New South Wales Archaeology Pty Ltd ACN 106044366

Revised Yass Valley Wind Farm - The Coppabella Hills

Aboriginal Cultural Heritage Assessment Report

Date: 2 August 2017
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Local Government Area: Yass Valley Shire Council

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1. SUMMARY

New South Wales Archaeology Pty Ltd conducted an assessment of the proposed Yass Valley Wind Farm in 2008, as documented in a final report in 2009 (Dibden 2009). Approval has since been granted for the Coppabella Hills section of the original proposal area.

Changes have been made to the layout as a result of detailed design and further consultation. Goldwind Pty Ltd is now seeking approval for a Project Modification from the NSW Department of Planning and Environment (DoP&E).

The Coppabella Wind Farm would be located at the interface of the Southern Tablelands and the South West Slopes, approximately 35 kilometres west and south-west of Yass, New South Wales.

This revised report documents the Aboriginal cultural heritage assessment undertaken in respect of changes to the project layout. Additional field survey was undertaken in November 2016 and April 2016. In order to function as a standalone report, this document describes the assessment of the entire project area.

The assessment has sought to identify and record Aboriginal cultural areas, objects or places, determine the archaeological potential of the proposal area and formulate management recommendations based on the results of the community consultation and a significance assessment.

The proposed Coppabella Wind Farm is defined as a Transitional Part 3A project/State Significant Development. The assessment has been conducted in accordance with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (NSW DEC July 2005), as relevant to Part 3 projects. During the current assessment, further consultation has been conducted with the Registered Aboriginal Parties and this is on-going.

Seventy Aboriginal object locales were recorded in the Coppabella Hills during the original assessment (Dibden 2009). In the 2016-2017 field surveys, a further 12 were identified. Artefacts have been found along the majority of crests in which turbines are proposed; the majority of locales contain either single or otherwise very few artefacts. It has been concluded that artefact density is generally very low in the hills. However, several Survey Units and locales within some Survey Units have been predicted to contain subsurface artefacts in low/moderate density including several ridge saddles, a large upland basin and certain areas within valleys. One potential Non-Indigenous heritage item was recorded near to areas of proposed impacts. This item is an area of ploughland (Coppabella SU24/H1) and is assessed to be of insufficient significance to warrant heritage listing.

As a result of the assessment the following conclusions and recommendations are made (see Section 7 & 8 for detailed recommendations in regard to management and mitigation):

- No areas were identified that could be characterised as places with a high probability of possessing subsurface Aboriginal objects with high potential conservation value. Accordingly, archaeological test excavation has not been undertaken in respect of the proposal (*cf.* NSW DECCW 2010a: 24).

- Management and mitigation strategies are set out in Section 7. These strategies should be used to formulate appropriate Statements of Commitments to condition development approval of the Project Modification.

- A Cultural Heritage Management Plan (CHMP) is currently being developed for the appropriate management and mitigation of development impacts during any further planning, prior to and during construction. The CHMP will guide the process for the management and mitigation of impacts to Aboriginal cultural heritage and set out procedures relating to the conduct of additional archaeological assessment, if required, and the management of any further Aboriginal cultural heritage values which may be identified.

- Personnel involved in the construction and development phases of the project should be trained in procedures to implement recommendations relating to cultural heritage, as necessary.

- Cultural heritage should be included within any environmental audit of impacts proposed to be undertaken during the construction phase of the development.

Archaeological evidence confirms that Aboriginal people have had a long and continuous association with the Yass region for thousands of years. We would in particular like to acknowledge and pay our respects to the traditional owners of the country which is encompassed by the proposal.

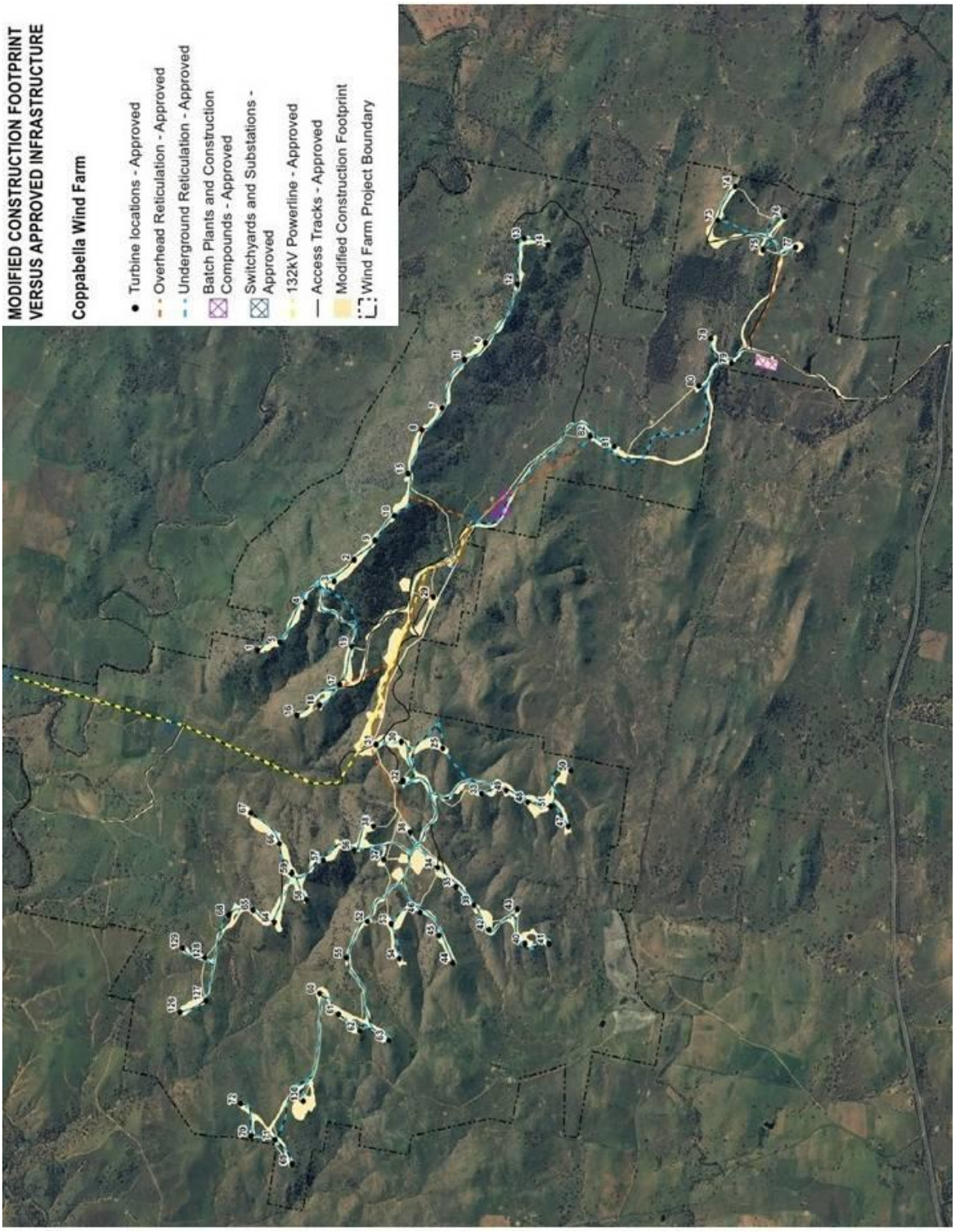

Figure 1 The Coppabella Wind Farm.

2. INTRODUCTION

Development Consent under Section 89E of the Environmental Planning and Assessment Act 1979 was issued for the Yass Valley Wind Farm (YVWF) in 2016 (SSD - 6698). The YVWF Development Consent allows for up to 79 turbines with 132kV connection to the north of the site (Figure 1). The wind farm is now called the Coppabella Wind Farm (CWF) and proponent is Goldwind Australia.

NSW Archaeology Pty Ltd has been commissioned to conduct a revised Aboriginal heritage (archaeological and cultural) assessment in relation to a Project Modification to the proposed CWF (the subject area). This report is a standalone document which includes the results of the original assessment conducted in 2008 (Dibden 2009) and further fieldwork conducted in 2016 and 2017.

The proposed CWF would be located in the Coppabella Hills, 30 kilometres west-northwest of Yass. The proposal would involve the construction and operation of up to 79 wind turbine generators with 132kV connection to the north of the site. The turbines would be placed along a series of ridgelines and surrounding crests currently used for farming.

The project site is located in the Yass Valley Shire Council area.

The proposal is comprised of the installation and construction, operation and decommissioning of the following infrastructure:

- Up to 79 wind turbine generators (wtgs);
- Electrical connections between wind turbines using a combination of underground cabling and overhead power lines;
- Underground communications cabling;
- Substations and transmission connections linking the wind turbines to an existing transmission system;
- Temporary construction facilities, site compounds, storage areas and batching plants;
- Access roads for installation and maintenance of wind turbines; and
- Onsite control rooms and equipment storage facilities.

The content and format of this report is set out in accordance with the NSW OEH (2011) *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* document. The report aims to document:

- The Aboriginal objects and declared Aboriginal places (as relevant) located within the area of the proposed activity;

- The cultural heritage values, including the significance of the Aboriginal objects and declared Aboriginal places that exist across the whole area that will be affected by the proposed activity, and the significance of these values for the Aboriginal people who have a cultural association with the land;
- How the requirements for consultation with Aboriginal people have been met (as specified in clause 80C of the NPW Regulation);
- The views of those Aboriginal people regarding the likely impact of the proposed activity on their cultural heritage (if any submissions have been received as a part of the consultation requirements, these are included and our response outlined);
- The actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the proposed activity, with reference to the cultural heritage values identified;
- Any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places; *and*
- Any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm, or, if this is not possible, to manage (minimise) harm.

The revised assessment and updated report has been conducted by Julie Dibden (*Australian National University: BA with honours; PhD*), NSW Archaeology Pty Ltd.

2. DESCRIPTION OF THE AREA – BACKGROUND INFORMATION

In this section, background and relevant contextual information is compiled, analysed and synthesised. The purpose of presenting this material is to gain an initial understanding of the cultural landscape. The following topics are addressed (*cf.* OEH 2011: 5):

- The physical setting or landscape;
- History of peoples living on that land; *and*
- Material evidence of Aboriginal land use.

A consideration of the landscape is necessary in archaeological work in order to characterise and predict the nature of Aboriginal occupation across the land (NSW 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, 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.

2.1 Topography, geology and vegetation

The proposed Coppabella Wind Farm is situated on the Southern Tablelands of New South Wales and is part of the Eastern Uplands of southeastern Australia (Jennings and Mabbutt 1977). The Eastern Uplands consists of a wide plateau which extends from the coastal escarpment on the east, to the slopes of its western side. The landscape has low

relative relief, lies generally below 600m altitude and possesses slopes generally less that 5º with about 20% of the area contains steeper hills and ranges. The area has a strongly seasonal thermal climate (Jennings and Mabbutt 1977).

The proposed wind farm is located west and southwest of Yass; the closest villages include Bowning, Binalong and Bookham. The area is currently a rural landscape and is predominantly utilised for sheep grazing.

The proposal area is situated on Silurian sedimentary sequences and Laidlaw volcanics (Branagan and Packham 2000). Low outcrops are common across the proposal area, particularly on crests and hillslopes where, in many cases, bedrock is present at greater than 50% (Plates 1 and 2). The rocky nature of much of the turbine ridge lines is likely to have made these landforms unfavourable camp locations for Aboriginal people.

The dominant soils are red and yellow podzolic lithosols on crests and hillslopes, and red and yellow earths in valleys (Wasson *et. al* 1998). As discussed further below, soils within the proposal area are highly eroded. This has significant ramifications in regard to the stability and integrity or otherwise of artefact bearing soil formations in the proposal area, both on crests and within valleys. Plates 3 and 4 below exemplify the eroded, skeletal nature of soils on the turbine ridges. It is noted, however, that usually saddles between knolls on crests contain greater soil depth, albeit disturbed.

Soils within valleys are both alluvial and colluvial and while undoubtedly disturbed are, of significant depth. In areas adjacent to drainage lines Post Settlement Alluvium is likely to be present above the original land surface (see Plate 11).

Plate 1 Rocky slopes on crests typical of the turbine envelopes.

Plate 2 Coppabella Hills: Survey Unit 16: Rocky knolls on crests typical of the turbine envelopes.

Plate 3 Note typical exposures encountered during the original survey conducted in 2008 showing erosion of topsoil to bedrock.

Plate 4 Note typical ground surface showing erosion of topsoil to bedrock and recent surface wash.

Prior to European settlement, the vegetation on hill slopes was open forest dominated by Eucalyptus spp.; valley floors contained extensive grasslands and swamps (Wasson *et al.* 1998). However, the area in now cleared and contains scattered trees only. Of note, given that they were a source of food (seeds) and fibre (bark) to Aboriginal people, Kurrajongs (*Brachychiton populneum*) are common on crests and hillslopes.

The botanist and explorer Allan Cunningham visited the region in 1824 and described the vegetation structure and stream character he observed at that time. From descriptions by Cunningham *and others*, Wasson *et. al* (1998) have concluded that streams in the region with a catchment of greater than 1000 km² possessed a continuous channel, while streams with smaller catchments had less distinct channels often described by early commentators as *chains of ponds*.

The naturalist Lhotsky, in 1834, described the ponds as follows: 'They are commonly round or oval basins of from 20 – 200 feet in diameter or length, excavated or sunk in the superficies of an alluvial soil, which is commonly of a rich kind...' (cited in Wasson *et al.* 1998). Jugiong Creek rises in the Coppabella Hills. It was described in 1829 by the explorer Charles Sturt, as a creek containing '... large ponds which are skirted by reeds' (cited in Wasson *et al.* 1998). Now, however, this creek is incised with a sandy bed strewn with boulders. The creeks located within the proposal area would all fall within the smaller catchment category as described above and, accordingly, are likely to have originally possessed indistinct channels and chains of ponds. Now, however, these features are absent and, instead, channel incision has created deep channels.

No major rivers flow through the proposal area, however, numerous creeks flow through the Coppabella Hills. These creeks are likely to have been discontinuous channels with chains of ponds and possibly swamp features. While not necessarily being places of abundant water, they are likely to have provided Aboriginal land users with a reasonably reliable local water source. The elevated hill landforms (crests and slopes), by and large, are unlikely to have provided people with any water. The exception to this is a small, locally unusual 'basin' feature within the Coppabella Hills which may have provided some water either in the form of springs or in small pools within minor 1st order drainage lines (Plate 5).

The proposal area can be characterised as a woodland resource zone. The hills would have possessed limited biodiversity and a general lack of water; accordingly they are likely to have been utilised by Aboriginal people for a limited range of activities which may have included hunting and gathering, travel through country and possibly ceremonial. Such activities are likely to have resulted in low levels of artefact discard. Given the often steeply undulating nature of the crests, artefacts are likely to be located in spatially discrete areas such as knolls or saddles, rather being continuous in distribution. The nature of stone artefacts discarded can be expected to have been correspondingly limited in terms of artefact diversity and complexity.

By comparison the valleys between the hills are likely to have possessed greater levels of biodiversity given the likely presence of chains of ponds and possibly also swamp features along drainage lines. In addition, a more reliable source of water is likely to have been present in valleys for much of the year. Such areas are likely to have been utilised more frequently and possibly by greater numbers of individuals at any one time; certainly the valleys are likely to have been the favoured camp locations while people occupied the broader local area. Accordingly, the levels of artefact discard in valleys can be predicted to be correspondingly higher; artefact diversity and complexity is also likely to be greater.

The morphological landform types located within the zones of proposed impact include crests, hillslopes and drainage depressions.

The Coppabella Hills turbine envelopes are undulating crests that vary in gradient between knolls and saddles from moderate to steep (Plates 5 and 6). The land falls from the crests as simple slopes which also vary in gradient from moderate to steep (Plates 7 and 8).

Plate 5 Basin in the Coppabella Hills likely to have been a favoured camping site in the area due to the presence of some water at high elevation.

Plate 6 Coppabella Hills; Survey Unit 1 - main ridge; note knolls and saddles.

