

ATTACHMENT 9 ARCHAEOLOGICAL ASSESSMENT

Taurus Energy
Proposed Wind Farm – Conroys Gap, via Yass
Aboriginal Archaeological Assessment

February 2006

A Report to Nick Graham-Higgs
nghenvironmental
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1. SUMMARY

1.1 Introduction

New South Wales Archaeology Pty Ltd was commissioned by ngenvironmental in July 2005 to undertake an Aboriginal archaeological assessment of an area of land at Conroys Gap, south west of Yass, in relation to a proposal by Taurus Energy Pty Ltd to develop a 30MW wind farm.

Taurus Energy proposes to develop a wind farm at Conroys Gap for the purpose of electricity generation. The proposal area is situated ca. 17 kilometres west of Yass. The proposal area is located on a number of private properties which are currently utilised for cattle and sheep grazing.

This archaeological assessment is concerned with areas of direct impact related to the proposal including the location of wind turbines, on-site electrical connections, communications cabling, two alternative substation sites and road access.

The proposal is to develop a 30 MW wind farm to supply electricity to the grid. The proposal is comprised of the construction, operation and decommissioning of the following components:

- Up to 15 wind turbines, each with three blades measuring up to 46 metres in length, and mounted on a tubular steel tower measuring up to 80 metres high;
- Electrical connections between wind turbines using a combination of underground cabling and overhead concrete pole power lines;
- Underground communication cabling;
- A substation and transmission connection linking the wind turbines to the existing Transgrid 132kV transmission system;
- Access roads across the site and minor upgrades with access via Black Range Road for installation and maintenance of wind turbines; and
- An onsite control room and equipment storage facility.

The project description is based on current planning; site layout may change as a result of issues which might arise in relation to ongoing assessments including biodiversity, archaeology, geology, wind regime, wind turbine availability and transmission connection design issues.

The proposed wind farm is defined as a Major Project under Part 3A of the Environmental Planning and Assessment Act 1979.

ngenvironmental has been commissioned by Taurus Energy to conduct a number of studies in relation to the proposal. This archaeological assessment forms one component of an Environmental Assessment Report.

The Department of Planning (DoP) is the consent authority in regard to the proposal.

1.2 The Archaeological Study

This archaeological project has been managed by Julie Dibden. An investigation for Aboriginal archaeological sites within the proposal area has been conducted by Julie Dibden, Andrew Pearce and Helen Selimiotis, NSW Archaeology Pty Ltd, Don Bell and Karen Denny, Buru Ngunawal Aboriginal Corporation and Dorothy Dickson, Onerwal Local Aboriginal Land Council.

The study has sought to identify and record any Aboriginal objects which may be present in the proposal area, to assess the archaeological potential of the landform elements present and to formulate management recommendations based on the results of background research, a field survey and site significance assessment.

The investigation has included both a literature search and field survey and has been undertaken in partnership with Buru Ngunawal Aboriginal Corporation and Onerwal Local Aboriginal Land Council.

The approach to archaeological recording in the current study has been a 'nonsite' methodology: the elementary unit recorded is an artefact (described as artefact locales) rather than a site. It is assumed that stone artefacts will be distributed across the landscape in a continuum with significant variations in artefact density and nature in different landform elements. While cultural factors will have informed the nature of land use, and

the resultant artefact discard, environmental variables are those which can be utilised archaeologically in order to analyse archaeological variability across the landscape. Accordingly in this study while the artefact is the elementary unit recorded it is the Survey Unit which is utilised as a framework of recording and analysis.

A landscape based approach and methodology has therefore been implemented during this study. The proposal area has been divided into a number of Survey Units each of which has been defined on the basis of a combination of environmental variables. These areas are termed *archaeological terrain units* which in this study have been defined according to landform element, gradient and aspect.

The rationale for employing this definition relates to its utility in regard to predicting the archaeological potential of landforms; archaeological terrain units are "...discrete, recurring areas of land for which it is assumed that the Aboriginal land use and resultant heritage evidence in one location may be extrapolated to other similar locations" (Kuskie 2000: 67); the archaeological evidence within individual Survey Units is assumed to be generally representative of the archaeological resource located within the entire Survey Unit.

The New South Wales National Parks and Wildlife Service has prepared a draft document which provides a series of guidelines regarding the assessment and management of Aboriginal cultural heritage in New South Wales. This report has been prepared in accordance with these draft guidelines (NSW NPWS 1997). Additionally the study has been conducted in accordance with the Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants (NSW DEC 2004).

1.3 Previously Recorded Sites

A search of the New South Wales DEC Aboriginal Heritage Information Management System (AHIMS) has indicated that there are no previously recorded sites located within the proposal area (AHIMS: 20th November 2005).

1.4 Results

Field work was undertaken in November 2005. The field survey was focused on investigating zones of proposed impact and these were subject to a comprehensive survey. Nine locales containing a total of 22 stone artefacts were recorded. Artefact density calculations based on a consideration of effective survey coverage indicate that all artefact locales, and the Survey Units in which they are situated, contain low density artefact distributions.

1.5 Conclusions

Given the absence of a reliable fresh water source and the limited resources that would have been present in the proposal area when the region was occupied by Aboriginal people, it is predicted that the area was not likely to have been subject to intensive or sustained Aboriginal habitation. Aboriginal habitation sites are expected to be present elsewhere in areas close to permanent watercourses and near to a confluence of resource zones.

The proposal area is likely to have been utilised for hunting and gathering forays conducted away from base camps. Such short term events are unlikely to result in the formation of large, high density or complex archaeological sites. It is predicted that such land usage would result in low to very low levels of artefactual discard.

The Survey Units present in the study area are each assessed to be of low or very low archaeological potential based on various environmental factors including steep gradients, the distance from reliable water and low biodiversity values.

The proposal area is assessed to be of generally low archaeological potential and sensitivity. The survey results are assessed to be in accordance with the predictive model of site location relevant to the proposal area.

The proposed Wind Farm will result in ground disturbance to a small area of the wider 370 hectare proposal site. Accordingly impacts can be considered to be minor in nature. Furthermore due to revisions in the layout of the Wind Farm four of the nine artefact locales recorded in the area are unlikely to be impacted by the proposal. In addition it is likely that some of the remaining five artefact locales could be avoided and hence will not be impacted. The Wind Farm construction will therefore result in a low level of impact to the archaeological resource in the proposal area.

1.6 Recommendations

It is recommended that (see Section 12 for a full listing of recommendations):

- The proponent should give due consideration to the discussion in regard to management and mitigation of Aboriginal artefact locales and Survey Units as outlined in Section 11 of this report.
- The proposal area is assessed to be of low archaeological potential and sensitivity. Accordingly, no further archaeological assessment is considered necessary in relation to the proposed Taurus Energy wind farm at Conroys Gap.
- The nine locales containing Aboriginal stone artefacts recorded in the proposal area do not surpass any scientific significance thresholds which would act to preclude impacts which may ensue as a result of the construction of the proposed wind farm.

Accordingly, if impacts to any of the stone artefact locales recorded in the proposal area are proposed unmitigated impacts are justified.

Acknowledgements

Gratitude is extended to the following people for their assistance in this project:

Don Bell and Karen Denny, Buru Ngunawal Aboriginal Corporation
Dorothy Dickson, Onerwal Local Aboriginal Land Council
David Wright, NSW DEC Administrator, Information Systems Section
Paul McPherson, nghenvironmental
Andrew Durran, Taurus Energy
James and Kerry Payne, 'Springvale'
Cathy and Bill Kaveney, 'Ferndale'



Figure 1 Location of the Conroys Gap wind farm (map supplied by proponent).

2. INTRODUCTION

2.1 Introduction

New South Wales Archaeology was commissioned by New South Wales Environmental on behalf of Taurus Energy in July 2005 to undertake an archaeological assessment of a proposed wind farm at Conroys Gap (Figure 1).

Taurus Energy proposes to develop a wind farm at Conroys Gap for the purpose of electricity generation. The proposal area is situated ca. 17 kilometres west of Yass. The proposal area is located on private properties which are currently utilised for cattle and sheep grazing.

This archaeological assessment is concerned with areas of direct impact related to the proposal including the location of wind turbines, on-site electrical connections, underground communications cabling, two alternative substation sites and road access.

The proposal is to develop a 30 MW wind farm to supply electricity to the grid. The proposal is comprised of the construction, operation and decommissioning of the following components:

- Up to 15 wind turbines, each with three blades measuring up to 46 metres in length, and mounted on a tubular steel tower measuring up to 80 metres high;
- Electrical connections between wind turbines using a combination of underground cabling and overhead concrete pole power lines;
- Underground communications cabling;
- A substation and transmission connection linking the wind turbines to the existing Transgrid 132 kV transmission system which passes across the proposal site;
- Access roads and minor upgrades to access the site via Black Range Road for installation and maintenance of wind turbines; and
- An onsite control room and equipment storage facility.

The project description is based on current planning; site layout may change as a result of issues which might arise in relation to ongoing assessments including biodiversity, archaeology, geology, wind regime, wind turbine availability and transmission connection design issues.

The proposed wind farm is defined as a Major Project under Part 3A of the Environmental Planning and Assessment Act 1979.

In accordance with the NSW NPWS guidelines for archaeological reporting this report aims to document:

- the proposed impacts;
- the involvement in the project of the Aboriginal community;
- the methodology implemented during the study;
- the environmental setting of the study area in order to establish background parameters;
- a review of archaeological and relevant literature and heritage listings on the NSW DEC Aboriginal Heritage Information Management System;
- a synthesis of local and regional archaeology;
- a predictive model of site location relevant to the proposal area;
- the archaeological sensitivity of the landforms subject to proposed impacts;
- the field survey strategy and results; and
- a series of recommendations based on the results of the investigation.

The field work component of this project has been conducted by Julie Dibden, Andrew Pearce and Helen Selimiotis, NSW Archaeology Pty Ltd, Don Bell and Karen Denny, Buru Ngunawal Aboriginal Corporation and Dorothy Dickson, Onerwal Local Aboriginal Land Council. This report has been written by Julie Dibden.

3. PARTNERSHIP WITH THE ABORIGINAL COMMUNITY

The proposed wind farm is defined as a Major Project under Part 3A of the Environmental Planning and Assessment Act 1979.

It is noted that under the terms of the Part 3A of the Environmental Planning and Assessment Act 1979 approvals etc and legislation that does not apply include:

- a permit under section 87 or a consent under section 90 of the National Parks and Wildlife Act 1974

This project has been undertaken in accordance with the NSW DEC Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants (IGACC) (NSW DEC 2004). The NSW DEC requires proponents to undertake consultation with the Aboriginal community "...as an integral part of the impact assessment" process (NSW DEC 2004).

The NSW DEC manages Aboriginal cultural heritage in NSW in accordance with the National Parks and Wildlife Act 1974. Part 6 of the Act provides protection for Aboriginal objects and Aboriginal Places. When an activity is likely to impact Aboriginal objects or declared Aboriginal Places approval of the Director-General of the NSW DEC under s90 or s87 of the NPW Act is required. The decision as to whether or not to issue s90 Consent or a s87 Permit is based on the supply to the NSW DEC by a proponent of adequate information to enable the Director-General to make a decision (NSW DEC 2004).

When administering its approval functions under the NPW Act the NSW DEC requires applicants to have consulted with the Aboriginal community about the Aboriginal cultural heritage values (cultural significance) of Aboriginal objects and places present in the area subject to development (NSW DEC 2004).

The NSW DEC requires consultation with the Aboriginal community because it recognises the following:

- That Aboriginal heritage has a cultural and archaeological significance and that both should be the subject of assessment to inform its decision process;
- That Aboriginal people are the primary determinants of the significance of their heritage;
- That Aboriginal community involvement should occur early in the assessment process to ensure that their values and concerns can be taken into account and so that their own decision making structures can function;
- That the information arising from consultation allows consideration of Aboriginal community views about significance and impact and allows for management and mitigation measures to be considered in an informed way (NSW DEC 2004).

The community consultation process as outlined in the IGACC document aims to improve the assessment process by providing the Aboriginal community with an opportunity to:

- Influence the design of the assessment of cultural and scientific significance;
- Provide relevant information about cultural significance values of objects/places;
- Contribute to the development of cultural heritage management recommendations; and
- Provide comment on draft assessment reports (NSW DEC 2004).

The role of the Aboriginal Community is outlined by the NSW DEC (2004) as follows:

- The Aboriginal community is the primary determinant of the significance of their heritage;
- The Aboriginal community may participate in the process via comment on the assessment methodology and contribution of cultural knowledge; and
- The Aboriginal community may comment on cultural significance of potential impacts and/or mitigation measures.

