 2 MCP study area

Ulan ID#	Site Name	DECC Site #	Site Type	Eastings	Northings	Landform
62	Identifier 62 or S4	36-3-040	artefact scatter	756000	6428000	Simple slope
65	Identifier 65 or S3	36-3-041	artefact scatter and grinding grooves	756510	6428030	Creek flat
66	Identifier 66		isolated find	756550	6428338	Simple slope
67	Identifier 67		isolated find	756552	6428448	Simple slope
68	Identifier 68 or F3		isolated find	756464	6428520	Simple slope
69	Identifier 69 or F1		isolated find	756545	6428599	Simple slope
70	Identifier 70 or S5	36-3-038	isolated find	756000	6428000	Simple slope
71	Identifier 71 or F4	36-3-038	artefact scatter	756660	6428867	Simple slope
72	Identifier 72		artefact scatter	756701	6428906	Simple slope
	Cook Gap	36-3-0015	axe grinding groove	760387	6415931	
	Ulan; Murragamba	36-3-0016	shelter with art	760796	6421957	
	Wollar	36-3-0020	shelter with art	777958	6415823	
	Cooks Gap	36-3-0027	axe grinding groove	7603873	6415931	
	Ulan	36-3-0039	scarred tree	760828	6427722	
	Ulan Creek; Site 2	36-3-0042	axe grinding groove, shelter with art, shelter with deposit	762944	6428010	
	Ulan; Wilpinjong Creek	36-3-0044	Bora/ceremonial, carved trees	771442	6420278	
	Ulan Creek; Site 18	36-3-0060	open campsite	760215	6426006	
	Ulan Creek; Site 19	36-3-0061	open campsite	760878	6426622	
	Ulan Creek; Site 21	36-3-0063	open campsite	761207	6428074	
	Bobadeen	36-3-0068	shelter with art	761661	6427966	
	Wollar; Gulgong	36-3-0074	open campsite	781478	6414502	
	Wattle Creek No.2	36-3-0098	shelter with art	769880	6422760	
	Yawanna No.2	36-3-0101	shelter with art	774740	6421270	
	Wilpinjong	36-3-0103	scarred tree	767950	6422190	
	Yawanna No.1	36-3-0106	shelter with art	774780	6421260	
	Yawanna No.3	36-3-0115	axe grinding groove	774800	6420900	

Ulan ID#	Site Name	DECC Site #	Site Type	Eastings	Northings	Landform
	Yawanna No.4	36-3-0116	open campsite	775200	6420600	
	Deridgeree No.3	36-3-0124	axe grinding groove	777480	6427480	
	Wattle Creek No.1	36-3-0133	shelter with art	769500	6422630	
	*Murragamba No.1	36-3-0134	shelter with art	761300	6421170	
	Moolarben Creek MC1	36-3-0222	open campsite	760420	6420820	Alluvial flat
	MC2	36-3-0223	open campsite	760420	6420880	Alluvial flat
	MC4	36-3-0241	artefact	763161	6421650	Alluvial flat
	MC11	36-3-0237	artefact	763384	6421070	Alluvial flat
	MC10	36-3-0238	artefact	763226	6422860	Alluvial flat
	MC8	36-3-0239	artefact	763193	6422680	Alluvial flat
	MC6	36-3-0240	artefact	763113	6421940	Alluvial flat
	WC/1	36-3-0287	art (pigment or engraved)	765680	6425480	Alluvial flat
	*MC7	36-3-0337	open campsite	763136	6422480	Alluvial flat
	N/A	36-3-0690	N/A	N/A	N/A	N/A
	N/A	36-3-0691	N/A	N/A	N/A	N/A
	N/A	36-3-0692	N/A	N/A	N/A	N/A
	N/A	36-3-0693	N/A	N/A	N/A	N/A
	N/A	36-3-0694	N/A	N/A	N/A	N/A
	N/A	36-3-0695	N/A	N/A	N/A	N/A
	N/A	36-3-0696	N/A	N/A	N/A	N/A
	N/A	36-3-0697	N/A	N/A	N/A	N/A
	N/A	36-3-0698	N/A	N/A	N/A	N/A
	N/A	36-3-0699	N/A	N/A	N/A	N/A

2.1 Known Registered DECC Aboriginal Sites within MCP Stage 1 & 2 areas

The 18 registered DECC Aboriginal sites located near the study area are: 36-3-0016, 36-3-0134, 36-3-0237, 36-3-0238, 36-3-0239, 36-3-0240, 36-3-0241, 36-3-0287, 36-3-0337, 36-3-0690, 36-3-0691, 36-3-0692, 36-3-0693, 36-3-0694, 36-3-0695, 36-3-0696, 36-3-0697, 36-3-0698, 36-3-0699 (*see* Table 1 above). These sites are described below:

2.2 Site Descriptions

36-3-0016 – This rock-shelter site with art was originally reported to Fred McCarthy by a Mr J Milliken Resident Engineer in the mid 1940's. McCarthy reports the site in his journal article for Mankind Vol. 3 No. 6 1944 (McCarthy 1944). It is described as Site Number 152, Murragamba, Gulgong Parish, Cave at Murragamba via Ulan. Known as 'Hands in the Rock Cave'; it contains hands, iguana and emu tracks in red. Its condition then was described as faded and vandalised. The site was later re-recorded by Bluff in 1987 and given a new NPWS site number 36-3-0134.

36-3-0134 – This is the same site as was reported by McCarthy in 1944. Warren Bluff recorded it in November 1987 calling it 'Murragamba 1'. The site was described as a large shelter in cliff-line with good deposit at northern end measuring 23m in length x 2.5m in height and 7m in depth with pencil charcoal paint over art names scratched in rock lying on flour. The owner was identified as Mr MJ Carlisle.

The site became known to local Aboriginal people in the mid 1980s and in 1999 the DECC investigated the site as part of a Ulan rock art conservation project (*see* Lambert 1999). Lambert reported that: *"Being a remote site on private property, visitation levels are low and there is no recent visitor damage. The site is in need of management to control illegal practice of writing on the shelter walls"*. The site is described as Wollar 1 but there was some confusion whether it had been previously recorded and registered. Lambert also comments that: *"The cave provides adequate protection from surface water and no intervention in the form of artificial drip-lines are proposed. The art appears stable and in good condition"* (Lambert 1999:4). There was a discussion on how the site should be fully recorded given the amount of graffiti and its history. The local landowners expressed a view that the graffiti should not be removed without consultation with the local farming community families who might have an historical connection to the site.

36-3-0237 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an open artefact scatter/campsite located at the edge of a spur near Murragamba Road, approximately 170m from Murragamba Creek. It contains a scatter of 14 artefacts all made up of quartz material except one piece of green volcanic material. The assemblage is described as flakes, broken flakes and one retouched item (backed artefact).

36-3-0238 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an open artefact scatter/campsite located the edge of a spur near Murragamba Road, approximately 70m from Murragamba Creek. It contains a scatter of six artefacts all made up of quartz material. The assemblage is described as flakes, flaked pebble and broken flakes.

36-3-0239 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an open artefact scatter/campsite located the edge of a spur near Murragamba road, approximately 60m from Murragamba Creek. It contains a scatter of three artefacts made up of quartz material and tuff. The assemblage is described as core, flakes, and broken blade.

36-3-0240 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an isolated find located the edge of a spur near Murragamba road, approximately 15m from Murragamba Creek. It contains a single complete flake of white chert.

36-3-0241 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an open artefact scatter/campsite located on the edge of a spur near Murragamba Road, approximately 70m from Murragamba Creek. It contains a scatter of 19 artefacts principally made up of quartz and tuff material. The assemblage is described as flakes and broken flakes.

36-3-0337 – MC 7 – This site was recorded in 2001 by David Maynard as part of a Telstra cable survey and is described as an open artefact scatter/campsite located the edge of a spur near Murragamba road, approximately 50m from Murragamba Creek. It contains a scatter of 32 artefacts principally made up of quartz and tuff material. The assemblage is described as flakes and broken flakes with a flake tool.

36-3-0690 to **36-3-0699** – There is no information currently available from DECC about these sites or their site cards.

2.3 Registered Sites of Cultural Significance

A search of the DECC AHIMS show there are no known places or sites of cultural significance located near the study area. According to Glen Morris Senior Aboriginal Sites Officer with DECC, records from the NSW National Parks and Wildlife Service Sacred Sites Survey show that there were no living Aboriginal people interviewed in the 1980s who knew of places or sites of sacred value located near the study area (Glen Morris pers comm. 2005).

Site types that have been typically recorded in the general region include (*see* Figure 2: Appendix 1):

- Open campsites made up of stone artefacts dominated by tuff, silcrete and quartz assemblages and sometimes containing hearth material in the form of burnt or cracked sandstone heat retainers. These sites vary in complexity and density depending on their physical condition in the modern landscape and their proximity to major resource zones.
- Scarred Trees representing Aboriginal removal of bark material to make shelters, dishes, canoes, string, shields, boomerangs and carved trees. Within the study area most Aboriginal scars are found on River Red Gum (*Eucalyptus camaldensis*) or Blakely's Red Gum (*Eucalyptus blakelyi*), White Box (*Eucalyptus albens*) and Grey Box (*Eucalyptus largiflorens*). There is a strong correlation between large canoe type scars and more permanent river watercourses (i.e. associated with the use of the Goulburn, Cudgegong and Macquarie River flood plains).

- Carved Trees represent important Aboriginal ceremonial or burial marker locations. They are usually carved on high quality timber such as Red Gum. A slab of bark is removed and then the inner wood tissue is carved using a stone axe or heavy duty cutting tool. Common designs found on carved trees are diamond or linear cross hatching motifs.
- Burial sites are sites that show evidence of Aboriginal burial in discrete locations. Burials in the study region are usually associated with major areas of occupation found next to rivers, lagoons, lakes, waterholes and some creeks. Skeletal material is normally discovered eroding out of sandy deposits, where interment is easiest. Burials may occur in an isolated context or they may be part of a larger cemetery.
- Bora rings are sites containing an arrangement of natural stone to represent ceremonial or ritual practice. They are often found near traditional ceremonial grounds in areas of abundant surface rock. Rocks may be arranged in a circular fashion or oval shapes signifying important ritual meaning for a ceremony. Often bora rings are found isolated on ridge tops or flat hilltops overlooking a significant stretch of country.
- Art sites. These types of sites reflect Aboriginal use of sandstone outcrops for the purpose of painting, engraving or drawing traditional designs. Art sites are often found in areas where people are using country that has good sources of sandstone in the form of rock-shelters, which offer cover from the elements or may be located next to a stream or river.
- Common symbols found in art sites are hand stencils, figurative art representing animal or human forms, tracks of animals and patterns of lines or circles that may represent landscape elements to a traditional story.
- Axe grinding grooves. These types of sites are associated with Aboriginal people using sandstone outcrops to sharpen stone implements and in particular stone axes. Grinding grooves are usually 5-20cm in length and 2-3cm in depth depending on how often the person is using the groove section. Grooves may be found in clusters and are usually concentrated around a surface rock pool where people use water to assist them in sharpening an edge.
- Contact sites. A contact site is site where there is evidence of Aboriginal people living traditionally in close proximity to European settlement. Aboriginal people may be using European items in traditional hunting and gathering practices, for instance bottle glass as a substitute for stone, or metal as a substitute for bone or stone.
- Sites may be associated with Aboriginal people working for European settlers, such as gathering bark sheeting for bark slab huts. Often historic items associated with that contact would be found in certain traditional campsites.

- Waterhole/well. These types of sites, as well as being important places for obtaining water, may also be sacred places and of religious significance to living Aboriginal people.

2.4 Chronology of Aboriginal Occupation in the Central Western and North-West Slopes

Chronology of Aboriginal occupation within the broader region is known to be at least 29,000–34,000 years Before Present (BP) (Kamminga & Mulvaney 1999). The Pleistocene sites of Cuddie Springs and Tambar Springs provide some evidence of early human exploitation of open plain landforms which also contain megafaunal species (i.e. Diprotodonts). Attenbrow (2003) reports a date of 11,050 +/- 135 years BP for a rock-shelter site occupation (Loggers Rock-shelter Site) within the Upper Mangrove catchment.

In 1994, Patrick Gaynor obtained a date of 20,000 years BP from Crazy Man Rock-shelter in the Warrumbungles National Park. In 1970 David Moore completed excavation of a small rock-shelter at Bobadeen. This excavation site adjoins but is not within the Moolarben Coal Mine exploration license (EL). The Bobadeen shelter excavation produced a basal occupation date of 5500 years BP (Moore 1970, 1981).

In 1961, Tindale completed an excavation at Noola Rock-shelter in the Rylstone area and suggested a date of approximately 12,000 years BP for basal occupation. Another site, Botobolar 5 has been dated to 5770 +/- 100 years BP. Excavations within the Ulan Mine Lease are limited to a salvage excavation and several test excavations. The age of occupation of the sites has been assessed as less than 5000 years old. Technological attributes of stone artefacts present at sites in Ulan have not been the subject of comparison with other sites in the Central Tablelands or Hunter Valley regions, with the exception of Moore's (1970) excavation at Bobadeen.

Moore's (1970) investigations also provide a date of 7000-8000 years BP for the Ulan region, while Pearson (1981) recovered an occupation date of 5500 BP at a shelter site at Botobolar (Kuskie & Clarke 2005).

Haglund's archaeological surveys, test excavations of rock-shelters and open sites and surface collection of stone artefacts were all completed within the Ulan mine lease area in the early 80s. A salvage of shelter site 36-3-177 was the first major sub-surface investigation within Ulan Coal Mine Lease areas.

2.5 Local Archaeological Studies

A majority of Aboriginal sites recorded in or near the MCP Stage 2 study area have been recorded by several different types of Aboriginal heritage assessment. These can generally be described as:

- Telecommunication and power-line environmental surveys such as those undertaken by David Maynard and Siobhan Lavelle for Telstra and Country Energy;
- Volunteer heritage site recordings such as those undertaken by Fred McCarthy of the Australian Museum and Mr Warren Bluff;
- Academic archaeological research undertaken by Dr Mike Pearson in 1981; and
- Environmental assessment of coal mining leases such as those undertaken by Haglund and Associates for Ulan Mine, Hamm for Moolarben Coal Project Stage 1 & 2, Navin/Officer for Wilpinjong Mine and Kuskie and Clarke for Ulan Coal Mine.

2.6 Ulan Coal Mine Lease Archaeological Assessment: Overview

Prior to 1980, three sites were listed by AHIMS in the immediate vicinity of the Ulan Coal Mine Lease (UCML). Since 1980, there have been a number of Aboriginal heritage assessments of the existing Ulan mining lease as part of EIA and other studies, resulting in the recording and registration of over 440 Aboriginal sites. Aboriginal Heritage investigations of the Ulan Mine Lease (i.e. Ulan Colliery and No. 2 Underground mine have been carried out (*see* Haglund 1980, 1981b, 1992 and Corkill 1991).

These archaeological assessments also reported archaeological site descriptions, as well as oral history, and describe test excavations carried out on rock-shelter sites and surface collections. Archaeological surveys of Ulan Coal's ML1468 by Haglund (1999a, 1999b) for the EIS have been reported. A salvage excavation was also undertaken within one rock-shelter site (Haglund 1996a). Archaeological surveys have also been carried out on the northward extension of underground mining, including Longwall Panels 11 and 12 (Haglund 1996b) and Longwall Panels 13-17 (Edgar 1997).

Archaeological salvage excavations have been carried out on SG5 rock-shelter site within Longwall Panel 13 (Haglund 2001a, 2001b, White 2001). Archaeological surveys have also been undertaken for areas west of the existing open cut mine, an irrigation area and other infrastructure facilities (Haglund 1999c, 1999d; Kuskie 2004; Kuskie & Clarke 2005a). Detailed archaeological surveys of portions of the ML1468 area in advance of underground mining, including Panels 18–22 (Kuskie & Webster 2001), Panels 23-26 and W1 (Kuskie & Clarke 2005b) and Panels W2 and W3 (Kuskie & Clarke 2007).

2.7 Haglund's Assessment Studies: 1980–99

Haglund and Associates completed a series of archaeological assessments at Ulan Coal Mine covering a period of almost 20 years. Parts of the Ulan mine were previously surveyed by Haglund (1980, 1981a, 1981b, 1992 and 1999d). Haglund's initial assessment (1980) involved a preliminary archaeological survey of the Ulan Colliery and No. 2 Underground Mine areas. Six Aboriginal sites and numerous isolated finds were identified, largely within the area proposed for open cut mining.

Between 1980-1981 and 1991-1992 Haglund carried out a series of archaeological surveys of mine leases covering parts of the Ulan Mine Exploration area. She identified at least 60 Aboriginal archaeological sites within UCML mining leases.

Corkill (1991) undertook an archaeological survey along a 4km route of a proposed coal conveyor belt and an area to be impacted by mine infrastructure development. Two artefact scatters and one isolated find were located during the survey. One artefact scatter (UC1), located on *'a level bench on the west bank of Ulan Creek in the vicinity of the confluence with an unnamed tributary'*, comprised 50-100 artefacts, predominantly of quartz and chert (Corkill 1991). The other artefact scatter site (UC2) comprised four artefacts on a long exposure adjacent to a road junction and was not to be impacted by the proposed works (Corkill 1991). Chert and quartz were also present at this site which had a high level of disturbance due to earlier road works.

An isolated find (distal end of a quartz flake) was located on a track. Corkill recommended that the full recording of site UC1 be completed and arrangements made to ensure the protection of the site during construction (Corkill 1991) of the Ulan lease area Haglund commented that large portions of existing lease area had yet to be inspected. Table 2 below summarises her findings.

Table 2 Sites recorded as a result of Haglund's 1990s assessments

Report Code	Field Code	Land Form	Size	Boundary Criteria	Deposit Type	Visible Artefacts	Materials represented	Condition	Comments
WV/8	Kwk4	Hill crest; low hill in valley	N/A		Sandy with leaf litter, vis<10%				
MC6	Kbd2	Valley floor and foot slopes			Pale sand with grass	1C, 5F	2 quartz, 1 chert, 2 quartzite, 1 petrified wood	Many wombat holes	Patchy visibility
MC7	Kbd4	Valley floor			Sand with grass	Not recorded		Many wombat holes	Not recorded due to failing light
MC8	Bt2	Hill slope	c.30m	Fence and edge of track	Decaying rock and red sand	c.20 fragments	Quartz and chert	Trampled, eroded, disturbed	Visible artefacts damaged, site may continue beyond fence (woodland)

Report Code	Field Code	Land Form	Size	Boundary Criteria	Deposit Type	Visible Artefacts	Materials represented	Condition	Comments
MC10	Mc13	Valley floor and foot slopes	10m x10m	Track and erosion scar	Eroding B horizon	1C, 3F	3 chert, 1 quartz	Graded, wash, eroding	Site may continue both sides of track, poor visibility
MC12	Mc12	Hill slope	c.10m x10m		Sandy, rocky	2F, >3FF	Chert	Wash, ploughing	Probable remains of minor knapping event
MC13	Kht1	Creek banks, hill slope	C30m dlam.	Edge of clearing	Coarse sand and rock frags = lag	>50 C, F, Ff	Quartz	Severe erosion, disturbed	Severely affected by logging erosion. <10 artefacts/m square
MC14	Kht2	Hillside	c.60m (?)	Track	Eroding colluvium	F, Ff	Quartz	Track, severe erosion and wash	Appears to relate to MC13 nearby; 1 artefact? 5-10m of track
MC15	Mc14	Ridge crest	x.20m dlam	Tracks (intersecting)	Sandy, silty soil, A2-B horizon	C, F, Ff and traffic prod.	Quartz	Traffic, graded, eroded	Some artefacts crushed, many traffic products
BO1	Kl1	Hill slope	50m x20m	Exposures	Topsoil, degrading	C and F (sample recording)	Quartz	Parts much disturbed, road, ploughing	Low lying areas may retain good deposit
BO2	Krm3	Hill slope	c.5m x2m	Exposure on track	Topsoil, degrading	2C, 4F and 1Fp	Quartz	Track worn, slope cleared	Single knapping event. Small area, extends beyond track
BO3	Krm2	Hill slope	c.6m x2m	Patchy exposure	Topsoil, degrading	2F	Quartz	Disturbed by post clearing	Minor knapping/ discard event?
BO4	Krm1	Hill slope	c.30m x2m	Exposure along track	Topsoil, degrading	Core, 3F	Quartz, chert	Soil profile disturbed by road ploughing	Remains of minor, disturbed scatters of background scatter?
BO8	Bc/11	Creek bank and footslopes	c.100 m x50m	Exposure along track and near dam	Topsoil, degrading	1C, 2F, 7FF	Quartz, chert	Surface graded, possibly ripped	Areas between track and creek may retain some less disturbed deposit
BO9	Area 1	Flat crest of low ridge	Crest c.350 m x50m	Patchy exposure	Degrading surface	1C, 1F	Quartz	Severely eroded	Very sparse, little or no potential for research
DU3	Area 2	Rock platform above deep gullies and minor creeks	c.300 m x20m	Exposed rock platform	Bare rock	Sample of c.40 artefacts recorded: C, F, FF backed pieces, hammer and anvil stones	Quartz, chert, basalt, quartzite, petrified wood	Exposed to wash	Represents repeated activities? Probably linked to shelter site just below western end

Note: C=Core, F=Flake, Ff=Flake fragment, Fp=Flaked piece.

Haglund's studies aimed to collect available background information, including oral history, and to get at least 50% survey coverage of surfaces affected by the proposed open-cut mining and associated works. She explains that:

> *A less intensive sampling of other areas aimed to define the types of sites likely to be present, patterns of distribution and, if possible, probable frequencies. Three levels of intensity of survey coverage were aimed for: 100% survey of open sites and some selected areas and, in some areas, 25% survey or single traverse to assess topography, visibility and similarity to areas of more detailed survey.*
>
> *Samples of stone artefacts were collected from sites which would be destroyed by the proposed mining activities, and selected rock-shelters adjacent to the proposed open-cut mine were tested for the presence of stone artefacts, but no extensive excavation had been carried out within the mine area prior to the 1996 salvage excavation;..*(Haglund 1997:34)

In these two years, Haglund reported on the results of two surveys conducted in the existing mine and proposed open and underground operations at Ulan. The areas examined are located north-west of the Goulburn River, encompassing land units featuring a limited alluvial plain cut by minor tributaries of that river and prominent high ridge structures of sandstone outcrops.

As a data set, these results apply to past habitation in relatively close proximity (800–2500m) of a major waterway and accordingly have potential for setting up comparative insights for the Moolarben Coal Project. To the south of the mine is a subset of habitation phenomena in the ephemeral catchment that makes up the head waters of this major river system.

In 1992, Haglund also surveyed a proposed access route, an area proposed for surface facilities for an extension of the underground mine as well as carrying out sample surveys of three areas of different topography, concentrating on valleys bordered by cliff faces. One of the sample areas overlapped somewhat with the present study area.

She explains that:

> *As survey conditions were different during the 1996 season, a portion of the overlap was re-surveyed (= the east part of the Brokenback Unit).The surface scatters of stone artefacts identified within CCL 741 during previous surveys were found mainly within cleared, often cultivated, areas.*
>
> *The scatters were seen on and in yellow podsolic soils and yellow earth soils which both form firm and well drained surfaces which may be affected by sheet-flooding and severe erosion, but are unlikely to become unpleasantly boggy. In these cleared areas the surface often seemed lowered by deflation of surface wash. The artefacts were mostly exposed on the surface or covered by a thin layer of accumulated debris and turf, except on alluvial flats close to the creek bank or in minor sandy patches where the cover could be deeper and exposure occurred mainly in the sides of small gullies or erosion scars.*
>
> *Some of the erosion was possibly recent, and due to prolonged droughts. However, some artefacts with a heavy growth of lichen must have been exposed for considerable amounts of time. Given the soil characteristics, there was and is little chance of finding organic archaeological material in these open sites;...* (Haglund 1997:25)

Haglund (1996b) conducted the salvage excavation of DECC site #36-3-177, a rock-shelter site situated in the vicinity of longwall panels 10 and 11 which was considered necessary because longwall mining of these panels was scheduled to take place and the potential for the site to be detrimentally affected by subsidence could not be discounted. Salvage excavation was conducted over three days and a total area of $10m^2$ was excavated (Haglund 1996b). A total of 391 lithic artefacts and 374 flaking debris items were recovered from this excavation; predominantly quartz (68%) then with chert (28%) and igneous rock and petrified wood which were also present. The bulk of the excavated assemblage comprised flakes (52%) and flake fragments (26). Other artefact types recovered included cores, core fragments, flaked pieces and modified flakes (Haglund 1996b).