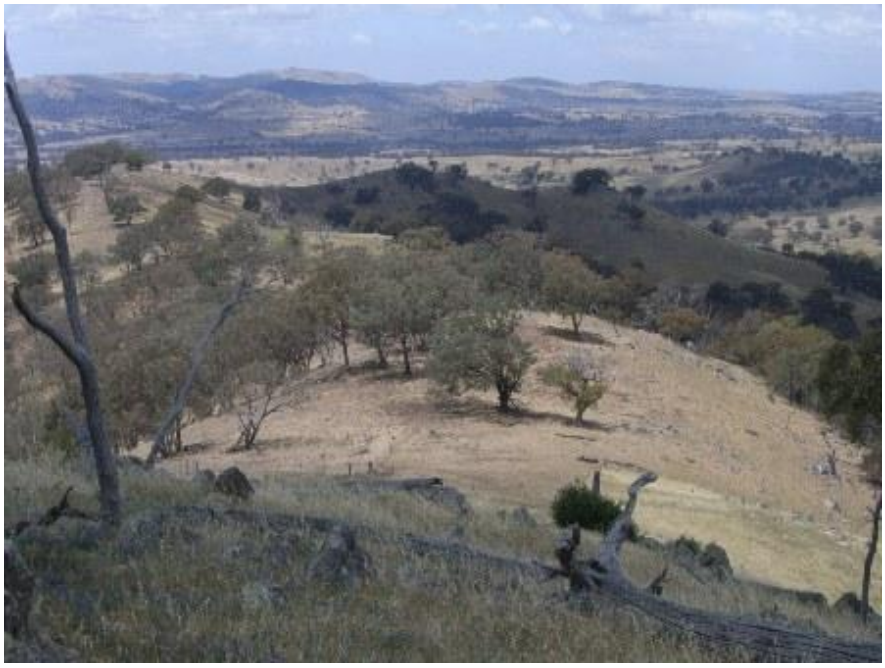

Plate 7 Coppabella Hills: Survey Unit 1; main ridge; note steeply undulating crest.

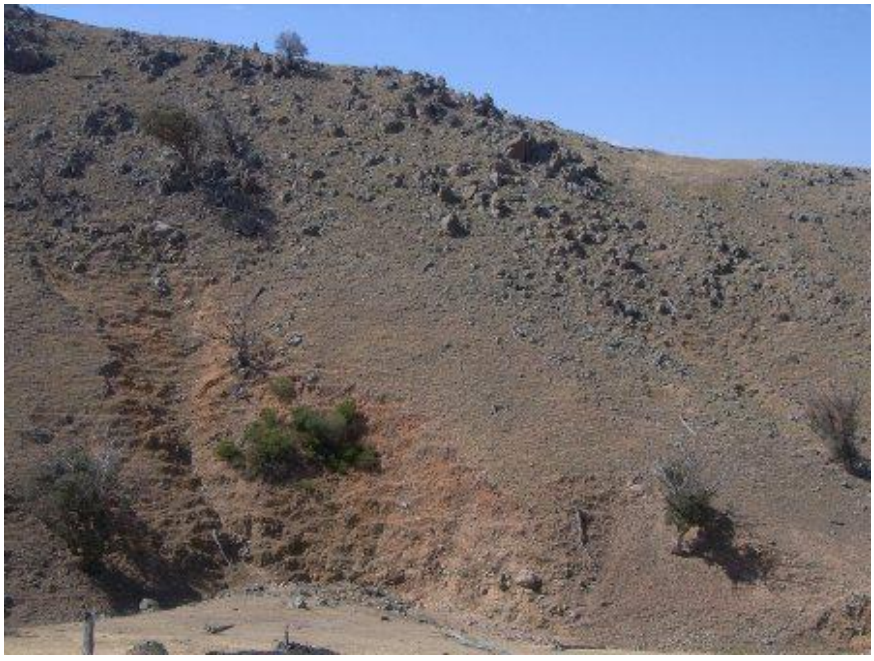

Plate 8 Coppabella Hills; note steep simple slope off crest (Survey Unit 15).

Plate 9 Coppabella Hills; main ridge; note steep slopes off the crest.

2.2 Landscape History

The proposed impacts relating to the Yass Valley Wind Farm are situated on farm land. The landscape history of the area is therefore related to previous and current farming activities including grazing and cultivation. Given that the most common Aboriginal objects expected to be present within the proposal area are stone artefacts located in or on ground surfaces, the following review is focused on describing the impact to soils and soil profiles which has resulted from decades of agriculture practice.

Land clearance commenced in the region with its occupation by early settlers during the early to mid 1800s (see Section 8 for information relating to early European settlement). Following clearance, the arable land was utilised for grazing and various cultivation endeavors including pasture improvement and cropping, while hilly land has been used exclusively for grazing. Currently, the majority of the proposed impact areas including the ridges, hill slopes and valleys are cleared and contain scattered and isolated trees or small stands only (Plate 10). By and large, all trees are mature or dying and saplings are not present.

As a result of the long history of grazing and cultivation, the area is located within a highly degraded landscape; similarly to other parts of Australia, vegetation, soils and geomorphological processes have been dramatically changed by clearing, cropping and grazing (Wasson *et al*. 1998). Tree clearance, the grazing of sheep and cultivation, has resulted in increased runoff and erosion, both on hill slopes and valley floors, much of which commenced very soon after initial European occupation (Wasson *et al*. 1998). These erosional processes have lead to significant changes to landscape processes. More

recently, dryland salinity has become a problem as a result of earlier vegetation clearance.

Plate 10 Ridge in the Coppabella Hills proposal area.

The pre-European vegetation and landform context is reviewed in Section 6. The series of photos below show the erosional features currently present within the proposal area. Stream incision and widening is now present along valley floors (Plate 11). Additionally, many gullies have cut into hillslopes and valley-side depressions (Plates 12 and 13) that previously, were unlikely to have been channeled (*cf.* Wasson *et al.* 1998). The majority of active channel and gully formation in the Southern Tablelands is believed to have occurred up until c. 1900.

Post Settlement Alluvium (PSA) is widely reported as covering the floodplains of creeks and streams in the region (Wasson *et al.* 1998). It is found to measure up to 1 - 3 metres in thickness and has been incised by modern channels rather than deposited overbank by these channels (see Plate 11).

While hillslope erosion (sheet and rill) and sediment accumulation in catchments of the region prior to European settlement is measurable, rates of erosion are considered to have been low (Olley *et al.* 2003). Similarly to stream incision and erosion, hillslope erosion increased significantly during the first 50 or so years of European occupation. Valley floors are likely to have been severely eroded with changes to soil structure in the early years of grazing due to stock trampling, removal of vegetation (via grazing and drought processes – *the period between 1830 -1850 was a time of below average rainfall*) and within the drainage lines themselves, by the onset of gullying (Dorrough *et al.* 2004; Olley *et al.* 2003). It is recognised that the effects of grazing on soils is most pronounced where

livestock congregate close to watering points (Lunt *et al.* 2007); both now with dams, and previously, these watering points are generally situated within valleys.

Plate 11 Channel incision in a drainage depression. This erosion is almost certainly a post European phenomenon. Note also the top yellow-brown soil layer visible in the channel section which is probably Post Settlement Alluvium deposited after the erosion of hillslopes.

Erosion in the region continues to be a problem due to dryland salinity (Seddon *et al.* 2007). Salinity cause bare scalds and gullying. Mitigation measures in the form of tree plantings are being carried out in a number of properties within the proposal area. These actions in themselves have resulted in additional localized disturbance of soils and any artefactual material which may be present.

Land clearance and subsequent erosional processes are likely to have resulted in varying levels of prior impacts to Aboriginal objects. Trees hosting evidence of cultural scarring will have been completely destroyed while Aboriginal objects located in or on the ground will have been disturbed and/or moved, resulting in loss of their original depositional context (both spatially and vertically).

Plate 12 Gully erosion extending from a crest on the Coppabella Hills; note also stock tracks.

2.3 History of Peoples Living on the Land

Aboriginal people have occupied Australia for at least 40,000 years and possibly as long as 60,000 (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). At the time of early occupation, Australia experienced moderate temperatures. However, between 25,000 and 12,000 years BP (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 - 10ºC 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 metres below present and, accordingly, the continent was correspondingly larger. With the cessation of glacial conditions, temperatures rose with a concomitant rise in sea levels. By c. 6,000 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[1] 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 humankinds' inspiring epics.*

In the late Pleistocene much of the land in the region was covered in snow, with glaciers in the mountains and the lower plains being treeless. Over time, the Aboriginal people experienced and adapted to steady and considerable changes in conditions associated with gradual climatic warming, including the alteration of vegetation and variation in the distribution of wildlife (Young 2000).

Human occupation of south-east NSW dates from at least 20,000 years ago as evidenced by dated sites including the Burrill Lake rock shelter (Lampert 1971), 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. In the south-eastern highlands, excavation of the Birrigai rock-shelter has provided dates of occupation from 21,000±200 years BP (Flood *et al.* 1987: 16). Pleistocene occupation sites are rare, however, and the majority of recorded sites date 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.

As far as possible, an ethnographic and historical review of Aboriginal life in the region will be outlined below. However, our ethnographic understanding of Aboriginal people in this area, and the historical dimension of the colonial encounter has been reconstructed from scant historical records produced during a context of death and dispossession (Swain 1993: 115), and is sketchy and severely limited. Stanner (1977) has described the colonial and post-colonial past as a 'history of indifference', and this portrays both the substantive situation which prevailed and the general lack of regard for this history. The earliest European reports regarding the Aborigines of the region are provided through the written observations of the first explorers, adventurers and settlers to the district. These sources present only fragmentary and incomplete accounts of the traditional culture of those Aboriginal groups who inhabited the area. Very soon after European contact, with increasing numbers of white settlers after the 1820s, much of the Aboriginal language and lifestyle had changed before it could accurately be recorded. Because of this, reliable information is limited regarding traditional Aboriginal culture and social geography at the time of European arrival.

Prior to the 1960s, 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

[1] Sahul is the name given to the single Pleistocene era continent which combined Australia with New Guinea and Tasmania.

used to define different cultural periods. With the application of direct dating techniques in the 1960s, 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 1960s 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 site locational models, subsistence, technology and environmental adaptation were addressed.

The primary focus of archaeological research in Australia throughout the 1960s, 1970s and 1980s was the examination of 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 has been focused on examining these issues.

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 were predicted to have been used.

Witter (1980) constructed two models of Holocene adaptation which he termed Riverine Oriented and Plateau Oriented. The Riverine model was defined 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. The Plateau subsistence regime was considered to be 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 7,000 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 courses 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 examination of early historical material, Pearson (1981) argued that the region was inhabited by a small number of clan groups each of which were comprised of 80 to 150 people. These groups 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 creeks. 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 on 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 noted that sites are widely distributed with a higher frequency situated along water courses than in less well drained areas away from creeks and rivers. They posited a model suggesting that the economic focus was within major streams and valleys, with occasional usage of the dryer inland zones. Witter and Hughes (1983) suggested that during dry periods occupation was confined to major stream valleys and that in wetter times people would have moved along temporarily watered headwater streams and onto plateau areas.

White (1986) conducted a general study of the Wiradjuru 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 '… interfinger (sic) 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.

The Yass region was occupied by Aboriginal speakers of at least two languages, Wiradjuri and Ngunawal. G.A. Robinson (in Mackaness 1941) noted that the people of Yass were called Onerwal [Ngunawal] (White and Cane 1986). According to Jackson-Nakano (2002), the Aboriginal group who occupied the Yass and Boorowa districts in the early years of European settlement were the Wallabalooa tribe. Jackson-Nakano (2002) also indicates that, according to Bayley (who wrote a brief history of Yass), *Warrambalulah* was the Aboriginal name for the area on which the first township of Yass was settled in 1836.

Following European occupation, Aboriginal society changed from autonomy and economic independence to both economic dependence on, and enforced settlement, by Europeans (White and Cane 1986). It is possibly the latter situation which is now most recalled by Aboriginal people who were either directly affected, or now remembered on behalf of earlier generations; the local camps and reserves in Yass, and elsewhere, are now focal places in the memory of these times.

White and Cane (1986) have defined three phases of this history. When Europeans began to occupy the district, Aboriginal people moved seasonally between an autonomous economic practice based on hunting, fishing and so on, and engagement with the settler society whereby European foodstuffs were obtained. It is probable that during that time, Europeans and Aborigines forged a mutually beneficial relationship, entailing amongst other things, the exchange of labour, foods and protection. Jackson-Nakano (2002) suggests that prominent members of the Wallabalooa group such as Jacky King, Billy the Bull and his brother Andy Lane forged very good relations with the earliest European settlers on their lands, in particular, the Humes, Broughtons, Kennedys, Walkers and Howells. While engaging with settler society, this practice by Aboriginal people, was done so on their own terms. From 1851, reserves of land were set aside for Aboriginal people, however, generally they were avoided and not used. Instead people preferred living on stations located in their own country or the outskirts of towns such as Yass (White and Cane 1986). White and Cane (1986) note that reports in the Yass Courier of 1857 and 1858 refer to a Blacks Camp, which may refer to the same Yass River Camp used later in the 19th century and earlier 20th century.

In the period from the 1830s through until the 1860s, the 'Yass Blacks' were a dominant group and allegedly terrorised and conducted raiding parties on other groups as far afield as Bega and Eden. King Andy frequently went on raids in the Goulburn, Cowra, Molong and Wellington districts (Jackson-Nakano 2002). The territorial expansion conducted by the local Aboriginal people was facilitated, at least in part, by the strong ties which they established with the European settlers and their vast properties.

With the passing of the Robertson Land Acts in 1861, closer settlement by small-scale free selectors reduced the capacity for Aboriginal people to maintain their occupation of country. However, from this time Aboriginal people began to acquire their own parcels of land by purchase or gazettal, and to farm it. Several of these properties were located in the Rye Park area at Brickey's Creek, Blakeney Creek and Flakeney Creek (Kaibala 1998). Between 1850s and the 1950s, Aboriginal families lived on farmlets and reserve land and did odd jobs for farmers or seasonal work on stations in the local area (Kaibala 1998).

By the 1880s, the European community at Yass began to demand that Aboriginal people around the town should be controlled. A parcel of land measuring 6 ½ acres at Oak Hill near the water works at Yass was set aside. With timber and iron provided by the Aborigines Protection Board 13 houses were built in 1888. One year later the land area of Oak Hill was reduced to 2 ½ acres (White and Cane 1986). By 1890, 78 people were recorded as living at this site in 12 houses and four bark huts. Similarly to earlier times, the occupation of the Oak Hill site was mutually beneficial to both Aborigines and Europeans. Aboriginal people were able to have ready access to the town economy, continue to live in family groups while being separate from whites, and work within the local economy. On the other hand, Europeans were happy to have Aborigines away from town but close enough to have access to their labour (White and Cane 1986).

However, in 1899, pressure mounted to remove the Aboriginal people from Yass. Inducements to encourage people to move to other reserves failed and by 1909 the Edgerton site, located 20 kilometres from Yass, was selected by the Aborigines Protection Board. While some people moved to Edgerton, others petitioned to remain at Oak Hill. This request was refused and the North Yass site was revoked. By 1916, however, Edgerton was abandoned with the people having moved back into Yass and camped at Yass Junction with the men working on railway works (White and Cane 1986). People moved back to Oak Hill to a location at the bottom of the hill called The Rocks on the Yass River (White and Cane 1986).

This period until 1930, continued to be one of great difficulty for Aboriginal people, both elsewhere in the state but specifically at Yass (White and Cane 1986). It was during this time that children were removed from their families; between 1900 and 1915 fifteen children were removed from Aboriginal families in Yass. With the proposal to construct the water works at Oak Hill at around 1925, Aboriginal people were again asked to leave the site. A new reserve was established in an attempt to remove people. This site known as Hollywood, is located south of Yass near the cemetery; in 1934 people were moved to the new site, although one or two families remained at Oak Hill.

The Hollywood site was a failure from many points of view, and by 1940 Aborigines had begun to return to North Yass; this was objected to by whites. However, the situation for the remaining families at Hollywood was becoming untenable also due to the recognition of its inadequate situation (White and Cane 1986). Thereafter, a period of resettlement

including placing people in a limited number of houses in the town and movement to other reserves located well away from Yass began; Oak Hill also continued to be occupied.
Aboriginal people continue to live in Yass and surroundings areas and maintain strong links and concerns for the sites of their ancestors.

2.4 Material Evidence

An updated search of the NSW OEH Aboriginal Heritage Management Information System (AHIMS) has been conducted for this project on the 21 July 2016 (Client Service ID: 235374). The search area measured 255 km² and encompassed the area between eastings 631000 – 648000, and northings: 6146000 – 6161000.

Seventy two Aboriginal object sites are recorded on AHIMS in the search area (Table 1; Figures 2-9), all of which were recorded during the initial Yass Valley Wind Farm surveys (Dibden 2009; Dibden 2013c). The AHIMS register only includes sites which have been reported to NSW OEH. Generally, sites are only recorded during targeted surveys undertaken in either development or research contexts. Accordingly, this search cannot be considered to be an actual or exhaustive inventory of Aboriginal objects situated within the local area or indeed within the subject area itself.

The following discussion 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.

2.4.1 Archaeology – The Local Area

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.