While it is recognised that under Part 3A of the Environmental Planning and Assessment Act 1979 approvals and legislation under the National Parks and Wildlife Act do not apply to the current project fulfilment of the consultation requirements as outlined in the IGACC document has nevertheless been undertaken as follows:

1. Notification and Registration of Interests

New South Wales Archaeology Pty Ltd, on behalf of the proponent, has actively sought to identify stakeholder groups or people wishing to be consulted about the project and has invited them to register their interest as follows:

Written notification about the project dated 21 October 2005 has been supplied to the following bodies:

- Onerwal Local Aboriginal Land Council
- Native Title Services
- Yass Valley Council
- The NSW Department of Environment and Conservation

The proposal area is situated within the area of Buru Ngunawal Aboriginal Corporation. Mr Don Bell, a traditional owner for the area, was advised of the project via telephone.

The Registrar of Aboriginal Owners was not notified of the project given that the proposal area is not situated within a National Park which possesses a register of Aboriginal owners.

In addition an advertisement has been placed in the Yass Tribune.

The closing date of registration of interest was noted as 9th November 2005.

No individuals or groups registered a written interest in this project.

The field work component of this project has been conducted by Mr Don Bell and Ms Karen Denny, Buru Ngunawal Aboriginal Corporation and Mrs Dorothy Dickson, Onerwal Local Aboriginal Land Council. Mr Bell is a traditional owner for the country encompassed by the Wind Farm. His extensive knowledge, assistance and advice is gratefully acknowledged.

4. THE DEVELOPMENT PROJECT

The proposal involves the installation of up to 15 power generating wind turbines. The turbines are to be placed along a section of the Black Range. Each wind turbine will have a capacity of between 1.5 MW and 3.0 MW.

In addition to the instalment of turbines, associated infrastructure including transmission connections to the grid, communications cabling, on-site roads and on-site electrical connections are also proposed. The project description as outlined below is based on the current status of planning. Site layouts as described in this report may change as a result of issues arising from the biodiversity and archaeological assessment and issues in regard to geology, wind regime, wind turbine availability and transmission connection design.

A description of these components and their related impacts are outlined as follows:

- Turbine Placements

Up to 15 turbines are proposed. The proposed wind turbine envelope is on Figure 2.

Turbines will possess three blades measuring up to 46 metres in length mounted on a tubular steel tower measuring up to 80 metres in height.

Each turbine will require a ground surface area measuring 80 - 90 metres in diameter which is reasonably clear of trees. The ground disturbance associated with each turbine will include the construction of reinforced concrete footings excavated to a maximum size of 15 x 15 metres.

A hardstand area adjacent to the turbine footings which could measure up to 30 x 30 meters is required for a crane. A delivery area for the various components is also necessary. In most cases it is anticipated that the turbine access track could be used as a delivery area.

Each tower will have a transformer which will be housed either within the base of the tower, in the nacelle (located on the tower) or adjacent to the tower as a small pod mount transformer.

- Electrical Connections

The onsite electrical works will include on-site power reticulation cabling (underground and overhead) at either 22,000V or 33,000V linking the rows of turbines and the turbines to a Substation. Underground cabling is proposed between the turbines, with overhead cabling connecting the turbines to the southern substation (if this alternative substation site is used).

Underground cabling would be laid out in trenches measuring 1 - 1.5 metre deep and 0.5 - 1 metre wide and where possible the trench routes will follow access tracks to minimise ground disturbance.

Overhead cabling would require an easement of ca. 20 metre wide and is proposed to be erected on 17- 20 metre high single wood or concrete poles spaced 150 - 300 metres apart.

- Substation

A substation is required to convert power from onsite reticulation voltage of 22kV or 33kV to a transmission voltage of 132kV suitable to connect to the Transgrid transmission system.

The substation is indicated to occupy an area measuring ca. 50 x 75 metres. The substation will be fenced and the ground covered with crushed rock and partly by concrete pads for equipment, walkways and cable covers. The exact location for the substation has not been determined; however two alternate site options have been identified:

Location A: On-site at a central location near to the main turbine groups.

Location B: On-site in the vicinity of the existing Transgrid 132kV transmission line.

- Site Access

Site access is proposed from Black Range Road making use of the existing gravel road currently used to access a communications tower situated on site.

On-site access tracks would be unsealed formations measuring approximately five metres wide. Tracks are required to the base of each turbine and the Substation and Control and Facilities Building.

- On-site Control and Facilities Building

An on-site Control and Facilities Building which will house instrumentation, control and communications equipment is proposed. The building will measure up to 15 x 10 metres and will be built on a concrete slab. Control and communications cabling is also required to extend from the Control and Facilities Building to each turbine and to the site Substation. The control cabling will be installed using the same method and route as the power cabling.

- On-going Wind Monitoring Equipment

A 50 meter high lattice tower monitoring mast is installed on site and another is proposed (65 m high) for the purposes of assessing wind speeds at the site. It is proposed to continue the operation of the masts. However, as a result of finalisation of turbine locations there may be some requirement to relocate the existing mast to a different location within the site, to replace the mast with a shorter or taller mast, or to install an additional mast.

Summary

This archaeological assessment is carried out in relation to those areas of proposed impact associated with the installation of the wind turbines; the proposed access roads on the property; the substation options and the transmission and communications connection routes.

Given the nature of the proposed works the project has the potential to cause impacts to any Aboriginal objects or deposits which may be present within the zones of direct impact. However it is noted that impacts will be discrete and generally small in area.

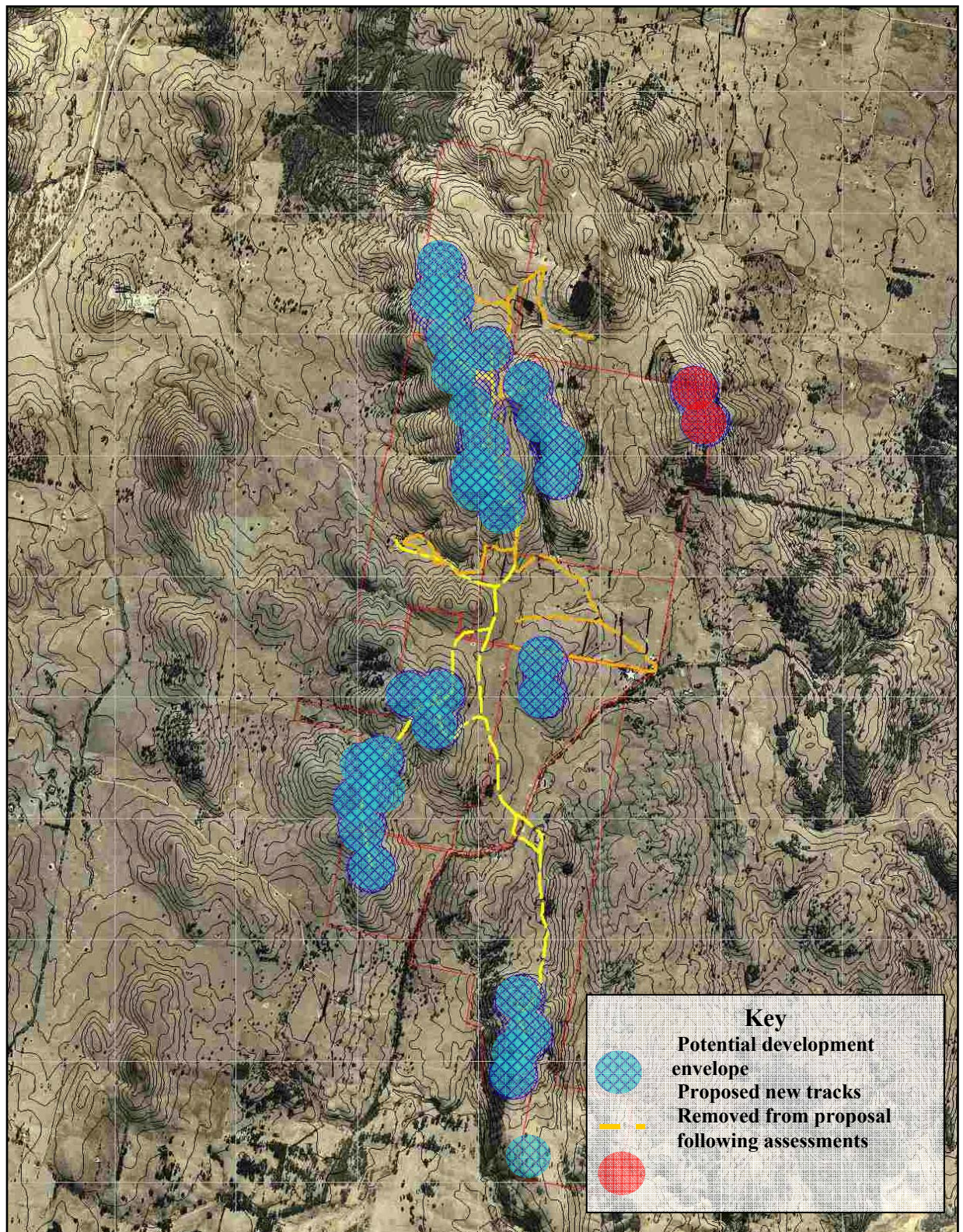


Figure 2. Location of proposed impact areas defined as a turbine envelope and shown in blue (supplied by nghenvironmental).

5. STUDY METHODOLOGY

This Aboriginal archaeological study has included the following components:

- A NSW DEC Aboriginal Heritage Information Management System site search to determine whether or not previously recorded sites are present on the proposal area and to give consideration to the type of sites known to be present within the local area.
- A review of local and regional archaeological reports and other relevant documents in order to provide a contextual framework to the study and heritage management process.
- A review of impacts relating to the construction of the Conroys Gap Wind Farm aimed at determining the potential nature and extent of impacts to any potential Aboriginal objects which may be present.
- A comprehensive field survey of the proposal area aimed at locating Aboriginal objects, recording survey coverage data and assessing the archaeological potential of the landforms present.
- Documentation of survey results.
- An analysis of survey results.
- A site significance assessment.
- The formulation of management recommendations ensuing from the above.

5.1 Literature Review

Background research has been conducted to determine if known Aboriginal heritage sites are located in the proposal area and to assist in the construction of a relevant model of site type and location.

The following information sources were accessed for this study:

- ☐ NSW DEC Aboriginal Heritage Information Management System
- ☐ Relevant archaeological reports held in the NSW DEC Cultural Heritage Unit

5.2 Field Survey and Methodology

Field work was undertaken in December 2005.

The field survey was designed to encompass all areas of proposed impacts as defined by a turbine envelope, but inclusive of additional components such as roads, electrical and communications connections and alternative substation sites. Field survey entailed a foot survey and was undertaken by six people. Survey coverage is described in Section 8 of this report.

The field survey was aimed at locating Aboriginal objects as defined under the Act. An assessment was also made of prior land disturbance, survey coverage variables (ground exposure and archaeological visibility) and the potential archaeological sensitivity of the land.

The approach to recording in the current study has been a ‘nonsite’ methodology: the elementary unit recorded is an artefact rather than a site (*cf* Dunnell 1993; Shott 1995). The rationale behind this approach is that artefacts may be directly observed however ‘sites’ are a construction within an interpretative process. Given that it can be expected that full archaeological visibility will not be encountered during the survey the process of identifying site boundaries (if they exist at all) will not be possible.

However, it can be expected that artefacts will be distributed across the proposal area in a virtual continuum. This phenomenon is not anomalous; subsurface work conducted elsewhere in the south east confirms this pattern (see Dibden 2005a; 2005b and 2005c). Therefore in respect of stone artefact distribution the notion of site is itself a meaningless concept and cannot encompass or reflect the actual distribution of artefacts across the landscape. Given that artefacts are continuous in distribution and not discrete ‘site’ occurrences artefact distribution is better conceptualised in continuous terms.

The density and nature of the artefact distribution will vary across the landscape in accordance with a number of behavioural factors which resulted in artefact discard. While cultural factors will have informed the nature of land use, and the resultant artefact discard, environmental variables are those which can be utilised archaeologically in order to analyse the variability in artefact density and nature across the landscape. Accordingly in this study while the artefact is the elementary unit recorded it is the Survey Unit which is utilised as a framework of recording and analysis (Wandsnider and Camilli 1992).

The study area has been divided into a number of Survey Units each of which have been defined on the basis of a combination of environmental variables which are assumed to relate to Aboriginal usage of the area. These areas are termed *archaeological terrain units* and in this study have been defined on the basis of a combination of landform element, gradient and aspect (*cf* Kuskie 2000: 67). The Survey Unit is defined as an individual area that is bounded on all sides by different archaeological terrain units.

The rationale for employing this definition relates to its utility in regard to predicting the archaeological potential of landforms; archaeological terrain units are "...discrete, recurring areas of land for which it is assumed that the Aboriginal land use and resultant heritage evidence in one location may be extrapolated to other similar locations" (Kuskie 2000: 67). Additionally, the archaeological evidence which has been located within individual Survey Units during the current study is assumed to be generally representative of the archaeological resource located within the entire Survey Unit.