Haglund's investigation of reduction sequences at site #36-3-177 largely followed Witter's (1992) technological analysis methodology, and using this occupation model analysed the stone tool assemblage in terms of the profiles forwarded by Witter (1994). The assemblage recovered from the excavation most resembled that described for a '*vantage point / crafts station'*. Haglund concluded, however, that the assemblage did not fit any one suggested model in particular (Haglund 1996b).

Haglund's interpretation of the Aboriginal heritage evidence recovered from site #36-3-177 was one of sporadic occupation associated with artefact manufacture and/or repair and that the shelter may represent a vantage point site at which casual manufacture took place (Haglund 1996b). The age of the site was assessed as being within the last 5000 years, although there was no datable material such as charcoal (Haglund 1996b).

Haglund (1996a), during another survey, located an isolated find northwest of site #36-3-177. This was a quartz flake with retouch and use-wear and was interpreted by Haglund (1996a) as representing an item lost or discarded in transit.

Haglund (1996c) also recorded eight rock-shelters and three artefact scatters which had the potential to be affected by longwall mining subsidence and the construction of a pumping station, access track and powerline associated with Longwall Panels 11 and 12; and recommended sub-surface testing for the open camp sites to be impacted and altering the route of the access track with an application for section 90 Consent for sites to be disturbed. Further investigation and consultation was recommended.

2.8 Site Location Modelling

Based on her three main Ulan survey assessments, Haglund (1997) argues that Ulan site location modelling can be explained in the following way:

> *…it is likely that at least some water-holes, springs and soaks could be found to be closely associated with archaeological material. It is also possible that more extensive and intensive investigation will reveal examples of additional site types;..* (Haglund 1997: 26)

She further explains that:

> *It should be noted that previous investigations have concentrated on two landforms, ridge slopes and/or valley floors, depending on what type of topography was most likely to be affected by particular proposed developments. These landforms are also, according to present models, those most likely to contain Aboriginal sites. However, judging from sample surveys in adjoining areas, open sites are likely to occur also on ridge crests, and quarry sites where there are outcrops of suitable rock, e.g. basalt;..* (Haglund 1997: 26)

Both Edgar (1997) and Haglund (1999a) presented a complementary Aboriginal occupation model for the Ulan region involving:

- Regular seasonal occupation by a local Aboriginal group, resulting in evidence of a range of economic activities associated with repeated long-term occupation, including hearths, stone tool manufacture and curation;
- Intensive but short-term occupation by Aboriginal people from the surrounding regions for special ceremonies. Stone tool assemblages would reflect intensive food gathering and preparation, extensive art and other special activities; and
- Ephemeral occupation resulting from travel through the area between the coast and further inland regions.

Edgar (1997) considered that the results of his survey support aspects of each of these occupations models and recommended that further work be conducted. A later survey by Haglund (1999a) provides evidence which primarily supports the first model of regular occupation.

2.9 Limitation of Sampling Methods and Previous Archaeological Assessment

Several factors from previous archaeological work are likely to affect the assessment of archaeological landscape values within the study area:

- The absence of any form of analysis of data sets to elicit discard patterning in the study area or indeed illuminate any of the primary characteristics of the archaeological record itself or the behavioural systems behind it.
- Site areas, density values, industrial attributes, tabulations of material types, landscape delineation, and similar elements in archaeological investigation that are designed to underscore the significance of cultural materials that may be lost if in fact the mine proposal proceeds as proposed are not adequately described.
- Haglund's overall assessment of significance is not comparable because she has too many lines of evidence which are fragmented and not discussed in any holistic way.

- Sites are discussed but not at an intersite level where comparability can be analysed.

2.10 Ulan Coal Mine Extensions Archaeological Assessment after 2000 Kuskie and Associates

Following on from the work of Haglund, Ulan Coal Mine engaged Peter Kuskie through his company South-East Archaeology Pty Ltd to undertake a series of archaeological assessments within parts of the Ulan Coal Mine that were being expanded for future development.

Kuskie and Webster (2001) comprehensively surveyed Longwall Panels 18-22 in ML1468, a 498ha area, over 12 days in June and July 2001, involving direct coverage of 57.8ha (12% of the study area), resulting in an effective survey sample of about 4.7ha (1% of the study area). This area was subdivided into 205 survey areas, with all different environmental contexts sampled. Vegetation was noted as being the primary detection-limiting factor (Kuskie & Webster 2001).

Some 58 Aboriginal heritage sites were identified; 56 artefact scatters, one rock-shelter with archaeological deposit and one ochre quarry. Three sites (BO10, #36-3-205 and #36-3-207) previously reported within the area were included in this total. Another three previously recorded sites (Haglund 1999a) within the area (BO2, BO3, BO4) could not be relocated. In addition, six potential archaeological deposits were also identified. Artefacts were identified at a very low mean density of 0.0025 artefacts per square metre of effective survey coverage across the entire study area sample (Kuskie & Webster 2001).

Kuskie and Webster (2001) identified and recorded in detail a total of 117 stone artefacts during the investigation. The lithic item assemblage was dominated by quartz (79%), with six other stone materials occurring in much lower frequencies. Sandstone outcrops, alluvial and colluvial gravels, quartz, quartzite, volcanics and ochre were noted within the study area. A total of 14 lithic item types were recorded, comprising thirteen categories of artefacts and lithic fragments, items that could not be positively identified as artefacts.

The lithic item assemblage was dominated by flakes and portions of flakes (51% of combined artefact total) and cores (26%). This evidence represented the dominance of non-specific stone flaking activities within the study area. Evidence of microblade manufacturing was very low, comprising 6% of the total assemblage. A very low frequency of utilised and/or retouched flaked artefacts was present (2% of the combined assemblage). Very low frequencies of tools indicative of other activities were identified. The flaked artefacts tend to be small in size (often less than 30mm in maximum dimension (Kuskie & Webster 2001).

This evidence indicates that Aboriginal utilisation of the Longwall Panels 18–22 study area was of a very low intensity and was probably infrequent and involved low numbers of people. Occupation was more likely focussed in surrounding areas where major watercourses and/or rock-shelters suitable for habitation are located (Kuskie & Webster 2001). Scientific significance of evidence within the Longwall Panels 18–22 study area was assessed as ranging from low to high within a local and regional context. Some 55 of the artefact scatter sites were assessed by Kuskie and Webster (2001) as being of low scientific significance in a local context.

Following minor archaeological surveys in 2003 and 2004, in 2005, Kuskie and Clarke completed an assessment of an area of the Western Open Cut for Ulan. During the initial surveys the then proposed western open cut extension area was subdivided into a total of 54 archaeological survey areas.

The total survey coverage of these survey areas equated to approximately 33,420m^2 or 3.3ha of ground. The total effective survey coverage of this sample area equated to about 3582m^2.

Surface visibility ranged between means of 10 and 20% in the survey areas. Archaeological visibility also ranged between means of 10 and 20%. Vegetation was the factor that typically limited surface visibility (Kuskie & Clarke 2005).

Following reinspection of the physically marked boundaries of the proposed new works, it was concluded that:

- No identified Aboriginal heritage sites are located directly within the *clean water diversionary dam study area*, west of the open cut, although site/locus OCE1/A and Haglund's Site S4 (Ulan ID #62, DECC #36-3-40) are situated within close proximity.
- One identified Aboriginal heritage site/locus, OCE1/A, extends marginally within the current *western open cut extension study area*, and another site/locus, OCE2/A, is situated within close proximity (Kuskie & Clarke 2005).

The sites west of the open cut are dominated by tuff, with quartz, chert and quartzite stone materials also present. However, the small size of the sample is noted.

Tuff is particularly notable west of the open cut in survey area OCE1 and west of the present study area in survey areas OCE34, 38, 39, 40 and 51 (South East Archaeology 2004), which include broad simple slopes, spur crests descending from the adjacent elevated terrain, and the main drainage depression. It occurs as tabular surface outcrops and has become incorporated into the gravels of the main watercourse (OCE40). In the lower portions of the simple slope (OCE34) tabular tuff is eroding from 0.15–0.20m below the present surface, and represents another source of the material. Many samples of the tuff examined were of sufficient quality for stone knapping (Kuskie & Clarke 2005).

In the then proposed western open-cut area examined by South East Archaeology in 2002 and 2003, a high frequency of tuff artefacts exhibited cortex, including 39% (of the tuff artefact total) with the tabular variety and 8% with a rougher, terrestrial cortex. A relatively high frequency of tuff cores were identified (26% of tuff artefacts), including many larger cores. The cores exhibiting cortex (80% of tuff cores) are particularly large, ranging from a maximum dimension of 60-200mm.

Many of the tuff flakes exhibiting cortex (39% of tuff flakes) are also large in size (size classes 6-10). All of these factors are strongly indicative that the tuff used for artefact manufacturing was procured from a local source. The evidence is also indicative of procurement and at least initial reduction of tuff at several sites, particularly at the loci OCE1/A and OCE34/B. At the later locus, it could even be speculated that Aboriginal digging for the high quality tuff that is in abundance 15-20cm below the surface has occurred, possibly causing the formation of the erosion scour (Kuskie & Clarke 2005).

Quartz pebbles were noted in several localities within the study area and it is common in the pebbly sandstone of the adjacent elevated terrain. It can be inferred that this material was procured from colluvial gravels available within or in the immediate vicinity of the study area. Chert was a favoured material for manufacturing artefacts, as it breaks by the process of conchoidal fracture (breakage through force being applied stone on stone) and provides flakes that have sharp, durable edges. Chert is present in the local Illawarra Coal Measures. Several artefacts were comprised of quartzite, and boulders of this material occur throughout the Ulan area and these may represent Permian era glacial erratics (Kuskie & Clarke 2005).

The small sample of lithic items recorded in or immediately adjacent to the western open-cut extension area predominantly includes flakes, cores and flake portions. These items represent general or non-specific knapping activities. However the presence of cores at site OCE1/A may relate to lithic procurement and reduction. The remainder of the items from the western open cut area include a chert utilised flake and a tuff utilised microblade – proximal portion. The utilised microblade portion and utilised flake are indicators of activities other than knapping, such as processing plant food or maintaining wooden implements (Kuskie & Clarke 2005).

The identified sites loci west of the open cut occur on all three of the landform units present (simple slope, spur crest and drainage depression). This result is consistent with the nature of the area, but does not indicate a particular focus of occupation within a particular environmental context. Evidence is distributed widely across the locality in typically very low numbers and densities (Kuskie & Clarke 2005).

Given the virtual absence of clear activity areas – locations where focused human activity has occurred – it can be argued that the evidence within the western open cut study area is predominantly indicative of low density background discard (Kuskie & Clarke 2005).

Kuskie & Clarke (2005) inferred on a preliminary basis from the evidence at the Aboriginal sites recorded within the present study and from other sources that:

- Members of the Wiradjuri people predominantly occupied the study area, within the past 5000 years. Members of neighbouring cultural groups (particularly the Kamilaroi) may also have sporadically occupied the area and occupation may have extended as far back as 30,000-40,000 years (although it is uncertain that any evidence for this may remain).
- Aboriginal people used the entire study area, but at a very low intensity.
- Focused occupation was more likely to have occurred in rock-shelters or overhangs on the scarps and on the major creek flats, but even this may have been relatively sporadic or of low intensity.
- Sandstone bedrock within the main ephemeral tributary of Ulan Creek close to the western open-cut study area was used for the shaping and/or maintenance of ground-edge hatchets.
- The stone materials tuff and quartz were favoured for stone-working activities.
- The manufacturing of stone tools, particularly flaked implements for use in making or maintaining wooden tools or butchering or processing foods, was generally a casual or opportunistic activity. Non-specific stone flaking was a common activity (Kuskie & Clarke 2005).

2.11 Regional Context

The nature of the evidence from the study area can be compared with other studies and sites in the region, although such a comparison is constrained by the limited sample sizes. Some of the notable similarities, particularly within the Longwall Panels 18–22 assessment of Kuskie and Webster (2001) and surveys of Haglund (1999a, 1999b), include:

- Stone artefacts being the dominant form of Aboriginal heritage evidence;
- Quartz being one of the dominant stone materials;
- A generally low mean density of artefacts;
- Dominance of non-specific stone flaking in the overall assemblage;
- Similar range of artefact types; and
- Estimated antiquity of the evidence.

Some of the notable differences, particularly with the studies in the elevated sandstone terrain but also the open lowland terrain investigated by Kuskie and Webster (2001), include:

- The dominance of tuff and presence of tuff sources and potential tuff lithic quarries;
- Absence of rock-shelter art and/or occupation sites; and
- Lower numbers and densities of artefacts than in several areas.

The majority of the items or context located within the study area do not appear to be unique in the region, with the possible exception of the evidence of tuff procurement and initial reduction (Kuskie & Clarke 2005).

2.12 Reassessment of Predictive Model of Site Location

In view of the survey results, the predictive model of site location can be reassessed. The results provide no evidence to contradict the assessments that burial, carved tree, scarred tree, stone arrangement, mythological and rock-shelter with art and/or occupation deposit sites have a low to very low potential to occur within the study area (Kuskie & Clarke 2005).

No grinding groove sites were identified; hence the potential for grinding groove sites within the study area can be revised downward to very low. The potential for lithic quarry sites was initially assessed as low. However, during the course of the investigation, sources of the stone material tuff were identified in widespread locations west of the open cut, including survey area OCE1 within the present study area. In at least one location, Aboriginal site OCE1/A, the evidence is indicative of procurement and possibly at least initial reduction of tuff.

This is consistent with Hiscock and Mitchell's (1993:32) general definition of a lithic quarry site as a '*location of an exploited stone source'*. However, within the revised study area boundaries, the potential for further evidence of lithic procurement to occur is considered to be low, although elsewhere west of the open cut where tuff of sufficient quality for knapping occurs this potential may be higher (Kuskie & Clarke 2005).

The prediction that artefact scatters have a moderate to high potential to occur across the level to gently inclined portions of landform elements (e.g. spur crests and simple slopes), particular adjacent to watercourses has been confirmed during this survey. Evidence was located in these contexts (Kuskie & Clarke 2005).

There remains potential for further stone artefact evidence to occur across virtually the entire study area, albeit typically in low density consistent with background discard, interspersed by occasional areas of higher density in which localised activity areas have occurred. At site OCE1/A, positioned largely between the western open-cut extension and diversionary dam study areas, there remains potential for deposits of sufficient integrity to be of research value (cf. Koettig 1989; Kuskie & Kamminga 2000).

However, in virtually all of the western open-cut extension and diversionary dam study areas, the potential for sub-surface deposits that are *in situ* or of possible research value appears to be low, considering the levels of ground disturbance, shallow upper soil unit and predictive model (Kuskie & Clarke 2005).

In 2007, Kuskie and Clarke, carried out an archaeological assessment of an area defined as SMP (*Subsidence Management Plan*) Area Longwall Panels: W2-W3 measuring approximately 478ha within the Ulan Coal Mine Lease. This development approval was part of a underground coal mine assessment. 21% of the study area was effectively sampled.

Twenty eight Aboriginal heritage sites were identified within the Longwall Panels W2-W3 SMP area, comprising a total of 22 artefact scatters (including 'isolated artefacts'), two rock-shelters with grinding grooves and artefacts, two rock-shelters with grinding grooves, and two rock-shelters with artefacts. Thirteen rock-shelters with Potential Archaeological Deposits (PADs) were also recorded (Kuskie & Clarke 2007).

Only 80 stone artefacts were recorded and Kuskie and Clarke concluded that:

> *Artefacts occur at a very low mean density of 0.0022 artefacts per square metre of effective survey coverage (accounting for visibility), across the sampled area. This evidence indicates that Aboriginal utilisation of the study area was of a very low intensity. It was probably infrequent and involved low numbers of people. Occupation is more likely to have been focused in surrounding areas where major watercourses and/or rock-shelters suitable for habitation are located;..* (Kuskie & Clarke 2007:3)

Three of the six rock-shelter sites were assessed as having low to moderate scientific significance within a local context, with one site (BB14/F) being assessed to be of moderate scientific significance within a local context, one site (MC1) as being of moderate to high significance within a local context, and one (MC2) as being of high significance within a local context and low to potentially moderate scientific significance within a regional context (Kuskie & Clarke 2007).

2.13 Site Descriptions and Significance Ratings

Kuskie and Clarke (2007) describe each of the sites, which are reproduced below in Table 3 along with their original scientific descriptions.

Table 3 Sites recorded by Kuskie and Clarke in 2007 for UCML SMP Study (after Kuskie & Clarke 2007)

Site Name	DECC #	Ulan ID#	Site Type[1]	MGA Eastings	MGA Northings	Scientific Significance[2]
BB14/A PAD^			Rock-shelter with PAD	755121	6436503	-
BB14/B^			Artefact Scatter	755333	6436458	Low
BB14/F^			Rock-shelter with Artefacts	755125	6436393	Moderate
BO33/B^			Artefact Scatter	757870	6436419	Low
BO36/A^			Rock-shelter with Artefacts	757579	6436530	Low to Moderate
BO37/A			Artefact Scatter	758617	6436885	Low
BO38/A			Artefact Scatter	758465	6436824	Low
BO39/A			Artefact Scatter	758085	6437602	Low
BO40/A			Artefact Scatter	757917	6436956	Low
BQ3	36-3-292		Artefact Scatter	756425	6437144	Low
MC1		163	Rock-shelter with Artefacts	756157	6437582	Moderate to

[1] Artefact scatter refers to both scatters (multiple identified artefacts) and isolated finds (single identified artefact). Four rock-shelters (MC46A-D) and an artefact scatter (MC41/C) recorded during the present survey but outside of the SMP area are excluded. Potential Archaeological Deposits (PADs) in rock-shelters are listed but their significance is not assessed due to the absence of identified evidence.

[2] Preliminary assessment of scientific significance within a local context based on the criteria outlined in Kuskie and Clarke (2007).

Site Name	DECC #	Ulan ID#	Site Type[1]	MGA Eastings	MGA Northings	Scientific Significance[2]
			and Grinding Grooves			High
MC2		164	Rock-shelter with Artefacts and Grinding Grooves	756191	6437687	High
MC32/C	36-3-376		Artefact Scatter	756541	6436881	Low
MC33/A PAD^			Rock-shelter with PAD	755299	6436592	-
MC34/A			Artefact Scatter	756458	6437087	Low
MC34/B			Artefact Scatter	756207	6437247	Low
MC34/C			Artefact Scatter	756033	6437212	Low
MC35/A			Artefact Scatter	755030	6437043	Low
MC36/A			Artefact Scatter	755524	6437155	Low
MC37/A			Artefact Scatter	755200	6436999	Low
MC38/A			Artefact Scatter	755443	6436931	Low
MC39/A			Rock-shelter with Grinding Grooves	755269	6437104	Low to Moderate
MC40/A PAD			Rock-shelter with PAD	755026	6437199	-
MC40/B PAD			Rock-shelter with PAD	755068	6437177	-
MC40/C PAD			Rock-shelter with PAD	755072	6437188	-
MC40/D PAD			Rock-shelter with PAD	755012	6437162	-
MC41/A			Artefact Scatter	756063	6437732	Low
MC41/B			Artefact Scatter	756102	6437830	Low
MC41/D			Rock-shelter with Grinding Grooves	756106	6437785	Low to Moderate
MC41/E			Artefact Scatter	756387	6437713	Low
MC41/F PAD			Rock-shelter with PAD	756156	6437710	-
MC41/G PAD			Rock-shelter with PAD	756119	6437744	-
MC41/H PAD			Rock-shelter with PAD	756102	6437753	-
MC42/A			Artefact Scatter	756358	6437617	Low
MC43/A PAD			Rock-shelter with PAD	755868	6437774	-
MC44/A			Artefact Scatter	757155	6437367	Low
MC44/B			Artefact Scatter	756788	6436906	Low
MC45/A PAD			Rock-shelter with PAD	755518	6437429	-
MC45/B PAD			Rock-shelter with PAD	755492	6437462	-
MC45/C PAD			Rock-shelter with PAD	755417	6437443	-
MC45/D			Artefact Scatter	755037	6437856	Low

^ *Site occurs in previously approved SMP Area (W1) area of overlap with SMP Area (W2-W3).*

2.14 Rock-shelter Sites

Site MC1 (Mona Creek 1)

Site MC1 is a large cavernous north-east facing rock-shelter with two openings at either end. It had previously been recorded by Haglund (1999b). A potential archaeological deposit was recorded during the Kuskie & Clarke 2007 survey and is considered to have high research potential. The sandstone surfaces of the shelter are subject to some exfoliation and disturbance to the deposit is potentially moderate, with animal burrows and a silty and sandy floor. Twenty-four artefacts were located within and around the shelter during the Kuskie & Clarke 2007 survey. Site MC1 also hosts a floating sandstone slab in the northern portion of the shelter, approximately 700mm in length, with three clearly defined grinding grooves. The grooves measure between 40–50mm wide and 300–400mm long. The grooves are shallow and clear, but slightly weathered.

Site MC2 (Mona Creek 2)

Site MC2 is a large cavernous south facing outcropping rock-shelter in a massive boulder. Site MC2 had previously been recorded by Edgar (Haglund 1999b). A potential archaeological deposit was recorded during the Kuskie & Clarke 2007 survey and is considered to have a moderate to high research potential. The sandstone surfaces of the shelter are stable, while disturbance to the deposit and surrounds is potentially moderate and primarily arises from animal burrowing and erosion. No visible artefacts were noted during the Kuskie & Clarke 2007 investigation. However, Haglund (1999b) noted three small quartz flakes. Haglund (1999b) also briefly reported the subsequent identification of a rare wooden implement, a boomerang, within the shelter. This item was not relocated during the present investigation and its precise provenance is uncertain.

Site MC2 also hosts a large floating sandstone slab in the central portion of the shelter, approximately 2m in length, with three clearly defined grinding grooves. The grooves identified measure between 60-90mm wide and 350-480mm long. The grooves are shallow and clear, but slightly weathered.

Site MC39/A

Site MC39/A is a south-westerly facing overhang, with substantial rubble overlying largely sandy and silty soils. Two grinding grooves occur on a freestanding/floating sandstone slab in the centre of the shelter. There is potential for further grooves which may be presently covered with silt. The grooves identified measure between 45–50mm wide and 240–260mm long. The grooves are shallow and clear, but slightly weathered. There is only potential for a shallow sub-surface deposit in a relatively small area, which may not be of research potential. No visible flaked stone artefacts are associated with site MC39/A.

Site MC41/D

Site MC41/D is a small westerly facing low shelter with a rocky and sandy floor. Two grinding grooves occur on a small, potentially portable freestanding/floating sandstone slab in the centre of the back of the shelter. The grooves identified measure between 35mm wide and 200-280mm long. The grooves are shallow and clear, but slightly weathered. There is low potential for a sub-surface deposit, particularly one that may be of research value. No visible flaked stone artefacts are associated with site MC41/D.

Site BB14/F

Site BB14/F is an exfoliating rock-shelter in a high sandstone rock formation, previously recorded by Kuskie and Clarke (2005b). A relatively shallow (c. 0.15m) potential archaeological deposit was recorded and is considered to have moderate to high research potential. The sandstone surfaces of the shelter are exfoliating, exposed and weathered, while disturbance to the deposit and surrounds is apparently moderate and primarily arises from animal burrowing and erosion. A single quartz flake portion was located approximately 3m west of the shelter opening.

Site BO36/A

Site BO36/A is a pair of moderately sized cavernous rock-shelters in a low-lying sandstone rock formation, previously recorded by Kuskie and Clarke (2005b). A relatively deep (c. 0.6m) potential deposit was recorded of the western shelter and is considered to have low to moderate research potential. The research potential of the smaller eastern shelter is assessed as limited. The sandstone surfaces of the shelter are predominantly stable, while disturbance to the deposit and surrounds is apparently moderate and primarily arises from animal burrowing and vegetation. Eighteen artefacts were located within and around the western shelter.