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: the plateau consisting of 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. Witter and Hughes (1983) argued that this association probably reflects more than simply access to drinking water noting that the valleys have the greatest vegetational diversity and contain a variety of aquatic food plants in streams. 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.

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^{o} 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).

In 1985 Silcox and Koettig surveyed the route of the proposed alternate Yass bypass. 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. This site locational pattern was noted to reflect in part the fact that creek or river valleys were not usually flat and that spurs and slopes usually terminated immediately adjacent to creeks. Surface artefact densities ranged from 1/30^{2} to 1/40m^{2}. Subsurface densities averaged 18/m^{2}. Ninety percent of the artefacts were unmodified flakes and flaked pieces; quartz was the dominant raw material. Silcox and Koettig concluded from the Yass By-pass studies that the pattern of distribution of sites in the Southern Tablelands was a predominance of small sites (less than 50 artefacts and often less than 10) interspersed with occasional medium sites of up to 300 artefacts, and on occasion, very large sites.

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, a permanent water course. The two artefacts scatters consisted of three artefacts each. Subsequent subsurface testing was carried out at an area identified to be of high potential to contain archaeological material near Derringullen Creek. The area was relatively flat ground consisting of a series of three main spurs separated by shallow drainage channels and extending c. 700m adjacent to the creek. The testing located a consistent however very low density artefact distribution (Koettig 1986b).

Silcox and Koettig (1988) carried out a survey and test excavation 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. Average artefact density of excavated sites was found to vary between very low and low; density varied between 2.3/m² to 12/m². No artefacts were retrieved from one of the test locations, a broad end of a spur overlooking a wide valley of an ephemeral creek. 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.

Dean-Jones (1990) conducted an assessment of a proposed hard rock quarry near Gunning. The study area included a crest and upper slopes of a hill north of the Lachlan River. No sites were recorded and this result was seen to be consistent with the predictive model of site location relevant to the area.

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.

Paton (1993) surveyed a proposed optical fibre cable route from Gunning to Dalton and Dalton to Flacknell Creek Road on the Southern Tablelands. The route traversed 21km of undulating hills in the Upper Lachlan River catchment. No Aboriginal sites were recorded and this result was deemed to be consistent with the predictive model of site location relevant to the area.

Klaver (1993) recorded seven artefact scatters near Bookham in respect of the proposed Hume Highway Bypass. The study area is located to the south of Marilba and Coppabella Hills study areas. The sites were all low density artefact scatters consisting of mostly chert and quartzite flakes.

Navin and Officer (1995) conducted a survey of the Bogo Quarry situated on Black Range situated southwest of the Marilba Hills study area. The study area consisted of a low hill. One artefact scatter and two isolated finds were recorded. The scatter was found on low gradient basal slopes 400-500 m south of Stony Creek.

Oakley (1995) surveyed a number of proposed Optus towers in the region, one of which was Mt Bowning east of the Marilba study area. No sites were found; the site was highly eroded and found to be of low potential.

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.

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.

Austral Archaeology Pty Ltd (2005) conducted a program of subsurface test excavation at the proposed Gunning Wind farm site. The works entailed grader scrapes and no artefacts were recovered.

Dibden (2006a) recorded nine locales containing stone artefacts during an assessment of the proposed Conroys Gap Wind farm. Artefact density calculations based on surface indicators indicate that all artefact locales contain low density artefact distributions. The Survey Units present in the study area were 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.

Dibden (2006b) recorded four locales containing stone artefacts during the study of the proposed Cullerin Wind Farm, situated north of Yass. Four locales containing 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.

OzArk Environmental and Heritage Management (2007) conducted a survey of the Wagga Wagga – Yass 132kV transmission line, a section of which traverses the northern part of the Carrols Ridge study area. The proposal relates to pole replacement works in an existing easement. Four Aboriginal artefact scatters only were recorded during the field survey of the entire route.

Austral Archaeology Pty Ltd (2008) surveyed a transmission line associated with the Gunning Wind farm and a number of other small discrete impact proposals. 25 sites were recorded defined as 13 open artefacts scatters, nine isolated finds, two areas of PAD and a

scarred tree. The majority of finds were located on ridgetops which Austral Archaeology Pty Ltd (2008) suggest reflects the use of these landforms for vantage points and movement through country. Austral Archaeology Pty Ltd (2008) argued that the diversity of the raw materials, lack of conjoined artefacts and related materials found in proximity suggested sporadic use over a long time rather than focused activities which might be expected to have taken place in more permanent habitation sites.

Navin Officer Heritage Consultants (2009) conducted a cultural heritage assessment in relation to the proposed Dalton Peaking Power Plant, located some four kilometres north of the township of Dalton. Areas of proposed impact included a 15 hectare power plant site, a three kilometre long (corridor width 25 – 50 metres) gas pipeline, as well as an access road and communications tower. In total, the survey area measured some 36 hectares of which 29.88 hectares was surveyed, over basal, upper and simple slopes, as well as spur crests and drainage lines. In the area of the proposed power plant, in conditions of moderate ground surface visibility, ten Aboriginal sites and two areas with potential archaeological deposit were located. The ten sites were comprised of six isolated finds, three low density artefacts scatters and one low density artefact scatter with potential archaeological deposit. Almost all sites were located on slopes, and were comprised of stone artefacts predominantly derived from silcrete, with some quartz and fine grained volcanic.

Thereafter, a second survey was conducted in relation to the Dalton Peaking Power Plant (Navin Officer Heritage Consultants 2011) as the result of a rerouting of the proposed pipeline alignment. The survey area was 3.4 kilometres long, covering 15.3 hectares. In this survey three low density artefact scatters were recorded, located on crests and adjoining slopes, and comprised of stone artefacts predominantly derived from silcrete, with some chert, and minor representations of quartz and quartzite. Sites were described as being representative of 'background scatter and/or low density artefact distributions ... a common site type across the South East Highlands'.

Dibden (2013a) recorded thirteen Aboriginal object locales during an initial field survey of the Rye Park Wind Farm, ten of which were single stone artefacts. The majority of the area surveyed was elevated ridge crests and undetected or subsurface stone artefacts were predicted to be present in extremely low density. In addition, three quartz outcrops were recorded which may have been used as stone procurement areas by Aboriginal people. Given the extensive survey coverage and adequate Effective Survey Coverage, the paucity of stone artefacts was considered to be an accurate reflection of the artefactual status of the proposal area. That is, the wind turbine ridges were assessed to contain very low density artefact distributions. Accordingly, undetected or subsurface stone artefacts were predicted to be present in extremely low density. The archaeological results were also in keeping with the information provided to us by the Buru Ngunawal Aboriginal Corporation people. Given the location of the wind turbine ridges well away from water, Wally Bell (pers. comm. 2012) indicated that the area would have been used '… for travel through country, *if that*'.

Dibden (2013b) surveyed a total of 93.4 kilometres of linear impact areas on a series of gently to moderately undulating amorphous ridgelines and hilltops during a survey of the proposed Bango Wind Farm. Fourteen Aboriginal object locales were recorded during the field survey. Undetected or subsurface stone artefacts were predicted to be present in extremely low density. Based on the relevant predictive model of site distribution and the results of the field survey, the subject area was assessed to be of generally low cultural and archaeological potential and significance.

Yass Valley Wind Farm

During the original heritage assessment of the Yass Valley Wind Farm, the Coppabella Hills area was divided into 24 Survey Units (Dibden 2009). The development envelope surveyed measured approximately 458 hectares. A total of 70 Aboriginal object locales were recorded. Artefacts were recorded in all Survey Units except SU4, SU8, SU10, SU12, SU13, SU14 and SU22 which were assessed to be of low archaeological potential on environmental grounds. Artefacts were recorded along the crests in which turbines are proposed; the majority of locales contain either single or otherwise very few artefacts. Given the relatively large areas of exposure, and the very few artefacts recorded, it was concluded that artefact density is generally very low in the Coppabella Hills proposal area. This result was consistent with the predictive model of Aboriginal land use. Artefacts were commonly found in saddles and on knolls along crests. The majority of locales on crests are situated on deflated and eroded soil profiles.

Several Survey Units and some locales within some Survey Units have been predicted to contain subsurface artefacts in low/moderate density including several ridge saddles in SU2 and SU20, a large upland basin in SU17 and the valleys in which SU23 and SU24 are located.

One potential Non-Indigenous heritage item was recorded in and adjacent to areas of proposed impacts. This item is an area of ploughland (Coppabella SU24/H1) and was assessed to be of insufficient significance to warrant heritage listing. This site is outside the current wind farm layout.

The previously recorded Aboriginal object locales in the Coppabella Hills are summarised in Table 1. Their location is shown here in Figures 2 - 9.

Table 1 Aboriginal object locale data as per Dibden (2009).

Site ID	Site name	Datum	Easting	Northing
51-4-0134	Coppabella Hills SU1/L1	GDA	642819	6154584
50-6-0080	Coppabella Hills SU1/L2	GDA	643703	6154378
51-4-0135	Coppabella Hills SU1/L3	GDA	644253	6153990
51-4-0136	Coppabella Hills SU1/L4	GDA	645389	6153125
51-4-0137	Coppabella Hills SU1/L5	GDA	645333	6153158
51-4-0138	Coppabella Hills SU1/L6	GDA	642729	6154727
51-4-0139	Coppabella Hills SU2/L1	GDA	644323	6150581
51-4-0140	Coppabella Hills SU2/L2	GDA	644896	6150090

Site ID	Site name	Datum	Easting	Northing
51-4-0141	Coppabella Hills SU2/L3	GDA	646005	6149548
51-4-0142	Coppabella Hills SU2/L4	GDA	646036	6149982
51-4-0143	Coppabella Hills SU2/L5	GDA	646503	6150176
51-4-0144	Coppabella Hills SU3/L1	GDA	641827	6155876
51-4-0145	Coppabella Hills SU3/L2	GDA	641472	6156158
51-4-0146	Coppabella Hills SU3/L3	GDA	641288	6156280
51-4-0147	Coppabella Hills SU3/L4	GDA	641707	6156002
51-4-0148	Coppabella Hills SU5/L1	GDA	641084	6155360
51-4-0149	Coppabella Hills SU5/L2	GDA	641008	6155364
51-4-0150	Coppabella Hills SU5/L3	GDA	640835	6155471
51-4-0151	Coppabella Hills SU6/L1	GDA	640209	6157045
51-4-0152	Coppabella Hills SU6/L2	GDA	640294	6157581
51-4-0153	Coppabella Hills SU6/L3	GDA	640342	6157439
51-4-0154	Coppabella Hills SU6/L4	GDA	640339	6157674
51-4-0155	Coppabella Hills SU6/L5	GDA	640339	6157816
51-4-0156	Coppabella Hills SU6/L6	GDA	640453	6157793
51-4-0157	Coppabella Hills SU7/L1	GDA	638080	6156655
51-4-0158	Coppabella Hills SU7/L2	GDA	638017	6156556
51-4-0159	Coppabella Hills SU7/L3	GDA	638434	6156064
51-4-0160	Coppabella Hills SU7/L4	GDA	638282	6155984
51-4-0161	Coppabella Hills SU9/L1	GDA	637855	6154746
50-6-0081	Coppabella Hills SU11/L1	AGD	634419	6152505
50-6-0082	Coppabella Hills SU11/L2	AGD	634321	6152869
51-4-0162	Coppabella Hills SU15/L1	GDA	638378	6153948
51-4-0163	Coppabella Hills SU15/L2	GDA	637864	6153147
51-4-0164	Coppabella Hills SU15/L3	GDA	639064	6155097
51-4-0165	Coppabella Hills SU16/L1	GDA	637737	6154110
51-4-0166	Coppabella Hills SU16/L2	GDA	637801	6154132
51-4-0167	Coppabella Hills SU16/L3	GDA	638024	6154255
51-4-0168	Coppabella Hills SU17/L1	GDA	638683	6154636
51-4-0169	Coppabella Hills SU17/L2	GDA	638709	6154712
51-4-0170	Coppabella Hills SU17/L3	GDA	638847	6154749
51-4-0171	Coppabella Hills SU17/L4	GDA	638874	6154783
51-4-0172	Coppabella Hills SU17/L5	GDA	638844	6154932
51-4-0173	Coppabella Hills US17/L6	GDA	638959	6154781
51-4-0174	Coppabella Hills SU18/L1	GDA	639229	6154275
51-4-0175	Coppabella Hills SU18/L2	GDA	639395	6154281
51-4-0176	Coppabella Hills SU19/L1	GDA	640167	6154207
51-4-0177	Coppabella Hills SU19/L2	GDA	639639	6153716
51-4-0178	Coppabella Hills SU20/L1	GDA	640920	6153539
51-4-0179	Coppabella Hills SU20/L2	GDA	641683	6154204
51-4-0180	Coppabella Hills SU20/L3	GDA	640486	6153798
51-4-0181	Coppabella Hills SU20/L4	GDA	640265	6154202
51-4-0182	Coppabella Hills SU21/L1	GDA	641693	6153406
51-4-0183	Coppabella Hills SU21/L2	GDA	641821	6153340
51-4-0184	Coppabella Hills SU23/L1	GDA	643822	6151618
51-4-0185	Coppabella Hills SU23/L2	GDA	643698	6151244

Site ID	Site name	Datum	Easting	Northing
51-4-0186	Coppabella Hills SU24/L1	GDA	642211	6154076
51-4-0187	Coppabella Hills SU24/L2	GDA	642257	6154017
51-4-0188	Coppabella Hills SU24/L3	GDA	642397	6153909
51-4-0189	Coppabella Hills SU24/L4	GDA	642754	6153595
51-4-0190	Coppabella Hills SU24/L5	GDA	642848	6153502
51-4-0191	Coppabella Hills SU24/L6	GDA	643036	6153332
51-4-0192	Coppabella Hills SU24/L7	GDA	643037	6153228
51-4-0193	Coppabella Hills SU24/L8	GDA	643111	6153329
51-4-0194	Coppabella Hills SU24/L9	GDA	643186	6153216
51-4-0195	Coppabella Hills SU24/L10	GDA	643226	6153181
51-4-0196	Coppabella Hills SU24/L11	GDA	643299	6153075
51-4-0197	Coppabella Hills SU24/L12	GDA	643495	6152972
51-4-0198	Coppabella Hills SU24/L13	GDA	643554	6152908
51-4-0199	Coppabella Hills SU24/L14	GDA	643640	6152844
51-4-0200	Coppabella Hills SU24/L15	GDA	643850	6152583

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 set out below.

2.4.2 Predictive Model of Site Type and Location

Stone artefact scatter sites are the most common site type found within the region. In the wider region 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. 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 artefacts depends on ground surface factors and whether or not the potential archaeological bearing soil profile is visible. Prior ground disturbance, vegetation cover and surface wash can act to obscure artefact scatter presence.

Given the environmental context, stone artefacts are predicted to be present in variable density across the landscape. On hill crests and slopes, artefacts are likely to be present in

low to very low densities only; given the undulating nature of hill crests, it is predicted that artefacts will be concentrated on knolls and saddles. In wide valleys it is predicted that artefact density is likely to be higher; also artefacts can be expected to be distributed as continuous occurrences, especially close to streams.

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

In the Yass district, traditionally Aboriginal people buried their dead in dug graves in rocky soils, usually on the tops of stony hills (White and Cane 1986). Other practices included the disposal of dead in caves (such as that on the Murrumbidgee near Burrinjuck, as described by Bennett in 1834), hollow trees and in graves dug into antbeds.

White and Cane (1986) note that traditional burial practices continued throughout the early period of European occupation, into the 1870s.

The potential for burials to be present is always possible. This site type they are rarely located during field survey. However, given that burials in the local area were reportedly on stony hills, it is likely, given the high erosional contexts of these landforms, that if present, they would be identified during the survey.

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 it 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 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. Quarries are rare site types in the region. One has been recorded near Galong north of the proposal area. This site is an intrusive dike of a dacite-like material which was extracted for flaked stone (Witter and Hughes 1983).

Ceremonial Places and Sacred Geography

Burbung and ceremonial sites are places which were used for ritual purposes. Possibly the most significant ceremonial practices known were those which were concerned with initiation and other rites of passage such as those associated with death. Sites associated with these ceremonies are burbung grounds and burial sites. Additionally, secret rituals were undertaken by individuals such as clever men. Such rituals were commonly undertaken in 'natural' locations such as water holes. Pearson (1981) made the following predictions in regard to ceremonial site patterning in the region:

- Burial sites 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.

In addition to site specific types and locales, Aboriginal people invested the landscape with meaning and significance; this is commonly referred to as a sacred landscape. Natural features are those physical places which are intimately associated with spirits or the dwelling/activity places of certain mythical beings. Tom Knight has recently identified Binalong Hill, which is located to the north of the proposal area, to be an important natural feature which was encompassed within the sacred landscape of the region (Phil Boot pers. comm. February 2009).