Field survey was designed to encompass the entire proposal area. Field survey entailed a foot survey and was comprehensive. The survey methodology entailed walking parallel transects across individual archaeological terrain units with each surveyor situated ca. 10 m apart. Each terrain unit was surveyed until the entire area had been systematically inspected. This methodology enabled direct visual inspection of as much of the ground surface of each Survey Unit as practicable.

It is noted here that survey routes and areas of ground exposure are not shown on Figure 3 in Section 8 for practical reasons. Survey transects were undertaken so as to visually inspect as much of the ground as possible and/or necessary and to maximize the chance of inspecting all areas of ground exposure which were present. Generally ground exposures were minimal in area (size) although present in innumerable instances as bare earth patches, tracks and erosional features. Accordingly, accurate mapping of exposures would be largely impossible without any extremely accurate GPS system and an excessively large amount of time neither of which were deemed to be necessary for conducting the task at hand.

6. LANDSCAPE CONTEXT

A consideration of the landscape is necessary in archaeological work in order to characterise and predict the nature of Aboriginal occupation across the land (NPWS 1997). In Aboriginal society landscape could be both the embodiment of Ancestral Beings and the basis of a social geography and economic and technological endeavour. The various features and elements of the landscape are/were physical places that are known and understood within the context of social and cultural practice.

Given that the natural resources that Aboriginal people harvested and utilised were not evenly distributed across landscapes Aboriginal occupation and the archaeological manifestations of that occupation will not be uniform across space. Therefore, the examination of the environmental context of a study area is valuable for predicting the type and nature of archaeological sites which might be expected to occur. Factors which typically inform the archaeological potential of a landform include the presence or absence of water, animal and plant foods, stone and other resources, the nature of the terrain and the cultural meaning associated with a place.

Additionally, geomorphological and humanly activated processes need to be defined as these will influence the degree to which archaeological sites may be visible and/or conserved. Land which is heavily grassed will prevent the detection of archaeological material while land which has suffered disturbance may no longer retain artefacts or stratified deposits. A consideration of such factors is necessary in formulating site significance and mitigation and management recommendations.

The following sections provide information in regard to the landscape context of the study area.

6.1 Topography, geology and vegetation

The proposed Conroys Gap Wind Farm is situated at ca. 17 kilometres west of Yass on the Southern Tablelands of New South Wales. The proposed impact area is situated on Black Range. The Wind Farm site is accessed via Black Range Road, off the Hume Highway.

The turbines are proposed to be installed on a number of crests of Black Range. The highest elevation at the site is approximately 850 metres. The topographic context of the proposal area is shown on Figure 2.

The Black Range is situated to the east of the Yass River (which flows into the Burrinjuck Dam).

The oldest rocks in the local area are volcanics associated with the Douro Group, namely the Hawkins Volcanics, deposited during the mid Silurian (approx 420 mya). The Hawkins Volcanics are dominated by welded rhyodacitic ignimbrites, which formed as a result of explosive volcanism within a terrestrial environment. This group of rocks covers a wide area, extending from south of Canberra and northwards to Dubbo and forms part of the Yass-Cowra Zone.

The Hawkins Volcanics are unconformably overlain by sedimentary rocks associated with the Late Devonian Hervey Group (approx 365 mya). The Hervey Group comprises fluvial derived sediments such as conglomerates, sandstones and siltstones, and has undergone low grade metamorphism.

The Hawkins Volcanics have been metamorphosed at a higher grading as a result of burial metamorphism. Deformation of the Hawkins Volcanics during the Tabberabberan Orogeny (mid Devonian) has resulted in folding and substantial removal of cover sequences (erosion) prior to the deposition of the Hervey Group.

The topography within the proposal area is dominated by the high, exposed ridge crest of the Black range (Plate 1). The landform elements located within the zones of proposed impact include ridge crest, simple slopes and drainage depressions (Plates 2 and 3).

The ridge crests on which the turbines are proposed are undulating, possessing slopes which vary between relatively flat to moderate gradient. The land falls on either side of the crests as simple slopes which vary between moderate to steep gradients.

The range country contains little water, although it is probable that seepage points would have provided Aboriginal people with some water. Such seepages were observed during field work however, they are unlikely

to have been considered as optimal water sources. Additionally water is likely to have been frequently available in pools located within the creeks which pass through the ranges.

The proposal area is drained by steep, intermittent 1st and 2nd order drainage depressions; the immediate local area would not have provided Aboriginal land users with a source of reliable water. Accordingly the area of proposed impacts is unlikely to have been utilised for long-term or repeated Aboriginal occupation.

Prior to European land clearance the proposal area would have been covered with woodland tree species and can accordingly be characterised as a woodland resource zone. The immediate area local area possesses limited biodiversity; the proposal area is situated away from a confluence of resource zones. Swamp features do not occur within the ranges. Accordingly, the ranges are unlikely to have provided an abundant aquatic plant supply to Aboriginal people. The ranges are likely to have been exploited for animal resources and terrestrial plants. Given the nature of the terrain encountered in the ranges, occupation of this landform was possibly ephemeral.

Accordingly the area would have been utilised by Aboriginal people for a limited range of activities which may have included hunting and gathering and travel through country. Such activities are likely to have resulted in low levels of artefact discard distributed in a spatially dispersed rather than focused manner. The nature of stone artefacts discarded can be expected to have been correspondingly limited in terms of artefact diversity and complexity.

The proposal area is currently utilised for cattle and sheep grazing. The dominant vegetation is mixed native-exotic pasture. Trees are present as small forest remnants and isolated paddock trees.

Summary

The impact areas relating to the proposed Wind Farm are situated primarily on the crests of high ridges. The area is subject to high wind speeds (Davy and Coppin 2003). Such an environment is unlikely to have been a favoured area for Aboriginal occupation. The proposal area consists of a ridge crest of high elevation in respect of the surrounding country. The slopes which fall away from the crest are of either moderate or steep gradient. Generally such landforms are known to be of low archaeological sensitivity.

The proposal area contains relatively low biodiversity values and in an Aboriginal land use context would have been a woodland resource environment. A source of abundant and reliable fresh water is absent from the proposal area. The area is predicted to have been utilised for low levels of Aboriginal occupation associated with hunting and gathering forays conducted away from base camp locations situated closer to sources of reliable water.

Given the environmental context, the proposal area is therefore assessed to be of relatively low archaeological sensitivity. The proposal area is predicted to contain low levels of artefact discard associated with hunting and gathering forays and movement through country.



Plate 1 Looking north: Note existing communications tower.



Plate 2 Looking south along simple gentle slopes.



Plate 3 Looking south along simple steep slopes towards Burrinjuck Dam: Route of overhead electrical connection (Survey Unit 32 on left; Survey Unit 33 on far right).

7. ARCHAEOLOGICAL CONTEXT

7.1 Social geography

On the basis of archaeological research it is known that Aboriginal people have occupied Australia for at least 40,000 years and possibly as long as 60,000 years (Mulvaney and Kamminga 1999: 2). By 35,000 years before present (BP) all major environmental zones in Australia, including periglacial environments of Tasmania, were occupied (Mulvaney and Kamminga 1999:114).

Radio carbon dating of cultural deposits from the Willandra Lakes, in western NSW, indicates occupation of that area for more than 30,000 years. Human occupation of south east NSW dates from at least 20,000 years ago as evidenced by dated sites at Burrill Lake (Lampert 1971), Bass Point (Bowdler 1970) and two sites near Buchan in Victoria; Cloggs Cave (Flood 1980) and New Guinea 2 (Ossa *et al* 1995). The Bulee Brook 2 site in the south coast hinterland ranges, excavated by Boot (1994) provides evidence that occupation of this zone had occurred by at least 18,000 years ago. Pleistocene occupation sites are however few with the majority of recorded sites dating from the mid to late Holocene. It is nevertheless reasonable to assume that the Yass area was occupied and utilised by Aboriginal people from the late Pleistocene onwards

At the time of early occupation Australia experienced moderate temperatures. However, between 25,000 and 12,000 years BP (a period called the Last Glacial Maximum) dry and either intensely hot or cold temperatures prevailed over the continent (Mulvaney and Kamminga 1999: 114). At this time the mean monthly temperatures on land were 6-10°C lower; in southern Australia coldness, drought and winds acted to change the vegetation structure from forests to grass and shrublands (Mulvaney and Kamminga 1999: 115-116).

During the Last Glacial Maximum at about 24-22,000 years ago, sea levels fell to about 130 m below present levels and accordingly, the continent was correspondingly larger. With the cessation of glacial conditions, temperatures rose with a concomitant rise in sea levels. By ca. 6000 BP sea levels had more or less stabilised to their current position. With the changes in climate during the Holocene Aboriginal occupants had to deal not only with reduced landmass, but changing hydrological systems and vegetation; forests again inhabited the grass and shrublands of the Late Glacial Maximum. As Mulvaney and Kamminga (1999: 120) have remarked:

When humans arrived on Sahul's shores and dispersed across the continent, they faced a continual series of environmental challenges that persisted throughout the Pleistocene. The adaptability and endurance in colonising Sahul is one of humankind's inspiring epics.

Arguably it is this recognition within the archaeological community, as well as other factors, which contributed to the primary focus of research in Australia throughout the 1960's, 1970's and 1980's which examined the relationship between Aboriginal people and their environment and the mechanisms of adaptation in what was *apparently* a land of harsh conditions and scanty, or at best seasonal resources? The bulk of archaeological research that has been undertaken in the region of the south west slopes and western plains has been focused on examining these issues.

Prior to the 1960's most archaeological research was aimed at defining change in the archaeological record; this was before direct dating techniques became available and accordingly the issue of time was handled by identifying differences in archaeological materials in archaeological deposit – specific artefacts in different layers of deposits were used to define different cultural periods. With the application of direct dating techniques in 1960's research shifted away from the use of artefacts for defining different time periods, towards seeking to explain the nature of different artefacts and assemblages of artefacts and food remains in terms of adaptation to the environment. The 1960's also saw a shift towards the use of explicit scientific methods of reasoning in archaeological practice. This impetus influenced archaeologists to focus on research topics which were believed to be answerable within a scientific methodology. Topics dealing with subsistence, technology and environmental adaptation were addressed. The following section outlines research conducted within the region. It is noted that limited research has been conducted within the local area itself and accordingly a wider sphere of research is examined in order provide a contextual basis for the study area.

Witter (1980) constructed a model of site distribution for the area situated between Canberra and Dalton. He argued that large lowland camps were found exclusively in river valleys or gently sloping land while medium sized lowland camps were found mainly on escarpments and saddles. Witter (1980) suggested that mid to late Holocene occupation of the area was focused around both tributary and major stream valleys. He argued that seasonal movement entailed occupation of the tributary valleys and lower slopes during winter in order to be

above cold air drainage but below cooler elevations. Additionally these locations would have provided reliable water and the exploitation of a diversity of resource zones. During summer the larger valley bottoms and higher elevated zones would have been used.

Witter (1980) constructed two models of Holocene adaptation which he termed Riverine Oriented and Plateau Oriented. Witter (1980) defined the Riverine model as a subsistence regime based on the semi-arid plains which was focused on the exploitation of aquatic plants such as *Typha* and *Triglochia* and animals such as fish and crustacea. This economy was focused on the plains woodlands close to major rivers with seasonal usage of semi-arid and dry temperate uplands. Witter (1980) defined the Plateau subsistence regime as based on *Acacia* as a vegetable staple. This economy was focused on ridges slopes and flats, however with camp sites tethered to water.

Pearson (1981) completed a regionally based investigation of Aboriginal and early European settlement patterns in the Upper Macquarie River region. He excavated three rock shelters which revealed Aboriginal occupation of the area dating from 7000 years BP. Pearson characterised Aboriginal site patterning as follows;

- Aboriginal sites were strongly related to water sources. Distance to water varied from 10 to 500 m and generally the average distance to water decreased as site size increased.
- Sites were located on hilly and undulating landforms rather than on river flats or the banks of waterways. However, the regional incidence of landform variation biased this sample;
- Site location was influenced by good drainage and views over water course and river flats;
- Most sites were located in open woodland contexts with smaller numbers being present in grassland or forest contexts;
- Burial sites and grinding grooves were situated close to habitation areas;
- Ceremonial sites were located away from habitation areas;
- Stone arrangements were located away from campsites in isolated places; they are associated with small hills and knolls or flat land;
- Quarry sites were located where suitable sources were present and reasonably accessible.

Based on an exploration of early historical material Pearson (1981) argued that the region was inhabited by a small number of clan groups each of which comprised of 80 to 150 people. These larger groupings were divided into smaller 'daily' units of up to 20 people. Pearson (1981) suggests that the 'daily' units made short moves between camp sites which resulted in elongated site formation such as continuous artefact scatters along creek banks. Pearson presented ethnographic evidence which suggested that camp sites were not used for longer than three nights and that large sites therefore probably represented accumulations of short term visits.