Lithic Artefact Scatter Sites

A total of 22 artefact scatter sites (incorporating '*isolated artefacts'*) (BB14/B, BO33/B, BO37/A, BO/38/A, BO39/A, BO40/A, BQ3, MC32/C, MC34/A-C, MC35/A, MC36/A, MC37/A, MC38/A, MC41/A-B, MC41/E, MC42/A, MC44/A-B and MC45/D) occur in or within 50m of the Ulan Coal SMP area (W2-W3).

Nineteen of these sites were located and recorded during the Kuskie and Clarke 2007 survey. One site (MC32/C) was recorded by Kuskie and Clarke (2005b) on the margin of the current study area but could not be relocated during the present survey. Another two sites are situated in the portion of the Ulan Coal SMP area that overlaps with the previously approved Ulan Coal SMP area (W1).

The sites recorded by Kuskie & Clarke range up to 2000m^2 in area (visible extent of evidence). Approximately two-thirds of the 'artefact scatter' sites comprise a single lithic artefact, which have been referred to in previous studies as 'isolated finds'. The remaining sites comprise two or more lithic items. Typically 'isolated artefacts' represent the only visible evidence of larger artefact scatters, in which low conditions of visibility have prevented the detection of further items.

A total of 80 lithic items were identified during the Kuskie and Clarke 2007 survey, including 40 artefacts in open artefact scatters and 24 artefacts associated with rock-shelters. This total includes 16 artefacts within the four rock-shelter sites (MC46/A-D) which lie marginally outside of the Ulan Coal SMP area. Artefact numbers range from 1 to 10 within each artefact scatter site recorded.

In general terms, the artefact densities identified within the study area are low by south-east Australian standards and indicate a generally low-intensity utilisation of the locality. The overall spatial distribution and nature of evidence is largely consistent with background discard, manuport and artefactual material which is insufficient either in number of in association with other material to suggest focused activity in a particular location (cf. Rich 1993; Kuskie & Kamminga 2000). This is interspersed by occasional focalised areas of slightly higher artefact density where activities or repeated activities have occurred.

2.15 Wilpinjong Coal Mine Assessment: Navin/ Officer 2005

In 2003, Excel Coal through its subsidiary Wilpinjong Coal Pty Limited, undertook to develop the Wilpinjong Coal Mine Operation. This new coal mine was located approximately 2km to the east of the current Stage 2 Moolarben Coal Project. Part of this assessment included an assessment of Aboriginal cultural heritage and likely open cut mine and associated infrastructure impacts (i.e. Coal Handling and Preparation Plant).

The mine development covered approximately 2800ha or 28km^2 in area and is generally described as the 'project disturbance area'. An Aboriginal cultural heritage survey was conducted by Navin Officer and members of the local Aboriginal community (i.e. Mudgee Local Aboriginal Land Council, Murong Gialinga Aboriginal and Torres Strait Islander Corporation and Warrabinga Native Title Claimants Aboriginal Corporation. Approximately 2510ha (25km^2) of the Wilpinjong Coal Exploration Licence area were surveyed, including comprehensive survey of the Project Disturbance Area and sample survey or other areas adjacent to the Project Disturbance Area.

A total of 235 Aboriginal sites and objects were recorded as a result of the assessment. These Aboriginal sites and objects are described as:

- Isolated finds and artefact scatters in open contexts;
- Rock-shelters with surface artefacts (may also contain potential or confirmed archaeological deposits);
- Rock-shelters with potential or confirmed archaeological deposits;
- Rock-shelters with rock art;
- Possible and probable Aboriginal scar trees;
- Potential archaeological deposits in an open context; and
- Reported places of Aboriginal cultural significance (reported by some Aboriginal people but disputed by others).

In addition, three non-Aboriginal scarred trees were recorded.

Table 4 Aboriginal Sites and Objects Identified in the Wilpinjong Project Area (after Navin Officer 2005)

Number of objects & sites recorded	Site Type Recorded
70	Open artefact scatters
1	Open artefact scatter and procurement site
64	Isolated finds
19	Rock-shelters with surface artefacts (may also contain potential or confirmed archaeological deposit)
21	Rock-shelters with potential archaeological deposit (only)
3	Rock-shelters with rock art (may also contain surface artefacts and confirmed or potential archaeological deposit
24	Possible Aboriginal scarred trees
15	Probably Aboriginal scarred trees
3	Surveyor's scarred trees (undebated European origin)
3	Probably surveyor scarred trees (debated origin)
1	Indeterminate tree feature (debated origin)
3	Other (debated origin) scarred trees
2	Potential archaeological deposits (PAD) (open context)

Number of objects & sites recorded	Site Type Recorded
2	Reported places of Aboriginal cultural significance (disputed by some other Aboriginal representatives)
3	Springs/natural pothole ('waterhole' recorded at the request of an Aboriginal representative)
4	Other (debated origin) isolated finds, lithic scatters or stone arrangements

Navin Officer summarise the main archaeological findings of their investigations in the following way:

> *There are three sites with artefact densities of between 51 to 100, and 101 to 500 estimated on the surface. These sites are located near the banks of* ***Cumbo*** *and* ***Wilpinjong Creeks****, as well as some basal slope contexts. Two sites were recorded with more than an estimated* ***500 artefacts****. Both occur along the banks of* ***Wilpinjong Creek*** *and outside of the Project open cut mine and contained infrastructure area. The margin of one of these sites would potentially be disturbed by realignment of an electricity transmission line.*
>
> *Three rock-shelter sites with rock art were identified during the field program. All occur outside of the Project disturbance area and within sandstone and conglomerate rocks. Identifiable motifs include upward pointing tridents or arrows shapes, and red hand stencils.*
>
> *Approximately* ***half*** *of the* ***recordings*** *identified during the survey are located within the Project Disturbance Area and would be subject to direct disturbance during the life of the Project. Approximately 10% of recordings are located within the Project Disturbance Area on the boundaries of the Project open cut pits and are also likely to be disturbed, subject to the detailed mine design.*
>
> *One site of high archaeological significance (within a local context) occurs within the Project Disturbance Area. This is a large open artefact scatter with more than 500 artefacts that may be impacted on its margin by the realignment of an electricity transmission line. No other recordings of high archaeological significance occur within the Project disturbance area. Eight stone material categories were recorded during the survey. The dominant categories were quartz (noted in 75% of all artefact occurrences), and tuff (36%).*
>
> *Just under half of the recorded Aboriginal sites occur within valley floor contexts, a third within basal valley slope contexts, 19% occur on mid valley slope contexts and 4% in upper valley contexts;*.. (Navin Officer: Fii-iii 2005)

2.16 Moolarben Coal Project Assessment of Stage 1: Hamm

In 2005 and 2006 Hamm (2006) undertook an assessment of Aboriginal cultural heritage values for the proposed Moolarben Coal Project Stage 1, located in the western coal fields of NSW, 40km north-east of Mudgee and 25km east of Gulgong. The study covered an area of approximately 35km^2 of low undulating hills and hillslopes from 400-680m above sea level on sandstone plateaus with extensive rock outcrop. Narrabeen Sandstone is the dominant parent rock. Parts have lower colluvial slopes of sandstone plateaus escarpments with low undulating rises and creek flats. Moolarben Creek flows through part of the study area. The landscape is heavily vegetated with some clearing for pastoral activity around the village of Ulan, and the locality of Moolarben along the Moolarben Creek. Approximately 4.2km^2 of land was foot surveyed from approximately 6.8km^2 of land available to be surveyed due to available surface visibility.

The assessment located and recorded a total of 1598 Aboriginal objects (302 sites). This cultural record was made up of: 63 open stone artefact scatter sites of varying densities, 219 individual stone artefact isolated finds, 18 rock-shelter sites, a grinding groove site and a scarred tree site. A majority of this record (87%) is made up of exposed stone artefactual material eroding from areas of bare soil exposure with less than five artefacts in density.

The most concentrated occupation areas located within the Stage 1 study area were:

- Central Moolarben Creek Alluvial Flats: Mayberry Property at Open Cut 3
- Southern Moolarben Creek Alluvial Creek Flats and Ridges: Stokes Property Open Cut 3 Extended
- Underground No. 4 Northern Ridge Lines: Westwood Property
- Bora Creek Alluvial Flats: Ulan Coal Mines Property.

The principal Aboriginal objects recorded in the assessment were stone artefacts. A total of 1597 stone artefacts were recorded. Quartz raw material dominated all assemblage components for MCP Stage 1 sites, accounting for 81.6% of the total raw material count. The next most commonly used raw material was Tuff, accounting for 10.6% of the total assemblage count. Silcrete was also used, but in much lower proportions.

A majority of surface assemblages recorded were made up of Broken Flakes, followed by Flaked Pieces and Complete Flakes. Retouched or used items only accounted for 2.2% of the total assemblage contents. Cores made up approximately 8.5% of the total assemblage content. A majority of cores were multi-platform type made from quartz and tuff materials. A total of four backed pieces (i.e. geometrics) were identified with three being recorded, within Transect 4 Underground No. 4. All three backed pieces are made from Tuff material.

A majority of flakes (Complete and Broken Proximal) contained approximately 75% broad platforms with 18% containing focal platforms. Cortex is found on approximately 12% of all stone artefact items. A comparison was made of the size of Complete Flakes. Graphing shows that a majority of quartz Complete Flakes recorded were between 10-40mm in length and 10-25mm wide. Whilst the Complete Flake size distribution for Tuff was much broader, showing a more diverse flake selection process operating.

Of a total of 302 sites recorded for the Stage 1 project area, eight sites (i.e. S1MC: 103, 230, 264, 280 (36-3-0042), 282, 283, 286, 287 are considered to be of high archaeological significance. However, given some of these sites are located within a disturbed context, further archaeological investigation may not be warranted. The remaining 294 sites were considered to be of medium or low archaeological significance. From an Aboriginal cultural assessment point of view, the most sensitive Aboriginal cultural landscape is located within the northern area of Underground No. 4 (i.e. near 'The Drip'). However, general Aboriginal community consultation advice has stated that all sites (archaeological or cultural) are of value, but none of the community members interviewed objected to the mining proposal going ahead.

A significant percentage of open alluvial plains and flats assessed in MCP Stage 1 have been disturbed due to historic farming practices, especially broad acre clearing for ploughing and pasture improvement. As a result of this activity, approximately 80% of Moolarben Creek's modern day channel has been heavily affected by sheet erosion as a result of agriculture. It is argued that this long-term impact may also be responsible for a lack of intact rich open sites which are more common along Murragamba and Wilpinjong Creeks. The presence of natural springs and soaks is likely to have heavily influenced the location of major open space Aboriginal sites occupation for the Moolarben Creek catchment and surrounding ridgelines. Although rock-shelters were used by Aboriginal people in the MCP Stage 1 study area they were more specific in their purpose (i.e. to carry out rock art and ceremony) and less likely to contain significant long term occupation evidence.

2.17 Moolarben Coal Project Assessment of Stage 2: Hamm

In 2006, Archaeological Risk Assessment Services Pty Ltd (ARAS) was engaged to undertake an assessment of the Aboriginal cultural heritage values of the proposed Stage 2 Moolarben Coal Project (MCP) area (Hamm 2008), located in the western coal fields of NSW, 40km north-east of Mudgee and 25km east of Gulgong. The Stage 2 study area is approximately 37km^2 in size, being located to the immediate east of the approved Stage 1 MCP site.

Stage 2 MCP investigation area consists of two proposed Underground Mines (UG 1 and UG 2) and a large Open Cut Mine (Open Cut No. 4). The total area of potential mine impact is approximately 2260ha or 22.6km^2.

The most dominant environmental feature of the Stage 2 investigation area is the Murragamba Creek Valley and the surrounding sandstone ridgelines which run in a north-south direction creating a series of elongated valleys. Approximately 7.65km^2 (20.6%) of the study area was assessed on foot by a team of qualified archaeologists and local Aboriginal community members over a 30 day period in 2006. A total of 49 survey foot transects were completed.

This assessment located and recorded a total of 4836 Aboriginal objects. This cultural record is made up of: 150 open stone artefact scatter sites of varying densities, 103 individual stone artefact isolated finds, four rock-shelter sites, a grinding groove site and 33 Potential Archaeological Deposits (PADS). A total of 258 Aboriginal sites have been identified in the investigation area. There are 18 existing Department of Environment and Climate Change (DECC) sites which have been re-recorded in light of this assessment and assigned their own S2MC site number.

A majority of this record (90%) is made up of exposed stone artefactual material eroding from areas of bare soil exposure with less than 50 artefacts in density. However, 33 of these open sites also contain PADs which are principally concentrated within the Murragamba Creek catchment. There are 10 sites that contain over 100 artefacts within their surface assemblage. Eleven sites were recorded as being of High Scientific Significance with one registered DECC site (37-3-0134) containing painted rock art that is assessed to be of regional significance. Twenty nine sites were assessed to be of Medium Scientific Significance and 218 were assessed to be of Low Scientific Significance. The Murragamba Creek Valley and adjacent Moolarben Ridge (Carr's Gap Ridge) are considered to be significant cultural landscape features.

The assessment of Aboriginal cultural values was by expression of interest through letters and community meetings. Several people were interviewed about places of cultural significance near the proposed Stage 2 MCP development area. Parts of the Munghorn Nature Reserve located to the south-east of Stage 2 MCP development area are considered to be significant from a contemporary Aboriginal cultural perspective.

No one was identified within the existing four Aboriginal groups as having cultural knowledge about the proposed Stage 2 MCP development area. Whilst local Aboriginal people generally expressed an interest in archaeological sites and their protection, there were no objections to the proposed coal mine project going ahead on cultural assessment grounds.

2.18 Site Definition and Problems of Site Recording

A significant issue in recording hunter-gatherer open space occupation is how to define an occupation location or 'site'. The NSW Department of Environment & Climate Change (DECC) advise developers and Consultants that the term 'site' is used to group objects or define a location where a relic or cultural item occurs. The general criterion used to define sites is set out below. Sites may be:

- Exposures where archaeological evidence is revealed;
- Topographic or land form units where occupation evidence has been recorded. This may be an entire landform unit (ridge, creek, valley) or part of a landform unit (saddle on ridge, creek bank);
- Locations having physical boundaries defined by rocks (stone arrangement), or earthworks (mounds) or cleared land (ceremonial ground);
- Locations having cultural significance to Aboriginal community groups;
- Locations having an arbitrary boundary or the assignation of a boundary for the convenience of recording (in cases where the site would probably be much larger if based on the criteria above). Arbitrary criteria include the use of a fence-line, dirt track or gully as a boundary. In some cases the area may simply be designated as 50m x 50m, or as a smaller sample plot, on the basis of convenience; and
- Locations having a specific artefact density. In some cases a site boundary may be defined by the average number of flakes per square metre. This is a specialised type of arbitrary criterion and justification of the rules used must be made explicit.

The chosen definition of a site or isolated find needs to be specified for the study. It is the Consultant's responsibility to decide on an appropriate definition, suited to the particular project, the research goals and comparability with other regional studies. DECC requires site forms to be completed for isolated finds.

In addition to the above, the NPW Act 1974 (amended) also defines an Aboriginal object as:

> *any deposit, object, or material evidence (not being a handicraft for sale) relating to indigenous and non European habitation of the area that comprises New South Wales being habitation both prior to and concurrent with the occupation of that area by persons of European extraction and includes Aboriginal remains;*..(NPW Act 1974, section 5: Part 1 pp: 8–9)

Other issues concerning site integrity, site formation and factors of disturbance have been argued by a number of authors. The work of Schiffer (1987) helped describe the patterns of transformational processes, both cultural and non-cultural that create the archaeological record. Following on from this Hurst Thomas (1991) argues four distinct cultural processes that affect the final condition of the archaeological record (i.e. especially for open space occupation).

These processes are defined as 'deposition, reclamation, disturbance and re-use' (Hurst Thomas 1991:132). These processes are briefly described below:

Deposition – These are actions, usually cultural in origin, that cause the accumulation of the archaeological record. This can be simple discard of cultural material at a site, burying the dead or the construction of a hearth. Size of cultural objects is one major influence on the way cultural objects are incorporated into the cultural deposit. This is called the 'size-sorting effect'.

Reclamation – This is the process whereby archaeological material is reincorporated back into a systemic context. Examples of this would be people re-using occupation areas or new people settling on an old campsite location that has been abandoned by another family group.

Disturbance – This process mainly refers to human or natural actions, which transform the archaeological record from its origin depositional context. Human actions would refer to prehistoric land-use patterns where materials are swept away or moved from a campsite to clear the ground. Modern human actions would be: Vegetation clearing on hill-slopes increasing sheet erosion and removing small artefacts that are redeposited on lower slopes and flats. Removal of old trees containing scars or carvings on them. Dam building and road building causing an increase in surface erosion and possible destruction of buried deposits. Cattle walking across sites causing artefacts to be scuffed, broken or working edges damaged. Trees falling over causing displacement of sub surface artefacts. Bushfire causing a heat distortion effect with surface artefacts and the collection of charcoal. Natural processes can refer to downslope slippage, gully and sheet erosion, and bioturbation by tree roots and insects.

Re-use – This process usually refers to how people may re-use cultural objects in a different way for a different purpose. An example could be stone tools used for another purpose or hearth stones used as anvils etc.

Given the above site disturbance factors, any comparison of open sites and their content can only be used as an indication of land-use in land unit context. The comparison will be limited in determining the true extent of occupation, unless ground exposure is uniform across several land units and measured at a consistent scale.

2.19 Stone Technology and its Variability

Hunter gatherer occupation sites or campsites (i.e. rock-shelter or open space) are likely to have a broad range of tool types due to the variety of activities undertaken at a site over a certain period of time. These types of sites are contrasted to the more specialised sites where food gathering or hunting requires a more restricted range of tool kit. Tools that are broken or exhausted are often found at these types of sites as well as resharpening flakes from a tool user carrying out tool maintenance (Kooyman 2000).

Lithic analysis can also lead to information about where a tool may have been manufactured and why it was discarded. The analysis of lithic debitage can also provide information on whether the tool was manufactured close to a quarry site or transported from a distance. Evidence such as the amount of decortification flakes, unmodified or broken flakes or flakes with specific types of platform can all lead to an understanding of the stages of tool manufacture.

Modelling of prehistoric hunter gather behaviours using lithic analysis has led some researchers to speculate on the level of sedentism or mobility. The assumption that mobility of a group limits the type of the toolkit has been put forward by a number of researchers (Walker 1978, Bleed 1986, Bamforth 1986). Conversely, greater sedentism usually means groups will have a greater range of resources to choose from at one site and thus their toolkits will contain more variety (Odell 1994). The more mobile a group is the more likely it is to standardise its core technology (Odell 1994).

Curation of tools is another important consideration in assessing lithic variability. Odell (1996) argues that curation will usually reduce the need for raw material supply. This leads on to the concept of gearing up or preparing tools in advance of use. This further raises the question of the functionality and versatility of tool types that may or may not tell us something about how prehistoric hunters maximised opportunity when using a range of landscape in the past.

2.20 Sample Size Considerations and Inter-Site Comparisons

An article by Hiscock (2001) on the effects of sample size on the interpretation of archaeological patterning of Holocene stone artefact assemblages requires some consideration in comparing sites across landscapes. The central issue for most consulting reports is the recording of rarer types of artefacts (i.e. backed artefacts) in relation to the entire site assemblage. Comparing the variation of assemblages between sites and using this to define site function may be refuted on the grounds that the sample sizes of site assemblages are too small to provide statistically valid comparisons.

Hiscock explains his proposition by using a hypothetical example:

> *Even in sites where only one specific kind of knapping activity takes place, such as the manufacture of backed artefacts, the various objects employed and created will be probably discarded at different rates. For instance, many flakes will be rapidly discarded, cores are likely to be discarded less frequently, backed artefacts less frequently still, and hammerstones may be rarely thrown away.*
>
> *These differences in the likelihood of discard relate to a number of factors, including the length of 'use-life' of each kind of object. When only a few of these objects have been discarded it is likely that the assemblages will be dominated by only those classes of object that are discarded frequently such as flakes and cores in this example. As occupation of the site continues and the size of the assemblage grows with further discard of material, it is likely that objects such as backed artefacts and hammerstones may be eventually discarded;*..(Hiscock 2001:50)

Hiscock further argues that a sample required to contain all possible categories of artefacts in a particular locality is proportional to the relative abundance of the rarest artefact type. Thus while some sites or regions with sample sizes of between 50–100 may be adequate, sites in other regions with 1000– 10,000 may be too small to provide a more complete assemblage composition. As Orton (1992) has put it, there is no absolute sample size in which all sites or regions are likely to contain an adequate sample of the total variation in assemblage composition.

3. ENVIRONMENT & LAND-USE HISTORY

The study area falls within the Sydney Basin physiographic land system (Murphy & Laurie 1998). Generally the land is described as having low undulating hills and hillslopes from 400-680m above sea level on sandstone plateaus with extensive rock outcrop. Narrabeen Sandstone is the dominant parent rock. Parts have lower colluvial slopes of sandstone plateaus escarpments with low undulating rises and creek flats. The Ulan soil landscape is the dominant soil landscape found within the study area and is describe in Table 5 below.

Table 5 Ulan Soil landscape of the study area
After Jammell Environmental Planning Services (2005)

Landscape	Landform	Lithology	Typical soils	Limitations
Ulan	Low undulating rises and creek flats. Elevations between 360-570 m. Slopes between 2-10%. Local relief varies between 10-40 m.	*Undifferentiated and Illawarra Coal Measures* Shale, sandstone, conglomerate, chert, coal and torbanite.	Yellow podzolic, yellow solodic/ solonetz, yellow and brown earths, and earthy sands.	Mod to high erosion hazard and susceptible to soil structure degradation. Imperfectly drained on the lower slopes and depressions. High soil salinity levels and low soil fertility.

Source: Adopted from DLWC (1998) & Jammell (2005).

There is no significant natural watercourse found within the study area, although some areas do contain run-off points in lower parts of the landscape. Prior to European settlement, the vegetation community in the study area would have been defined as woodland. The existing vegetation community has been classified by Aitkens (2006) as cleared remnant woodland. Many of these remnant woodlands and forests are floristically variable, with some being characterised by White Box (*E. albens*), Yellow Box (*E. melliodora*) and Blakely's Redgum (*E. Blakelyi*).

The community characterised by these species is listed as endangered under the TSC Act and EPBC Act (Grassy White Box Woodland). Woodlands dominated by Rough-barked Apple (*Angophora floribunda*) are commonly found along the creek lines, often in association with Yellow Box (*E. melliodora*) and Blakely's Redgum (*E. Blakelyi*). The adjoining sandy terraces of the Permian geological period also host monotypic communities dominated by Rough-barked Apple (*A. floribunda*). More clayey soils support Grey Box (*E. moluccana*) dominated communities.

A majority of the study area has been cleared of mature eucalypt trees for pasture improvement and this has seen the growth of Sifton Bush(*Cassinia arcuata*) across midslopes. Regrowth of mainly Ironbark species such as Narrow-leaved Ironbark (*E. crebra*) and Broad-leaved Ironbark (*E. fibrosa*) has also occurred in places. A number of small farm dams lie within the rail loop extension area as do some fence-lines which run in a north-south direction.

4. ABORIGINAL CONSULTATION

As part of the Aboriginal community stakeholder consultation process, the following MCP Stage 1 Aboriginal stakeholder groups were notified about the proposed assessment and invited to participate in the archaeological work:

- Mudgee Local Aboriginal Land Council based in Mudgee;
- Murong Gialinga Aboriginal & Torres Strait Islander Corporation based in Mudgee; and
- Warrabinga Native Title Claimants Aboriginal Corporation based in Kandos.

A total of two Aboriginal Community Stakeholder representatives per group were invited to participate in the survey assessment (*see* Appendix *4*).

5. SURVEY ASSESSMENT METHODS

I was provided with a basic site plan showing the location of the rail loop extension area (*see* Figure 2: Appendix 1). I conducted the survey assessment with six Aboriginal people on 10 February 2009.

The most likely sites to occur within the land proposed for development area are isolated finds, open campsites and scarred trees. Rarer sites may include grinding grooves, carved trees, bora grounds (stone arrangements) and burials.

6. ASSESSMENT COVERAGE & SURVEY RESULTS

The most significant constraint in carrying out the survey assessment was lack of ground surface visibility. Some land units did contain vehicle tracks and small patches of erosion due to cattle grazing (*see* Plates 1-3: Appendix 2). Average visibility across the study area would have been between 0% and 25%. Foot coverage across the study area was 100%. Orange flags were used to mark potential cultural features for detailed recording (i.e. Aboriginal Objects).