Knight's (2001) Masters research conducted in the area of the Weddin Mountains was oriented differently to prior research conducted in the region. Knight's (2001) focus

moved away from a previous emphasis on the economic and subsistence dimensions of movement and land usage, towards an examination of the cultural construction and social practice of inhabiting a sacred landscape. This approach is a departure from a consideration of the land and its resources as being a determinant of behaviour, to one in which land is regarded as a *text* – within this conception, land and its individual features, are redolent with meanings and significances which are religiously and ritually centred, rather than economically based.

Knight's (*cf* 2001:1) work was possible in great measure by the historical record which explicitly defines Weddin as a site of ritual significance. However, the research was additionally driven by a theoretical approach to 'cultural landscapes'. Landscape is redefined away from considerations of its material features which provide a backdrop to human activity, towards a view that a landscape *is rather*, a conceptual entity. According to this view the natural world does not exist outside of its conceptual or cognitive apprehension. The landscape becomes known within a naming process or narrative; thus the landscape is brought into being and understanding – within this process: - "…explanatory parables…" such as legends and mythology are the embodiment of the landscape narrative (Knight 2001: 6). *These narratives are relative to a particular culture.*
It is this, which makes an archaeological investigation of the cultural landscape such a thorny one: At distance in time and cultural geography, and especially in the absence of specific ethnographic information, how can the archaeologist attempt to investigate and know these narratives? Knight (2001: 11) employed the concept of the landscape as *mentifact* whereby archaeological interpretation is concerned with the reconstruction of the landscape as a reflection of prehistoric cosmologies. He argued that this can be reconstructed by exploring the systematic relationships between sites and their topographic setting. This is defined as an *inherent* approach as it is concerned with the role of landscape in both everyday and sacred life. This view is concerned with an integration of the sacred and profane rather than their existence as separate categories of social life: - where "Cult activity may have existed as an inextricably 'embedded' component of daily life, where significant locations and ritual aspects of material culture were thoroughly incorporated into secular ranges and uses" (Knight 2001:13). In this regard Knight (2001: 14) correctly points out that no dichotomy between the material and ideational world existed within Aboriginal life.

Knight (2001: 15) argued that the notion of sacred space is of central concern within an inherent perspective on interpreting cultural landscape. Within human cosmologies locales within the landscape are constructed as being sacred space; this process of the construction of sacred space has been termed *hierophany* by Eliade (1961 in Knight 2001: 15). However, while Knight (2001: 15) suggests that physical entities such as stones, trees, or topographic features such as mountains, caves and rocky outcrops may be subject to such processes of transformation or construction, in reality in Aboriginal society any natural feature of less obvious significance can and should be included within this listing. Aboriginal constructions of heirophany can include the most insignificant landscape feature and objects of less fixed temporal existence such as animals and plants.

While the outside observer readily 'sees' and apprehends mountains and rocky features, more subtle elements of the natural world are easily passed 'unseen'. This point is one which suggests that the personal cultural geography of the archaeologist can severely impact upon the interpretation of the sacred landscape. Knight (2001) does acknowledge this to some extent illustrating the issue by referring to the example of "Jump Up Rock" situated north of Weddin. This place is only understood to have been an important landscape feature by recourse to prior knowledge regarding the meaning of the site name; the hill itself is insignificant and therefore not readily apprehended through an outsiders gaze as being of special significance.

Knight (2001: 16) refers to the issue of peculiarities of form (eg shape, colour, size or texture) and natural distinctiveness (eg isolated mountains or rocky features within a plains context) as being an important distinguishing feature of sacred locales. Knight (2001: 16) argues that the construction of sacred space in such a manner is particularly relevant to people for whom the natural domain is the dwelling place of/or the manifestation of their deities. Knight (2001: 16) again draws from Eliade (1964) to suggest that it is at the sacred place that the three fundamental cosmological worlds, the everyday, the upper and underworld may converge; typically the upper world will be associated as a point of 'access' with tall things such as trees while the underworld will be associated with pools and caves. Eliade contends that places where all three worlds can possibly connect, the *axis mundi*, are of a heightened order of sacredness. Hierophanies are therefore natural features which are ascribed sacredness. Additionally, Knight (2001: 17) refers to their ability to provide a landscape based opportunity for people to commune with other worldly deities and associated power because they may constitute spatial access between worlds via ritual.

Guided by these theoretical considerations Knight (2001: 20) engaged with Bradley's (cited in Knight 2001) model of the 'archaeology of natural places' in order to provide guidance for investigating the cultural landscape of the Weddin Mountains and its environs. Bradley (2000) has argued that natural places can be explored archaeologically in order to determine the nature of their role in human cosmologies by attending to four archaeological categories: - Votive offerings, rock art, production sites and monuments. This model was developed within a European context, with its attendant biases of concepts and archaeological categories; clearly not all concepts, some of which are clearly Eurocentric, will be applicable in Australia. Nor will all these data sets, will be found within the Australian context.

Knight (2001) gives consideration to the types of natural places which might be ascribed sacred significance. These include mountains, woodlands and groves, springs pools and lagoons, rock outcrops and caves and sinkholes. He argues that Aboriginal cosmology is expressed via the natural landscape and sacred places were those which were directly related to the Dreaming. He says that these sacred sites typically are those which are remarkable or important physiographically such as caves, rocks and so on.

Given the potential for natural features to have been important places within an Aboriginal cosmological frame of reference, the survey has sought to identify outstanding natural features present in the study area. It is however noted that the landscape of entire proposal area is expressed as an abundance of hills and ridges and that therefore high places are unlikely to standout as unusual or significant.

Contact Sites

These sites are those which contain evidence of Aboriginal occupation during the period of early European occupation in a local area. Evidence of this period of "contact' could potentially be Aboriginal flaked glass, burials with historic grave goods or markers, and debris from "fringe camps' where Aborigines who were employed by, or traded with, the white community may have lived or camped. The most likely location for contact period occupation sites would be camp sites adjacent to permanent water, and located in relative proximity to centres of European occupation such as towns and homesteads. The potential for such sites to be present in the proposal area is possible however considered to be unlikely given the location of impacts away from towns or homesteads.

2.4.3 Field Inspection – Methodology

The methodological approach adopted in this assessment attends particularly to location and relationality as a means of contextualising the material evidence of cultural practice across space. Given the nature of the physiography, different places within the region are likely to have been utilised for different purposes, and also by different categories of people. Landscape is more than a set of 'objective' topographic features. Landscapes are constructed out of cultural and social engagement; they are '... topographies of the social and cultural as much as they are physical contours' (David & Thomas 2008: 35). The conceptual approach to understanding landscape in this assessment is based on a concern with experience, occupation and bodily practice (*cf.* Thomas 2008: 305). The location of material evidence in different environmental and topographic contexts across the study area has the potential to be informative of different activities and social contexts. Landform and environmental elements, as measurable empirical space, will be employed methodologically to explore landuse, occupation and the nature of both recorded and unseen (ie subsurface) material evidence. Given the vast space encompassed by the subject area, this methodology allows for the identification, at a fine level of spatial resolution, of elements representative of the patterns of social life and how these may vary over space.

The practical methodology for the field survey entailed a pedestrian traverse of the proposed activity area. The field survey was aimed at locating Aboriginal objects. 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 (*cf.* Dunnell 1993; Shott 1995). 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, Survey Units are utilised as a framework of recording, analysis (*cf.* Wandsnider and Camilli 1992) and ultimately, the formulation of recommendations.

The variables recorded are defined below.

Survey Unit Variables

Landscape variables utilised are conventional categories taken from the *Australian Soil and Land Survey Field Handbook* (McDonald *et al.* 1998):

Landforms form the primary basis for defining Survey Unit boundaries. The following landform variables were recorded:

Morphological type:

- Crest: - element that stands above all or almost all points in the adjacent terrain – smoothly convex upwards in downslope profile. The margin is at the limit of observed curvature.
- Simple slope: - element adjacent below crest or flat and adjacent above a flat or depression.
- Flat: - planar element, neither crest or depression and is level or very gently inclined.
- Open depression: - extends at same elevation or lower beyond locality where it is observed.

Slope class and value:

- Level: 0 - 1%.
- Very gentle: 1 - 3%.
- Gentle: 3 - 10%.
- Moderate: 10 - 32%.
- Steep: 32 - 56%.

Geology

The type of geology was recorded and as well the abundance of rock outcrop – *as defined below*. The level of visual interference from background quartz shatter was noted.

- No rock outcrop: - no bedrock exposed.
- Very slightly rocky: - <2% bedrock exposed.
- Slightly rocky: - 2-10% bedrock exposed.
- Rocky : - 10-20 % bedrock exposed.
- Very rocky: - 20-50% bedrock exposed.
- Rockland: - >50% bedrock exposed.

Soil

Soil type and depth was recorded. The potential for soil to contain subsurface archaeological deposit (based on depth) was recorded as Low, Moderate or High. This observation is based solely on the potential for soil to contain artefacts; it does not imply that artefacts will be present or absent.

Geomorphological processes

The following gradational categories were recorded:

- eroded
- eroded or aggraded
- aggraded

Geomorphological agents

The following geomorphological agents were recorded:

- gravity: *collapse or particle fall*
- precipitation: *creep; landslide; sheet flow*
- stream flow: *channelled or unchannelled*
- wind
- biological: *human; nonhuman*

Survey coverage variables were also recorded; these are described further below.

Aboriginal Object Recording

For the purposes of defining the artefact distribution in space it has been labelled as a locale (eg. Survey Unit 1/Locale 1).

The measurable area in which artefacts are observed has been noted and if relevant, a broader area encompassing both visible and predicted subsurface artefacts has been defined. In addition, locale specific assessments of survey coverage variables have been made. The prior disturbance to the locale has been noted. Artefact numbers in each locale have been recorded and a prediction of artefact density noted, based on observed density taking into consideration Effective Survey Coverage, and a consideration of environmental context.

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 test 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 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 survey coverage variables estimated during the survey are defined as follows:

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

Archaeology Visibility – an estimate of the average levels of potential archaeological surface visibility within those exposures of bare ground. Archaeological visibility is generally less than ground exposure as it is dependent on adequate breaching of the bare ground surface which provides a view of the subsurface soil context. Based on subsurface test excavation results conducted in a range of different soil types across New South Wales it is understood that artefacts are primarily situated within 10 - 30 cm of the ground profile; reasonable archaeological visibility therefore requires breaching of the ground surface to at least a depth of 10 cm.

Based on the two visibility variables as defined above, an estimate (Net Effective Exposure) of the archaeological potential of exposure area within a survey unit has been calculated. The Effective Survey Coverage (ESC) calculation is a percentage estimate of the proportion of the Survey Unit which provided the potential to view archaeological material.

The data collected forms the basis for the documentation of survey results outlined in the section below.

2.4.4 Field Inspection 2016 - 2017

Two periods of field survey have been conducted for this revised report. The first was undertaken from 24 - 27 November 2016 and the second on 13 April 2017. The results are

described below. The location of Survey Unit areas and Aboriginal object site recordings are shown on Figures 2 - 9. For practical ease of reference, the Survey Units and Aboriginal object locales recorded in Dibden (2009) are included in this current report. Given that some Survey Units recorded in Dibden (2009) are no-longer in the proposal or are otherwise changed, proposed impacts have been updated as relevant (Table 2). Survey Units recorded in the 2016 and 2017 are described in Table 3.

Table 2 Description of Survey Units recorded in Dibden (2009).

SU	Proposed Impacts	Morphological Landform	Slope	Aspect	Abundance Rock	Abundance Quartz	Soil	Geomorphology	Aboriginal objects & predicted artefact density
SU1	Turbines, roads & electrical	crest; narrow and undulating	Moderately to steeply inclined	open	Very Rocky	Negligible	sandy loam	eroded	generally very low to low SU1/L1 SU1/L2 SU1/L3 SU1/L4 SU1/L5 SU1/L6
SU2	Turbines, roads & electrical	crest; undulating	Moderately to steeply inclined	open	Very Rocky	Negligible	sandy loam	eroded	generally very low to low SU2/L1 SU2/L2 SU2/L3 SU2/L4 SU2/L5
SU3	Turbines, roads & electrical	crest; narrow and undulating	Moderately to steeply inclined	open	Very Rocky	Negligible	sandy loam	eroded	generally very low to low SU3/L1 SU3/L2 SU3/L3
SU4	nil	simple slope	moderately inclined	west	Very rocky	Negligible	sandy loam	eroded	negligible
SU5	Turbines, roads & electrical	crest; narrow and undulating	Gently to moderately inclined	open	Rocky	Negligible	sandy loam	eroded	generally low SU5/L1 SU5/L2 SU5/L3
SU6	nil	simple slope	Gently inclined	west	Rocky	Negligible	sandy loam	eroded	generally low SU6/L1 SU6/L2 SU6/L3 SU6/L4 SU6/L5 SU6/L6

SU	Proposed Impacts	Morphological Landform	Slope	Aspect	Abundance Rock	Abundance Quartz	Soil	Geomorphology	Aboriginal objects & predicted artefact density
SU7	Turbines, roads & electrical	crest; narrow and undulating	Moderately to steeply inclined	open	Very rocky	Negligible	sandy loam	eroded	generally very low to low SU7/L1 SU7/L2 SU7/L3 SU7/L4
SU8	Transmission line	simple slope	moderately inclined	open	Rocky	Negligible	sandy loam	eroded	very low
SU9	Turbines, roads & electrical	crest; narrow and undulating	Moderately to steeply inclined	open	Very rocky	Negligible	sandy loam	eroded	generally very low to low SU9/L1
SU10	nil	simple slope	Moderately to steeply inclined	west	Very Rocky	Negligible	sandy loam	eroded	generally very low to low
SU11	nil	simple slope	Very gently inclined	Open	Very slightly rocky	low	sandy loam	eroded or aggraded	Low SU11/L1 SU11/L2
SU12	nil	crest; undulating	Moderately to steeply inclined	open	Very Rocky	Negligible	sandy loam	eroded	generally very low to low
SU13	nil	simple slope	Gently to moderately inclined	open	Very slightly rocky	low	sandy loam	eroded or aggraded	generally very low to low
SU14	Turbines, roads & electrical	crest; undulating	Gently to moderately inclined	open	Very slightly rocky	low	sandy loam	eroded	generally very low to low
SU15	Turbines, roads & electrical	crest; undulating	Gently to moderately inclined	open	Rockland	low	sandy loam	eroded	generally very low to low SU15/L1 SU15/L2 SU15/L3

SU	Proposed Impacts	Morphological Landform	Slope	Aspect	Abundance Rock	Abundance Quartz	Soil	Geomorphology	Aboriginal objects & predicted artefact density
SU16	Turbines, roads & electrical	crest; undulating	Gently to moderately inclined	open	Rockland	low	sandy loam	eroded	generally very low to low SU16/L1 SU16/L2 SU16/L3
SU17	Turbines, roads, electrical & compound	crest: "basin"	Gently to moderately inclined	open	Slightly rocky	low	sandy loam	eroded or aggraded	low to moderate SU17/L1 SU17/L2 SU17/L3 SU17/L4 SU17/L5 SU17/L6
SU18	Turbines, roads & electrical	simple slope	Gently to moderately inclined	west	Rocky	low	sandy loam	eroded	generally very low to low SU18/L1 SU18/L2
SU19	Turbines, roads & electrical	crest; undulating	Gently to moderately inclined	open	Very rocky	low	sandy loam	eroded	generally very low to low SU19/L1 SU19/L2
SU20	Turbines, roads & electrical (part TL)	crest; undulating	Gently to moderately inclined	open	Very rocky	low	sandy loam	eroded	generally very low to low SU20/L1 SU20/L2 SU20/L3 SU20/L4
SU21	nil	crest; undulating	Gently to moderately inclined	open	Very rocky	low	sandy loam	eroded	generally very low to low SU21/L1 SU21/L2
SU22	Turbines, roads & electrical	crest; undulating	moderately inclined	open	Slightly rocky	low	sandy loam	eroded	low
SU23	nil	simple slope	Gently inclined	east	No rock outcrop	Negligible	sandy loam	eroded or aggraded	low to moderate SU23/L1 SU23/L2
SU24	Transmission	simple slope	Gently	north	Very	Negligible	sandy	eroded or aggraded	Moderate

SU	Proposed Impacts	Morphological Landform	Slope	Aspect	Abundance Rock	Abundance Quartz	Soil	Geomorphology	Aboriginal objects & predicted artefact density
	line; batch plant & substation/ compound		inclined		slightly rocky		loam		SU24/L1 SU24/L2 SU24/L3 SU24/L4 SU24/L5 SU24/L6 SU24/L7 SU24/L8 SU24/L9 SU24/L10 SU24/L11 SU24/L12 SU24/L13 SU24/L14 SU24/L15

Table 3 Description of Survey Units recorded during the 2016 - 2017 field surveys.