Pearson (1981) also considered the issue of the reliance upon food staples. He argued that rather than a reliance of a singular food type, a wider based economy was practised with the implication that such a non-specialised economy would probably not have been affected by periodic shortfalls in certain foods and that human movement would have been similarly unaffected.

According to Witter and Hughes (1983), the low hill areas of the Lachlan catchment contained sites which are generally situated on valley flanks. They posited a model suggesting that the economic focus was within major streams and valleys with occasional usage of the dryer inland zones.

White (1986) conducted a general study of the Wiradjuri in which the Witter model (as outlined above) was applied. White (1986) however, explored the basic notions of Riverine and Plateau further, emphasizing the regional division by stressing the comparative importance of less seasonally influenced terrestrial hunting in the east. In the Western Slopes region riverine plains "...interfingers with the higher land", and White argued that the economy in such country probably consisted of an annual regime which was dependant on the use of both riverine and plateau environments.

7.2 Previously Recorded Sites

A search of the NSW DEC Aboriginal Heritage Management Information System has been conducted (AHIMS 2/11/2005). There are no previously recorded sites in the proposal area as listed on the AHIMS register.

The AHIMS register only includes sites which have been reported to NSW DEC. Accordingly, this search cannot be considered to be an actual or exhaustive inventory of Aboriginal sites situated within the local area. Generally, sites are only recorded during targeted surveys undertaken in either development or research contexts. It can be expected that sites will be present within the local area but that to date they have not been recorded and/or reported to NSW DEC.

Common sites recorded in the region include isolated finds, open artefact scatters or camp sites. The distribution of each site type is related to variance in topography and ground surface geology. Rare site types include rock shelter, scarred trees, quarry and procurement sites, burials, stone arrangements, carved trees and traditional story or other ceremonial places.

The following discussion in Section 7.3 will present a review of previous archaeological work in the region for the purposes of producing a predictive model of site type and location relevant to the study area.

7.3 Archaeology – The local area

There have been no previous archaeological studies conducted within the study area itself and few have been undertaken within the immediate local area. However, a number of studies have been undertaken in the broader Yass area primarily in response to statutory requirements for environmental impact assessment. The following discussion includes a review of archaeological work and its results conducted within the regional area.

Packard (1984) conducted an investigation of the association of Aboriginal archaeological sites with modern areas of salinisation and salt scalding in the Yass River Basin. Of the 61 known salting sites, 35 were included in the analysis. Site location was found to range in elevation from 560 m-755 m asl, slope gradient less than 5° and most of the sites had northwest, north or easterly aspects (Packard 1984:50). A wide range of artefact and stone types was found at most of the sites, suggesting that a range of activities had been carried out (Packard 1984:54).

Witter (1980) surveyed a proposed natural gas pipeline route from Dalton to Canberra. The survey crossed the Yass River and hilly country in the centre of the Upper Yass River catchment. Witter recorded 11 open campsites and 32 isolated finds. The majority of artefacts were comprised of quartz. Witter (1981) subsequently excavated one site and collected a total of 400 artefacts from six others. Backed blades were a prominent element in these collections. Silcrete was the principal raw material. Other raw materials included felsite, volcanics and quartz. Witter (1981:46) concluded that quartz was probably the predominant stone type utilised in the region.

Koettig and Silcox (1983) surveyed the route of the proposed freeway bypass north and east of Yass. Eight artefact scatters and 50 isolated finds were found within the 14 km x 200 m survey area. Seven of the sites were located on low ridges and slopes and one on creek flats. All of the sites were found within 200 m of a watercourse.

In 1985 Silcox and Koettig surveyed the route of the proposed alternate Yass bypass, together with the proposed Barton Highway extension. The survey located three surface and two subsurface artefact scatters and six isolated finds. Eighty percent of the sites were situated on ridgeline slopes or crests within 200 m of creeks. Surface artefact densities ranged from 1/30² to 1/40m². Subsurface densities averaged 18/m². Ninety percent of the artefacts were unmodified flakes and flaked pieces; quartz was the dominant raw material.

Silcox and Koettig (1988) subsequently carried out a survey and test excavations within a 6 km proposed alternative route for the Barton Highway extension at Yass. Five isolated finds and a surface scatter of >150 artefacts were recorded during the survey, with two additional sites located during subsurface testing. One site yielded 21 artefacts from a series of ten test pits. Artefacts comprised flakes, flaked pieces, cores and a backed blade. Fifty seven percent of the artefacts were of silcrete. Other raw materials recorded were quartz, indurated mudstone, volcanic and chert.

Witter and Hughes (1983) began a survey of transmission lines from Wagga Wagga to Yass. The survey was completed by Packard and Hughes (1983). Two 'land systems' were identified in the study area: gently rolling hills, largely cleared of timber, and major stream valleys. Archaeological sites were rare in the hills and occurred mainly in areas close to major valleys. The initial survey located four Aboriginal sites, 13 isolated finds and a possible Aboriginal scarred tree. Packard and Hughes (1983) recorded five small artefact scatters, eight isolated finds and two possible Aboriginal scarred trees. Artefactual material was principally debitage. Quartz was the most common lithic material, with negligible percentages of acid volcanics and chert. Sites were located mainly in ploughed paddocks near creeks.

Koettig (1986a) investigated a proposed water pipeline route between Bowning and Yass and located two small artefact scatters and two Aboriginal scarred trees near Derringullen Creek. Subsequent subsurface testing at Derringullen Creek located a low density subsurface archaeological deposit (Koettig 1986b).

During a survey of a proposed fibre optic cable route between Cootamundra, NSW, and Hall, ACT, Kuskie (1992) located a small artefact scatter on a broad elevated terrace on the southern side of the Yass River. The site comprised a retouched chert flake, a chert flaked piece and a broken acid volcanic flake.

An Aboriginal burial site associated with the Oak Hill camp was investigated by Sullivan (1982), Koettig (1986c) and White and Cane (1986). The investigations concluded that the site is an important historical Aboriginal burial place and recommended that it be protected from any further disturbance. Koettig (1986c) recommended further investigation. Koettig's (1986) study area also included areas east of Coolalie Road and west of Yellow Creek Road. Five very small artefact scatters and two isolated finds were recorded on knolls, spurs, slopes and creek banks near the Yass River. Broken flakes were the most commonly recorded artefact. Bipolar cores were also present. Principal raw materials were silcrete and quartz.

Saunders (2000) recorded an Aboriginal open campsite of eight stone artefacts located by Ngunawal ACT and District Aboriginal Council of Elders Association monitors in the Powertel fibre optic cable easement approximately 20m south of the Yass River and 200m north of Yass River Road, northwest of Gundaroo. Saunders also recorded an Aboriginal artefact scatter located by Ngunawal ACT and District Aboriginal Council of Elders Association monitors 50m north of Dalton Open Camp Site (NPWS Site 51-5-003). The monitors collected 50 stone artefacts from the site.

Navin Officer Heritage Consultants (2001) investigated the site of the Yass substation located in an area of low gradient slopes, drainage lines and alluvial flats along the middle reaches of Booroo Ponds Creek. A small low density artefact scatter was located along a spur crest. The scatter comprised three flakes and a flaked piece. Raw materials were volcanic, silcrete and chert. The spur crest in the vicinity of the exposed artefacts was considered to have archaeological potential.

A number of studies have been carried out specifically in relations to wind farms in the local area. These are discussed below:

At Crookwell Jo McDonald Cultural Heritage Management (1998) conducted salvage excavation at the proposed Crookwell wind farm. Excavating a total of 25 1 m x 1 m squares, 2,154 stone artefacts were retrieved, with this find interpreted as '...indicating a single limited encampment where one (or several) person(s) knapped a limited range of raw materials (silcrete, chalcedony and quartz) to produce a set of distinctive tools...' including 10 complete *Pejar Points*. The site was located on a secondary spur with a westerly aspect and was situated at ca. 1 km from Middle Creek.

Jo McDonald Cultural Heritage Management Pty Ltd (2003) undertook a survey of the Gunning Wind Farm, situated on the Cullerin Range. The Gunning Wind Farm proposal area consists of range crest and valley topography elevated at 840 meters (asl). Four sites containing stone artefact scatters and three isolated artefacts were recorded across the proposal area (Jo McDonald Cultural Heritage Management Pty Ltd 2003). One of the scatters was identified as a quartz quarry; blocky quartz was found to outcrop at the site. The majority of recorded artefacts were identified as quartz, however, quartzite, silcrete and red agate was also recorded. Steep hill tops were considered to be of low archaeological potential, while elevated contexts close to water were considered to be of higher sensitivity.

Reeves and Thomson (2004) undertook a survey in relation to the proposed Woodlawn Wind Farm at Tarago. The Woodlawn proposal area is situated at the site of the former Woodlawn open cut mine situated 9 kilometers west of Tarago. The majority of the proposed impact zones are situated on the spine of a steep ridge of the Turallo Range. Fifteen stone artefact sites, eight of which were isolated finds, were recorded and the low density distribution was determined to be representative of background scatter calculated to be 6 artefacts per hectare. Artefacts were recorded across a wide range on landform elements including crest, slopes, and drainage depressions; the results indicated no strong patterning of artefact location in relation to landform. Stone materials recording included rhyolite, quartz and silcrete, volcanics and tuff. The impact zone was assessed to be of low archaeological potential. The results indicated that the range was utilised for low levels of Aboriginal exploitation and may have functioned as a transit route between larger resource zones.

OzArk Environment & Heritage Management P/L (2004) conducted an assessment of the proposed Taralga Wind Farm. The Taralga proposal area is situated 2-4 kilometers to the east of Taralga. The proposed impact zones encompassed ridge crest, slopes and drainage depression. Six artefact sites and one scarred tree were recorded. Stone materials recording included rhyolite, quartz and silcrete and volcanics. The majority of site recordings were made near water.

Based on the above review and a consideration of the elevation, geology, hydrology and topography of the study area the type of sites known to occur in the region and the potential for their presence within the study area are listed as follows.

7.4 Predictive Model of Site Type and Location

Stone artefact scatter sites containing low artefact numbers and densities are in the most common site type found within the region. In the wider Yass area a general correlation between different types of watercourses and the nature of the evidence of past Aboriginal occupation is evident. Higher artefact density sites are located near to permanent water sources and low density artefact distributions are found elsewhere.

The type of sites known to occur in the region and the potential for their presence within the study area are listed as follows:

Stone Artefacts

Stone artefacts are found either on the ground surface and/or in subsurface contexts. The raw materials used for artefact manufacture in the local area will commonly be silcrete, volcanics and quartz.

Stone artefacts will be widely distributed across the landscape in a virtual continuum, with significant variations in density in relation to different environmental factors. Artefact density and site complexity is expected to be greater near reliable water and the confluence of a number of different resource zones.

The detection of artefact scatters depends on ground surface factors and whether or not the potential archaeological bearing soil profile is visible. Prior ground disturbance, vegetation cover and sediment/gravel deposition can act to obscure artefact scatter presence.

Given the environmental context of the proposed Wind Farm stone artefacts are predicted to be present in low densities only.

Grinding Grooves

Grinding grooves are found in rock surfaces and result from the manufacture and maintenance of ground edge tools. Grinding grooves are only found on sedimentary rocks such as sandstone. Given the absence of suitable rock exposures in the study area grinding groove sites are unlikely to be present.

Burials sites

Burial sites have been recorded within the wider region. This site type is rarely located during field survey and given the topography, nature of the soils and geology, burials are not predicted to be recorded during the study.

Rock Shelter Sites

Rock shelters sites are unlikely to be present in the study area given the absence of large vertical stone outcrops.

Scarred and Carved Trees

Scarred and Carved trees result from either domestic or ceremonial bark removal. Carved trees associated with burial grounds and other ceremonial places have been recorded in the wider region. In an Aboriginal land use context this site type would most likely have been situated on flat or low gradient landform units in areas suitable for either habitation and/or ceremonial purposes.

Bark removal by European people through the entire historic period and by natural processes such as fire blistering and branch fall make the identification of scarring from a causal point of view very difficult.

Accordingly, given the propensity for trees to bear scarring from natural causes their positive identification is impossible unless culturally specific variables such as stone hatchet cut marks or incised designs are evident and rigorous criteria in regard to tree species/age/size and its specific characteristics in regard to regrowth is adopted.

Nevertheless, the likelihood of trees bearing cultural scarring remaining extant and in situ is low given events such as land clearance and bushfires. Generally scarred trees will only survive if they have been carefully protected (such as the trees associated with Yuranigh's grave at Molong where successive generations of European landholders have actively cared for them).

The study area has been extensively cleared. While not impossible this site type is unlikely to have survived and therefore be extant in the study area.