Field conditions were good. The main method of survey assessment was foot transect. The survey team consisted of six people walking slowly across the study area spaced 20m apart. A total of one foot transect was investigated. Areas which contained evidence of ground surface exposure were investigated thoroughly. The original vegetation community can be described as open forest/woodland with ironbarks dominant. Over 90% of the site has been cleared for pasture improvement purposes.

Table 6 explains which areas were sampled and what physical evidence were located during the survey assessment.

Table 6 Archaeological assessment sample unit and results February 2009

(*see* Figure 3: Appendix 1)

Land Form Units	Transect No.	Area investigated	Results
Broad Ridge crest Simple Slopes	1	100m x 800m 1.E:0762947 1.N:6426674 2.E:0762940 2.N:6426674 3.E:0764082 3.N:6426038 4.E:0764149 4.N:6426109 Vehicle access track Boundary fence Dams	4 sites identified 3 Isolated Find and 1 Artefact Scatter with PAD Eroding scalds 0–25m visibility Re-growth, pasture grasses Sifton Bush, Small shrubs, trees

7. RESULTS & DISCUSSION

A total of four Aboriginal Sites (making up a total of five Aboriginal Objects) were located as a result of Aboriginal cultural heritage assessment. This cultural record is made up of three Isolated Finds, one Artefact Scatter with a Potential Archaeological Deposit. The archaeological evidence represents stone artefact material being exposed by surface erosion processes and ploughing activities.

The Aboriginal Objects located on the surface are principally concentrated on a broad spur/ridge crest feature which lies above minor ephemeral drainage associated with Wilpinjong Creek catchment (*see* Figure 3: Appendix 1). The four sites (Sites S1MC 306-S1MC 309) are described in Table 7 below.

Table 7 MCP Stage1 Rail Loop Extension Aboriginal Site Descriptions

Site Name	Site Features	Comments
S1MC 306 (T1)	Isolated find. Spur slope. Bare soil patch: 1m^2. No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a mid-slope feature. The site is in poor condition.	A single isolated flake. Quartz . Unmodified. Broken Flake. L:9mm W:7mm T:6mm. Distal fragment. No cortex. E:0763630 N:6426632
S1MC 307 (T1)	Isolated find. Spur slope. Bare soil patch: 1m^2. No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a vehicle track mid-slope feature. The site is in poor condition.	A single isolated flake. Quartz . Unmodified. Broken Flake. L:25mm W:16mm T:6mm. Distal fragment. No cortex. E:0763714 N:6426587
S1MC 308 (T1)	Artefact Scatter & Potential Archaeological Deposit. 10m x 1m area. Spur slope. Bare soil patch. Possible cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a spur/ mid-slope feature. The site is in poor condition.	An artefact scatter and PAD containing 2 artefacts 1. Quartz . Unmodified. Broken Flake. L:15mm W:13mm T:4mm. Distal fragment. No cortex 2. Quartz . Unmodified. Flaked Piece. L:41mm W:38mm T:17mm. No cortex . E:0763945 N:6426408(centre)
S1MC 309 (T1)	Isolated find. Spur slope. Bare soil patch: 1m^2. No cultural deposits present. There is no hearth or visible bone material associated with the site's contents. The site is located on a vehicle track mid-slope feature. The site is in poor condition.	A single isolated flake. Quartz . Unmodified. Broken Flake. L:12mm W:15mm T:4mm. Medial fragment. No cortex. E:0763991 N:6426357

7.1 Site Age & Subsurface Potential

Without evidence of buried hearths (i.e. ancient fireplaces), rock-shelter deposits containing dateable carbon material are the only evidence that could be dated directly. None of the open sites recorded in the study area can be directly dated. This obviously means that true age cannot be known. Another technique of indirect dating is seriation. Hiscock (1986) has set out the main stone tool reduction sequence for the Hunter Region and is further refining this through research looking (Eastern Sequence Project) to identify the nature and directionality of technological changes in stone artefact assemblages in Aboriginal sites within the Sydney Basin. The study is also looking to compare temporal trends between and within sub-regions of the Hunter Region and the Sydney Basin.

Surface artefactual assemblage data recorded in Rail Loop study area and overall for MCP Stage 1 & 2 Aboriginal sites show stone tool manufacture being associated with a backed technology sequence principally designed for geometric and bondi point production. It is likely that the surface assemblages recorded in the Rail Loop study area can be generally described as being part of the Eastern Regional Sequence of backed technology, first proposed by Fred McCarthy in the 1940s (Hiscock & Attenbrow 2002).

In terms of direct dating, the surface evidence is likely to be only a few hundred or thousand years old. One can only speculate, given the extent of erosion and likely disturbance along Wilpinjong Creek and surrounding landforms that most sites are probably not more than 500-2000 years old.

Although a majority of the soils are shallow over much of the study area and likely to have been heavily bioturbated, there is some alluvial soil development within the immediate Bora and Wilpinjong Creek catchments. This, coupled with the fact that human occupation is likely to have been concentrated within a certain distance from creek margins, show there may be some potential for buried open deposits.

7.2 Limitations of the Data

The most significant limitation of the survey data is the lack of ground visibility on larger areas of flat land (open paddocks adjacent to Wilpinjong and Bora Creeks). Due to the above, more archaeological evidence was expected in areas within 100m along most of Wilpinjong's Creek's catchment. Although ploughing has no doubt removed potential sub-surface deposits in some alluvial land units, more buried evidence would be expected to be found where occupation material has accumulated over a long period of time.

7.3 Landscape Setting

The four sites recorded are as expected in their current topographical setting. Archaeological material is especially concentrated on elevated spur land units east-west of Wilpinjong Creek. The highest concentration of occupation evidence is located between the spurs, terraces and creek flats. As cultural features, they represent low level Aboriginal occupation of the Bora and Wilpinjong Creek valleys. Artefacts found in isolation are likely to have represented discard events associated with short-term fringing occupation. This may have been associated with a small ridge-crest campsite or site-specific activity events (i.e. stone tool manufacturing and discard events). Due to the level of soil disturbance across the study area, the possibility of dating individual artefacts has been lost.

Within a broader context, the sites in their landscape setting are not identified as being rare or significant when compared with other geomorphic or archaeological landscape features in the Moolarben and Ulan region.

8. SIGNIFICANCE ASSESSMENT

The consultant has based his Significance Assessment of the MCP Stage 1 Rail Loop cultural resource on the following criteria:

- *NSW National Parks and Wildlife Service Guidelines*
- Australian Heritage Commission National Estate criteria
- Archaeological significance assessment
- Aboriginal social significance
- Educational value

It is important to state that not all cultural heritage sites or places are equally significant or important and consequently worthy of long-term preservation. A detailed discussion of significance criteria and how it has changed over time has recently been undertaken by Byrne et al (2001). The most important criteria for the assessment of the MCP Stage 1 Rail Loop study area Aboriginal cultural resources are:

- Aboriginal social significance
- Scientific archaeological significance
- Educational significance

Excluding Aboriginal social significance, these specific criteria are defined below.

8.1 Aboriginal Social Significance

Moolarben Coal Operation Pty Ltd has undertaken to consult directly with all Aboriginal community stakeholder groups affected by this development proposal. As such, the relevant groups will be providing their own statement of Aboriginal significance to accompany this report (*see* Appendix *4*).

'Scientific significance' is defined as: '*The scientific or research value of a place. This will depend upon the importance of the data involved, on its rarity, quality or representativeness and on the degree to which the place may contribute further substantive information*.' (Byrne et al 146:2002).

In the Sydney Basin context, I have used following archaeological assessment criteria concerning Aboriginal history and past land-use, which are represented by the following headings:

- Information and Research Potential
- Regional Research Priorities
- Representativeness
- Rarity

- Educational Potential
- Cultural Landscape Value

8.2 Information & Research Potential

This criterion is relevant to assessing an area's research potential in understanding Australia's cultural history or human occupation of Australia. An area's cultural resource may have the potential to provide information that will contribute to understanding past human behaviour. Three factors are considered important in assessing a site, suite of sites or cultural object as having research potential:

- A place or site's intactness or integrity (this may include the state of preservation of a site or cultural remains). An intact site or place may reveal a greater amount of cultural evidence for past human behaviour. Sites in poor condition may be limited in what they can contribute to further research.
- Whether a site or Aboriginal Object may demonstrate connectedness to other sites within a landscape or within a regional context.
- The chronological potential of a site or suite of sites to provide dates of human history for that particular evidence of occupation. This includes whether the site or place has potential for dateable deposits or strata.

8.3 Regional Research Priorities

This research criterion is important for assessing the significance of when information will contribute on a regional level and will assist other researchers in the understanding of past human behaviour. It is usually understood in the context of regional research priorities. Some priorities may be focused on chronology, others on technological variability, while others may be looking at site function.

8.4 Representativeness

This archaeological assessment criterion is based on a conservation objective. It is particularly relevant when assessing what a site or place may contribute if it were to be preserved for future generations. The concept has to be assessed in a regional and local context. If very little of this type of site or suite of sites has been conserved, then it becomes a conservation priority. The aim for cultural resource managers is to conserve a representative sample of sites or places for future generations and research.

The main problem of this criterion is that much of the comparative data for site conservation, especially on a regional scale, has not been systematically gathered by many conservation agencies. Defining 'variability' may be an aim for cultural resource managers, but if nothing is known about what has been destroyed or lost due to natural or human development processes then comparisons concerning representativeness are meaningless.

Without the above information, archaeologists are encouraged to assess representativeness based on their field experience and on their reading of the representative literature.

8.5 Rarity

This concept of significance criteria concerns the issue of how distinct a site or cultural object may be compared to other similar sites or objects. 'Rare' implies that sites or objects of this nature have not been readily reported or assessed in a local or regional context before. The criterion of rarity may be assessed at a range of levels including local, regional, national, state or international.

8.6 Educational Potential

Sites or places that help educate the broader public about Wiradjuri Aboriginal history are a valuable resource. It is usually the level of information retrieved from sites or objects that can really assist in enlightening the public about what happened at a particular place in the past. This educational potential comes from the work of the archaeologist in translating their findings or research results into everyday language that people can understand.

The educational outcomes may be presented in newspaper articles, books, video presentations, lectures, radio broadcasts and information brochures. The information may be displayed as part of a local or regional museum. A mining company may use the research results to inform their employees about Aboriginal cultural history and occupation of a local area. The Aboriginal community may take the information and use it in local schools to teach and educate children about Wiradjuri Aboriginal history and culture.

8.7 Cultural Landscape Value

This value combines the concept of aesthetic and social significance in the broader context of how living Wiradjuri Aboriginal people perceive the local landscape and their sites or cultural objects within it. This Aboriginal concept may be connected to the understanding of religious and scenic values where places and natural features may contain inherent Wiradjuri cultural landscape values.

Sites or Aboriginal Objects found within a landscape which is 'untouched' or has natural scenic beauty may be important when assessing cumulative impact or broader landscape disturbance. Aboriginal people will place a value on an entire landscape (with all its natural features) and how that may be affected by development impact.

9. SIGNIFICANCE RESULTS

9.1 Information & Research Potential

The following sites are considered to have some research potential based on their local contents and condition: S1MC 308.

9.2 Regional Research Values & Representativeness

There are no sites considered to have any regional research value.

9.3 Rarity

There are no sites were considered rare based on their content, landscape aspect and research potential.

9.4 Educational Potential

There are no sites or Aboriginal Objects considered to have any educational potential.

9.5 Cultural Landscape Values

The Rail Loop area does not contain Aboriginal cultural landscape values.

9.6 Scientific Significance Rating

Based on the above significance criteria, Table 8 below summarises the main significance rating for each site. It shows level of scientific significance assessed for Aboriginal sites/objects located within the project area.

Table 8 Level of scientific significance assessed for Aboriginal sites/ objects located within MCP Stage 1 Rail Loop Extension area

Low	Medium	High
S1MC 306-307:309	S1MC 308	None

10. DEVELOPMENT IMPACTS & CONSERVATION OUTCOMES

Following a meeting with Moolarben Coal Operations Pty Ltd on 11 February 2009 to determine likely impacts from the development proposal on existing Aboriginal heritage, none of the sites identified in the assessment can be conserved as a result of the development.

A total of four sites will be impacted by the development proposal. Of these four sites, three are of low scientific significance and one is of medium scientific significance. All will be impacted by the current development proposal (*see* Figure 3: Appendix 1).

11. MANAGEMENT RECOMMENDATIONS

The following recommendations are made based on the existing and proposed legal requirements of the *NSW National Parks and Wildlife Act 1974* and Part 3A of the *Environment Planning & Assessment Act 1979* and the type of archaeological evidence found within the study area:

- The study area is considered to have low potential for Aboriginal heritage.
- The above conclusion is reached based on Aboriginal consultation advice, background archaeological/historical research, field assessment and land-use history.
- Sites S1MC 306-309 be subject to surface collection in keeping with the methodology being currently applied under MCP Stage 1 Aboriginal Heritage Plan (*see* Section 2.5.3 of the AHP) approved by the NSW Department of Planning on 29 August 2008.
- Site S1MC 308 be subject to sub surface testing initially using a mechanical device.
- This salvage work be undertaken with the participation of the three existing Aboriginal Stakeholder community groups: Mudgee Local Aboriginal Land Council based in Mudgee; Murong Gialinga Aboriginal & Torres Strait Islander Corporation based in Mudgee and Warrabinga Native Title Claimants Aboriginal Corporation based in Kandos.
- If additional Aboriginal Sites or Objects are identified as result of the salvage assessment for S1MC 308 and cannot be permanently avoided by the development proposal, further archaeological assessment may be warranted.

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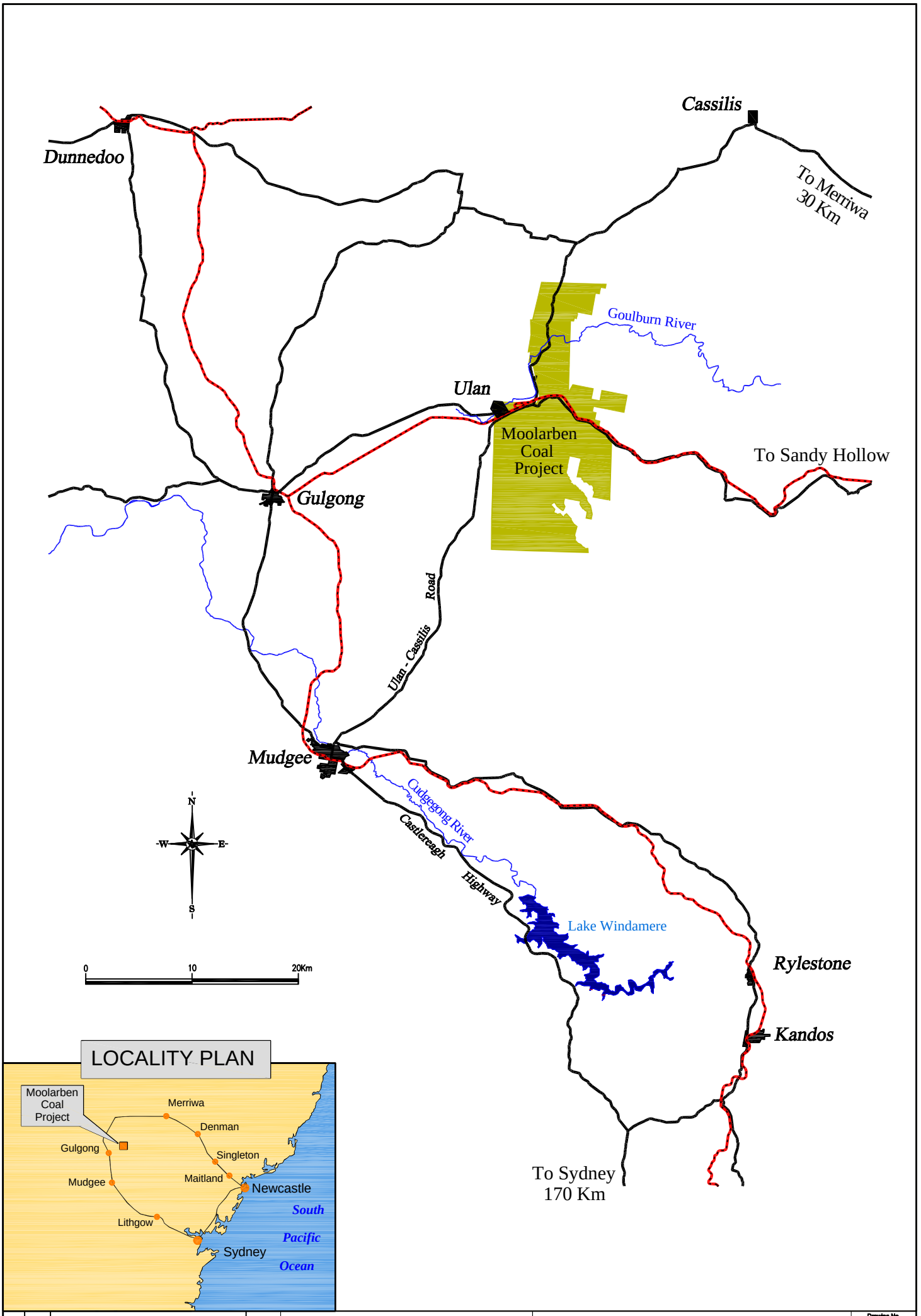
Appendix 1 FIGURES

Figure 1 General Location Map.

Figure 2 Known Aboriginal sites and objects located near the study area.

Figure 3 Survey Transect and newly recorded Aboriginal sites and objects located within the study area.



Rev.	Drawn	Description	Approved
A	NM	Issued Drawing	AW

Moolarben Coal Mines Pty Limited
ABN 82 108 601 672
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North Sydney NSW 2060
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Fax: 02 9923 2427

MOOLARBEN COAL PROJECT - FIGURE 1
GENERAL LOCATION MAP
SHOWING STUDY AREA

Date	Scale:	Drawn	Checked	Approved
05.04.2006	NTS	NM	AW	AW

Drawing No.	Revision No.	Sheet Size
01469	A	A4

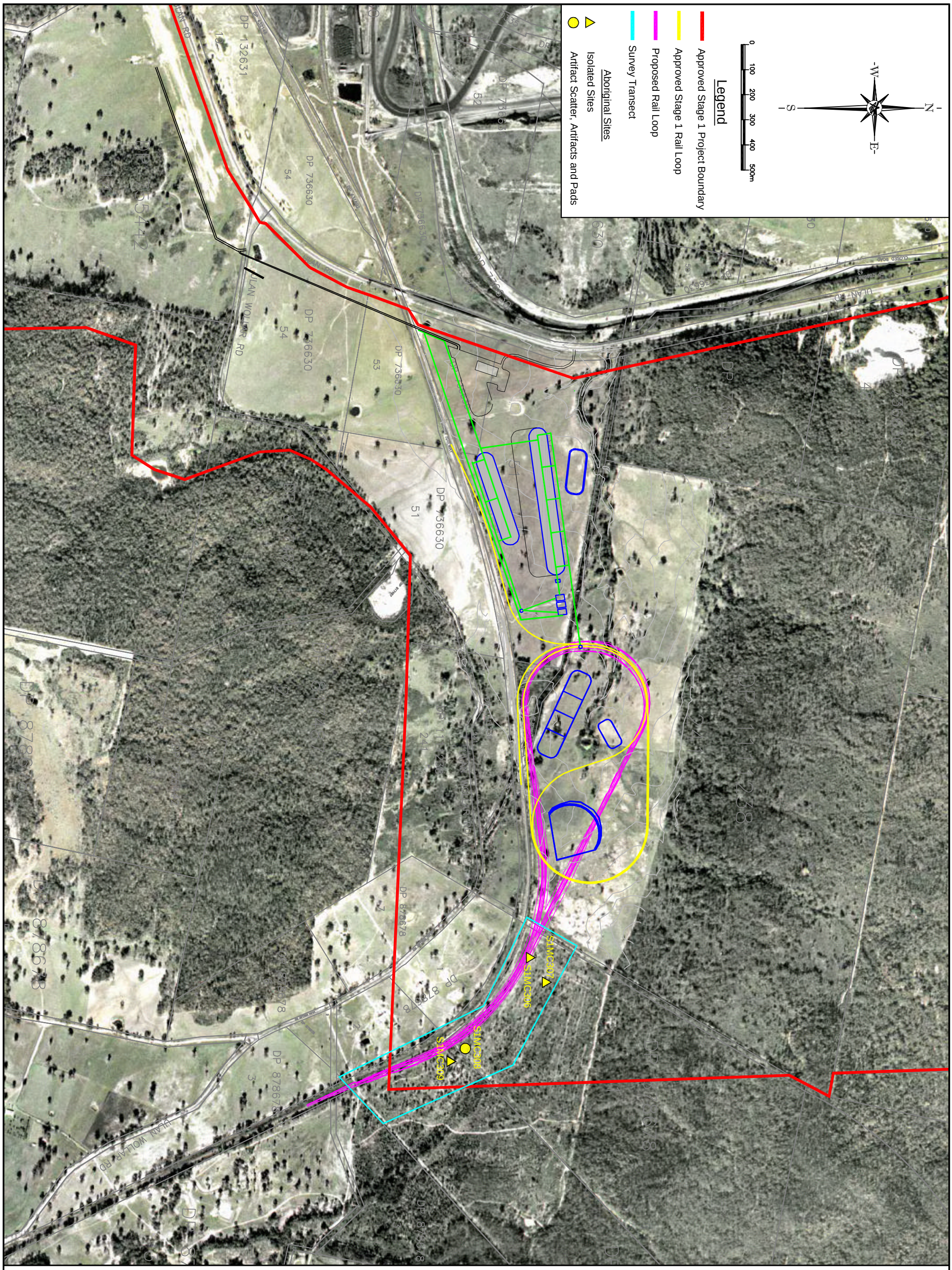
Moolarben Coal Project

Known Recorded Sites Located Near the Study Area

Figure 2

Pegasus Technical

CAD FILE: 03814A.dwg



Pegasus Technical

Moolarben Coal Project

Survey Transect & Newly Recorded Sites

Figure 3

CAD FILE: 03822A.dwg

Appendix 2 PLATES

Plate 1 Looking at Survey Transect 1 east along rail loop corridor

Plate 2 Looking east along survey transect at typical ground exposure

Appendix 3 DECC AHIMS REGISTER SEARCH RESULTS

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AHIMS Aboriginal Heritage Information Management System

Department of Environment & Conservation

APPENDIX 1

List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info.	Report ID
						Gender	General	Location			Contact	
36-3-0454	WCP 177	GDA	55	770132	6417479	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0455	WCP 178	GDA	55	769042	6418083	None	☐	☐	Artefact			
		Status	Valid						Potential Archaeological Deposit (PAD		Permit(s)	
36-3-0456	WCP 179	GDA	55	767683	6421370	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0457	WCP 180	GDA	55	768077	6417927	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0458	WCP 181	GDA	55	767620	6415880	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0459	WCP 182	GDA	55	767560	6418332	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0460	WCP 183	GDA	55	769758	6419369	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0461	WCP 184	GDA	55	769914	6419951	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0462	WCP 185	GDA	55	771497	6417049	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0463	WCP 186	GDA	55	773708	6417456	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0464	WCP 187	GDA	55	771101	6416606	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	

WOLLAR 1:25,000

AHIMS Aboriginal Heritage Information Management System

Department of Environment & Conservation

APPENDIX 1

List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions: Gender	Access Restrictions: General	Access Restrictions: Location	Site Features	Site Types (recorded prior to June 2001)	Further Info. / Contact	Report ID
36-3-0553	WCP117	GDA	55	767046	6417986	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status	Valid								Permit(s)	
36-3-0554	WCP118	GDA	55	767012	6417958	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status	Valid						Artefact		Permit(s)	
36-3-0555	WCP119	GDA	55	767012	6417958	None	☐	☐	Artefact			
		Status	Valid						Potential Archaeological Deposit (PAD		Permit(s)	
36-3-0556	WCP120	GDA	55	767018	6417924	None	☐	☐	Artefact			
		Status	Valid						Potential Archaeological Deposit (PAD		Permit(s)	
36-3-0557	WCP121	GDA	55	767260	6418550	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0558	WCP122	GDA	55	767483	6418950	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
36-3-0559	WCP123	GDA	55	767528	6418870	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0560	WCP124	GDA	55	767322	6418870	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
36-3-0561	WCP125	GDA	55	767551	6418682	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0562	WCP126	GDA	55	767359	6418476	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0563	WCP127	GDA	55	772442	6416074	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	