SU	Proposed Impacts	Morphological Landform	Slope	Aspect	Abundance Rock	Abundance Quartz	Soil	Geomorphology	Aboriginal objects & predicted artefact density
SU25	Roads, batch plant & electrical	Undulating lower simple slope	gentle	open	Very slightly rocky	Very low	sandy loam	eroded or aggraded	generally very low to low SU25/L1
SU2a	Turbines, roads, & electrical	crest; undulating	Moderately to steeply inclined	open	Very Rocky	Negligible	sandy loam	eroded	generally very low to low
SU24a	Roads, batch plant & electrical	simple slope	Gently inclined	north	Very slightly rocky	Negligible	sandy loam	eroded or aggraded	Moderate close to drainage line; very low elsewhere
SU26	Roads, electrical & transmission line	simple slopes	Moderately to steeply inclined	south	Very rocky	Negligible	sandy loam	eroded	Negligible
SU27	Transmission line and substation	simple slopes	Gently inclined	south	Very rocky	Negligible	sandy loam	eroded	Negligible/very low
SU6a	Transmission line and substation	simple slopes	Gently inclined	open	Rocky	Low	sandy loam	eroded	Generally very low, increasing towards the south end
SU26a *Not surveyed*	Roads & electrical	simple slopes	Moderately to steeply inclined	south	Rocky	-	sandy loam	eroded	Negligible
SU4a *Not surveyed*	Road, and electrical	simple slope	Moderately to steeply inclined	west	Very rocky	-	sandy loam	eroded	Negligible
SU7a	Turbines, roads & electrical	Crest; undulating	Moderately to gently inclined	open	Very rocky	Negligible	sandy loam	eroded	Generally very low to low SU7a/L1

SU	Proposed Impacts	Morphological Landform	Slope	Aspect	Abundance Rock	Abundance Quartz	Soil	Geomorphology	Aboriginal objects & predicted artefact density
SU7b *Not surveyed*	Turbines, roads & electrical	Crest; undulating	Moderately to gently inclined	open	Very rocky	-	sandy loam	eroded	Negligible/very low
SU14a	Turbines, roads & electrical	crest; undulating	Gently to moderately inclined	open	Very rocky	low	sandy loam	eroded	Generally very low to low SU14a/L1
SU15a *Not surveyed*	Turbines, roads & electrical	crest; undulating	Moderately inclined	open	Rockland	-	sandy loam	eroded	Generally very low to low
SU19a	Turbines, roads & electrical	crest; undulating	Gently to moderately inclined	open	Very rocky	low	sandy loam	eroded	Generally very low to low
SU1a *Not surveyed*	Electrical	simple slope	Moderately to steeply inclined	south	Very rocky	-	sandy loam	eroded	Negligible
SU18a *Not surveyed*	Electrical	simple slope	Moderately to steeply inclined	west	Rocky	-	sandy loam	eroded	Generally very low to low
SU17a	Road and compound option	crest	Gentle to level	Open to north	Very rocky to sparse	Occasional	Sandy/gravely loam	Eroded	Generally low or low moderate SU17a/L1 SU17a/L2 SU17a/L3
SU17b	Road and compound option	Simple slope	Gentle to level	North-west	sparse	negligible	Sandy loam	Eroded	Generally low SU17b/L1
SU28	Coppabella Road	Simple slope	Moderate	Open-north	Rocky	Moderate	Gravely loam	Eroded	Very low
SU29	Coppabella Road	Basal slope/flat	Gentle	Open-north	Sparse	Moderate	Sandy loam	Eroded/aggrading	Low/moderate SU29/L1

SU	Proposed Impacts	Morphological Landform	Slope	Aspect	Abundance Rock	Abundance Quartz	Soil	Geomorphology	Aboriginal objects & predicted artefact density
SU30	Coppabella Road	Basal slope/terrace	Very gentle	Open-open	Occasional	Moderate	Sandy loam	Eroded/aggrading	Low/moderate SU30/L1 SU30/L2 SU30/L3
SU31	Coppabella Road	Simple slope	Gentle	South	Occasional	Moderate	Sandy loam	Eroded/aggrading	Low
SU32	Coppabella Road	Simple slope	Gentle	South	Occasional	Moderate	Sandy-gravelly loam	Eroded	Very low

Table 4 Aboriginal object locales recorded during the 2008 field survey.

SU	Locale	Easting	Northing	Area m	Exposure	Exposure Area m	Ground Exposure %	Arch Visibility %	Artefact #	Predicted Density	Condition	Subsurface potential at locale	Subsurface potential away from locale
SU1	L1	642819	6154584	40 x 40	animal tracks erosion under trees	70 x 70	2	90	7	low	relatively intact	Yes	Yes In saddle However probably low density
SU1	L2	643703	6154378	1 x 1	erosion	50 x 40	2	90	1	low	moderately disturbed	Yes	Yes In saddle However probably low density
SU1	L3	644253	6153990	1 x 1	erosion	20 x 1	2	90	1	negligible	moderately disturbed	No	No
SU1	L4	645389	6153125	1 x 1	erosion	nil exp on grass	2	90	1	very low	moderately disturbed	Yes	Yes However probably low density
SU1	L5	645333	6153158	15 x 5	animal tracks	100 x 20	2	90	2	low	relatively intact	Yes	Yes However probably low density
SU1	L6	642729	6154727	1 x 1	animal tracks	100 x 20	4	90	1	negligible	moderately disturbed	No	No
SU2	L1	644323	6150581	1 x 1	erosion	20 x 20	80	70	1	very low	moderately disturbed	No	No
SU2	L2	644896	6150090	20 x 15	vehicle	60 x 3	70	80	25	low	moderately disturbed	Yes	Yes In saddle However probably low density

SU	Locale	Easting	Northing	Area m	Exposure	Exposure Area m	Ground Exposure %	Arch Visibility %	Artefact #	Predicted Density	Condition	Subsurface potential at locale	Subsurface potential away from locale
SU2	L3	646005	6149548	10 x 5	erosion	30 x 20	80	80	4	very low	moderately disturbed	No	No
SU2	L4	646036	6149982	3 x 3	under trees	3 x 3	20	90	7	low	relatively undisturbed	Yes	Yes In saddle However probably low density
SU2	L5	646503	6150176	2 x 2	bare earth	20 x 20	50	70	2	very low	poor	No	No
SU3	L1	641827	6155876	20 x 20	animal tracks bare earth	40 x 40	10	90	2	low	moderately disturbed	Yes	Yes In saddle However probably low density
SU3	L2	641472	6156158	30 x 30	animal tracks bare earth erosion	50 x 50	30	90	20	low	moderately disturbed	Yes	Yes In saddle However possibly low/moderate density
SU3	L3	641288	6156280	1 x 1	bare earth	50 x 50	20	50	1	very low	moderately disturbed	Yes	Yes
SU3	L4	641707	6156002	1 x 1	animal tracks	20 x 0.4	10	90	1	very low	moderately disturbed	Yes	Yes
SU5	L1	641084	6155360	10 x 10	animal tracks bare earth erosion	30 x 30	10	90	5	low	moderately disturbed	No	No

SU	Locale	Easting	Northing	Area m	Exposure	Exposure Area m	Ground Exposure %	Arch Visibility %	Artefact #	Predicted Density	Condition	Subsurface potential at locale	Subsurface potential away from locale
SU5	L2	641008	6155364	15 x 5	animal tracks bare earth erosion	50 x 50	90	70	3	low	moderately disturbed	Yes	Yes
SU5	L3	640835	6155471	20 x 10	animal tracks bare earth erosion	50 x 20	90	90	4	very low	moderately disturbed	No	Yes
SU6	L1	640209	6157045	60 x 60	animal tracks bare earth erosion	100 x 80	60	80	32	low	moderately disturbed	Yes	Yes
SU6	L2	640294	6157581	1 x 1	erosion	100 x 50	40	80	1	very low	moderately disturbed	Yes	Yes
SU6	L3	640342	6157439	1 x 1	erosion	100 x 50	cont	90	1	very low	moderately disturbed	No	Yes
SU6	L4	640339	6157674	12 x 5	animal tracks bare earth erosion under tree	20 x 20	40	40	2	very low	moderately disturbed	Yes	Yes
SU6	L5	640339	6157816	15 x 5	animal tracks bare earth erosion under trees	50 x 20	50	60	7	low	moderately disturbed	Yes	Yes

SU	Locale	Easting	Northing	Area m	Exposure	Exposure Area m	Ground Exposure %	Arch Visibility %	Artefact #	Predicted Density	Condition	Subsurface potential at locale	Subsurface potential away from locale
SU6	L6	640453	6157793	4 x 4	animal tracks bare earth erosion under trees	50 x 20	60	80	4	low	moderately disturbed	Yes	Yes
SU7	L1	638080	6156655	1 x 1	vehicle	50 x 10	70	80	1	very low	highly disturbed	No	No
SU7	L2	638017	6156556	1 x 1	bare earth	50 x 10	20	90	1	very low	moderately disturbed	No	No
SU7	L3	638434	6156064	5 x 5	bare earth erosion	50 x 50	60	90	3	low	moderately disturbed	No	No
SU7	L4	638282	6155984	5 x 5	bare earth	50 x 50	60	90	3	low	moderately disturbed	No	No
SU9	L1	637855	6154746	25 x 10	bare earth erosion	50 x 50	50	90	6	very low	moderately disturbed	No	No
SU11	L1	634419	6152505	10 x 1	vehicle graded road	100 x 10	100	80	2	low	highly disturbed	No	Yes
SU11	L2	634321	6152869	1 x 1	erosion bare earth	10 x 10	90	80	1	low	moderately disturbed	No	Yes
SU15	L1	638378	6153948	10 x 5	Erosion bare earth	50 x 50	90	90	2	very low	moderately disturbed	No	No
SU15	L2	637864	6153147	1 x 1	erosion bare earth animal tracks	90 x 90	90	90	1	Very low	moderately disturbed	No	No
SU15	L3	639064	6155097	1 x 1	bare earth	10 x 10	50	80	1	very low	moderately disturbed	No	No

SU	Locale	Easting	Northing	Area m	Exposure	Exposure Area m	Ground Exposure %	Arch Visibility %	Artefact #	Predicted Density	Condition	Subsurface potential at locale	Subsurface potential away from locale
SU16	L1	637737	6154110	4 x 2	Erosion bare earth animal tracks	50 x 50	70	90	2	very low	moderately disturbed	No	No
SU16	L2	637801	6154132	15 x 4	Erosion bare earth animal tracks	50 x 50	70	90	2	very low	moderately disturbed	No	No
SU16	L3	638024	6154255	1 x 1	animal tracks	20 x 0.3	30	90	1	very low	moderately disturbed	No	No
SU17	L1	638683	6154636	2 x 2	bare earth	5 x 5	50	70	3	low moderate	uncertain	Yes	Yes
SU17	L2	638709	6154712	1 x 1	erosion	5 x 5	40	60	1	low moderate	uncertain	Yes	Yes
SU17	L3	638847	6154749	1 x 1	animal tracks bare earth	10 x 10	30	70	2	low moderate	uncertain	Yes	Yes
SU17	L4	638874	6154783	1 x 1	animal tracks bare earth	10 x 10	30	70	1	low moderate	uncertain	Yes	Yes
SU17	L5	638844	6154932	25 x 25	Mechanical dam	25 x 25	20	50	27	low moderate	highly disturbed	No	Yes
SU17	L6	638959	6154781	25 x 15	animal tracks bare earth	50 x 50	50	60	8	low moderate	uncertain	Yes	Yes
SU18	L1	639229	6154275	1 x 1	animal tracks	10 x 10	50	80	1	very low	moderately disturbed	No	No

SU	Locale	Easting	Northing	Area m	Exposure	Exposure Area m	Ground Exposure %	Arch Visibility %	Artefact #	Predicted Density	Condition	Subsurface potential at locale	Subsurface potential away from locale
SU18	L2	639395	6154281	10 x 10	bare earth animal tracks	50 x 20	60	80	15	low	moderately disturbed	No	No
SU19	L1	640167	6154207	1 x 1	vehicle	20 x 10	90	70	1	very low	highly disturbed	No	No
SU19	L2	639639	6153716	40 x 40 saddle	bare earth animal tracks erosion vehicle	60 x 60	40	90	17	low moderate	highly disturbed	No	No
SU20	L1	640920	6153539	50 x 50	animal tracks bare earth	70 x 70	50	70	44	low moderate	moderately disturbed	Yes	No
SU20	L2	641683	6154204	1 x 1	erosion	50 x 50	80	30	1	low	moderately disturbed	Yes	No
SU20	L3	640486	6153798	20 x 20	bare earth animal tracks	50 x 50	60	70	11	low moderate	uncertain	Yes	No
SU20	L4	640265	6154202	1 x 1	bare earth animal tracks erosion	20 x 20	70	70	1	low	moderately disturbed	No	No
SU21	L1	641693	6153406	70 x 40	bare earth animal tracks erosion	80 x 50	20	70	3	low moderate	moderately disturbed	Yes	No

SU	Locale	Easting	Northing	Area m	Exposure	Exposure Area m	Ground Exposure %	Arch Visibility %	Artefact #	Predicted Density	Condition	Subsurface potential at locale	Subsurface potential away from locale
SU21	L2	641821	6153340	30 x10	bare earth animal tracks erosion	50 x 40	30	70	5	low moderate	moderately disturbed	Yes	No
SU23	L1	643822	6151618	40 x 3	vehicle	100 x 3	30	80	2	low	moderately disturbed	No	Yes
SU23	L2	643698	6151244	50 x 10	vehicle bare earth	30 x 10	40	80	15	low	moderately disturbed	No	Yes
SU24	L1	642211	6154076	80 x 20	animal tracks	80 x 20	10	80	36	low moderate	uncertain	Yes	Yes
SU24	L2	642257	6154017	50 x 5	animal tracks	70 x 5	10	80	6	low moderate	uncertain	Yes	Yes
SU24	L3	642397	6153909	2 x 2	vehicle	50 x 3	20	50	3	low moderate	uncertain	Yes	Yes
SU24	L4	642754	6153595	45 x 3	vehicle	50 x 3	20	50	23	low moderate	uncertain	Yes	Yes
SU24	L5	642848	6153502	20 x 5	animal	50 x 3	20	50	2	low moderate	uncertain	Yes	Yes
SU24	L6	643036	6153332	15 x 10	bare earth animal tracks	50 x 10	10	50	9	low moderate	uncertain	Yes	Yes
SU24	L7	643037	6153228	20 x 3	vehicle	50 x 3	20	70	3	low moderate	moderately disturbed	Yes	Yes
SU24	L8	643111	6153329	10 x 10	bare earth under trees	20 x 20	5	70	3	low moderate	moderately disturbed	Yes	Yes
SU24	L9	643186	6153216	1 x 1	animal tracks	50 x 3	20	50	1	low moderate	moderately disturbed	Yes	Yes

SU	Locale	Easting	Northing	Area m	Exposure	Exposure Area m	Ground Exposure %	Arch Visibility %	Artefact #	Predicted Density	Condition	Subsurface potential at locale	Subsurface potential away from locale
SU24	L10	643226	6153181	1x 1	animal tracks vehicle	50 x 3	30	50	1	low moderate	moderately disturbed	Yes	Yes
SU24	L11	643299	6153075	30 x 10	animal tracks vehicle bare earth	80 x 10	30	50	15	low moderate	moderately disturbed	Yes	Yes
SU24	L12	643495	6152972	30 x 30	mechanical dam	30 x 30	10	90	37	low moderate	highly disturbed	No	Yes
SU24	L13	643554	6152908	20 x 10	vehicle erosion	50 x 10	80	80	6	low moderate	moderately disturbed	No	Yes
SU24	L14	643640	6152844	100 x 3	vehicle	100 x 3	80	80	10	low moderate	moderately disturbed	Yes	Yes
SU24	L15	643850	6152583	80 x 3	vehicle	100 x 3	80	80	2	low moderate	moderately disturbed	Yes	Yes

Table 5 Aboriginal object locales recorded during the 2016 - 2017 field survey.