Stone Quarry and Procurement Sites

A lithic quarry is the location of an exploited stone source (Hiscock & Mitchell 1993:32). Sites will only be located where exposures of a stone type suitable for use in artefact manufacture occur.

8. SURVEY RESULTS

8.1 Results

A total of nine locales containing a total of 22 stone artefacts were recorded within the survey area during this study. These sites are further described below and their location is shown on Figure 4.

The table below provides a summary of stone artefact recordings.

Name	Grid reference AMG Hand GPS Aust 66		Landform	Description	Impacts
Survey Unit 6/Locale 1	657258e	6142590n	ridge crest: simple slope	1 stone artefact	Turbine envelope including access road; on-site electrical connection
Survey Unit 6/Locale 2	657224e	6142538n	ridge crest: simple slope	linear arrangement of stone cobbles (cultural status ?)	Turbine envelope including access road; on-site electrical connection
Survey Unit 11/Locale 1	658165e	6143569n	simple slope	1 stone artefact	Access road; on-site electrical connection
Survey Unit 15/Locale 1	658024e	6145142n	ridge crest	2 stone artefacts	Turbine envelope including access road; on-site electrical connection
Survey Unit 19/Locale 1	657644e	6146289n	ridge crest	1 stone artefact	Turbine envelope including access road; on-site electrical connection
Survey Unit 23/Locale 1	658631e	6145098n	ridge crest	1 stone artefact	<i>Nil: Area no longer in impact zone</i>
Survey Unit 23/Locale 2	658611e	6145055n	ridge crest	3 stone artefacts	<i>Nil: Area no longer in impact zone</i>
Survey Unit 23/Locale 3	658640e	6144909n	ridge crest	1 stone artefact	<i>Nil: Area no longer in impact zone</i>
Survey Unit 23/Locale 4	658621e	6144791n	ridge crest	3 stone artefacts	<i>Nil: Area no longer in impact zone</i>
Survey Unit 30/Locale 1	658530e	6142418n	drainage depression	9 stone artefacts	Overhead electrical

Table 1 Summary of stone artefact recordings.

Conroys Gap Survey Unit 6/Locale 1 grid reference: Hand GPS (Aust 66): 657258. 6142590 (AMG)

This recording consists of one stone artefact found on a slope of a ridge crest in Survey Unit 6 (Plate 4). The site location has an aspect to the north east and a gradient of 6°. Soils in the area are rocky. The area is situated at ca. 800 m away from an ephemeral water course (2nd order stream). The land falls relatively steeply away from the crest to the east of the Survey Unit.

In an Aboriginal land use context it is predicted that such an area would have been utilised for low levels of occupation which probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard.

The artefact is situated in a grassed paddock and was located in an animal track exposure. The wider area contains low rocky outcrops and cobbles.

The artefact recorded is described as follows:

- Rhyolite (grey fine grained) flake measuring 24 x 17 x 3 mm

The artefact was found in an area of exposure measuring 20 m x 0.4 m (8m²). Ground exposure within that area is estimated to be 70% with ca. 60% of that exposure assessed to be archaeological visibility. Based on surface indicators artefact density at the artefact locale is therefore calculated to be 1/3.36 m² (0.3 artefacts per m²).

It is probable that additional artefacts are present across Survey Unit 6, however it is predicted that any additional artefacts will be present in extremely low numbers and density.

This artefact recording is situated within a general area in which a turbine, access track and onsite electrical connections are proposed and may therefore be subject to impacts relating to the wind farm proposal.



Plate 4 Survey Unit 6/Locale 1 (artefact location denoted by paper): looking south.

Conroys Gap Survey Unit 6/Locale 2 grid reference: Hand GPS (Aust 66): 657224. 6142538 (AMG)

This recording consists of a linear arrangement of stone cobbles situated on a slope of a ridge crest in Survey Unit 6 (Plate 5). The site location has an aspect to the north east and a gradient of 6°. Soils in the area are rocky.

The arrangement consists of c. 28 cobbles arranged in a straight line (5 m long) with an orientation of 190°. There is a possibility that this arrangement is a natural formation; alternatively it may be the result of grading for vehicle access. The cultural status of this arrangement is unknown.

This site is situated within a general area in which a turbine, access track and onsite electrical connections are proposed and may therefore be subject to impacts relating to the wind farm proposal.



Plate 5 Survey Unit 6/Locale 1: looking south.

Conroys Gap Survey Unit 11/Locale 1 grid reference: Hand GPS (Aust 66): 658165. 6143569 (AMG)

This recording consists of one stone artefact found on a simple slope in Survey Unit 11 (Plate 6). The site location has an aspect to the south east and a gradient of 4°. Soils in the area are rocky. The area is situated at ca. 150 - 200 m away from an ephemeral water course (1st order drainage depression).

In an Aboriginal land use context it is predicted that such an area would have been utilised for low levels of occupation which probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard.

The artefact is situated in a grassed paddock and was located in a bare earth exposure.

The artefact recorded is described as follows:

- Silcrete flake with retouch measuring 65 x 40 x 5 mm

The artefact was found in an area of exposure measuring 5 m x 5 m (25m²). Ground exposure within that area is estimated to be 80% with ca. 75% of that exposure assessed to be archaeological visibility. Based on surface indicators artefact density at the artefact locale is therefore calculated to be 1/15m² (0.07 artefacts per m²).

It is probable that additional artefacts are present across Survey Unit 11, however it is predicted that any additional artefacts will be present in low numbers and density.

This artefact recording is situated within a general area in which an access track and onsite electrical connections are proposed and may therefore be subject to impacts relating to the wind farm proposal.



Plate 6 Survey Unit 11/Locale 1: looking northwest.

Conroys Gap Survey Unit 15/Locale 1 grid reference: Hand GPS (Aust 66): 658024. 6145142 (AMG)

This recording consists of two stone artefacts found on the west side of a ridge crest in Survey Unit 15 (Plate 7). The site location has a southerly aspect and a gradient of 2°. Soils in the area are skeletal and rocky. The area is situated at ca. 500 m away from an ephemeral water course (1st order drainage depression).

In an Aboriginal land use context it is predicted that such an area would have been utilised for low levels of occupation which probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard.

The artefacts are situated in a grassed paddock and were located in a bare earth exposure associated with a rocky outcrop. The area has a very low potential to contain subsurface deposit given the shallow (to non-existent) soil.

The artefacts recorded are described as follows:

- Purple rhyolite flake portion (proximal with bending break) measuring 26 x 22 x 6 mm
- Purple rhyolite flake measuring 24 x 26 x 9 mm

The artefacts were found in an area of bare earth exposure around bedrock and cobbles measuring 5 m x 3 m (15m²). Ground exposure within that area is estimated to be 40% with ca. 95% of that exposure assessed to be archaeological visibility. Based on surface indicators artefact density at the artefact locale is therefore calculated to be 2/5.7m² (0.35 artefacts per m²).

It is probable that additional artefacts are present across Survey Unit 15, however it is predicted that any additional artefacts will be present in very low numbers and density.

This artefact recording is situated within a general area in which a turbine, access track and onsite electrical connections are proposed and may therefore be subject to impacts relating to the wind farm proposal.

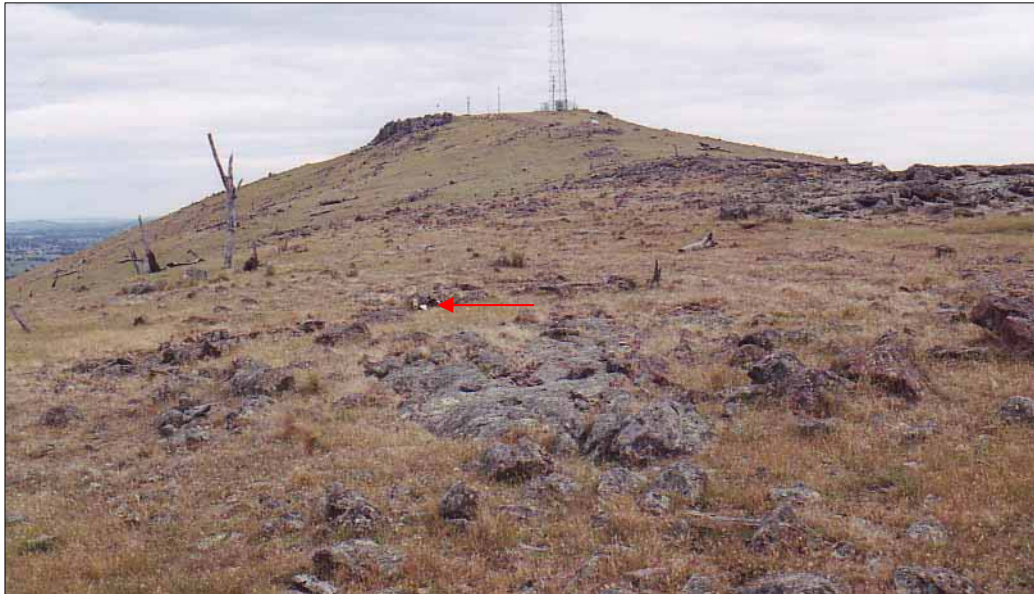


Plate 7 Survey Unit 15/Locale 1: looking 340°. Location of artefacts denoted by arrow.

Conroys Gap Survey Unit 19/Locale 1 grid reference: Hand GPS (Aust 66): 657644. 6146289 (AMG)

This recording consists of one stone artefact found on the west side of a ridge crest in Survey Unit 19 (Plate 8). The site location has an open aspect and a gradient of 1°. Soils in the area are skeletal and rocky. The area is situated at ca. 250 m away from an ephemeral water course (2nd order drainage depression).

In an Aboriginal land use context it is predicted that such an area would have been utilised for low levels of occupation which probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard.

The artefacts are situated in a grassed paddock and were located in a bare earth/rock exposures associated with a rocky outcrop. The area has a very low potential to contain subsurface deposit given the shallow soil.

The artefact recorded is described as follows:

- Rhyolitic tuff flake portion (proximal: focal platform) measuring 17 x 24 x 3 mm

The artefact was found in an area of bare earth exposure around bedrock and boulders measuring 20 m x 10 m (200m²). Ground exposure within that area is estimated to be 25% with ca. 85% of that exposure assessed to be archaeological visibility. Based on surface indicators artefact density at the artefact locale is therefore calculated to be 1/42.5m² (0.02 artefacts per m²).

It is probable that additional artefacts are present across Survey Unit 19, however it is predicted that any additional artefacts will be present in low numbers and density.

This artefact recording is situated within a general area in which a turbine, access track and onsite electrical connections are proposed and may therefore be subject to impacts relating to the wind farm proposal.



Plate 8 Survey Unit 19/Locale 1: looking south west. Location of artefact denoted by figure.

Conroys Gap Survey Unit 23/Locale 1 grid reference: Hand GPS (Aust 66): 658631. 6145098. (AMG)

This recording consists of one stone artefact found on a ridge crest in Survey Unit 23 (Plate 9). The site location has an open aspect and a gradient of 1°. Soils in the area are very rocky. The area is situated at ca. 600 m away from an ephemeral water course (2nd order drainage depression).

In an Aboriginal land use context it is predicted that such an area would have been utilised for low levels of occupation which probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard.

The artefact is situated in a grassed paddock and was located in a large erosion scour. The area has a low potential to contain subsurface deposit.

The artefact is recorded are described as follows:

- Fine grained volcanic flake (with vein quartz on dorsal surface) measuring 55 x 45 x 25 mm. Found in large erosion scour: 20 x 10 m - see Plate 9)

The artefact was found in a large area of an erosion exposure measuring 20 m x 10 m (200m²). Ground exposure within that area is estimated to be 95% with ca. 85% of that exposure assessed to be archaeological visibility. Based on surface indicators artefact density at the artefact locale is therefore calculated to be 1/161.5m² (0.006 artefacts per m²).

This artefact recording is situated within an area now excluded from proposed wind farm impacts.



Plate 9 Survey Unit 19/Locale 1: looking south east. Location of artefact denoted by figure.

Conroys Gap Survey Unit 23/Locale 2 grid reference: Hand GPS (Aust 66): 658611. 6145055. (AMG)

This recording consists of three stone artefacts found on a ridge crest in Survey Unit 23 (Plate 10). The site location has an open aspect and a gradient of 1°. Soils in the area are very rocky. The area is situated at ca. 600 m away from an ephemeral water course (2nd order drainage depression).

In an Aboriginal land use context it is predicted that such an area would have been utilised for low levels of occupation which probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard.

The artefacts are situated in a grassed paddock and were located in areas of bare earth. The area has a low potential to contain subsurface deposit.

The artefacts recorded are described as follows:

- Purple rhyolite flaked piece measuring 34 x 23 x 6 mm
- Purple rhyolite flaked piece measuring 33 x 22 x 8 mm
- Unknown material prob. Rhyolite (weathered patina) flake measuring 34 x 40 x 6 mm.