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Environment
& Conservation

WOLLAR 1:25,000

List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info.	Report ID
						Gender	General	Location			Contact	
36-3-0531	WCP95	GDA	55	773968	6417817	None	☐	☐	Modified Tree (Carved or Scarred)			
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36-3-0532	WCP96	AGD	55	773970	6418008	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	**Valid**								Permit(s)	
36-3-0533	WCP97	GDA	55	774018	6418065	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	**Valid**								Permit(s)	
36-3-0534	WCP98	GDA	55	773986	6418077	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	**Valid**								Permit(s)	
36-3-0535	WCP99	GDA	55	773802	6418148	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	**Valid**								Permit(s)	
36-3-0536	WCP100	GDA	55	773853	6418099	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	**Valid**								Permit(s)	
36-3-0537	WCP101	GDA	55	773848	6418091	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	**Valid**								Permit(s)	
36-3-0538	WCP102	GDA	55	768724	6420426	None	☐	☐	Artefact			
		Status	**Valid**								Permit(s)	
36-3-0539	WCP103	GDA	55	768862	6420231	None	☐	☐	Artefact			
		Status	**Valid**								Permit(s)	
36-3-0540	WCP104	GDA	55	768609	6420249	None	☐	☐	Artefact			
		Status	**Valid**								Permit(s)	
36-3-0541	WCP105	GDA	55	768901	6419830	None	☐	☐	Artefact			
		Status	**Valid**								Permit(s)	

AHIMS Aboriginal Heritage Information Management System

Department of Environment & Conservation

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APPENDIX 1

List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions: Gender	General	Location	Site Features	Site Types (recorded prior to June 2001)	Further Info. / Contact	Report ID
36-3-0641	WCP67	GDA	55	772720	6419067	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0642	WCP68	GDA	55	773006	6418706	None	☐	☐	Modified Tree (Carved or Scarred)			
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36-3-0643	WCP69	GDA	55	772369	6418807	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
36-3-0644	WCP70	GDA	55	771843	6417719	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0645	WCP71	GDA	55	771715	6417414	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0646	WCP72	GDA	55	771626	6417830	None	☐	☐	Art (Pigment or Engraved) Artefact Potential Archaeological Deposit (PAD			
		Status	Valid								Permit(s)	
36-3-0647	WCP73	GDA	55	771578	6417365	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0648	WCP74	GDA	55	771040	6417320	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0649	WCP75	GDA	55	770872	6417192	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
36-3-0650	WCP76	GDA	55	770887	6416900	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0651	WCP77	GDA	55	770912	6417330	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	

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List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions: Gender	General	Location	Site Features	Site Types (recorded prior to June 2001)	Further Info. / Contact	Report ID
36-3-0608	WCP34	GDA	55	768414	6418593	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0609	WCP35	GDA	55	768253	6418543	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0610	WCP36	GDA	55	768465	6418489	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status	Valid						Artefact		Permit(s)	
36-3-0611	WCP37	GDA	55	768465	6418489	None	☐	☐	Art (Pigment or Engraved)			
		Status	Valid						Potential Archaeological Deposit (PAD		Permit(s)	
36-3-0612	WCP38	GDA	55	768665	6418489	None	☐	☐	Artefact			
		Status	Valid						Potential Archaeological Deposit (PAD		Permit(s)	
36-3-0613	WCP39	GDA	55	768532	6418680	None	☐	☐	Artefact			
		Status	Valid						Potential Archaeological Deposit (PAD		Permit(s)	
36-3-0614	WCP40	GDA	55	768145	6417921	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0615	WCP41	GDA	55	768083	6417772	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0616	WCP42	GDA	55	768013	6418339	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0617	WCP43	GDA	55	767922	6417818	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0618	WCP44	GDA	55	767641	6416465	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status	Valid								Permit(s)	

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List of Sites (Partial)

Grid Reference Type = AMG Map Sheet = NARR4S Feature Search Type = AHIMS Features

Site Id	Site Name	Grid Ref. Type	Zone	Easting	Northing	Access Restrictions: Gender	Access Restrictions: General	Access Restrictions: Location	Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
36-3-0162	Cockabulte (site 4);	AMG	55	749050	6441050	None	☐	☐	Artefact	Shelter with Deposit		1333
		Status	Valid									
36-3-0164	Ulan 103;	AMG	55	757560	6433680	None	☐	☐	Artefact Grinding Groove	Axe Grinding Groove Shelter with Deposit		2423
		Status	Valid									
36-3-0165	Ulan 104;	AMG	55	757600	6432580	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0167	Ulan 106;	AMG	55	758440	6434560	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0168	Ulan 107;	AMG	55	757250	6434770	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0169	Ulan 108;	AMG	55	757000	6435000	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0170	Ulan 109;	AMG	55	756770	6435400	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0171	Ulan 110;	AMG	55	756790	6435400	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0172	Ulan 111;	AMG	55	756810	6435410	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0173	Ulan 112;	AMG	55	755770	6434030	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0174	Ulan 113;	AMG	55	755730	6434050	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									

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List of Sites (Partial)

Grid Reference Type = AMG Map Sheet = NARR4S Feature Search Type = AHIMS Features

Site Id	Site Name	Grid Ref. Type	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						Gender	General	Location				
36-3-0175	Ulan 114;	AMG	55	755730	6434050	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0176	Ulan 115;	AMG	55	755660	6434360	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0177	Ulan 116;	AMG	55	758950	6432530	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0179	Ulan 118;	AMG	55	757550	6433690	None	☐	☐	Artefact	Shelter with Deposit		2423
		Status	Valid									
36-3-0187	Identifier 110;Site 32;	AMG	55	756790	6435400	None	☐	☐	Artefact	Shelter with Deposit		
		Status	Valid									
36-3-0188	Identifier 111;Site 33;	AMG	55	756810	6435410	None	☐	☐	Artefact	Shelter with Deposit		
		Status	Valid									
36-3-0205	Ulan SG25	AMG	55	759000	6434700	None	☐	☐	Stone Quarry	Quarry		
		Status	Valid						Artefact			
36-3-0206	Ulan SG24	AMG	55	759030	6434640	None	☐	☐	Artefact	Shelter with Deposit		
		Status	Valid									
36-3-0207	Ulan SG23	AMG	55	758800	6435930	None	☐	☐	Artefact	Shelter with Deposit		
		Status	Valid									
36-3-0208	Ulan SG22	AMG	55	758700	6434587	None	☐	☐	Artefact	Shelter with Deposit		
		Status	Valid						Water Hole	Water Hole/Well		
36-3-0225	L 1 (Loughville 1)	AMG	55	757400	6429400	None	☐	☐	Artefact	Open Camp Site		
		Status	Valid									

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List of Sites (Partial)

Grid Reference Type = AMG Map Sheet = NARR4S Feature Search Type = AHIMS Features

Site Id	Site Name	Grid Ref. Type	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						Gender	General	Location				
36-3-0234	MC1	AMG	55	754090	6440410	None	☐	☐	Artefact			
		Status	Valid									
36-3-0248	BO27	AMG	55	758960	6435740	None	☐	☐	Artefact			
		Status	Valid									
36-3-0249	BO26	AMG	55	758850	6435680	None	☐	☐	Artefact			
		Status	Valid									
36-3-0250	BO25	AMG	55	759040	6435610	None	☐	☐	Artefact			
		Status	Valid									
36-3-0251	BO24	AMG	55	759080	6435950	None	☐	☐	Artefact			
		Status	Valid									
36-3-0253	BO22	AMG	55	759170	6434910	None	☐	☐	Artefact			
		Status	Valid									
36-3-0254	BO20	AMG	55	758810	6434740	None	☐	☐	Artefact			
		Status	Valid									
36-3-0255	BO19	AMG	55	759210	6435070	None	☐	☐	Artefact			
		Status	Valid									
36-3-0256	BO18	AMG	55	759250	6435670	None	☐	☐	Artefact			
		Status	Valid									
36-3-0292	BQ3 (Basalt Quarry 3)	AMG	55	756310	6436950	None	☐	☐	Artefact			
		Status	Valid									

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Grid Reference Type = AMG Map Sheet = GULG3N Feature Search Type = AHIMS Features

Site Id	Site Name	Grid Ref. Type	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report
						Gender	General	Location				
36-3-0004	Ulan;Dexter Mountain;	AMG	55	756787	6420002	None	☐	☐	Art (Pigment or Engraved)	Shelter with Art		
		Status	Valid									
36-3-0041	Ulan Creek;Site 3;	AMG	55	757104	6428502	None	☐	☐	Artefact	Open Camp Site		361
		Status	Valid									
36-3-0047	Stubbo Creek 3;	AMG	55	739276	6424042	None	☐	☐	Artefact	Open Camp Site		
		Status	Valid									
36-3-0048	Slapdash Creek 1;	AMG	55	737542	6421727	None	☐	☐	Artefact	Open Camp Site		
		Status	Valid									
36-3-0155	JOS DAVIS BRIDGE;	AMG	55	741590	6419720	None	☐	☐	Modified Tree (Carved or Scarred)	Scarred Tree		1333
		Status	Valid									
36-3-0159	X 29;	AMG	55	758410	6426580	None	☐	☐	Artefact	Open Camp Site		361
		Status	Valid									
36-3-0163	Ulan 102;	AMG	55	755830	6426600	None	☐	☐	Artefact	Open Camp Site		2423
		Status	Valid									
36-3-0226	EF1 Ulan	AMG	55	757150	6428300	None	☐	☐	Artefact	Isolated Find		
		Status	Valid									
36-3-0235	CC1 COOYAL CREEK	AMG	55	742860	6418890	None	☐	☐	Artefact			
		Status	Valid									
36-3-0236	MC3	AMG	55	758420	6424550	None	☐	☐	Artefact			
		Status	Valid									

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List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions: Gender	General	Location	Site Features	Site Types (recorded prior to June 2001)	Further Info. / Contact	Report ID
36-3-0487	WCP211	GDA	55	766953	6418347	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0488	WCP212	GDA	55	767340	6418935	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0489	WCP213	GDA	55	767250	6418768	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0490	WCP214	GDA	55	767380	6418668	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0491	WCP215	GDA	55	766857	6418302	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0492	WCP216	GDA	55	767084	6418194	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0493	WCP217	GDA	55	772380	6416589	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0494	WCP218	GDA	55	772393	6416642	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0495	WCP219	GDA	55	772467	6416920	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0496	WCP220	GDA	55	772530	6417256	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0497	WCP221	GDA	55	772612	6417691	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	

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AHIMS Aboriginal Heritage Information Management System

Department of Environment & Conservation

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st of Sites (Partial)

id Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

te ID	Site Name		Datum	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info.	Report ID
							Gender	General	Location			Contact	
-3-0443	WCP 166	✓	GDA	55	774210	6417972	None	☐	☐	Modified Tree (Carved or Scarred)			
			Status	Valid								Permit(s)	
-3-0444	WCP 167	✓	GDA	55	774175	6417960	None	☐	☐	Modified Tree (Carved or Scarred)			
			Status	Valid								Permit(s)	
-3-0445	WCP 168	✓	GDA	55	774376	6417608	None	☐	☐	Potential Archaeological Deposit (PAD			
			Status	Valid								Permit(s)	
-3-0446	WCP 169	✓	GDA	55	774143	6417777	None	☐	☐	Modified Tree (Carved or Scarred)			
			Status	Valid								Permit(s)	
-3-0447	WCP 170	✓	GDA	55	774274	6417965	None	☐	☐	Modified Tree (Carved or Scarred)			
			Status	Valid								Permit(s)	
-3-0448	WCP 171	✓	GDA	55	774247	6417965	None	☐	☐	Modified Tree (Carved or Scarred)			
			Status	Valid								Permit(s)	
-3-0449	WCP 172	✓	GDA	55	771678	6420157	None	☐	☐	Potential Archaeological Deposit (PAD			
			Status	Valid								Permit(s)	
-3-0450	WCP 173	✓	GDA	55	771907	6420224	None	☐	☐	Artefact			
			Status	Valid						Potential Archaeological Deposit (PAD		Permit(s)	
-3-0451	WCP 174	✓	GDA	55	771399	6419731	None	☐	☐	Artefact			
			Status	Valid								Permit(s)	
-3-0452	WCP 175	✓	GDA	55	771542	6418199	None	☐	☐	Artefact			
			Status	Valid								Permit(s)	
-3-0453	WCP 176	✓	GDA	55	770194	6417886	None	☐	☐	Artefact			
			Status	Valid								Permit(s)	

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List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info.	Report ID
						Gender	General	Location			Contact	
36-3-0652	WCP78	GDA	55	770824	6416689	None	☐	☐	Artefact			
		Status	**Valid**								Permit(s)	
36-3-0653	WC OS 16 with PAD	AGD	55	767367	6422761	None	☐	☐	Artefact			
		Status	**Valid**								Permit(s)	
36-3-0657	WC OS 18	AGD	55	765865	6423952	None	☐	☐	Artefact		Colley, Sarah (1168)	
		Status	**Valid**								Permit(s)	
36-3-0658	WC OS 17 with PAD	AGD	55	766479	6423495	None	☐	☐	Artefact		Warrabinga Native	
		Status	**Valid**								Permit(s)	
36-3-0659	WC IF 5	AGD	55	767284	6422874	None	☐	☐	Artefact		Warrabinga Native	
		Status	**Valid**								Permit(s)	
36-3-0660	WC OS 15 with PAD	AGD	55	769001	6421142	None	☐	☐	Artefact		Warrabinga Native	
		Status	**Valid**								Permit(s)	
36-3-0661	WC IF 4	AGD	55	769272	6420809	None	☐	☐	Artefact		Warrabinga Native	
		Status	**Valid**								Permit(s)	
36-3-0662	WC OS 14	AGD	55	769878	6420402	None	☐	☐	Artefact		Warrabinga Native	
		Status	**Valid**								Permit(s)	
36-3-0663	WC OS 13 with PAD	AGD	55	769987	6420251	None	☐	☐	Artefact		Warrabinga Native	
		Status	**Valid**								Permit(s)	
36-3-0664	WC PAD 1	AGD	55	771196	6419721	None	☐	☐	Artefact		Warrabinga Native	
		Status	**Valid**								Permit(s)	
36-3-0665	WC IF 3	AGD	55	771371	6419748	None	☐	☐	Artefact		Warrabinga Native	
		Status	**Valid**								Permit(s)	

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AHIMS Aboriginal Heritage Information Management System

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ist of Sites (Partial)

rid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

ite ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info.	Report ID
						Gender	General	Location			Contact	
6-3-0509	WCP233	GDA	55	774209	6418644	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status	Valid								Permit(s)	
6-3-0510	WCP234	GDA	55	774422	6418360	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
6-3-0511	WCP235	GDA	55	773914	6418734	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
6-3-0512	WCP236	GDA	55	774178	6418994	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
6-3-0513	WCP237	GDA	55	772878	6419301	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
6-3-0514	WCP238	GDA	55	770576	6416748	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
6-3-0515	WCP79	GDA	55	770786	6416510	None	☐	☐	Water Hole			
		Status	Valid								Permit(s)	
6-3-0516	WCP80	GDA	55	770756	6416595	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
6-3-0517	WCP81	GDA	55	770562	6416585	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
6-3-0518	WCP82	GDA	55	770722	6416428	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status	Valid								Permit(s)	
6-3-0519	WCP83	GDA	55	770508	6416343	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	

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irid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

ite ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions: Gender	General	Location	Site Features	Site Types (recorded prior to June 2001)	Further Info. / Contact	Report ID
6-3-0498	WCP222	GDA	55	772556	6417780	None	☐	☐	Artefact			
		Status **Valid**									Permit(s)	
6-3-0499	WCP223	GDA	55	771435	6419138	None	☐	☐	Artefact			
		Status **Valid**									Permit(s)	
6-3-0500	WCP224	GDA	55	770066	6417096	None	☐	☐	Artefact			
		Status **Valid**									Permit(s)	
6-3-0501	WCP225	GDA	55	769110	6416961	None	☐	☐	Artefact			
		Status **Valid**									Permit(s)	
6-3-0502	WCP226	GDA	55	768690	6419155	None	☐	☐	Artefact			
		Status **Valid**									Permit(s)	
6-3-0503	WCP227	GDA	55	770356	6420383	None	☐	☐	Artefact			
		Status **Valid**									Permit(s)	
6-3-0504	WCP228	GDA	55	770563	6420668	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status **Valid**									Permit(s)	
6-3-0505	WCP229	GDA	55	770566	6416004	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status **Valid**									Permit(s)	
6-3-0506	WCP230	GDA	55	770584	6416001	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status **Valid**									Permit(s)	
6-3-0507	WCP231	GDA	55	770555	6416059	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status **Valid**									Permit(s)	
6-3-0508	WCP232	GDA	55	774062	6418634	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status **Valid**									Permit(s)	

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st of Sites (Partial)

id Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

e ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info.	Report ID
						Gender	General	Location			Contact	
-3-0476	WCP200	GDA	55	768811	6419935	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
-3-0477	WCP201	GDA	55	769100	6419743	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
-3-0478	WCP202	GDA	55	769046	6419655	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
-3-0479	WCP203	GDA	55	768423	6419307	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
-3-0480	WCP204	GDA	55	768512	6419768	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
-3-0481	WCP205	GDA	55	768656	6419375	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
-3-0482	WCP206	GDA	55	768129	6418868	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
-3-0483	WCP207	GDA	55	768547	6418803	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
-3-0484	WCP208	GDA	55	768747	6418814	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
-3-0485	WCP209	GDA	55	766850	6418150	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
-3-0486	WCP210	GDA	55	766789	6417930	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	

AHIMS Aboriginal Heritage Information Management System

Department of Environment & Conservation

WOLLAR 1:25 000

APPENDIX 1

List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions: Gender	General	Location	Site Features	Site Types (recorded prior to June 2001)	Further Info. / Contact	Report ID
56-3-0465	WCP 188	GDA	55	770194	6416729	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
56-3-0466	WCP 189	GDA	55	770387	6416289	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
56-3-0467	WCP 190	GDA	55	770091	6420022	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
56-3-0468	WCP 191	GDA	55	770067	6420513	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
56-3-0469	WCP192	GDA	55	771158	6420301	None	☐	☐	Artefact			
		Status	Valid						Potential Archaeological Deposit (PAD		Permit(s)	
56-3-0470	WCP193	GDA	55	772009	6419956	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
56-3-0471	WCP195	GDA	55	774308	6416524	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
56-3-0472	WCP196	GDA	55	773980	6418129	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
56-3-0473	WCP197	GDA	55	773982	6418144	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
56-3-0474	WCP198	GDA	55	768904	6420447	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
56-3-0475	WCP199	GDA	55	768760	6420674	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	

WOLLAR 1:25,000

AHIMS Aboriginal Heritage Information Management System

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APPENDIX 1

List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions: Gender	General	Location	Site Features	Site Types (recorded prior to June 2001)	Further Info. / Contact	Report ID
36-3-0432	WCP 155	GDA	55	772228	6417918	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0433	WCP 156	GDA	55	772184	6417380	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0434	WCP 157	GDA	55	772217	6417143	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0435	WCP 158	GDA	55	771958	6416988	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0436	WCP 159	GDA	55	771982	6416730	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0437	WCP 160	GDA	55	771446	6416123	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
36-3-0438	WCP 161	GDA	55	771855	6416725	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
36-3-0439	WCP 162	GDA	55	771710	6416719	None	☐	☐	Artefact			
		Status	Valid								Permit(s)	
36-3-0440	WCP 163	GDA	55	774066	6418110	None	☐	☐	Modified Tree (Carved or Scarred)			
		Status	Valid								Permit(s)	
36-3-0441	WCP 164	GDA	55	774187	6418189	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status	Valid								Permit(s)	
36-3-0442	WCP 165	GDA	55	774281	6418028	None	☐	☐	Potential Archaeological Deposit (PAD			
		Status	Valid								Permit(s)	

WOLLAR 1:25,000

AHIMS Aboriginal Heritage Information Management System

Department of Environment & Conservation

APPENDIX 1

List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum), Map Sheet like 541%, Feature Search Type = AHIMS Features

Site ID	Site Name		Datum	Zone	Easting	Northing	Access Restrictions: Gender	General	Location	Site Features	Site Types (recorded prior to June 2001)	Further Info. / Contact	Report ID
46-3-0421	WCP 144	✓	GDA	55	770589	6420596	None	☐	☐	Artefact			
			Status	Valid								Permit(s)	
46-3-0422	WCP 145	✓	GDA	55	770532	6420684	None	☐	☐	Potential Archaeological Deposit (PAD			
			Status	Valid								Permit(s)	
46-3-0423	WCP 146	✓	GDA	55	770366	6420979	None	☐	☐	Potential Archaeological Deposit (PAD			
			Status	Valid								Permit(s)	
46-3-0424	WCP 147	✓	GDA	55	770612	6415935	None	☐	☐	Potential Archaeological Deposit (PAD			
			Status	Valid								Permit(s)	
46-3-0425	WCP 148	✓	GDA	55	770596	6415935	None	☐	☐	Potential Archaeological Deposit (PAD			
			Status	Valid								Permit(s)	
46-3-0426	WCP 149	✓	GDA	55	770708	6416157	None	☐	☐	Modified Tree (Carved or Scarred)			
			Status	Valid								Permit(s)	
46-3-0427	WCP 150	✓	GDA	55	773285	6416741	None	☐	☐	Modified Tree (Carved or Scarred)			
			Status	Valid								Permit(s)	
46-3-0428	WCP 151	✓	GDA	55	772204	6419996	None	☐	☐	Artefact			
			Status	Valid								Permit(s)	
46-3-0429	WCP 152	✓	GDA	55	768375	6416723	None	☐	☐	Artefact Potential Archaeological Deposit (PAD Art (Pigment or Engraved)			
			Status	Valid								Permit(s)	
46-3-0430	WCP 153	✓	GDA	55	768456	6417253	None	☐	☐	Art (Pigment or Engraved) Potential Archaeological Deposit (PAD			
			Status	Valid								Permit(s)	
46-3-0431	WCP 154	✓	GDA	55	768503	6417372	None	☐	☐	Potential Archaeological Deposit (PAD			
			Status	Valid								Permit(s)	

Department of Environment & Conservation

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List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum) Zone = 55 Map Sheet = WOLL2N Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						Gender	General	Location				
36-3-0074	Wollar;Gulgong;	AGD	55	781478	6414502	None	☐	☐	Artefact	Open Camp Site		
		Status	Valid									
36-3-0098	Wattle Creek NO:2;	AGD	55	769880	6422760	None	☐	☐	Art (Pigment or Engraved)	Shelter with Art		
		Status	Valid									
36-3-0101	Yawanna NO:2;	AGD	55	774740	6421270	None	☐	☐	Art (Pigment or Engraved)	Shelter with Art		
		Status	Valid									
36-3-0103	Wilpinjong;	AGD	55	767950	6422190	None	☐	☐	Modified Tree (Carved or Scarred)	Scarred Tree		
		Status	Valid									
36-3-0106	Yawanna No.1;	AGD	55	774780	6421260	None	☐	☐	Art (Pigment or Engraved)	Shelter with Art		
		Status	Valid									
36-3-0115	Yawanna No.3;	AGD	55	774800	6420900	None	☐	☐	Grinding Groove	Axe Grinding Groove		
		Status	Valid									
36-3-0116	Yawanna No.4;	AGD	55	775200	6420600	None	☐	☐	Artefact	Open Camp Site		1333
		Status	Valid									
36-3-0124	Deridgeree No.3;	AGD	55	777480	6427480	None	☐	☐	Grinding Groove	Axe Grinding Groove		
		Status	Valid									
36-3-0133	Wattle Creek No:1;	AGD	55	769500	6422630	None	☐	☐	Art (Pigment or Engraved)	Shelter with Art		
		Status	Valid									
36-3-0134	Murragamba No:1;	AGD	55	761300	6421170	None	☐	☐	Art (Pigment or Engraved)	Shelter with Art		
		Status	Valid									
36-3-0222	Moolaben Creek MC1	AGD	55	760420	6420820	None	☐	☐	Artefact	Open Camp Site		
		Status	Valid									

Department of Environment & Conservation

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List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum) Zone = 55 Map Sheet = WOLL2N Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						Gender	General	Location				
36-3-0223	MC2	AGD	55	760420	6420880	None	☐	☐	Artefact	Open Camp Site		
		Status	**Valid**									
36-3-0237	MC11	AGD	55	763384	6421070	None	☐	☐	Artefact			
		Status	**Valid**									
36-3-0238	MC10	AGD	55	763226	6422860	None	☐	☐	Artefact			
		Status	**Valid**									
36-3-0239	MC8	AGD	55	763193	6422680	None	☐	☐	Artefact			
		Status	**Valid**									
36-3-0240	MC6	AGD	55	763113	6421940	None	☐	☐	Artefact			
		Status	**Valid**									
36-3-0241	MC4	AGD	55	763161	6421650	None	☐	☐	Artefact			
		Status	**Valid**									
36-3-0287	WC/1	AGD	55	765680	6425480	None	☐	☐	Art (Pigment or Engraved)			
		Status	**Valid**									

Department of Environment & Conservation

APPENDIX 1

List of Sites (Partial)

Grid Reference Type = AGD (Australian Geodetic Datum) Zone = 55 Map Sheet = WOLL2N Feature Search Type = AHIMS Features

Site ID	Site Name	Datum	Zone	Easting	Northing	Access Restrictions			Site Features	Site Types (recorded prior to June 2001)	Further Info. Contact	Report ID
						Gender	General	Location				
36-3-0015	Cook Gap;	AGD	55	760387	6415931	None	☐	☐	Grinding Groove	Axe Grinding Groove		
		Status	Valid									
36-3-0016	Ulan;Murragamba;	AGD	55	760796	6421957	None	☐	☐	Art (Pigment or Engraved)	Shelter with Art		
		Status	Valid									
36-3-0020	Wollar; X	AGD	55	777958	6415823	None	☐	☐	Art (Pigment or Engraved)	Shelter with Art		
		Status	Valid									
36-3-0027	Cooks Gap;	AGD	55	760387	6415931	None	☐	☐	Grinding Groove	Axe Grinding Groove		
		Status	Valid									
36-3-0039	Ulan;	AGD	55	760828	6427722	None	☐	☐	Modified Tree (Carved or Scarred)	Scarred Tree		361
		Status	Valid									
36-3-0042	Ulan Creek;Site 2;	AGD	55	762944	6428010	None	☐	☐	Artefact Art (Pigment or Engraved) Grinding Groove	Axe Grinding Groove Shelter with Art Shelter with Deposit		361
		Status	Valid									
36-3-0044	Ulan;Wilpinjong CReek;	AGD	55	771442	6420278	None	☐	☐	Ceremonial Ring (Stone or Earth) Modified Tree (Carved or Scarred)	Bora/Ceremonial Carved Tree		
		Status	Valid									
36-3-0060	Ulan Creek;Site 18;	AGD	55	760215	6426006	None	☐	☐	Artefact	Open Camp Site		1299
		Status	Valid									
36-3-0061	Ulan Creek;Site 19;	AGD	55	760878	6426622	None	☐	☐	Artefact	Open Camp Site		1299
		Status	Valid									
36-3-0063	Ulan Creek;Site 21;	AGD	55	761207	6428074	None	☐	☐	Artefact	Open Camp Site		1299
		Status	Valid									
36-3-0068	Bobadeen;	AGD	55	761661	6427966	None	☐	☐	Art (Pigment or Engraved)	Shelter with Art		1299
		Status	Valid									

APPENDIX 1

Fax 6372 3186

Card No 2 Addit ... information ?