SU	Locale	Easting	Northing	Area m	Exposure	Exposure Area m	Ground Exposure %	Arch Visibility %	Artefact #	Predicted Density	Condition	Subsurface potential at locale	Subsurface potential away from locale
SU25	L1	644346	6149223	100 x 40	Bare earth/ erosion & track	100 x 40	2	90	11	low	Highly disturbed by dam construction	No	Yes on flat to northeast. However probably low density
SU6a	L1	639873	6156630	c.100 x 100	Bare earth/ erosion & track	25 x 10	20	60	Sample 10	Low/ moderate	Disturbed by erosion and grazing; probably cultivated in the past	Yes, but limited	Locale predicted to extend over entire basal slope
SU7a	L1	637830	6157130	5 x 1	Bare earth/ erosion & track	25 x 1	80	80	3	Low/ moderate	Disturbed by road construction	Yes	Locale predicted to extend over entire saddle
SU14a	L1	635428	6156421	1 x 1	Bare earth	1 x 1	30	60	1	Low	Disturbed	Yes	Yes however very low density
SU17a	L1	638493	6154738	10 x 2	Bare earth	10 x 2	20	40	4	Low	Disturbed	Yes, but limited	Locale predicted to extend over entire crest

SU	Locale	Easting	Northing	Area m	Exposure	Exposure Area m	Ground Exposure %	Arch Visibility %	Artefact #	Predicted Density	Condition	Subsurface potential at locale	Subsurface potential away from locale
SU17a	L2	638473	6154601	9 x 0.3	Sheep track	20 x 1	20	40	2	Low	Disturbed	Yes, but limited	Locale predicted to extend over entire crest
SU17a	L3	638416	6154549	20 x 5	Sheep track/bare earth	40 x 10	10	40	14	Low/ moderate	Disturbed	Yes, but very limited	Locale predicted to extend over entire crest
SU17b	L1	638645	6154549	20 x 5	Sheep track	20 x 0.3	10	40	14	Low	Disturbed	Yes, but very limited	Locale predicted to extend over entire slope
SU29	L1	636844	6156398	20 x 5	Drain/ track	30 x 10	20	80	3	Low/ moderate	Disturbed	Yes	Locale predicted to extend over entire landform
SU30	L1	636953	6156483	10 x 5	Drain/ Bare earth	10 x 5	20	80	4	Low/ moderate	Disturbed	Yes	Locale predicted to extend over entire landform
SU30	L2	637089	6156639	10 x 5	Mechanical scrap/ track	10 x 10	20	80	14	Low/ moderate	Disturbed	Yes	Locale predicted to extend over entire landform

SU	Locale	Easting	Northing	Area m	Exposure	Exposure Area m	Ground Exposure %	Arch Visibility %	Artefact #	Predicted Density	Condition	Subsurface potential at locale	Subsurface potential away from locale
SU30	L3	637001	6156515	1 x 1	erosion	10 x 0.5	40	80	1	Low/ moderate	Disturbed	Yes	Locale predicted to extend over entire landform

Survey Coverage

The results of this revised assessment are entirely comparable to that previously surveyed (Dibden 2009). The ridge crests and simple slope landforms are highly eroded. Frequently topsoil is absent and the ground surface is simply bedrock shatter, cobbles and outcrops. However, these landforms possessed low levels ground exposure during the 2016/2017 surveys due to the presence of thick grass. Accordingly, their archaeological status has necessarily been determined by recourse to the results of the 2008 survey (*cf.* Dibden 2009).

Lower simple slopes and flats were targeted during the 2016/2017 surveys given that new impacts are proposed in these contexts. Generally ground exposure and archaeological visibility was low, however, occasional large erosional scours were inspected. New sites were recorded in lower landforms. This result is in keeping with the predictive model of site location as outlined in Dibden (2009).

The trees in the proposal area and its surrounds are predominately regrowth, estimated to be around 50 years old (or less). All trees located within areas of direct impact were inspected during the survey and no evidence of Aboriginal scarring is evident.

Approximately 43 kilometres of linear impact areas were surveyed during the 2016/2017 field work. The survey coverage data recording is set out in Table 6. Effective Survey Coverage achieved in the Coppabella Hills as a result of the combined field seasons (2008, 2016 & 2017) is calculated to have been 5.3% of the surveyed area.

Given the strength of the predictive model relevant to the subject area, the survey results can be confidently extrapolated to any unsurveyed areas (see Table 3). The unsurveyed areas include steep slopes and small areas of ridge crests. Both landforms are predicted to contain negligible or at best very low density artefact distribution. It is concluded that the proposed wind farm is generally of low archaeological and cultural potential and sensitivity. The exception to this is flats and basal simple slopes adjacent and close to higher order streams.

Table 6 Survey Coverage Data.

SU	Area Sq m	Ground Exposure %	Ground Exposure Sq m	Arch Visibility %	EAV Sq m	ESC %
SU1	418830	60	12565	5	10052	2.4
SU2	803153	10	40158	60	24095	3.0
SU3	131728	5	3952	80	3161	2.4
SU4	15348	5	153	80	123	0.8
SU5	119398	20	11940	70	8358	7
SU6	75894	80	24286	70	17000	22.4
SU7	170692	20	13655	80	10924	6.4
SU8	67897	20	2716	90	2444	3.6
SU9	82906	40	16581	90	14923	18

SU	Area Sq m	Ground Exposure %	Ground Exposure Sq m	Arch Visibility %	EAV Sq m	ESC %
SU10	172475	10	3450	80	2760	1.6
SU11	106700	10	5335	70	3735	3.5
SU12	187855	20	22543	80	18034	9.6
SU13	321095	30	19266	20	3853	1.2
SU14	96650	30	14498	70	10148	10.5
SU15	277146	20	33258	80	26606	9.6
SU16	80449	50	24135	90	21721	27
SU17	144255	15	6491	50	3246	2.25
SU18	73976	30	2219	60	1332	1.8
SU19	249638	60	74891	80	59913	24
SU20	203656	40	57024	70	39917	19.6
SU21	144660	30	26039	70	18227	12.6
SU22	205922	30	30888	20	6178	3
SU23	87694	20	3508	80	2806	3.2
SU24	349911	20	13996	50	6998	2
SU25	240800	1	2408	80	1926.4	0.8
SU2a	254000	1	2540	80	2032	0.8
SU24a	227100	1	2271	80	1816.8	0.8
SU26	169900	5	8495	90	7645.5	4.5
SU27	84350	1	843.5	80	674.8	0.8
SU6a	114850	2	2297	80	1837.6	1.6
SU7a	116800	1	1168	80	934.4	0.8
SU14a	177100	1	1771	80	1416.8	0.8
SU19a	113550	1	1135.5	80	908.4	0.8
SU17a	68945	2	1378.9	70	965	1.4
SU17b	47387	1	473.9	60	284	0.6
SU28	2500	10	250	80	200	8
SU29	1200	10	125	80	100	8.3
SU30	2000	5	100	80	80	4
SU31	2000	3	60	70	42	2.1
SU32	3000	5	150	80	120	4
Total	6213410		476448		327485.7	5.3

Aboriginal Object Recordings

The Aboriginal object locales recorded during the 2008 survey are summarised in Table 4. The Aboriginal object sites recorded in 2016/2017 are summarised in Table 5.

A total of 82 Aboriginal object locales have been recorded within the Coppabella Hills survey area.

Artefacts were recorded in all Survey Units except SU4, SU8, SU10, SU12, SU13, SU14, SU22, SU28, SU31 and SU32 all of which are assessed to be of generally low archaeological potential on environmental grounds. SU22 could be an exception and possess a relatively higher density distribution given its proximity to a valley encompassed by SU24; nevertheless artefact distribution is not likely to exceed low density.

Artefacts were recorded along the crests in which turbines are proposed; the majority of locales contain either single or otherwise very few artefacts. Given the relatively large areas of exposure frequently encountered (particularly in the 2008 field season), and the very few artefacts recorded, it is concluded that artefact density generally, is very low in the Coppabella Hills proposal area. This result is not unexpected and indeed consistent with the predictive model of Aboriginal land use.

Several Survey Units and locales within some Survey Units have been predicted to contain subsurface artefacts in low/moderate density including several ridge saddles in SU2 and SU20, a large upland basin in SU17, SU17a and SU17b and the valleys in which SU23, SU24, SU29 and SU30 are located.

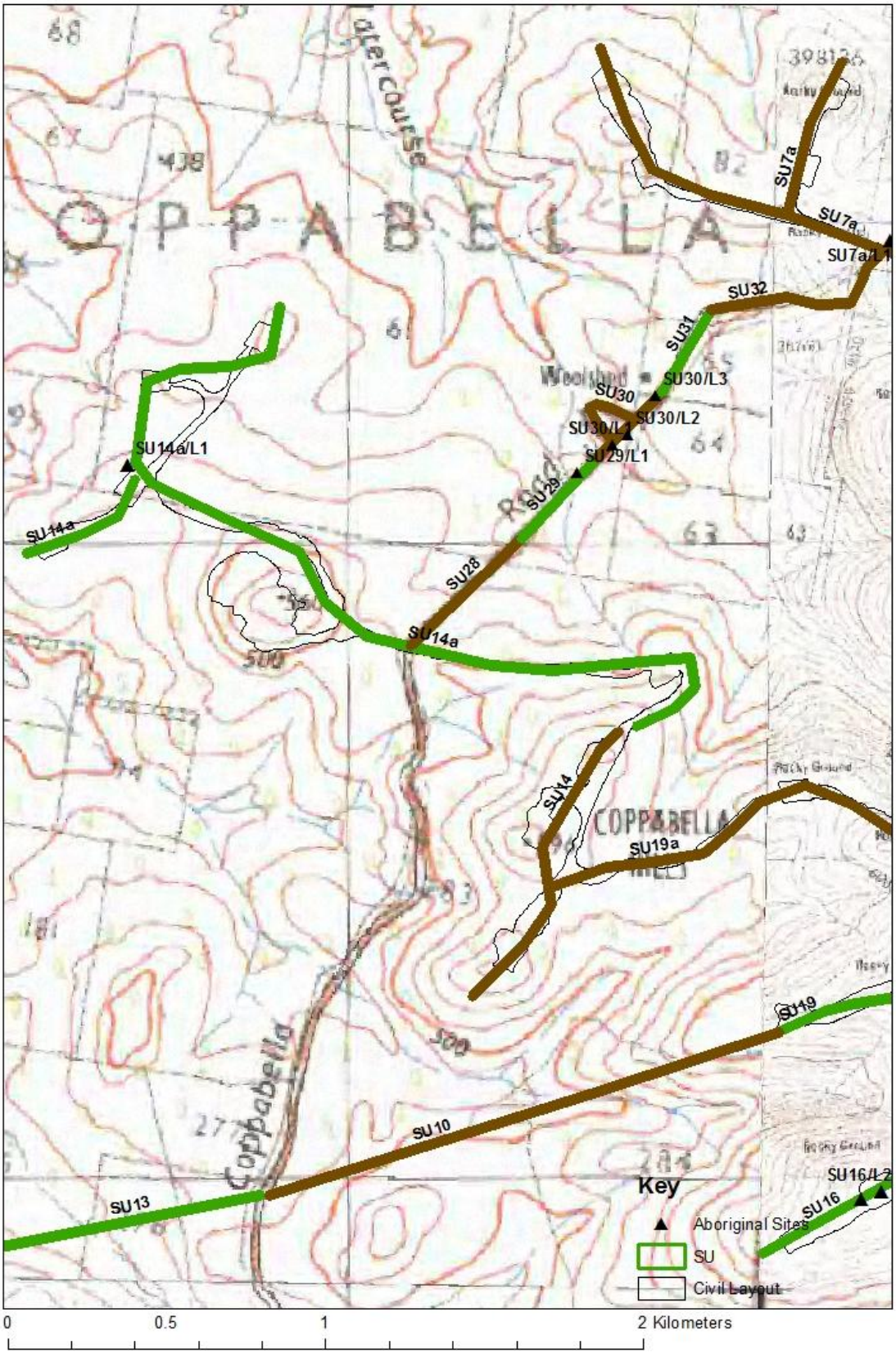

Figure 2 Location of Aboriginal object sites and Survey Units - northwest.

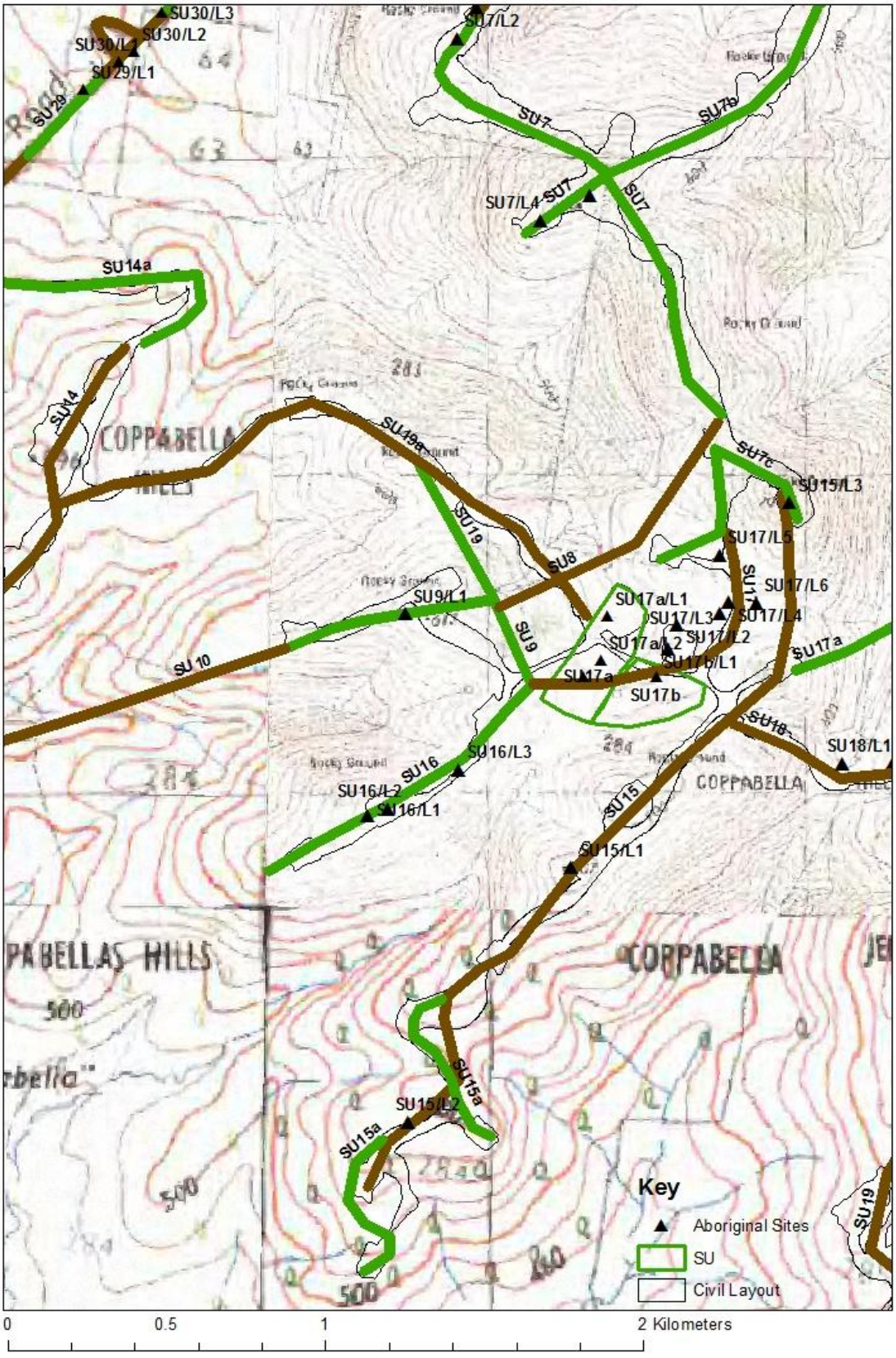

Figure 3 Location of Aboriginal object sites and Survey Units - west.