The artefacts were found in an area of bare earth exposure around bedrock and boulders measuring 10 m x 2 m (20m²). Ground exposure within that area is estimated to be 35% with ca. 85% of that exposure assessed to be archaeological visibility. Based on surface indicators artefact density at the artefact locale is therefore calculated to be 3/5.95m² (0.5 artefacts per m²).

This artefact recording is situated within an area now excluded from proposed wind farm impacts.



Plate 10 Survey Unit 23/Locale 2: looking south east. Location of artefacts in area where Karen Denny and Don Bell are situated.

Conroys Gap Survey Unit 23/Locale 3 grid reference: Hand GPS (Aust 66): 658640. 6144909. (AMG)

This recording consists of one stone artefact found on a ridge crest in Survey Unit 23 (Plate 11). The site location has an open aspect and a gradient of 2°. Soils in the area are very rocky. The area is situated at ca. 600 m away from an ephemeral water course (2nd order drainage depression).

In an Aboriginal land use context it is predicted that such an area would have been utilised for low levels of occupation which probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard.

The artefact is situated in a grassed paddock and located in a large erosion scour. The area has a low potential to contain subsurface deposit.

The artefact is recorded are described as follows:

- Purple rhyolite flake portion (proximal) measuring 16 x 29 x 6 mm

The artefact was found in a large area of an erosion exposure measuring 25 m x 15 m (375m²). Ground exposure within that area is estimated to be 90% with ca. 80% of that exposure assessed to be archaeological visibility. Based on surface indicators artefact density at the artefact locale is therefore calculated to be 1/270m² (0.004 artefacts per m²).

This artefact recording is situated within an area now excluded from proposed wind farm impacts.



Plate 11 Survey Unit 23/Locale 3: looking north. Location of artefact in area of figure.

Conroys Gap Survey Unit 23/Locale 4 grid reference: Hand GPS (Aust 66): 658621. 6144791. (AMG)

This recording consists of three stone artefacts found on a ridge crest in Survey Unit 23. The site location has an open aspect and a gradient of 2°. Soils in the area are very rocky. The area is situated at ca. 600 m away from an ephemeral water course (2nd order drainage depression).

In an Aboriginal land use context it is predicted that such an area would have been utilised for low levels of occupation which probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard.

The artefacts are situated in a grassed paddock and were located in areas of bare earth and an erosion scar. The area has a low potential to contain subsurface deposit.

The artefacts recorded are described as follows:

- Brown silcrete flake measuring 20 x 23 x 9 mm
- Brown silcrete flake measuring 19 x 15 x 8 mm
- Brown silcrete flake measuring 15 x 15 x 9 mm

The artefacts were found in an area of bare earth exposure measuring 5 m x 1 m (5m²). Ground exposure within that area is estimated to be 95% with ca. 85% of that exposure assessed to be archaeological visibility. Based on surface indicators artefact density at the artefact locale is therefore calculated to be 3/4m² (0.25 artefacts per m²).

This artefact recording is situated within an area now excluded from proposed wind farm impacts.

Conroys Gap Survey Unit 30/Locale 1 grid reference: Hand GPS (Aust 66): 658530. 6142418. (AMG)

This recording consists of nine stone artefacts found in a drainage depression in Survey Unit 30. The site location has an aspect to 30 ° and a gradient of 4°. The area is situated adjacent to an ephemeral water course (2nd order drainage depression).

In an Aboriginal land use context it is predicted that such an area would have been utilised for low levels of occupation which probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard.

The artefacts are situated in a grassed paddock and were located in areas of bare earth and animal tracks. The area has a low potential to contain subsurface deposit.

The artefacts recorded are described as follows:

- Grey silcrete flake measuring 25 x 40 x 8 mm
- Grey silcrete flake measuring 20 x 15 x 5 mm
- Grey silcrete flake portion (distal) measuring 55 x 45 x 11 mm
- Quartz flake measuring with retouch 28 x 16 x 11mm
- Grey silcrete flake measuring 15 x 9 x 4 mm
- Cream silcrete flake measuring 12 x 22 x 9 mm
- Chert flake measuring 8 x 11 x 4 mm
- Chert flake measuring 24 x 31 x 8 mm
- Silcrete flake measuring (broken in 2 pieces) 24 x 18 x 5 mm

The artefacts were found in an area of bare earth exposure measuring 25 m x 5 m (125m²). Ground exposure within that area is estimated to be 75% with ca. 75% of that exposure assessed to be archaeological visibility. Based on surface indicators artefact density at the artefact locale is therefore calculated to be 9/79.3m² (0.1 artefacts per m²).

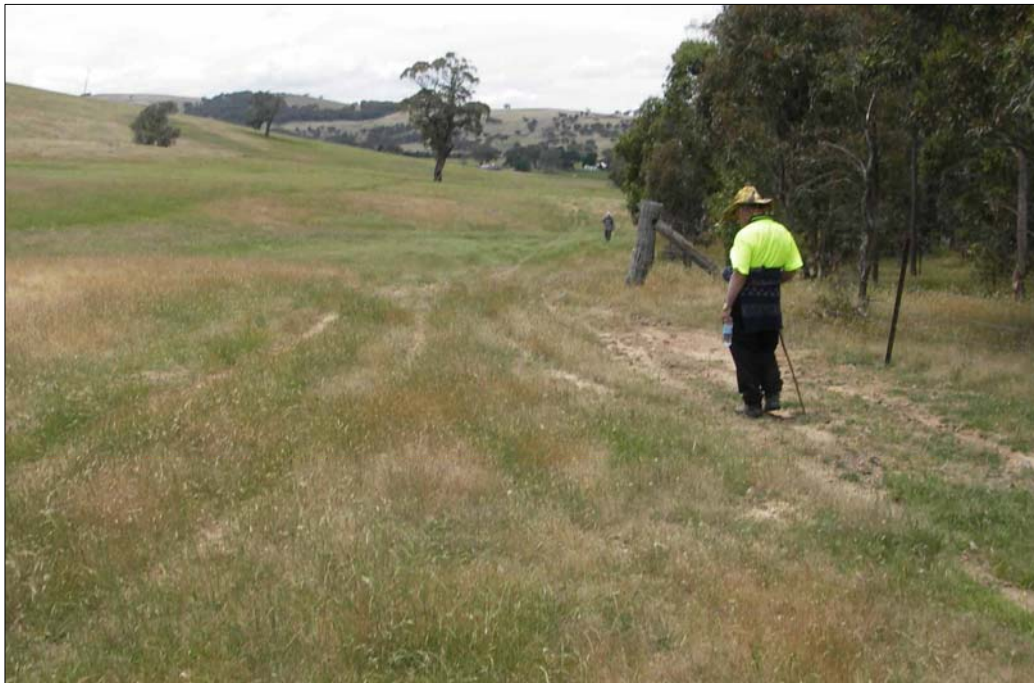


Plate 12 Survey Unit 30/Locale 1: looking 20°. Location of artefacts in area of where Mr Bell is standing.

8.2 Survey Coverage Variables

Survey Coverage Variables are a measure of ground surveyed during the study and the type of archaeological visibility present within that surveyed area. Survey coverage variables provide a measure with which to assess the effectiveness of the survey so as to provide an informed basis for the formulation of management strategies.

Specifically, an analysis of survey coverage is necessary in order to determine whether or not the opportunity to observe stone artefacts in or on the ground was achieved during the survey. In the event that it is determined that ground exposures provided a minimal opportunity to record stone artefacts it may be necessary to undertake archaeological excavation for determining whether or not stone artefacts are present. Conversely, if ground exposures encountered provided an ideal opportunity to record the presence of stone artefacts, the survey results may be considered to be adequate and accordingly no further archaeological work may be required.

Two main variables were used to measure ground surface visibility during the study; the area of ground exposure encountered and the quality and type of ground visibility (archaeological visibility) within those exposures.

The two survey coverage variables estimated during the survey are defined as follows:

Average Ground Exposure – a percentage estimate of the total area of ground inspected which contained exposures of bare ground; and

Average Archaeology Visibility – a percentage estimate of the average levels of potential archaeological surface visibility within those exposures of bare ground.

Based on the two visibility variables as defined above, a net estimate (Net Effective Exposure) of the archaeological potential of exposure area within a survey unit or set of units has been calculated. The Effective Survey Coverage (ESC) calculation is defined and required by the NPWS. The ESC provides an estimate of the proportion of the total study area which provided a net 100% level of ground surface visibility (with archaeological potential).

Thirty three Survey Units was defined and recorded during the study. The Survey Units are described in Table 2 and Table 3 below; their location is shown on Figure 3.

The total survey area measured ca. 214.2 hectares and approximately 144.4 hectares of that area was traversed and inspected during the survey. The survey transects conducted across each Survey Unit included the inspection of exposures such as erosional features, vehicle tracks, animal tracks and burrows, and bare earth patches. Generally ground exposures were relatively sparse given that the proposal area is grassed; ground surfaces are covered with vegetation and in woodland areas, leaf and bark litter.

It is estimated that ground exposure inspected across the study area measured ca. 4.1 hectares. Of that ground exposure it is calculated that ca. 3.28 hectares inspected provided potential archaeological visibility (the potential artefact bearing soil profile). Effective survey coverage achieved during the study is calculated to have been 1.53 % of the entire proposal area.

8.3 Discussion

Nine locales containing stone artefacts were recorded. Artefact density calculations based on surface indicators indicate that all artefact locales contain low density artefact distributions. Effective survey coverage achieved during the survey is assessed to have been low. Nevertheless the survey results are in keeping with the predictive model of site location relevant to the proposal area.

The Survey Units present in the study area are each assessed to be of low or very low archaeological potential based on various factors including nature of the topography, steep gradients and the distance from reliable water.

Given the absence of a reliable fresh water source in the proposal area and the limited resources that would have been present in the former woodland zone, it is predicted that the area was not likely to have been subject to intensive or sustained Aboriginal habitation. Aboriginal habitation sites are expected to be present closer permanent watercourses and in areas where there was a confluence of resources represented.

Instead, it is predicted that the land occupied by the proposal area is likely to have been utilised for hunting and gathering forays conducted away from base camps. Such short term events are unlikely to result in the formation of large, high density or complex archaeological sites. It is predicted instead that such land usage would result in low to very low levels of artefactual discard.

The proposal area is assessed to be of low archaeological potential and sensitivity.

Survey Unit	Landform element	Vegetation	Geology/soils	Landuse impacts	Proposed Impacts
SU1 (Plate 13)	Ridge crest; Open aspect; 0-3° gradient	Grassed (exotic)	Brown gravely loam; sparse cobbles and small boulders	Original clearance; pasture improvement; grazing	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU2	Ridge crest and knoll; Open aspect; 0-3° gradient	Grassed	Brown gravely loam; very rocky: cobbles and small boulders	Original clearance; grazing;	Turbine area (access track, on-site electrical and communications underground cabling)
SU3	Ridge crest; slope Aspect 180°; 12-16° gradient	Grassed	Brown gravely loam; cobbles and small boulders	Original clearance; pasture improvement; grazing	Turbine area (access track, on-site electrical and communications underground cabling)
SU4 (Plate 14)	Ridge crest; slope Aspect 180°; 8° gradient	Grassed	Brown gravely loam; cobbles and small boulders	Original clearance; pasture improvement; grazing	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU5	Ridge crest; slope Open aspect; 4° gradient	Grassed	Brown gravely loam; cobbles and small boulders; quartz	Original clearance; grazing	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU6	Ridge crest; slope Aspect 30°; 8° gradient	Grassed	Brown gravely loam; cobbles and small boulders; quartz	Original clearance; grazing	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU7	Ridge crest: shoulder aspect 25°; 2° gradient	Grassed	Brown gravely loam; cobbles and small boulders	Original clearance; grazing	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU8 (Plate 14)	Ridge crest: Open aspect; 0-3° gradient	Grassed	Brown gravely loam; cobbles and small boulders	Original clearance; grazing	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU9	Simple slope; Aspect 30°; 11° gradient	Grassed	Brown gravely loam; cobbles and small boulders	Original clearance; pasture improvement; grazing	Access track, on-site electrical and communications underground cabling
SU10 (Plate 15)	Drainage depression; Aspect: 120° 4° gradient	Grassed	Brown gravely loam; cobbles and small boulders	Original clearance; grazing; pasture improvement; dam construction	Access track, on-site electrical and communications underground cabling
SU11 (Plate 15)	Simple slope; Aspect: 120° 4° gradient	Grassed; few trees	Brown gravely loam; cobbles	Original clearance; pasture improvement; grazing;	Access track, on-site electrical and communications underground cabling
SU12 (Plate 16)	Drainage depression; Aspect: 100° 2-3° gradient	Grassed	Brown gravely loam; cobbles	Original clearance; pasture improvement; grazing;	Access track, on-site electrical and communications underground cabling
SU13	Ridge crest; Aspect to south; 15° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing; communications tower access road	Access track, on-site electrical and communications underground cabling