National Parks and Wildlife Service
BOX N189, GROSVENOR STREET POST OFFICE, SYDNEY, NSW 2000. TEL (02) 237 6500

Site Recording Form — Art Sites

APPENDIX 1

MAP NAME	EDITION	SCALE	REFERENCE	HEAD OFFICE USE ONLY
Dubbo	metric	250K	7613 4211	NWPS Site No.: 36-3-134
			1	Site types: SHELTER & ART. File Nos.:
				Date: 28-1-88
Gulgong	1st	1:50000	6/30E 2117N	Filed by: BW.

Site name: Murragamba No 1 Locality/Property Name:

Owner/~~Manager~~: Mr M.J. Carlisle Address: Ulan (phone 063-734693

Local Post Office: Ulan NPWS District: Muswellbrook Region: Central

Reason for Investigation (Give R.O. Instruction No. where applicable):

private

36-3-0134

Portion No.: 97 Other Land Category:

Parish: Wilpinjong County: Phillip

Plan/Sketch/Section of Site attached? YES/~~NO~~

How many? 2

Air Photo Refs. (For stereo pair) —

Photos Taken? YES/~~NO~~

How many attached? 21

How to get to the site.
(Refer to permanent features, give best approach to site eg. from above, below, along cliff. Draw diagram on separate sheet.)

Must have permission to Enter

See Mr Carlisle for directions

to site

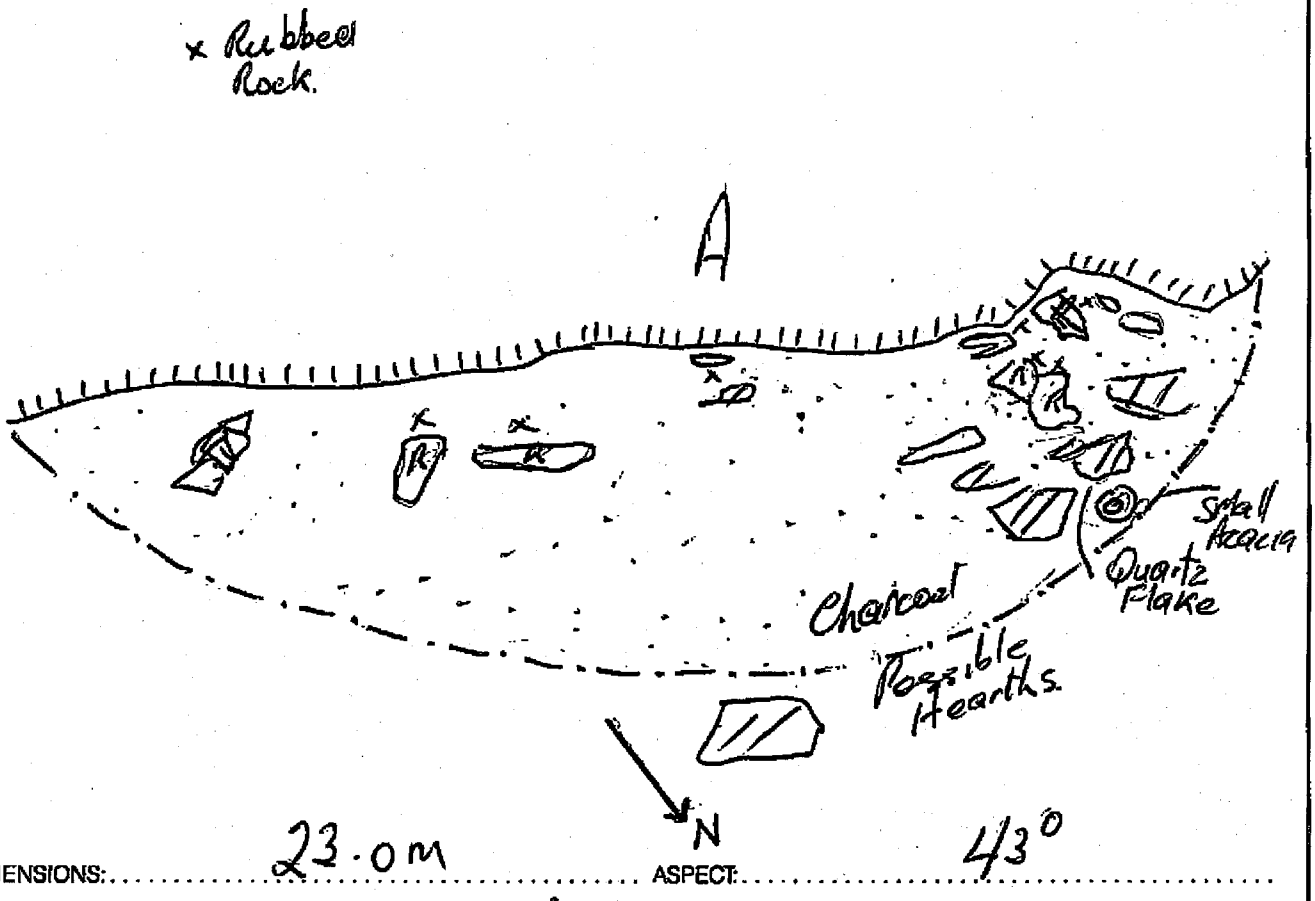
phone number Mr Kevin Carlisle

brother to Max

Site Recorded by: W.T. Bluff Date: 7/87

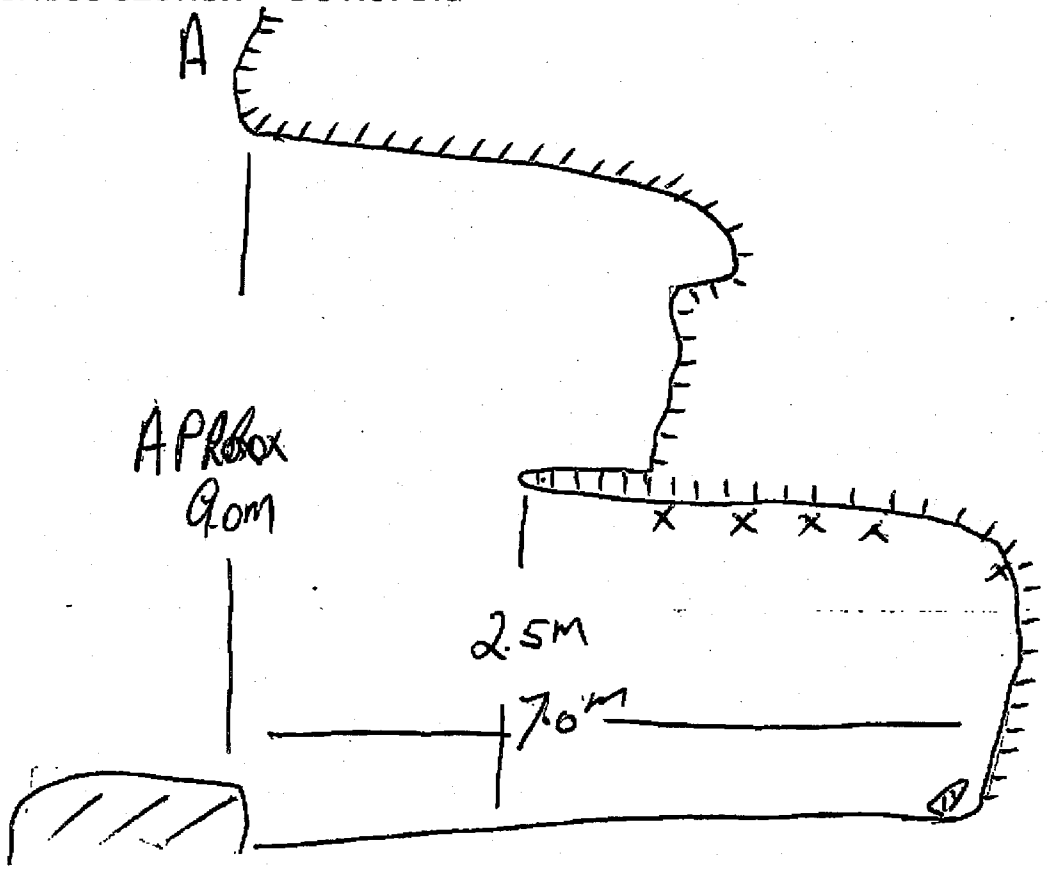
Address/Institution: Mortdale

SITE PLAN — SHOW SCALE + LOCATION OF ART



DIMENSIONS: 23.0m ASPECT: 43°

SITE CROSS SECTION — DO NOT DIG



36-3-

CONDITION OF SITE:

Causes of Art Damage: ☐ Vandalism ☑ Graffiti ☐ Foot Traffic ☐ Camping ☐ Pastoral ☐ Urban ☐ Mining ☐ Plant/Moss/Lichen ☐ Smoke ☐ None ☐ Other (Specify): .....

Erosion Damage: ☐ Exfoliation ☐ Water ☑ Fracturing ☐ Wind ☐ Rock Fall ☐ Salt ☐ None ☐ Other .....

Animal Damage: ☐ Dust ☐ Rubbed Surfaces ☑ Disturbed Deposit ☐ Bird/Insect Nest ☐ None Other .....

Description of Site Condition: large shelter with pencil, charcoal & paint over ext names also scratched in rock lying on floor.

ACCOMPANYING DOCUMENTATION:

	Location		Location
☑ Photos	.....	☐ Slides	.....
☐ Tracings	.....	☐ Published Ref.	.....
☐ Drawings	.....	☐ Notes	.....
☐ Aerial Photo	.....	☐ Artifacts	.....
☐ Charcoal Sample	.....	☐ Aboriginal Report	.....
☐ Other (Specify)	.....		

Published References: .....

IMPORTANCE OF SITE TO ABORIGINES: ☐ Traditional ☐ Contact ☐ Contemporary ☑ Unknown

Informant/Land Council: .....

Address: .....

Details: .....

PURPOSE OF RECORDING: ☐ Research ☐ EIS ☑ Interest ☐ Other: .....

RECOMMENDATIONS FOR MANAGEMENT/PRESERVATION:: clean & fence.

SITE LOCATION AND ENVIRONMENT:

LOCAL GEOLOGY: [x] Sandstone [ ] Granite [ ] Limestone [ ] Shale
[ ] Other Detail: conglomerate

TOPOGRAPHY: [ ] River Valley [ ] Creek Gully [ ] Estuary [ ] Beach
[x] Hill Slopes [ ] Cliffline [ ] Ridge [ ] ....
[ ] Lake Edge [ ] Water Hole [ ] Swamp [ ] ....

SOILS: [ ] Rocky [ ] Clay [x] Sandy [ ] Silt
[ ] Gravel [x] Humic [ ] .... [ ] ....

VEGETATION: [ ] Woodland [ ] Grassland [x] Forrest [ ] Heath
[ ] Swampy [ ] Desert [ ] Mallee [ ] ....

Local Specific Vegetation: Ironbark Stringybark Black Pine, Geebung
Acacia, Casuarina, Leptospermum, Boronia [illegible]
[illegible], Sifter Bush

DESCRIPTION OF NATURAL ENVIRONMENT: Macropods, Reptiles
Wombats

NEAREST DRINKING WATER: [ ] River [x] Creek [ ] Lake [ ] Spring
[ ] Well [ ] Rockhole
[ ] Other: .... [ ] Distance from Site: 600 m
[ ] Permanent [x] Temporary [ ] Unknown
Detail: Trib [illegible] Ck

PRESENT LAND USE: Grazing

DESCRIPTION OF EUROPEAN IMPACT: clearing fencing

NATURE OF SITE: [ ] Boulder [ ] Outcrop [x] Cliffline [ ] Open Surface

Form of Erosion: [x] Cavernous [ ] Honeycomb [ ] Exfoliation

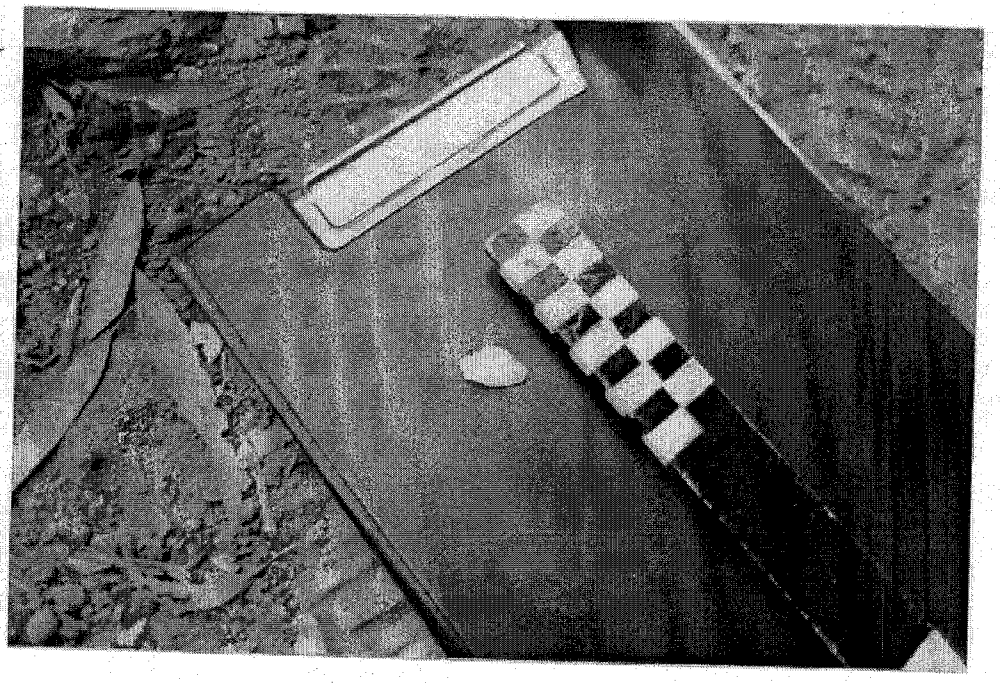
Surface Condition: [ ] Stable [x] Exfoliating [ ] Exposed/Weathered
[ ] Has Accretion ~~(Mineral~~/Insect)
Detail: paper wasps

PHYSICAL DESCRIPTION OF SITE: large shelter in cliffline with
good deposit on North end

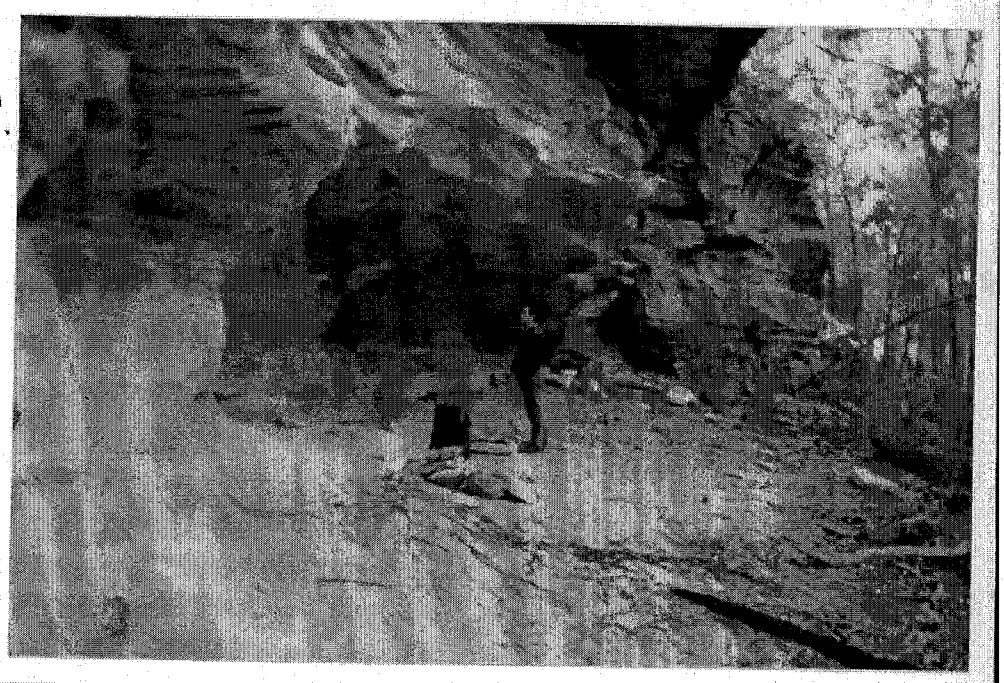
OTHER SITES/SITE TYPES IN VICINITY: art shelter

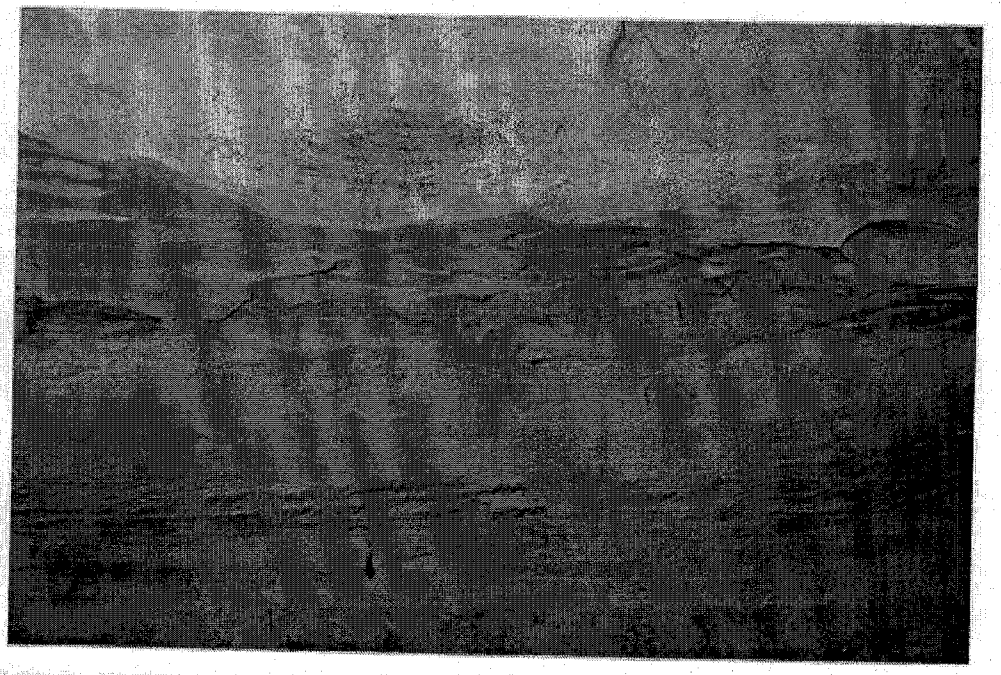
SITE ASSOCIATIONS: 9 possible grind stones on floor, much
charcoal on North end 1 piece of clear quartz
seen in [illegible]

0

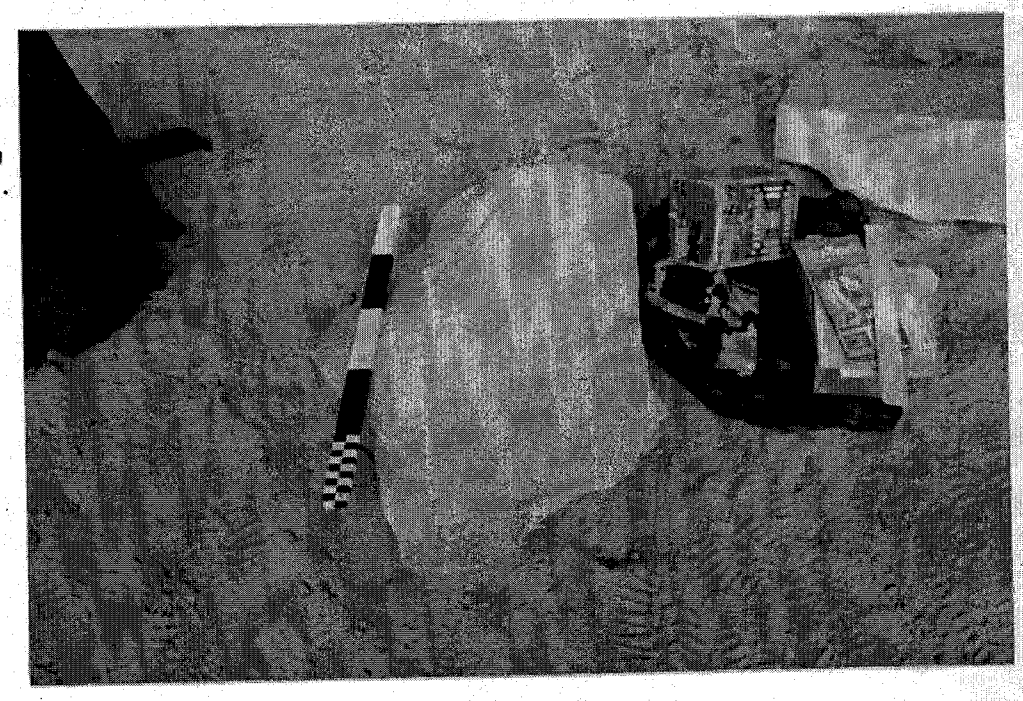


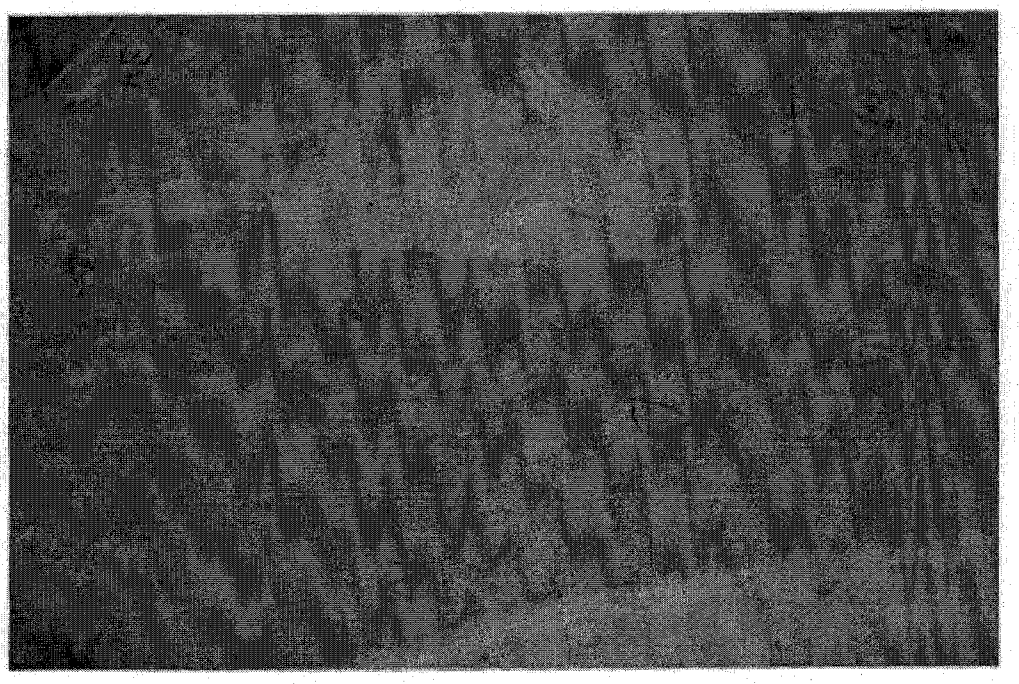
36-3-134
"Murragamba 1".