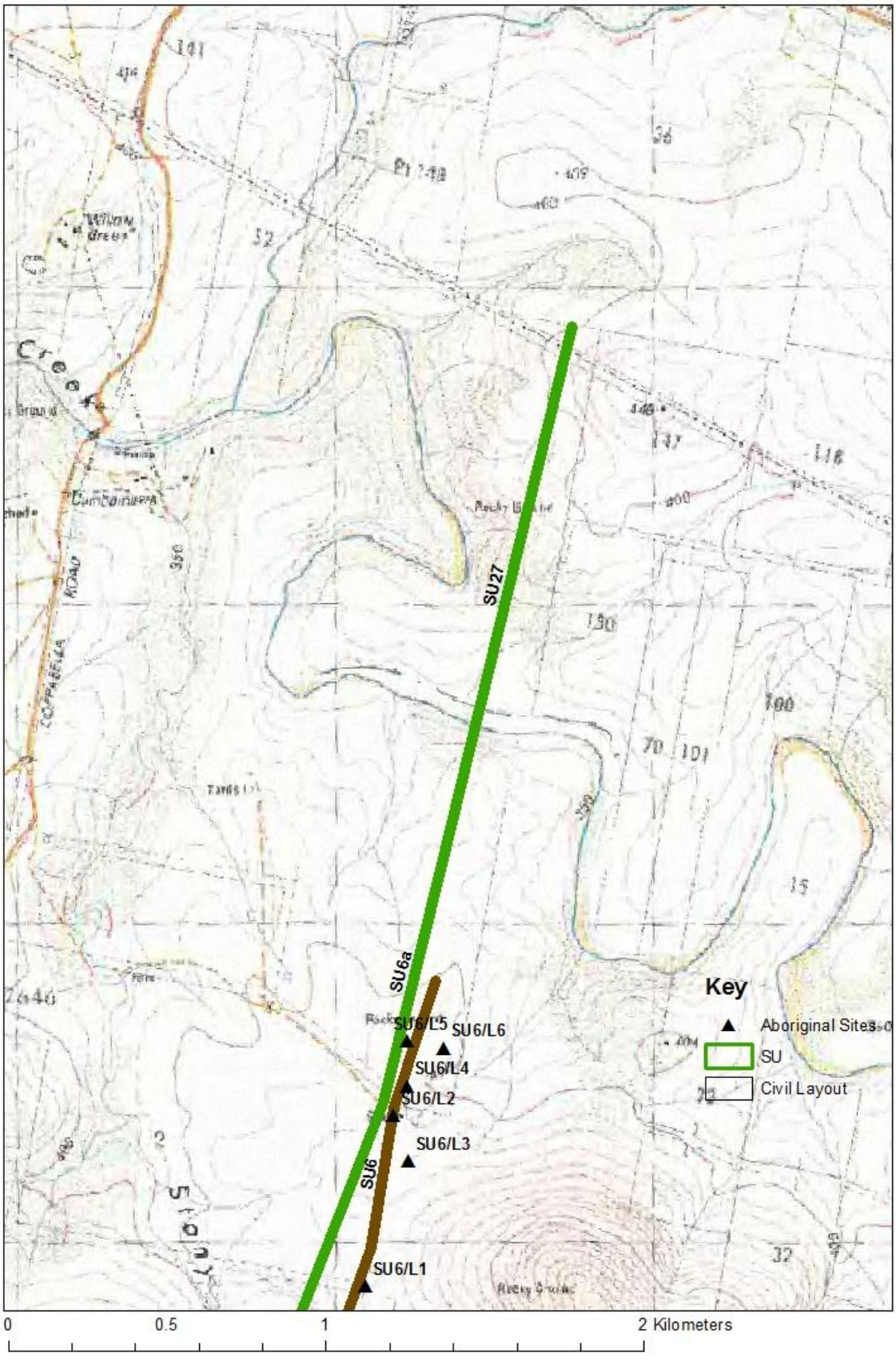

Figure 4 Location of Aboriginal object sites and Survey Units - electrical connection to north.

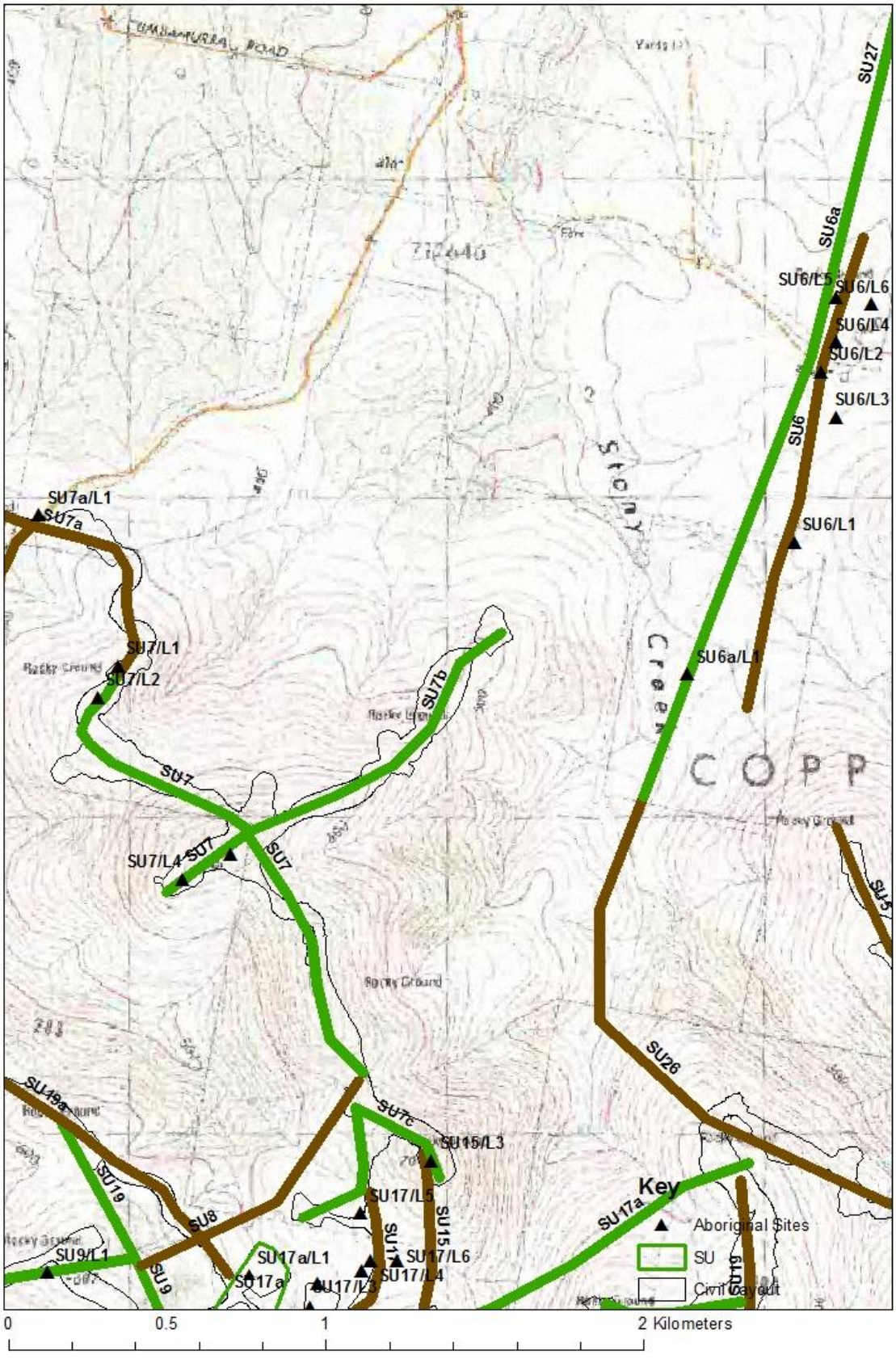

Figure 5 Location of Aboriginal object sites and Survey Units - north.

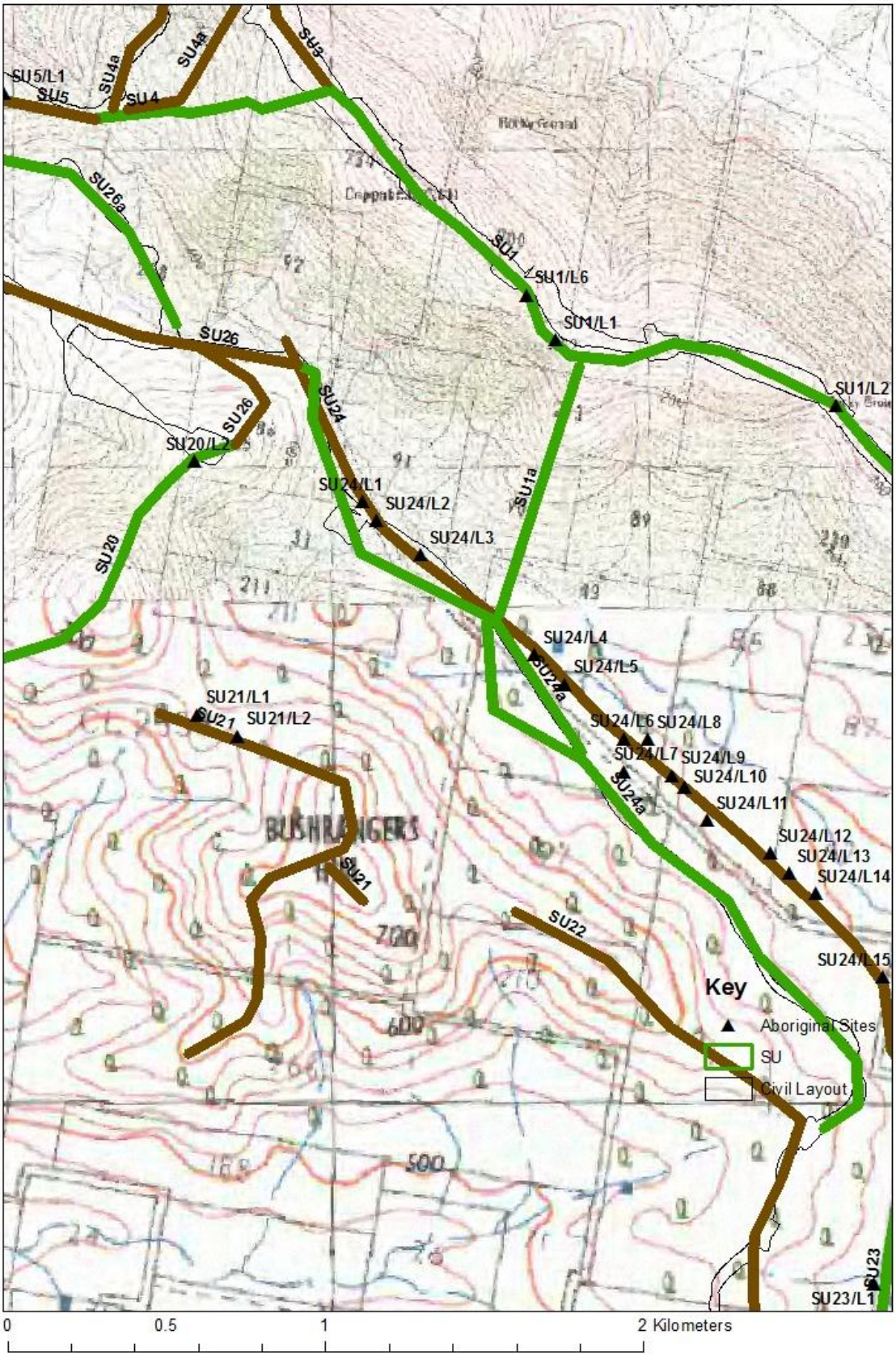

Figure 6 Location of Aboriginal object sites and Survey Units - mid.

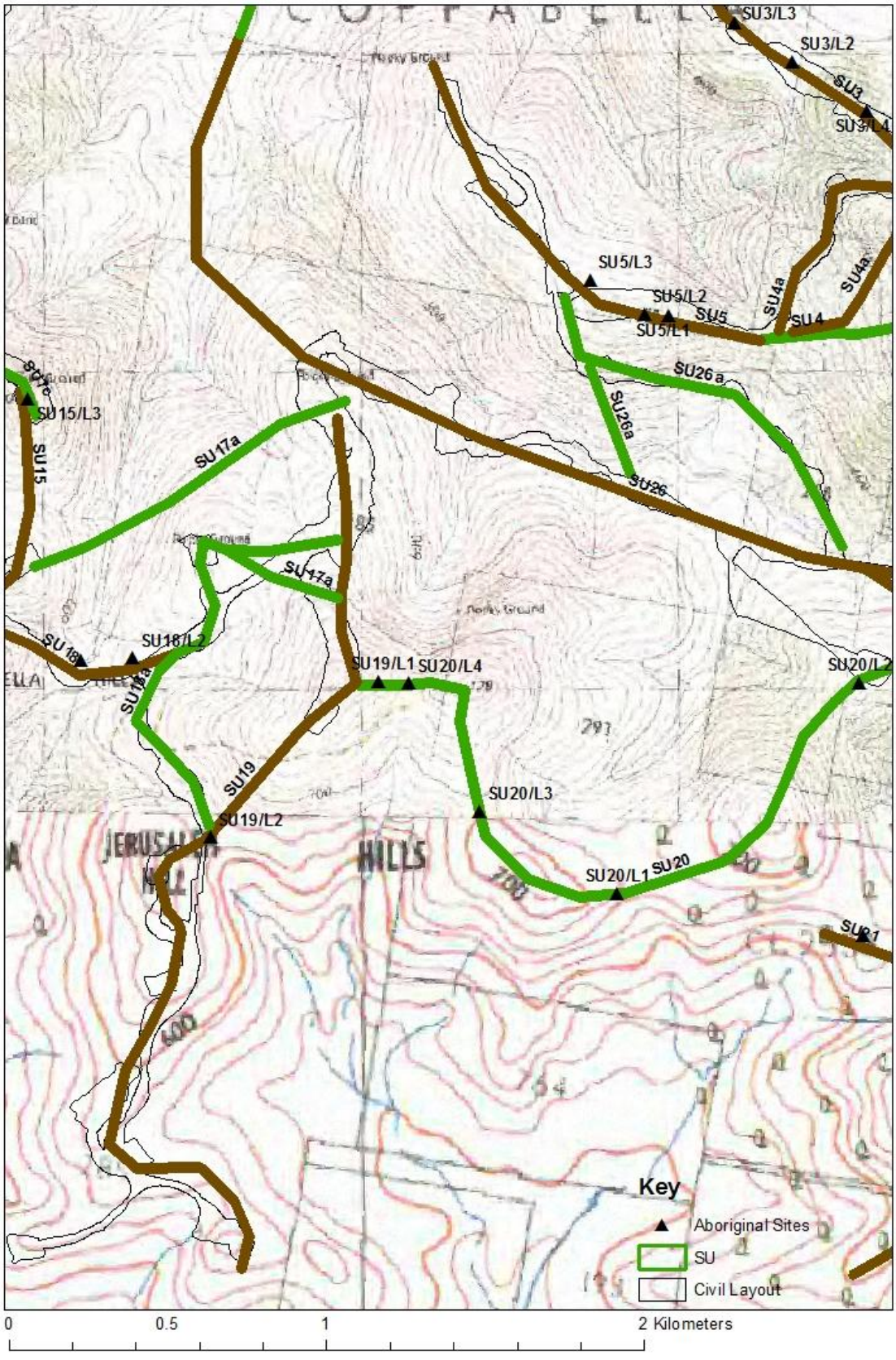

Figure 7 Location of Aboriginal object sites and Survey Units - mid south.

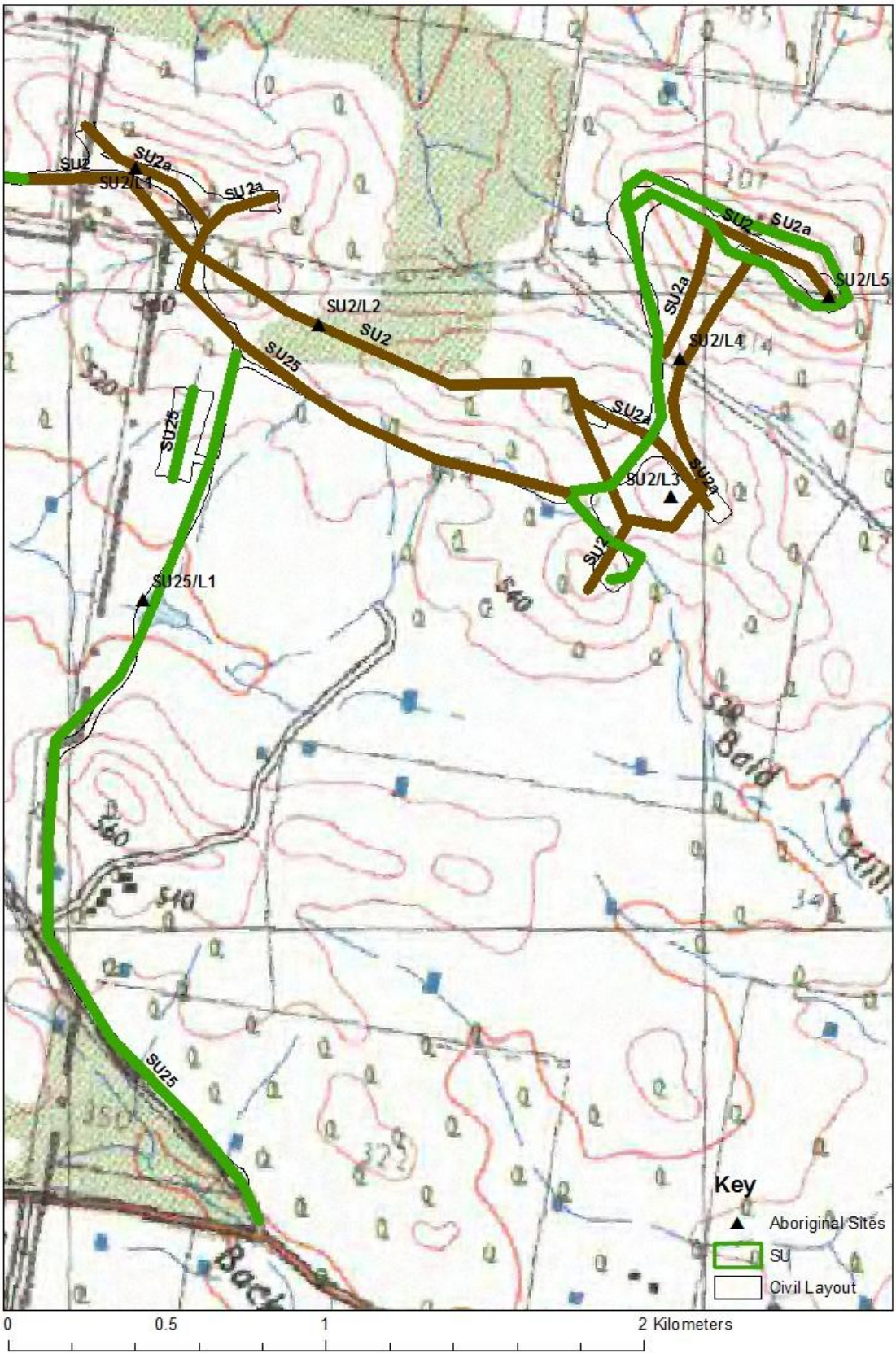

Figure 8 Location of Aboriginal object sites and Survey Units - southeast.