Survey Unit	Landform element	Vegetation	Geology/ soils	Landuse impacts	Proposed Impacts
SU14	Ridge crest; Aspect to south; 10° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing; communications tower access road	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU15 (Plate 17)	Ridge crest; Aspect to south; 8° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing; communications tower access road	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU16 (Plate 18)	Ridge crest; knoll; Open aspect; 0-3° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing; Trig, communications towers and access road	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU17 (Plate 19)	Ridge: Simple slope; Aspect to 60°; 12-18° gradient	Grassed	Brown gravely loam; cobbles and outcrops; quartz	Original clearance; grazing	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU18 (Plate 19)	Ridge crest; aspect to 20°; 18° gradient	Grassed	Brown gravely loam; cobbles and outcrops; quartz	Original clearance; grazing	Turbine area (access track, on-site electrical and communications underground cabling)
SU19 (Plate 19)	Ridge crest; open aspect; 0-3° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU20	Ridge crest; open aspect; 0-2° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU21	Saddle; open aspect; 3-6° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU22	Ridge crest; Knoll Open aspect; 3° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing	Turbine area (turbine, access track, on-site electrical and communications underground cabling)
SU23 (Plate 20)	Ridge crest; open aspect; 3-6° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing	Nil: <i>area no longer in impact zone</i>
SU24 (Plate 21)	Simple slope Aspect to east; 16° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing	Nil: <i>area no longer in impact</i>
SU25 (Plate 21)	Drainage depression; Aspect to south; 1-3° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing	Nil: <i>area no longer in impact</i>
SU26 (Plate 21)	Simple slope; aspect to west; 14° gradient	Grassed	Brown gravely loam; cobbles and outcrops	Original clearance; grazing	Nil: <i>area no longer in impact</i>
SU27 (Plate 21)	Ridge crest; Open aspect; 3-6° gradient	Grassed with scattered trees	Brown gravely loam; cobbles and outcrops	Original clearance; grazing	Nil: <i>area no longer in impact</i>
SU28	Ridge crest; Open aspect; 0-5° gradient	Grassed	Brown gravely loam; cobbles	Original clearance; grazing	Nil: <i>area no longer in impact</i>

Survey Unit	Landform element	Vegetation	Geology/soils	Landuse impacts	Proposed Impacts
SU29	Simple slope; Aspect to west; 14° gradient	Grassed	Brown gravely loam; cobbles	Original clearance; grazing	Nil: <i>area no longer in impact</i>
SU30	Drainage depression; Open aspect; 1-3° gradient	Grassed	Brown gravely loam; cobbles	Original clearance; grazing	On-site electrical cabling
SU31	Simple slope; Aspect to south; 4° gradient	Grassed with scattered trees	Brown gravely loam; cobbles and outcrops	Original clearance; grazing	On-site electrical cabling
SU32 (Plate 3)	Simple slope; Aspect to 240°; 12-18° gradient	Grassed	Brown gravely loam; cobbles	Original clearance; grazing	On-site electrical cabling
SU33 (Plate 3)	Simple slope; aspect to east; 15-20° gradient	Grassed with scattered trees	Brown gravely loam; cobbles and outcrops	Original clearance; grazing	On-site electrical cabling Substation B

Table 2: Description of Survey Units



Plate 13. Survey Unit 1 looking 210°.



Plate 14. Taken from Survey Unit 4 looking south to Survey Unit 8 (as denoted by arrow).



Plate 15. Survey Unit 10 looking north east towards Survey Unit 11 beyond dam.



Plate 16. Survey Units 12 and 11 looking south.



Plate 17. Survey Unit 15 looking south.



Plate 18. Survey Unit 16: looking north.



Plate 19. From Survey Unit 17: looking 300° to Survey Units 18 and 19.



Plate 20. From Survey Unit 22: looking 150° to Survey Unit 23.



Plate 21. From Survey Unit 22: looking west to Survey Units 24, 25, 26 and north end of 27.

Survey Unit	Exposures	Survey Unit Area	Area surveyed	Ave. ground exposure	Ave. arch visibility %	Net effective exposure	Effective survey coverage	Artefacts recorded	Potential density of undetected artefacts
SU1	bare earth patches; animal tracks	200 x 120 = 24,000 m ²	70% 16,800 m ²	10 m ²	50%	5 m ²	0.02 %	-	low
SU2	bare earth patches around rocks; animal tracks	450 x 100 = 45,000 m ²	70% 31,500 m ²	40 m ²	50%	20 m ²	0.04 %	-	very low
SU3	bare earth patches; animal tracks	50 x 120 = 6,000 m ²	80% 4,800 m ²	10 m ²	60%	6 m ²	0.1 %	-	very low
SU4	bare earth patches	100 x 130 = 13,000 m ²	80% 10,400 m ²	40 m ²	60%	24 m ²	0.18 %	-	very low
SU5	bare earth patches; animal tracks	200 x 130 = 26,000 m ²	85% 22,100 m ²	100 m ²	60%	60 m ²	0.23 %	-	low
SU6	bare earth patches; animal tracks	100 x 130 = 13,000 m ²	85% 11,050 m ²	100 m ²	60%	60 m ²	0.46 %	SU6/L1 1 artefact SU6/L2	low (density: 0.017/m ²)
SU7	bare earth patches; animal tracks	170 x 130 = 22,100 m ²	85% 18,785 m ²	200 m ²	60%	120 m ²	0.54 %	-	low
SU8	bare earth patches; animal tracks	500 x 120 = 60,000 m ²	85% 51,000 m ²	100 m ²	70%	70 m ²	0.12 %	-	low
SU9	bare earth patches; animal and vehicle tracks	400 x 150 = 60,000 m ²	65% 39,000 m ²	100 m ²	70%	70 m ²	0.12 %	-	very low
SU10	bare earth patches; dam	220 x 200 = 44,000 m ²	70% 30,800 m ²	150 m ²	70%	105 m ²	0.24 %	-	low
SU11	bare earth patches; exposures under trees	430 x 200 = 86,000 m ²	70% 60,200 m ²	150 m ²	65%	97.5 m ²	0.11 %	SU11/L1 1 artefact	low (density: 0.0102/m ²)

Survey Unit	Exposures	Survey Unit Area	Area surveyed	Ave. ground exposure	Ave. arch visibility %	Net effective exposure	Effective survey coverage	Artefacts recorded	Potential density of undetected artefacts
SU12	nil	100 x 200 = 20,000 m ²	50% 10,000 m ²	0	0	0	0	-	very low
SU13	bare earth patches; track; erosion	400 x 150 = 60,000 m ²	60% 36,000 m ²	1,080 m ²	80%	864 m ²	1.44 %	-	low
SU14	bare earth patches; track; erosion	700 x 250 = 175,000 m ²	60% 105,000 m ²	3,150 m ²	80%	2,520 m ²	1.44 %	-	low
SU15	bare earth patches; track; erosion	600 x 250 = 150,000 m ²	75% 112,500 m ²	5,625 m ²	80%	4,500 m ²	3 %	SU15/L1 2 artefacts	low (density: 0.0004/m ²)
SU16	bare earth patches; track; erosion	150 x 100 = 15,000 m ²	85% 12,750 m ²	382.5 m ²	80%	306 m ²	2.04 %	-	low
SU17	bare earth patches; animal tracks	370 x 150 = 55,500 m ²	75% 41,625 m ²	2,081 m ²	85%	1,768 m ²	3.18 %	-	very low
SU18	bare earth patches; animal tracks	200 x 105 = 21,000 m ²	75% 15,750 m ²	788 m ²	85%	670 m ²	3.19 %	-	very low
SU19	bare earth patches; animal tracks; erosion	600 x 300 = 180,000 m ²	75% 135,000 m ²	6,750 m ²	85%	5,738 m ²	3.19 %	SU19/L1 1 artefact	low (density: 0.0002/m ²)
SU20	bare earth patches; animal tracks; erosion	180 x 200 = 36,000 m ²	75% 27,000 m ²	270 m ²	85%	230 m ²	0.64 %	-	low
SU21	Nil	200 x 200 = 40,000 m ²	75% 30,000 m ²	0	0	0	0	-	low
SU22	bare earth patches	200 x 200 = 40,000 m ²	75% 30,000 m ²	1,500 m ²	85%	1,275 m ²	3.19 %	-	very low
SU23	bare earth patches; erosion	1000 x 200 = 200,000 m ²	75% 150,000 m ²	7,500 m ²	85%	6,375 m ²	3.19 %	SU23/L1 SU23/L2 SU23/L3 SU23/L4 Total = 8 artefacts	low (density: 0.001/m ²)
SU24	bare earth patches; erosion scours	380 x 150 = 57,000 m ²	55% 31,350 m ²	4,702 m ²	70%	3,292 m ²	5.78 %	-	very low
SU25	bare earth patches; erosion	250 x 150 = 37,500 m ²	55% 20,625 m ²	825 m ²	65%	536 m ²	1.43 %	-	very low
SU26	bare earth patches; erosion; animal tracks	480 x 150 = 72,000 m ²	55% 39,600 m ²	1,584 m ²	70%	1,108 m ²	1.54 %	-	very low
SU27	bare earth patches; erosion; animal tracks	600 x 200 = 120,000 m ²	50% 60,000 m ²	3,000 m ²	80%	2,400 m ²	2 %	-	low
SU28	nil	500 x 100 = 50,000 m ²	55% 27,500 m ²	0	0	0	0	-	very low
SU29	bare earth patches; animal tracks	150 x 120 = 18,000 m ²	55% 9,900 m ²	30 m ²	70%	21 m ²	0.12 %	-	very low
SU30	bare earth patches; animal tracks; erosion	800 x 120 = 96,000 m ²	65% 62,400 m ²	624 m ²	60%	374 m ²	0.39 %	SU30/L1 9 artefacts	low (density: 0.02/m ²)
SU31	bare earth patches; animal tracks	300 x 120 = 36,000 m ²	55% 19,800 m ²	5 m ²	50%	2.5 m ²	0.007 %	-	very low

Survey Unit	Exposures	Survey Unit Area	Area surveyed	Ave. ground exposure	Ave. arch visibility %	Net effective exposure	Effective survey coverage	Artefacts recorded	Potential density of undetected artefacts
SU32	bare earth patches; creek channel	700 x 120 = 84,000 m ²	65% 54,600 m ²	50 m ²	70%	35 m ²	0.04 %	-	very low
SU33	bare earth patches	1200 x 150 = 180,000 m ²	65% 117,000 m ²	150 m ²	70%	105 m ²	0.06 %	-	very low
Total		214.2 ha	144.4 ha	4.1 ha		3.28 ha	1.53 %	22 artefacts	

Table 3: Survey Coverage Data.

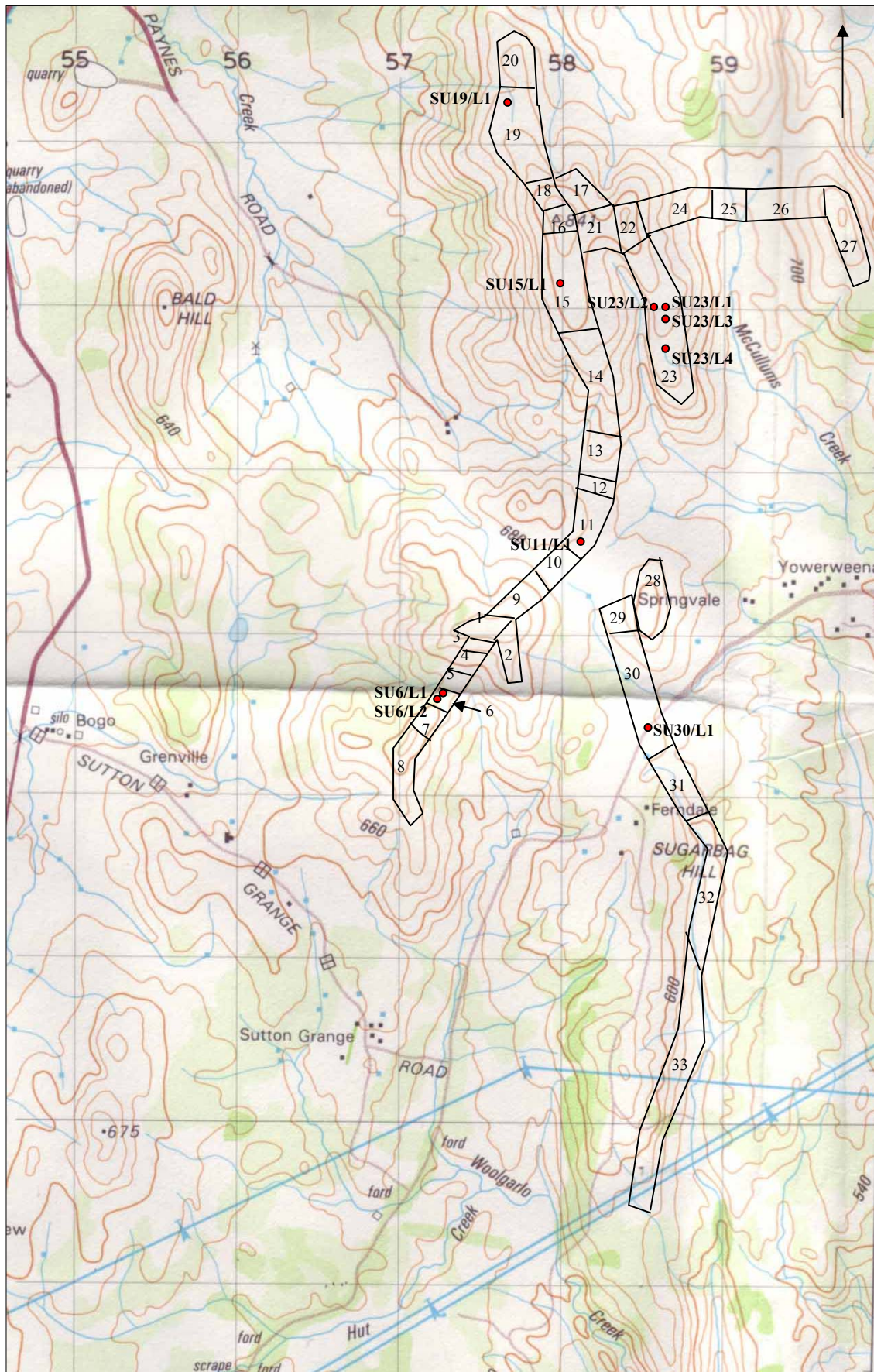


Figure 3. Location of survey units and recorded Aboriginal artefact locales.