36-3-134
"Murragamba 1".





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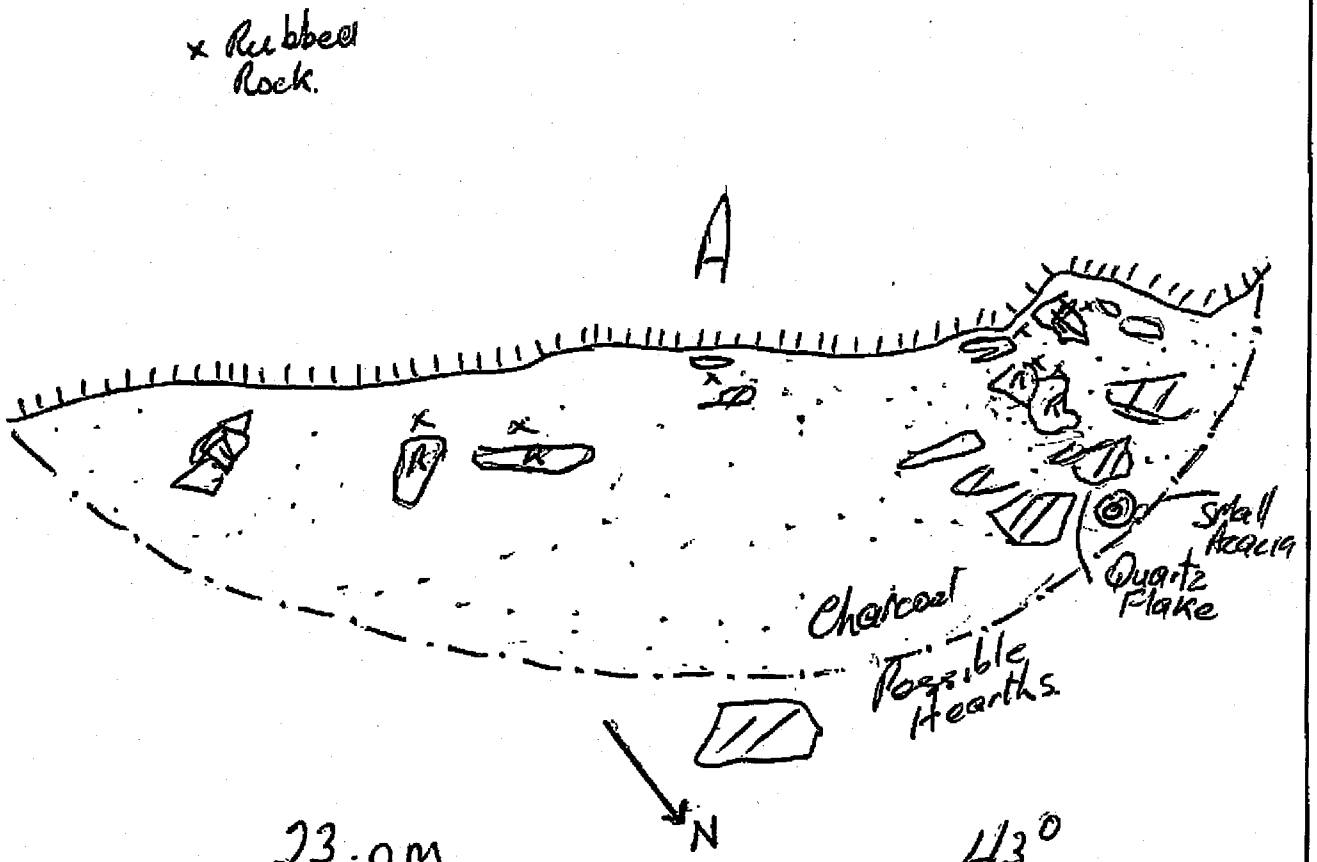
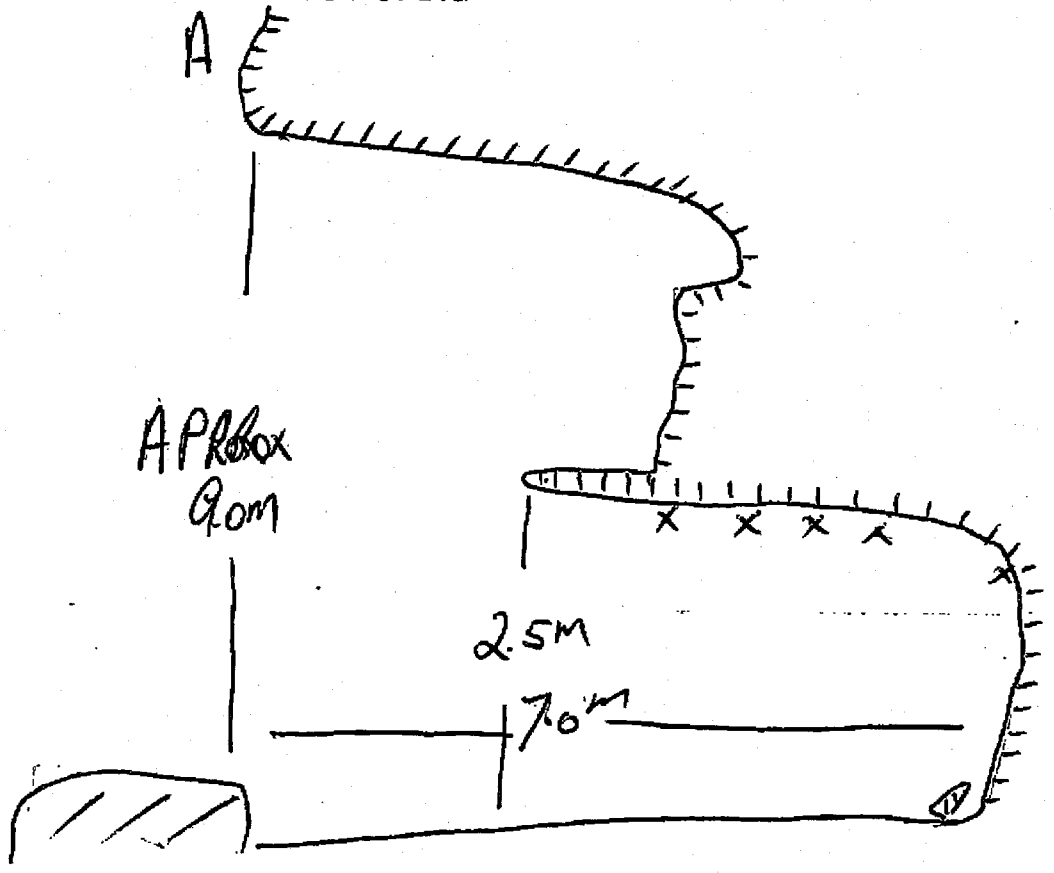
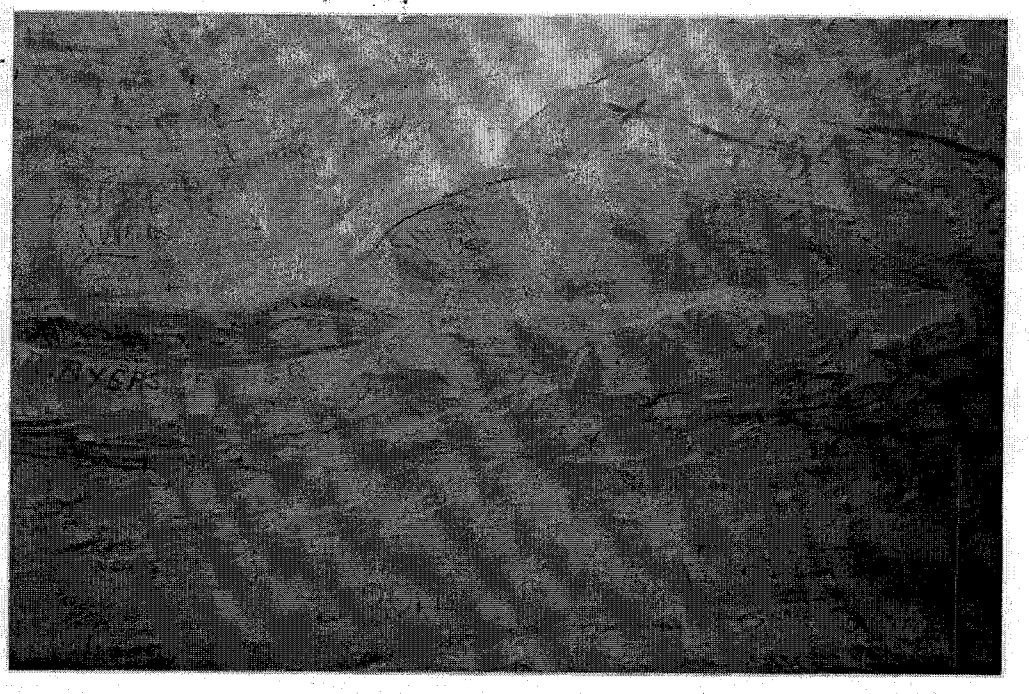
SITE PLAN — SHOW SCALE + LOCATION OF ART



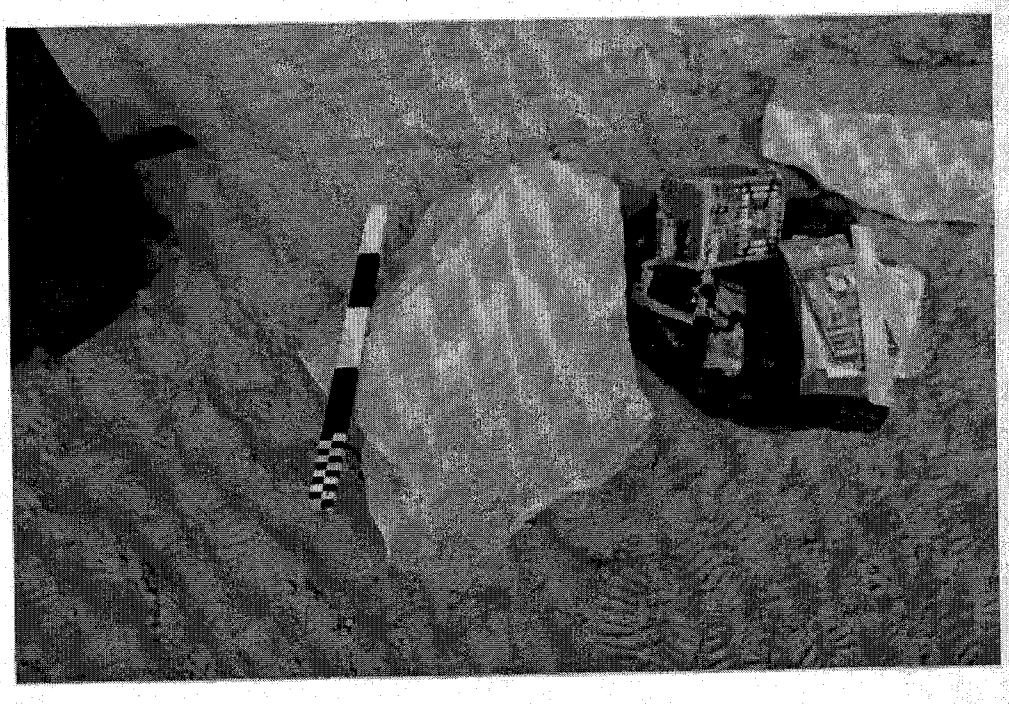
DIMENSIONS: 23.0m ASPECT: 43°

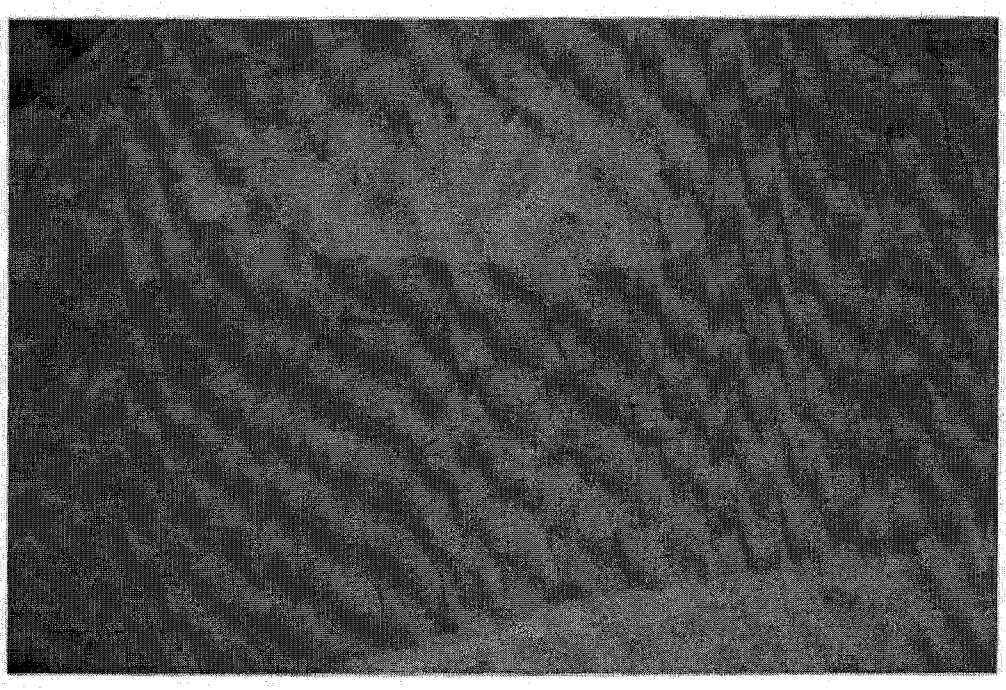
SITE CROSS SECTION — DO NOT DIG





36-3-134
"Murragamba 1".





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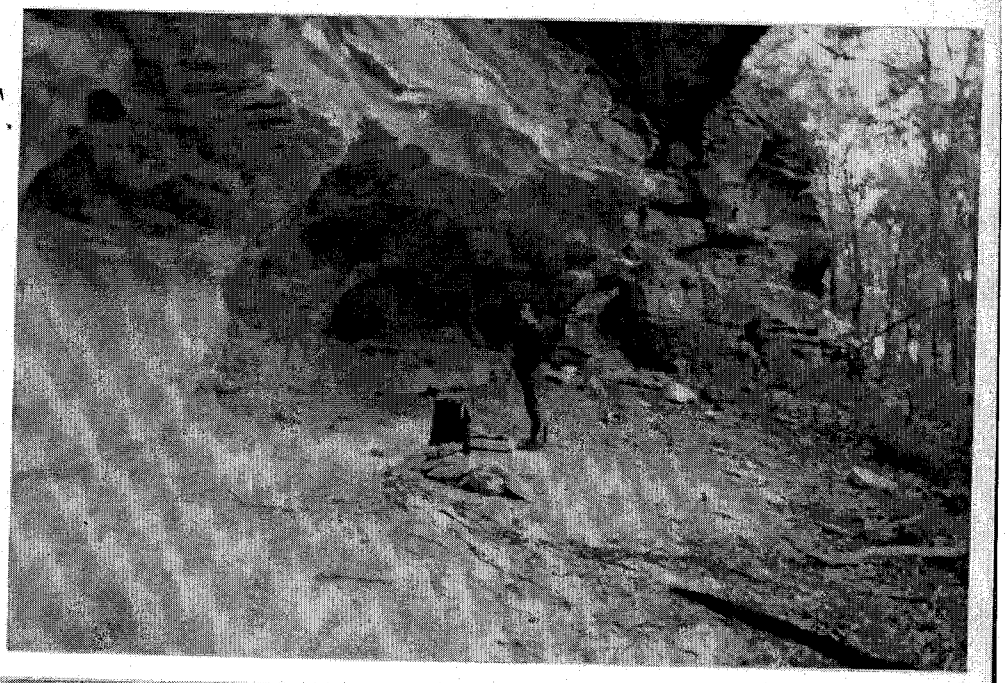
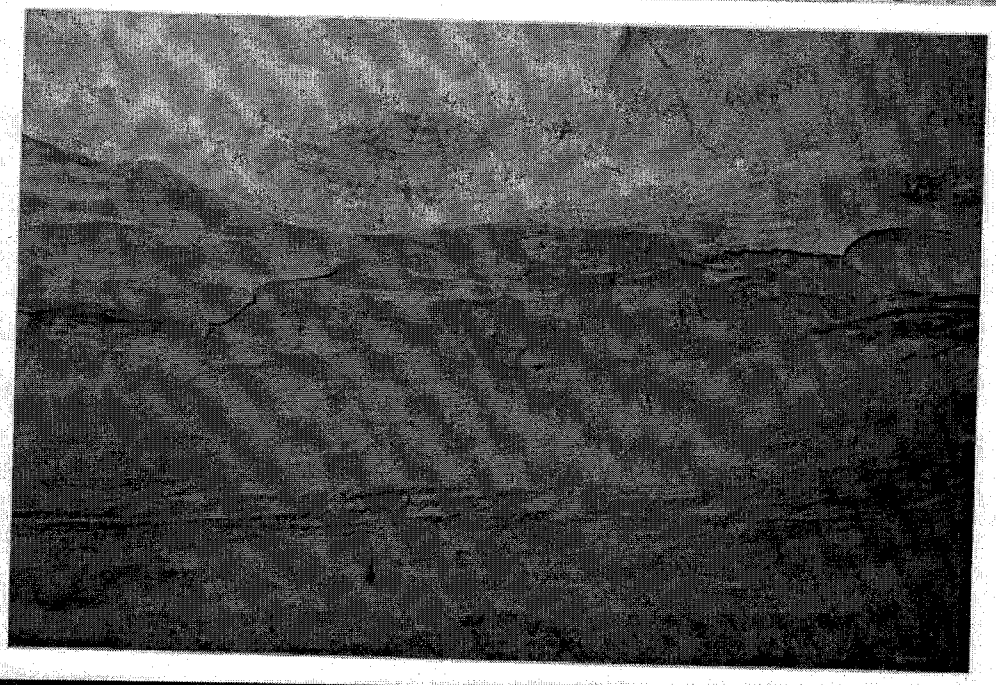
36-3-134
"Nurragamba 1".





SITE LOCATION AND ENVIRONMENT:

LOCAL GEOLOGY: [x] Sandstone [ ] Granite [ ] Limestone [ ] Shale
[ ] Other Detail: Conglomerate

TOPOGRAPHY: [ ] River Valley [ ] Creek Gully [ ] Estuary [ ] Beach
[x] Hill Slopes [ ] Cliffline [ ] Ridge [ ] ....
[ ] Lake Edge [ ] Water Hole [ ] Swamp [ ] ....

SOILS: [ ] Rocky [ ] Clay [x] Sandy [ ] Silt
[ ] Gravel [x] Humic [ ] .... [ ] ....

VEGETATION: [ ] Woodland [ ] Grassland [x] Forrest [ ] Heath
[ ] Swampy [ ] Desert [ ] Mallee [ ] ....

Local Specific Vegetation: Ironbark Stringybark Black Pine, Geebung, Acacia, Casuarina, Leptospermum, Boronia, Kunzea, Sifter Bush

DESCRIPTION OF NATURAL ENVIRONMENT: Macropods, Reptiles, Wombats

NEAREST DRINKING WATER: [ ] River [x] Creek [ ] Lake [ ] Spring
[ ] Well [ ] Rockhole
[ ] Other: .... [ ] Distance from Site: 600 m
[ ] Permanent [x] Temporary [ ] Unknown
Detail: Trib Munnagamba Ck

PRESENT LAND USE: Grazing

DESCRIPTION OF EUROPEAN IMPACT: Clearing fencing

NATURE OF SITE: [ ] Boulder [ ] Outcrop [x] Cliffline [ ] Open Surface

Form of Erosion: [x] Cavernous [ ] Honeycomb [ ] Exfoliation

Surface Condition: [ ] Stable [x] Exfoliating [ ] Exposed/Weathered
[ ] Has Accretion ~~(Mineral~~/Insect)
Detail: paper wasps

PHYSICAL DESCRIPTION OF SITE: Large shelter in cliffline with good deposit on North end

OTHER SITES/SITE TYPES IN VICINITY: Art shelter

SITE ASSOCIATIONS: 9 possible grind stones on floor, much charcoal on North end. 1 piece of clear quartz seen in cliffline

0

36-3-

CONDITION OF SITE:

Causes of Art Damage: ☐ Vandalism ☑ Graffiti ☐ Foot Traffic ☐ Camping ☐ Pastoral ☐ Urban ☐ Mining ☐ Plant/Moss/Lichen ☐ Smoke ☐ None ☐ Other (Specify): .....

Erosion Damage: ☐ Exfoliation ☐ Water ☑ Fracturing ☐ Wind ☐ Rock Fall ☐ Salt ☐ None ☐ Other .....

Animal Damage: ☐ Dust ☐ Rubbed Surfaces ☑ Disturbed Deposit ☐ Bird/Insect Nest ☐ None Other .....

Description of Site Condition: large shelter with pencil charcoal + paint over ent names also scratched in rock lying on floor.

ACCOMPANYING DOCUMENTATION:

	Location		Location
☑ Photos	.....	☐ Slides	.....
☐ Tracings	.....	☐ Published Ref.	.....
☐ Drawings	.....	☐ Notes	.....
☐ Aerial Photo	.....	☐ Artifacts	.....
☐ Charcoal Sample	.....	☐ Aboriginal Report	.....
☐ Other (Specify)	.....		

Published References: .....

IMPORTANCE OF SITE TO ABORIGINES: ☐ Traditional ☐ Contact ☐ Contemporary ☑ Unknown

Informant/Land Council: .....

Address: .....

Details: .....

PURPOSE OF RECORDING: ☐ Research ☐ EIS ☑ Interest ☐ Other: .....

RECOMMENDATIONS FOR MANAGEMENT/PRESERVATION:: clean + fence.

APPENDIX 7

MOOLARBEN COAL EA 2 : ABORIGINAL CULTURAL HERITAGE SURVEY ASSESSMENT: SIGN IN/OUT SHEET.

Name	Organisation	Date	Sign In/Time	Sign Out/Time
WENDY ANN LEWIS	WARRABINGA.	30·8·06	10.00.	4'00
Thelma Pye	NEW	30/8/06	10·00	4·00
Lyn Syme	NEW	30/8/06	10·00	4·00
KEVIN WILLIAMS	MURONG GIALINGA	30/8/06	10·00	4·00
DAVID. MAYNARD.	MLALC	30·8·06	10·00	4·00
Geoff Murray	Mudgee landcouncil	30·8·06	10:00	"
CHRISTINE MAYNARD	Murong Gialinga	30.8.06	10.00	"
WENDY LEWIS	WARRABINGA	31·8·06	8·30	4·00
JOHN BARTON	"	"	"	"
STEVEN FLICK	Murong Gialinga	"	"	"
ROSIE PYE	MLALC	"	"	"
DAVID MAYNARD	MLALC	"	"	"
GAIL RATCLIFFE		"	"	"
LYN SYME		"	"	"
KEVIN WILLIAMS		"	"	"
Steven Flick	Murong Gialinga	4·9·06	8·00	3·30
D. MAYNARD.	MLALC.	4·9·06		3·30
thelma Pye	MLALC	4·9·06	8·00	3·30
WENDY LEWIS	WARRABINGA	4·9·06	8·00	3·30
Toni Whillock	"	"	8·00	3·30
Lyn Syme	NEW	4/9/06	8·00	3·30.
Gail Ratcliffe	NEW	4/9/06	8·00.	3·30.
K WILLIAMS	MURONG GIALINGA	4/9/06	8·00	3·30
CHRISTINE MAYNARD	Murong Gialinga	5.9.06	8.00	~~8·00~~ Chris Maynard.
Geoff Murray	Mudgee landcouncil	5/9/06	8·00	4.00
KEVIN WILLIAMS	MURONG GIALINGA	5/9/06	8·00	4·00 K Williams.
Lyn Syme	NEW	5/9/06	8.00	4·00
Gail Ratcliffe	NEW	5/9/06	8·00	4·00
D. MAYNARD	MLALC	5·9·06	8·00	D. Maynard 4·00
TONI WHILLOCK.	WARRABINGA	"	8·00	Whillock 4.00pm.
WENDY LEWIS	"	"	8·00	W Lewis 4.00pm

APPENDIX 7

MOOLARBEN COAL EA 2 : ABORIGINAL CULTURAL HERITAGE SURVEY ASSESSMENT: SIGN IN/OUT SHEET.

Name	Organisation	Date	Sign In/Time	Sign Out/Time
WENDY ANN LEWIS	WARRABINGA.	28-8-2006		4:30
John BARTON	"	28/8/06		"
Gail Ratcliffe	NE Wiradjuri	28/08/06		"
KEVIN WILLIAMS	MURONG GIALINGA	28/8/06		"
Steven Ellis	M.L.A.L.C	28.8.06		"
DAVID MAYNARD.	M.L.A.L.C	28.8.06		"
Lyn Syme	DEC	28.8.06		"
29/8/06			8.00	
Lyn Syme	DEC	29.8.06		4:00
KEVIN WILLIAMS	MURONG GIALINGA	29/8/06		4:00
Todd Vermilis		29/8/06		4:00
CHRISTINE MAYNARD	MURONG GALINGA	29.8.06.		4:00
Steven Ellis	MLALC	29.8.06		3:30
Thelma Page	MLALC	29.8.06		3:30
Gail Ratcliffe.	NE Wiradjuri	29/08/06		4:00
John BARTON	Cabonga	29/8/06		3:30

APPENDIX 7

MOOLARBEN COAL EA 2 : ABORIGINAL CULTURAL HERITAGE SURVEY ASSESSMENT: SIGN IN/OUT SHEET.

Name	Organisation	Date	Sign In/Time	Sign Out/Time
Thelma Pye	MLALC	9.10.06	TPye 8.00	TPye 3.30
Heather Porter	Warrabinga	9.10.06	HPorter 8.00	HPorter 3.30
KEVIN WILLIAMS	MURONG GIALINGA	9/10/06	KWilliams 8.00	KWilliams 3.30
DAVID MAYNARD	MLALC	9/10/06	DMaynard	DMaynard 3.30
Jim Buttes	MURONGA GIALINGA	9/10/06	[illegible] 8.00	[illegible] 3.30
Lyn Syme	NEW	9/10/06	[illegible] 8.00	[illegible] 3.30
Gail Ratcliffe	NEW	9/10/06	[illegible] 8.00	[illegible] 3.30
Thelma Pye	MLALC	10.10.06	TPye 8.00	TPye 4.00
Heather Porter	Warrabinga	10.10.06	HPorter 8.00	HPorter 4.00
DAVID MAYNARD	MLALC	10.10.06	DMaynard	DMaynard 4.00
Jim Buttes	MURONG GIALINGA	10.10.06	[illegible] 8.00	[illegible] 4.00
KEVIN WILLIAMS	MURONG GIALINGA	10/10/06	KWilliams 8.00	KWilliams 4.00
Lyn Syme	NEW	10/10/06	[illegible] 8.00	[illegible] 4.00
Gail Ratcliffe	NEW	10/10/06	[illegible] 8.00	[illegible] 4.00
Heather Porter	Warrabinga	11/10/06	HPorter 8.00	HPorter 1.30
Jim Buttes	MURONG GIALINGA	11/10/06	[illegible] 8.00	[illegible] 1.30
Lyn Syme	NEW	11/10/06	[illegible] 8.00	[illegible] 1.30
KEVIN WILLIAMS	MURONG GIALINGA	11/10/06	KWilliams 8.00	KWilliams 1.30
Thelma Pye	MLALC	11/10/06	TPye 8.00	TPye 1.30
Heather Porter	Warrabinga	12/10/06	HPorter 8.00	
DAVID MAYNARD	MLALC	12.10.06	DMaynard 8.00	
Jim Buttes	MLALC	12.10.06	[illegible] 8.00	
Lyn Syme	NEW	12/10/06	[illegible] 8.00	
Gail Ratcliffe	NEW	12/10/06	[illegible] 8.00	
KEVIN WILLIAMS	MURONG GIALINGA	12/10/06	KWilliams 8.00	

APPENDIX 7

MOOLARBEN COAL EA 2 : ABORIGINAL CULTURAL HERITAGE SURVEY ASSESSMENT: SIGN IN/OUT SHEET.

Name	Organisation	Date	Sign In	Time	Sign Out	Time
D. MAYNARD	MLALC	22.9.06	D Maynard	7.00	D Maynard	3.00
Thelma Pye	MLALC	22.9.06	TPye	7.00	TPye	3.00
WENDY ANN LEWIS	WARRABINGA	"	WLewis	7.00	WLewis	3.00
Gail Ratcliffe	NEW	22/09/06	GRatcliffe	7.00	GRatcliffe	3.00
Lyn Syme	NEW	22/9/06	Syme	7.00	Syme	3.00
KEVIN WILLIAMS	MURONG GIALINGA	22/9/06	KWilliams	7.00	KWilliams	3.00
Wendy lewis	Warrabinga	3/10/06	WLewis	8:00	WLewis	2:30
Toni Whillock	Warrabinga	3/10/06	TWillock	8:00	TWillock	2:30
Kelli Whillock	warrabinga	3/10/06	KWillock	8am	KWillock	2:30
Thelma Pye	MLALC	3/10/06	TPye	8am	TPye	2.30
Heather Porter	Warrabinga	3/10/06	HPorter	8am	HPorter	2:30
KEVIN WILLIAMS	MURONG GIALINGA	3/10/06	KWilliams	8:00	KWilliams	2:30
Lyn Syme	NEW	3/10/06	Syme	8.00	Syme	2:30
Gail Ratcliffe.	NEW	3/10/06	GRatcliffe	8:00	GRatcliffe	2:30
K						
Wendy lewis	warrabinga	4/10/06	WLewis	8:00	WLewis	3:30
Toni Whillock	warrabinga	4/10/06	TWillock	8:00	TWillock	3:30
Heather Porter	Warrabinga	4/10/06	HPorter	8:00	HPorter	3:30
Thelma Pye	~~NEW~~ MLALC	4/10/06	TPye	8:00	TPye	3:30
Kelli Whillock	Warrabinga	4/10/06	KWillock	8am	KWillock	3:30
Lyn Syme	NEW	4/10/06	Syme	8:00	Syme	3:30
KEVIN WILLIAMS	MURONG GIALINGA	4/10/06	KWilliams	8:00	KWilliams	3:30
DAVID MAYNARD	MLALC	5.10.06	DMaynard	8:00	DMaynard	4.05
Lyn Syme	NEW	5/10/06	Syme	8:00	Syme	4.05
Gail Ratcliffe.	NEW	5/10/06	GRatcliffe	8:00	GRatcliffe	4.05
KEVIN WILLIAMS	MURONG GIALINGA	5/10/06	KWilliams	8:00	KWilliams	4.05
WENDY LEWIS	WARRABINGA	"	WLewis	8:00	WLewis	4.05
Heather Porter	Warrabinga	5/10/06	HPorter	8:00	HPorter	4.05
KEVIN WILLIAMS	MURONG GIALINGA	6/10/06	KWilliams	8:05	KWilliams	3.30
Gail Ratcliffe	NEW	6/10/06	GRatcliffe	8:05	GRatcliffe	3:30
Lyn Syme	NEW	6/10/06	Syme	8:05	Syme	3:30
DAVID MAYNARD	MLALC	6.10.06	DMaynard	8:00	DMaynard	3:30
WENDY ANN LEWIS	WARRABINGA	6.10.06	WLewis	8:00	WLewis	3.30
Heather Porter	Warrabinga	6.10.06	HPorter	8:00	WLewis	3:30

APPENDIX 7

MOOLARBEN COAL EA 2 : ABORIGINAL CULTURAL HERITAGE SURVEY ASSESSMENT: SIGN IN/OUT SHEET.

Name	Organisation	Date	Sign In/Time		Sign Out/Time	
WENDY LEWIS	WARRABINGA	6-9-2006	WALewis	8.00	WALewis	3.00
TONI WHILLOCK.	"	"	Toni Whillock	8.00	Toni Whillock	3.00
Lyn Syme	NEW	6/9/06	Syme	8.00	Syme	3.00
K. WILLIAMS	MURONG GIALINGA	6/9/06	KWilliams	8.00	KWilliams.	3.00
Thelma Rye	NEW	6/9/06	TRye	8.00	TRye	300
Geoff Murray	Mudgee land council	6.9.06	Geoff Murray	800	Geoff Murray	300
Steven Flick	Murong Gialinga	6.9.06	SFlick	400	SFlick	300
DAVID MAYNARD	MLALC	6.9.06	DMaynard	800	DMaynard	3.00
DAVID MAYNARD	MLALC	11.9.06	DMaynard	8.00		
Thelma Rye	MLALC	11.9.06	TRye	8.00		
Lyn Syme	NEW	11/9/06	Syme	8.00	Syme	4.00
KEVIN WILLIAMS	MURONG GIALINGA	11/9/06	KWilliams	8.00	KW.	4.00
Roby Williams	WARRABINGA	11/9/06	Roby Williams	8.00		
Robyn Williams	Warrabinga	12/9/06	Robyn Williams			
Gail Ratcliffe	N.E.W.J	12/9/06	G Ratcliffe	8.00	G Ratcliffe	
Geoff Murray	Mudgee land council	12.9.06	Geoff Murray	800		
Steven Flick	Murong Gialinga	12.9.06	SFlick	8.00		
DAVID MAYNARD	MLALC	12.9.06	DMaynard	8.00		
Lyn Syme	NEW	12.9.06	Syme	8.00		
KEVIN WILLIAMS	MURONG GIALINGA	12-9-06	KWilliams	8.00		
WENDY ANN LEWIS	WARRABINGA NTCAC	13-9-06	WALewis	8.00	WALewis	4.00
KEVIN WILLIAMS	MURONG GIALINGA	13/9/06	KWilliams	8.00	KWilliams	4.00
DAVID MAYNARD	MLALC	13.9.06	DMaynard	8.00		4.00
Emma Syme	NEW	13.9.06	Syme	8.00	Syme	4.00
Lyn Syme	NEW	13/9/06	Syme	8.00	Syme	4.00
Thelma Rye	MLALC	13.9.06	TRye	8.00	TRye	4.00
Gail Ratcliffe	N.E.W.	14/09/06	G Ratcliffe	8.00	G Ratcliffe	3.30
~~Geoff Murray~~ SFlick	Mudgee land council	14.09.06	~~Geoff Murray~~	8.00	SFlick	3.30
~~Steven Flick~~ G Murray	Murong Gialinga	14.09.06	Geoff Murray	8.00	Geoff Murray	300
DAVID MAYNARD	Mudgee LAND Council	14.9.06	DMaynard	8.0	DMaynard	5.00
Emma Syme	~~NEW~~ WARRABINGA	14.9.06	Syme	8.00	Syme	3.30
Lyn Syme	NEW	14.9.06	Syme	8.00	Syme	3.30
KEVIN WILLIAMS	MURONG GIALINGA	14/9/06	KWilliams	8.00	KWilliams	3.30
Wendy Lewis	WARRABINGA.	14/9/06	WALewis	8.00	WALewis	3.30

APPENDIX 7

MOOLARBEN COAL EA 2 : ABORIGINAL CULTURAL HERITAGE SURVEY ASSESSMENT: SIGN IN/OUT SHEET.

Name	Organisation	Date	Sign In	Time	Sign Out	Time
Wendy Ann Lewis	Warrabinga	15-9-2006	[signature]	8.00	[signature]	1.30
Emma Syme	NEW	15-9-2006	[signature]	8.00	[signature]	1.30
David Maynard	MLALC	15.9.06	[signature]	8.00	[signature]	~~1.30~~ 2.00
Geoff Murray	Mudgee land council	15 9 06	[signature]	8.00	[signature]	11.30
Steven Flick	Murong Gialinga	15.9.06	[signature]	8.00	[signature]	11.30
Lyn Syme	NEW	15/9/06	[signature]	8.00	[signature]	12.00
Kevin Williams	Murong Gialinga	15/9/06	[signature]	8.00	[signature]	12.00
Wendy Ann Lewis	Warrabinga.	18/9/2006	[signature]	8.00	[signature]	3.30
Kevin Williams	Murong Gialinga	18/9/06	[signature]	8.00	[signature]	3.30
Lyn Syme	NEW	18/9/06	[signature]	8.00	[signature]	3.30
Gail Ratcliffe	NEW	18/9/06	[signature]	8.00	[signature]	3.30
Christine Maynard	MGATSIC.	18/9/06	[signature]	8.00	[signature]	3.30
Geoff Murray	Mudgee land council	18.9.06	[signature]	8.00	[signature]	3.30
David Maynard	Mudgee L. Council	18.9.06	[signature]	8.00	[signature]	3.30
Lyn Syme	NEW	19/9/06	[signature]	8.00	[signature]	2.00
Steven Flick	Murong Gialinga	19 9 06	[signature]	8.00	[signature]	2.00
Kevin Williams	Murong Gialinga	19/9/06	[signature]	8.00	[signature]	2.00
Gail Ratcliffe.	N.E.W.	19/09/06	[signature]	8.00	[signature]	2.00
David Maynard	MLALC	19.9.06	[signature]	8.00	[signature]	2.00
Wendy Ann Lewis	Warrabinga	19.9.06	[signature]	8.00	[signature]	2.00
Thelma Pye	MLALC	19.9.06	[signature]	8.00	[signature]	2.00
~~Kevin Williams~~	~~Murong Gialinga~~	~~19.9.06~~				
Wendy Ann Lewis	Warrabinga	20.9.06	[signature]	8.00	[signature]	3.30.
Thelma Pye	NEW	20.9.06	[signature]	8.00	[signature]	3.30
Lyn Syme	NEW	20/9/06	[signature]	8.00	[signature]	3.30
Kevin Williams	Murong Gialinga	20/9/06	[signature]	8.00	[signature]	3.30
Geoff Murray	[illegible]	20 9 06	[signature]	8.00	[signature]	3.30
Steven Flick	MLALC	20.9.06	[signature]	8.00	[signature]	3.30
David Maynard	MLALC	20.9.06	[signature]	8.00	[signature]	3.30
Kevin Williams	Murong Gialinga	21/9/06	[signature]	8.00	[signature]	4.00
Wendy Ann Lewis	Warrabinga	"	[signature]	8.00	[signature]	4.00
Gail Ratcliffe	NEW	21/09/06	[signature]	8.00	[signature]	4.00
Thelma Pye	MLALC	21.9.06	[signature]	8.00	[signature]	4.00
D. Maynard	MLALC	21.9.06	[signature]	8.00	[signature]	4.00
Christine Maynard	Murong Gialinga.	21.9.06.	[signature]	8.00	[signature]	4.00

Moolarben Coal Mines Pty Limited

Sign in - Sign Off Register This form MUST be completed each day and provided to your MCM representative at the end of the field work

Unique Identifier Number (this number is to come from the Number assigned to the approved ENV_PRO_0001): _____

Date	Time on site	Name	Company	Work to be carried out	Time off site	State of land on departure
26-6-2008	8am	WENDY ANN LEWIS	WARRABINGA NTCAC	Archaeological Survey	4pm	As Found. Wendy Ann Lewis
26.6.2008	8 AM	LOLITA M'CONNELL	N.E.W.C.O.	" "	4 PM.	" L. McConnell.
"	"	Donna Whillock	WARRABINGA NTCAC	" "	"	VOLUNTEER
"	8.AM.	CHRISTINE MAYNARD.	MLALC.	" "	4. "PM	Christa Maynard
	8am	Debbie Foley	morong gilgia	"	4pm	Foley.

APPENDIX 7

Appendix 4 ABORIGINAL CONSULTATION ADVICE

Advertisement & Pending receipt of community reports

Murong Gailinga
Aboriginal & Torres Strait Islander Corporation

PO Box 1097 ~ Mudgee NSW 2850 ~ ABN: 342 699 091 174
M.G.A.T.S.I.C ~ Chairperson - Mr. Larry Foley ~ Ph 02 6372 0859

5 April 2009

Giles Hamm
MOOLARBEN Coal Operations Pty Ltd
Locked Bag 2003.
MUDGEE. N.S.W.

Response Requested by Gile Hamm
Re: Rail Loop Extensions DF
Site - S1 MC 306 to 309 Surface collection
Site - S1 MC 308 Surface collection sub surface testing

Dear Giles,

It is M.G.A.T.S.I.C understanding that Moolarben Coal operations manages all cultural material under the NPW Act 1979 section 85A Care and Control Permit.
And that the above site will also be managed under the same Act

M.G.A.T.S.I.C is looking forward to the next Aboriginal Cultural Heritage Report - Re above sites and our ongoing involvement in monitoring and site work with you and Moolarben Coal Operations

Murong Gailinga A.T.S.I.C.

Sincerely,

Chairperson
Larry Foley

jp M.G.A.T.S.I.C

WARRABINGA

Native Title Claimants Aboriginal Corporation

535 Pheasants Nest Road
Pheasants Nest, NSW 2574
PH: 02-46841341
MOB: 0409966163 EMAIL: lewisbarton@bigpond.com.au
FAX: 02-46843454

6/4/2009

Giles Hamm
ARAS P/L

Re Rail Loop East Sites Recommendations
for Sect 75W Assessment.

Dear Giles,

Our site Officers have identified 4 sites SIMC306 – SIMC309 within Rail Loop Corridor.

We support management recommendation be collected from 4 sites and site SIMC 308 be subject to sub surface Testing

Yours in Indigenious Unity
Wendy Ann Lewis
Secretary (Hon)

Mudgee Local Aboriginal Land Council

PO Box 1098
Mudgee NSW 2850
Phone: 0263723511
Fax: 02 63723522
Email: mudgeelalc@bigpond.com

Giles Hamm
Archaeological Risk Assessment Services Pty Ltd
PO Box 67
Katoomba NSW 2780

6th April 2009

Dear Giles

This letter is to advise you that the Mudgee Local Aboriginal Land Council agrees to your recommendations re Sites S1 MC 306 to 309 as follows:

- That Site S1 MC308 be approved for further testing including subsurface testing
- That further testing is conducted re the rail loop extensions
  That Sites S1MC 306-309 in the Rail Loop Extension area will be subject to surface collection.

If you have any queries regarding this matter please do not hesitate to contact me.

Yours Sincerely

Tony Lonsdale
A/g CEO

Appendix 5 GENERAL GLOSSARY OF TERMS

Analytical Recording	A process of site recording which obtains detailed archaeological data useful in archaeological analysis.
Analysis	Evaluation of archaeological data to determine the archaeological significance of sites recorded within an impact area.
Archaeological Deposit	A layer of soil material containing archaeological remains.
Archaeological Investigation	The process of assessing the archaeological potential of an impact area by a qualified archaeologist.
Archaeological Comparability	The evaluation of whether archaeological sites are uniformly different or similar across an impact area.
Archaeological Data	Archaeological information that is recorded as a result of an archaeological investigation.
Artefact	Any object made by human agency (e.g. stone artefacts).
Artefact Scatter	A collection of artefacts usually lying as a lag deposit on an eroding surface.
Assemblage	1. A group of stone artefacts found in close association with one another. 2. Any group of items designated for analysis-without any assumptions of chronological or spatial relatedness (Witter 1995)
Avoidance	A management strategy which protects Aboriginal Sites within an impact area by avoiding them totally in development.
Broken Flake	A flake which is either a distal fragment or proximal fragment.
Campsite	A site which contains a variety of artefactual data not specific to one type of stone tool reduction sequence.

Complete Flake	A flake which is whole and not broken.
Core	A lump or nodule of stone from which flakes have been removed.
Debitage	Unmodified flakes or fragments of stone material removed as a result of stone tool manufacture or modification.
Flake	A piece of stone detached from a core, displaying a bulb of percussion and striking platform
Flaked Piece	A fragment of stone where negative flake scarring is visible but no obvious striking platforms are present.
Hearth	The site of a campfire represented by charcoal, burnt earth, ash and sometimes stones used as heat retainers.
Isolated Find	A single artefact found in an isolated context.
Impact Area	An area that requires archaeological investigation and management assessment
In situ	Latin words meaning ‘on the spot, undisturbed’.
Knapping Floor	A location on a site which normally represents a stone artefact reduction episode.
Landform	Any one of the various features that make up the surface of the earth.
Landscape	That part of the land’s surface, more or less extensive being viewed or under study, that relates to all aspects of its physical appearance, including various vegetation associations and landforms.
Land System	An area, or group of areas, commonly delineated on a map, throughout which there is a recurring pattern of topography, soils, and vegetation.

Land Unit	An area of common landform, and frequently with common geology, soils, and vegetation types, occurring repeatedly at similar points in the landscape over a defined region. It is a constituent part of a land system.
Management Plans	Conservation plans which identify short and long term management strategies for all known sites recorded within an impact area.
Methodology	The procedures used to undertake an archaeological investigation.
Minimum Requirements	The minimum standard for which NPWS will accept the reporting of an archaeological investigation.
Mitigation	To address the problem of conflict between land use and site conservation.
Open Site	An archaeological site situated within an open space (e.g. archaeological material located on a creek bank, in a forest, on a hill etc).
Open Area Excavation	A method of excavation where large areas of an archaeological site are open at any one time. A horizontal representation of Aboriginal occupation of different archaeological features is considered to be more important than vertical stratigraphic relationships.
Research Design	A research strategy for carrying out an intensive archaeological investigation and analysis.
Sampling	The process of selecting part of an area under archaeological investigation as a basis for generalising about the whole.
Sample Unit	An area of investigation which is uniform size or density and which can be quantified for analytical reasons.
Salvage	A method by which an archaeological site or group of sites may be fully investigated before they are totally destroyed by a development.

Site	A place where past human activity is identifiable.
Site Recording	The systematic process of collecting archaeological data for an archaeological investigation
Spatial Significance	A site which may contain potential sub-surface deposits or in situ material useful in the analysis of human use of land and site formation process.
Summary Recording	A process of site recording where archaeological data is collected on a summary level only.
Survey Coverage	A graphic and statistical representation of how much of an impact area was actually surveyed and therefore assessed.
Technological Significance	Artefactual material which may contain types or items, although not unique, may be included in a sample to demonstrate an aspect of stone artefact variability.
Test excavation	A process of exploratory excavation carried out on a small scale and used to determine site extent, site condition and excavation potential.

GLOSSARY BIBLIOGRAPHY

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