9. STATUTORY CONTEXT

Two pieces of legislation provide the primary basis for Aboriginal heritage management in NSW, the National Parks and Wildlife Act 1974 (NPW Act) and the Environmental Planning and Assessment Act 1979 (EP&A Act) (NPWS 1997).

The Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment Act 1979 (EP&A Act), its regulations, schedules and guidelines provides the context for the requirement for environmental impact assessments to be undertaken during land use planning (NPWS 1997).

Part 3A of the Environmental Planning and Assessment Act 1979

On 9 June 2005 the NSW Parliament passed the Environmental Planning and Assessment Amendment (Infrastructure and Other Planning Reform) Bill. The Act was assented to on 16 June 2005 and commenced on 1 August 2005. This amendment contains key elements of the NSW Government's planning system reforms and makes major changes to both plan-making and major development assessment.

A key component of the amendments is the insertion of a new Part 3A (Major Projects) into the EP&A Act. The new Part 3A consolidates the assessment and approval regime for all major developments which previously were addressed under Part 4 (Development Assessment) or Part 5 (Environmental Assessment).

Part 3A applies to all major State government infrastructure projects, developments previously classified as State significant and other projects, plans or programs of works declared by the Minister. The amendments aim to provide a streamlined assessment and approvals regime and also to improve the mechanisms available under the EP&A Act to enforce compliance with approval conditions of the Act.

Under Part 3A Major infrastructure and other projects, the following relevant definitions apply:

approved project means a project to the extent that it is approved by the Minister under this Part, but does not include a project for which only approval for a concept plan has been given.

critical infrastructure project means a project that is a critical infrastructure project.

development includes an activity within the meaning of Part 5.

major infrastructure development includes development, whether or not carried out by a public authority, for the purposes of roads, railways, pipelines, electricity generation, electricity or gas transmission or distribution, sewerage treatment facilities, dams or water reticulation works, desalination plants, trading ports or other public utility undertakings.

project means development that is declared under section 75B to be a project to which this Part applies.

proponent of a project, means the person proposing to carry out development comprising all or any part of the project, and includes any person certified by the Minister to be the proponent.

The current report has been compiled for inclusion within an Environmental Assessment Report

Under the terms of Part 3A of the Environmental Planning and Assessment Act 1979 the following authorizations are not required for an approved project (and accordingly the provisions of an Act that prohibit an activity without such an authority do not apply):

- a permit under section 87 or a consent under section 90 of the National Parks and Wildlife Act 1974

10. SIGNIFICANCE ASSESSMENT

The information provided in this report and the assessment of significance of Aboriginal objects provides the basis for the proponent to make informed decisions regarding the management and degree of protection which should be undertaken in regard to the Aboriginal objects located within the study area.

10.1 Significance Assessment Criteria

The NPWS (1997) defines significance as relating to the meaning of sites: “meaning is to do with the values people put on things, places, sites, land”. The following significance assessment criteria is derived from the relevant aspects of ICOMOS Burra Charter and NSW Department of Urban Affairs and Planning’s ‘State Heritage Inventory Evaluation Criteria and Management Guidelines’.

Aboriginal archaeological sites are assessed under the following categories of significance:

- cultural value to contemporary Aboriginal people,
- archaeological value,
- aesthetic value,
- representativeness, and
- educational value.

Aboriginal cultural significance

The Aboriginal community will value a place in accordance with a variety of factors including contemporary associations and beliefs and historical relationships. Most heritage evidence is valued by Aboriginal people given its symbolic embodiment and physical relationship with their ancestral past.

Consultation with the local Aboriginal community is necessary to identify the cultural significance attached to heritage sites and the broader landscape.

Archaeological value

The assessment of archaeological value involves determining the potential of a place to provide information which is of value in scientific analysis and the resolution of potential archaeological research questions. Relevant research topics may be defined and addressed within the academy, the context of cultural heritage management or Aboriginal communities. Increasingly, research issues are being constructed with reference to the broader landscape rather than focusing specifically on individual site locales. In order to assess scientific value sites are evaluated in terms of nature of the evidence, whether or not they contain undisturbed artefactual material, occur within a context which enables the testing of certain propositions, are very old or contain significant time depth, contain large artefactual assemblages or material diversity, have unusual characteristics, are of good preservation, or are a part of a larger site complex. Increasingly, a range of site types, including low density artefact distributions, are regarded to be just as important as high density sites for providing research opportunities.

Representativeness

Representative value is the degree to which a “class of sites are conserved and whether the particular site being assessed should be conserved in order to ensure that we retain a representative sample of the archaeological record as a whole” (NPWS 1997). Factors defined by NPWS (1997) for assessing sites in terms of representativeness include defining variability, knowing what is already conserved and considering the connectivity of sites.

Educational value

The educational value of cultural heritage is dependent on the potential for interpretation to a general visitor audience, compatible Aboriginal values, a resistant site fabric, and feasible site access and management resources.

Aesthetic value

Aesthetic value relates to aspects of sensory perception. This value is culturally contingent.

10.2 Significance Value of the Aboriginal Site in the Study Area

Stone artefact scatters are a common site type in the local area and wider region. Stone artefacts can be expected to be distributed in a virtual continuum across most landscape element contexts. The density of this background artefact scatter will be related to factors such as the nature of the terrain (landform element, gradient and slope), the permanence of the local water source and the proximity of other resource features. Open artefact scatters will contain differences in terms of their artefact density and composition. These differences will potentially reflect differences in site function ie different activities undertaken in different places. Therefore, these site types, while common, will each have the potential to provide unique archaeological data and hence interpretive value within a research context.

The nine artefact locales recorded in the proposal area are representative of common site types in the region. They are each assessed to have low research potential given low artefact numbers and densities. The nine locales are accordingly each assessed to be of low local scientific significance. Aboriginal heritage sites often have high cultural value to the local Aboriginal community given that they provide direct physical and symbolic linkages to their ancestral past and to the landscape.

11. MITIGATION AND MANAGEMENT STRATEGIES

The aim of this study has been to identify Aboriginal objects and to predict the archaeological potential of the Survey Units, to assess site significance and thereafter, to consider the potential impact of the proposal upon this heritage. Nine locales containing stone artefacts have been identified to be located within the proposal area; no Survey Units have been assessed to contain subsurface artefacts in anything other than low density. In the following sections a variety of strategies that can be considered for the mitigation and management of development impact to Aboriginal objects is listed and discussed.

11.1 Management and Mitigation Strategies

Further Investigation

The current field survey has been focused on recording artefactual material present on visible ground surfaces. Further archaeological investigation entails subsurface excavation which is generally undertaken as test pits for the purposes of identifying the presence of artefact bearing soil deposits and their nature, extent, integrity and significance.

Further archaeological investigation in the form of sub-surface test excavation can be appropriate in certain situations. Such situations generally arise when the proposed development is expected to involve ground disturbance in areas which are assessed to have potential to contain moderate to high density artefactual material. Additionally subsurface investigation is increasingly being undertaken for the purposes of characterising spatial variation in subsurface deposits across a range of landform elements. Subsurface investigation provides a level of surety in regard to the archaeological status of a place so that informed management decisions can be duly made.

Test excavation can be undertaken in a variety of ways including hand excavation, shovel pits, auger holes, mechanically excavated trenches or surface scrapes. Generally sub-surface test excavation can only be carried out after a s87 Permit is issued to an archaeologist by the Director-General, NSW DEC. Such a strategy is proactive and enables the proponent to properly manage archaeological sites prior to development activity occurring.

No Survey Units have been identified in the proposal area to warrant further archaeological investigation. The proposal area is predicted to be of low archaeological potential and sensitivity. Furthermore the survey results are assessed to have provided a reasonably reliable indication of the archaeological status of the area.

Conservation

Conservation is a suitable management option in any situation however, it is not always feasible to achieve. Such a strategy is generally adopted in relation to sites which are assessed to be of high cultural and scientific significance, but can be adopted in relation to any site type.

When conservation is adopted as a management option it may be necessary to implement various strategies to ensure sites and 'Aboriginal objects' are not inadvertently destroyed or disturbed during construction works or within the context of the life of the development project. Such procedures are essential when development works are to proceed within close proximity to identified sites.

In the case at hand, conservation of the artefacts locales is considered to be desirable if at all possible. However, given the nature and density of the stone artefacts recorded in the proposal area and the low scientific significance rating each artefact locale has been accorded, none are assessed to warrant conservation if impacts are proposed.

Mitigated Impacts

Mitigated Impacts usually takes the form of partial site impact and/or salvage prior to impact. Such a management strategy is appropriate when sites are assessed to be of moderate or high scientific significance to the scientific and/or Aboriginal community and when avoidance of the site is not feasible. Salvage can include the surface collection or sub-surface excavation of artefacts, usually as a condition of a s90 Consent issued by the Director-General, NSW DEC.

From a scientific perspective none of the artefact locales recorded in the proposal area warrant mitigation of impacts.

Unmitigated Impacts

Unmitigated Impacts to Aboriginal objects can be given consideration when they are assessed to be of low or low/moderate archaeological and cultural significance and otherwise in situations where conservation is simply not feasible. In order to conduct unmitigated impacts to a site the proponent usually applies for and obtains a s90 Consent from the Director-General, NSW DEC. s90 Consent applications must be accompanied by supporting documentation from the local Aboriginal community.

Given the nature and density of the stone artefacts recorded in the proposal area and the low scientific significance rating each artefact locale has been accorded unmitigated impacts would be appropriate if impacts are proposed.

12. RECOMMENDATIONS

The following recommendations are made on the basis of:

- A consideration of the Part 3A amendment to the Environmental Planning and Assessment Act (see Section 9 Statutory Information).
- The results of the investigation as documented in this report.
- Consideration of the type of development proposed and the nature of proposed impacts.

It is recommended that:

- The proponent should give due consideration to the discussion in regard to management and mitigation of Aboriginal objects outlined in Section 11 of this report.
- The proposal area is assessed to be of low archaeological potential and sensitivity. Accordingly, no further archaeological assessment is considered necessary in relation to the proposed Taurus Energy Wind Farm at Conroys Gap.

The nine locales containing Aboriginal stone artefacts recorded in the proposal area do not surpass any scientific significance thresholds which would act to preclude impacts which may ensue as a result of the construction of the proposed Wind Farm. Accordingly, if impacts to any of the stone artefact locales recorded in the proposal area are proposed unmitigated impacts are justified.

It is noted however that four of the recorded artefact locales are situated outside areas of proposed impact as a result of revisions to the layout. Accordingly these four artefact locales will not sustain impacts relating to the proposal.

It is possible that some of the remaining recorded artefact locales similarly will not be situated within areas of impact.

- Copies of the report should be forwarded to:
Archaeologist South Branch
Environment Protection and Regulation Division
Department of Environment and Conservation
PO Box 2115
Queanbeyan NSW
- Copies of this report should be forwarded to:

Buru Ngunawal Aboriginal Corporation
Onerwal Local Aboriginal Land Council

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