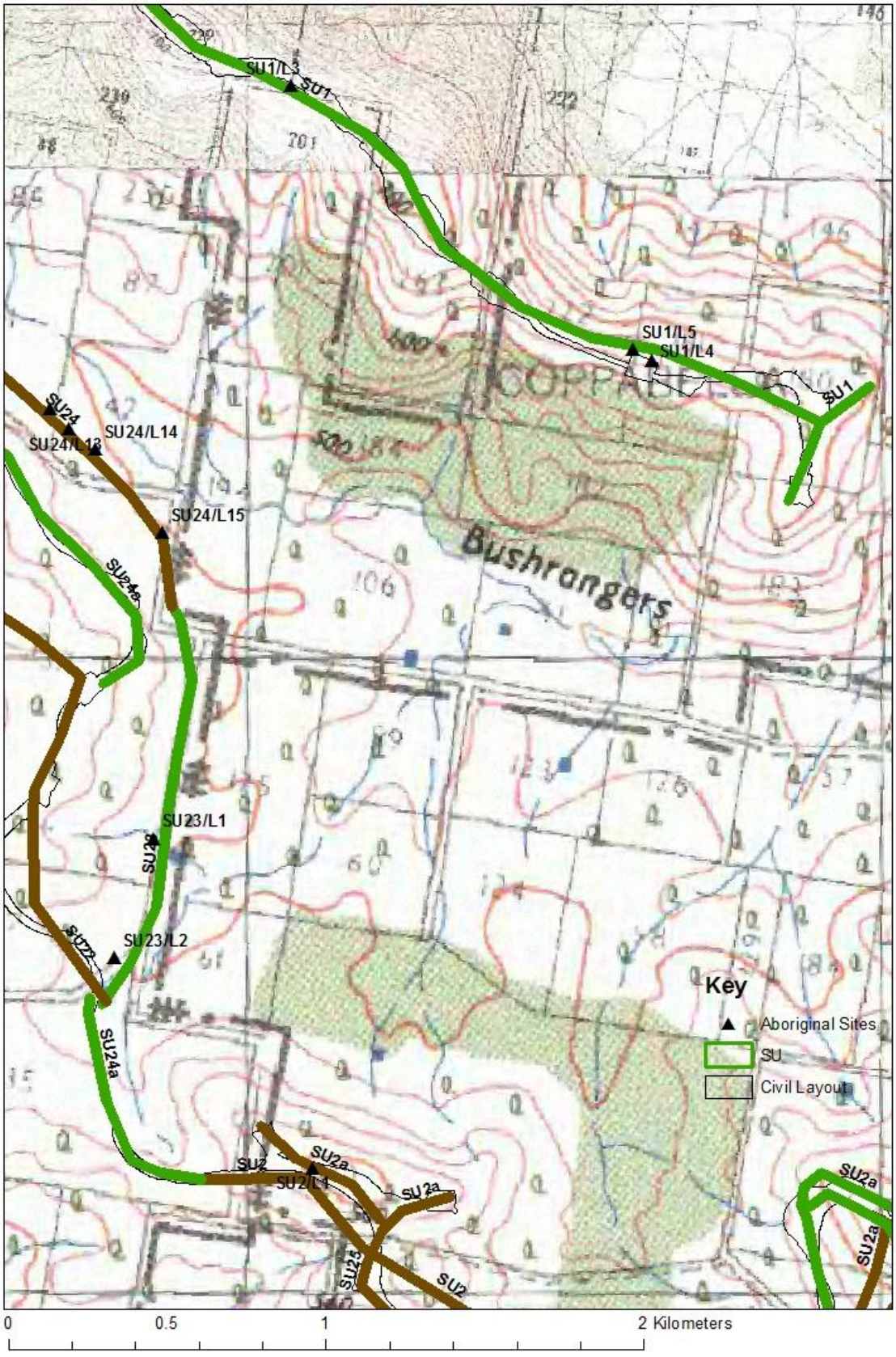

Figure 9 Location of Aboriginal object sites and Survey Units - northeast.

3. PARTNERSHIP WITH THE ABORIGINAL COMMUNITY

This project has been undertaken in accordance with the NSW DECC Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants (IGACC) (NSW DEC 2004). The NSW DECC requires proponents to undertake consultation with the Aboriginal community "…as an integral part of the impact assessment" process (NSW DEC 2004). While it is recognised that under Part 3A, Environmental Planning and Assessment Act, National Parks and Wildlife Act 1974 Part 6 approvals are not required, the consultation process as outlined in the IGACC policy document has nevertheless been implemented for this project.

In order to fulfil the consultation requirements as outlined in the IGACC document NSW Archaeology Pty Ltd, on behalf of the proponent, adopted the following procedure:

1. Notification and Registration of Interests

   NSW 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 30th September 2008 has been supplied to the following bodies:

   - Young Local Aboriginal Land Council;
   - Onerwal Local Aboriginal Land Council;
   - Native Title Services;
   - Yass Valley and Harden Shire Councils; and
   - The NSW Department Environment and Climate Change.

   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 15th October 2008 edition of the Yass Tribune.

   Buru Ngunawal Aboriginal Corporation, Ngunawal Heritage Aboriginal Corporation and Onerwal Local Aboriginal Land Council registered an interest in this project.

Notification in regard to this Project Modification was provided to the RAPS for this project, in conjunction with a draft Cultural Heritage Management Plan, via email dated 10 August 2016. An invitation to apply to assist with fieldwork was sent to RAPS on 13 September 2016. No applications were received.

A copy of this Revised Report has been provided to RAPs for their perusal and review. No responses were received.

4. STATUTORY CONTEXT

The NPW Act provides statutory protection for all Aboriginal objects and Aboriginal Places.

An 'Aboriginal object' is defined as

> 'any deposit, object or material evidence (not being a handicraft for sale) relating to Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains'.

An Aboriginal place is an area declared by the Minister to be an Aboriginal place for the purposes of the Act (s84), being a place that in the opinion of the Minister *is or was of special significance with respect to Aboriginal culture*.

Under s90 of the NPW Act a person must not destroy, damage or deface or knowingly cause or permit the destruction, damage or defacement of an Aboriginal object or Aboriginal Place without first obtaining the s90 consent Aboriginal Heritage Impact Permit (AHIP). Consents which enable a person to impact an Aboriginal object are issued by the OEH upon review of a s90 Aboriginal Heritage Impact Permit application.

Under Section 89J of the Environmental Planning and Assessment Act 1979, the following authorisations are not required for State significant development that is authorised by a development consent granted after the commencement of this Division (and accordingly the provisions of any Act that prohibit an activity without such an authority do not apply):

- an Aboriginal heritage impact permit under section 90 of the National Parks and Wildlife Act 1974.

5. SIGNIFICANCE ASSESSMENT

The information provided in this report and the assessment of significance 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 and Non-Indigenous items located within the study area.

5.1 Significance Assessment Criteria - Indigenous

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 or scientific 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.

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.

In order to assess the criteria of archaeological significance further, and also to consider the criteria of rarity, consideration can be given to the distribution of stone artefacts across the continent. There are two estimates of the quantity of accumulated stone artefacts in Australia (Wright 1983:118; Kamminga 1991:14; 2002). Wright estimated an average of 500,000 débitage items and 24,000 finished tools per square kilometre, which equates to a total of about 180 billion finished stone tools and four trillion stone débitage items in Australia. Kamminga's estimates, which were determined from a different set of variables, provide a conservative estimate of 200 billion stone tools and 40 million tonnes of flaking débitage (see Kamminga 1991:14; 2002). These two estimates are similar, and suggest that the actual number of stone tools and items of flaking débitage in Australia is in the trillions. The stone artefacts distributed in the proposed activity area cannot, therefore, be considered to be rare.

The vast majority of stone artefacts found in Australia comprise flaking debris (termed débitage) from stone tool making. While it can be reasonably inferred from a range of ethnographic and archaeological evidence that discarded stone artefacts and flaking debris was not valued by the maker, in certain circumstances these objects may to varying degrees have archaeological research potential and/or Aboriginal social value. However, only in very exceptional circumstances is archaeological research potential high for particular sites (Kamminga, J. pers. comm. June 2009).

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.

5.2 Significance Value of the Aboriginal Objects in the Study Area

The scientific significance of the recorded Aboriginal artefact locales in the project area are listed below:

Table 7 Significance values of the Aboriginal objects in the proposal area.

SU	Locale	Predicted Density	Significance	Criteria
SU1	L1	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU1	L2	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU1	L3	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density; eroded: no excavation potential
SU1	L4	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density
SU1	L5	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU1	L6	negligible	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU2	L1	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU2	L2	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Research potential: predicted low artefact density
SU2	L3	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU2	L4	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value

SU	Locale	Predicted Density	Significance	Criteria
				Research potential: predicted low artefact density
SU2	L5	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU3	L1	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU3	L2	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU3	L3	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density
SU3	L4	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density
SU5	L1	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density; eroded: no excavation potential
SU5	L2	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU5	L3	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU6	L1	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU6	L2	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density
SU6	L3	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low

SU	Locale	Predicted Density	Significance	Criteria
				artefact density
SU6	L4	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density
SU6	L5	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU6	L6	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU7	L1	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU7	L2	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU7	L3	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density; eroded: no excavation potential
SU7	L4	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density; eroded: no excavation potential
SU9	L1	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU11	L1	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU11	L2	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU15	L1	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low

SU	Locale	Predicted Density	Significance	Criteria
				artefact density; eroded: no excavation potential
SU15	L2	Very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU15	L3	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU16	L1	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU16	L2	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU16	L3	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU17	L1	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context
SU17	L2	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context
SU17	L3	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context
SU17	L4	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context
SU17	L5	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially

SU	Locale	Predicted Density	Significance	Criteria
				relatively undisturbed context
SU17	L6	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in potentially relatively undisturbed context
SU18	L1	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU18	L2	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density; eroded: no excavation potential
SU19	L1	very low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted very low artefact density; eroded: no excavation potential
SU19	L2	low moderate	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low/moderate artefact density; eroded: no excavation potential
SU20	L1	low moderate	Low/moderate local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density
SU20	L2	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low artefact density
SU20	L3	low moderate	Low/moderate local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context
SU20	L4	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU21	L1	low moderate	Low/moderate local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density
SU21	L2	low moderate	Low/moderate local scientific	Common Aboriginal object and site type Low educational value

SU	Locale	Predicted Density	Significance	Criteria
			significance	Low aesthetic value Moderate research potential: predicted low/moderate artefact density
SU23	L1	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU23	L2	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU24	L1	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in potentially relatively undisturbed context
SU24	L2	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in potentially relatively undisturbed context
SU24	L3	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in potentially relatively undisturbed context
SU24	L4	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in potentially relatively undisturbed context
SU24	L5	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in potentially relatively undisturbed context
SU24	L6	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in potentially relatively undisturbed context
SU24	L7	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context

SU	Locale	Predicted Density	Significance	Criteria
SU24	L8	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context
SU24	L9	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context
SU24	L10	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context
SU24	L11	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context
SU24	L12	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density
SU24	L13	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density
SU24	L14	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context
SU24	L15	low moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density in a potentially relatively undisturbed context
SU25	L1	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU6a	L1	Low/ moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted

SU	Locale	Predicted Density	Significance	Criteria
				low/moderate artefact density
SU7a	L1	Low/ moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density
SU14a	L1	Low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU17a	L1	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU17a	L2	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU17a	L3	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU17b	L1	low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density
SU29	L1	Low/ moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density
SU30	L1	Low/ moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density
SU30	L2	Low/ moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density
SU30	L3	Low/ moderate	Potentially moderate scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Moderate research potential: predicted low/moderate artefact density

6. THE PROPOSED ACTIVITY

In this section the nature and extent of the proposed activity and any potential harm to Aboriginal areas, objects and/or places is identified.

A full description of the proposal and its potential impact on the landscape and heritage resource is described. A summary of the impact history of the study area has been described in Section 2 and is not repeated here. However, it is emphasised that prior and existing land uses have caused significant changes to geomorphological processes in the area with an associated effect on the archaeological resource.

Potential impacts to archaeology and heritage during the construction phase of the wind farm proposal relate to site preparation, operation of vehicles and machinery and the installation of infrastructure. This may involve earthworks and excavations and vegetation clearing.

6.1 Proposed Impacts

The Yass Valley WF Development consent SSD-6698 allows for:

- the construction, operation, and decommissioning of the wind farm.
- Up to 79 wind turbine generators are proposed.
- No wind turbines greater than 150 metres in height
- Micrositing as per Schedule 2, Condition 9 of the Consent.

The proposed impact areas are shown in Figures 1 - 6.

The proponent is proposing to install Goldwind wind turbines that could include the following:

- GW 121 turbine – These turbines have rotors with three blades and a rotor diameter of about 121m. They are mounted on a tubular steel tower with rotor hub height of approximately 89 metres high. Generation capacity could vary between 2.5 and 3.0 MW. Allowed under the consent.
- GW 140 turbine - These turbines have rotors with three blades and a rotor diameter of about 140m. They are mounted on a tubular steel tower with rotor hub height of approximately 100 metres high. Generation capacity could vary between 3.0 and 3.8MW. Would require modification of the consent.

In addition to installation of turbines, construction would include the following activities:

- Electrical connections between wind turbines and the on-site substation, which would be a combination of underground 33kV cable and overhead 33kV power lines;

- On site 33kV/132kV substation and 132kV line to the point of grid connection;
- Onsite control buildings and equipment storage facilities;
- Temporary mobile concrete batching plant;
- Access roads to turbine sites and the substation and for installation of the 132kV transmission line;
- Minor upgrades to local roads, as required, for the installation and maintenance of wind turbines;
- A number of freestanding permanent monitoring masts for wind speed verification and monitoring.

A description of the individual components and their related impacts is outlined as follows:

Turbines

The ground disturbance associated with each turbine will include:

- the construction of reinforced concrete footings excavated to approximately 15 x 15 metres.
- A hardstand area adjacent to the turbine footings which could measure up to 60 x 35 metres is required for a crane and placement of some components during turbine erection.
- A delivery area for the various components is also necessary. It is anticipated that the turbine access track would be used as part of the delivery area and occur alongside the hardstand.
- Each turbine will have a transformer located adjacent to the base of the tower as a small pad mount transformer. A set of turbine coolers will also be located near the base of the tower. These items will be located within the disturbed area for the footings.

Electrical Connections

The onsite electrical works will include on-site power reticulation cabling (underground and overhead) linking the turbines to a substation. Underground cabling is proposed between the turbines, with overhead cabling proposed in some steeper locations to connect the turbines to the substation.
Underground cabling would be laid out in trenches measuring 1 - 1.5 metres deep and 0.5 - 1 metres wide. Where practical the trench routes will follow access tracks, with short spur connections to each turbine. However, direct cable routes involving less cable length are sometimes used. Multiple cables may be placed in trenches side by side.

Overhead lines (33kV or 132kV) would require an easement of up to 45 metres wide and would be erected on 30 - 40 metres high single steel or concrete poles spaced 150 - 300 metres apart, with spans avoiding all wet areas. Postholes would be 3 - 5 metres deep and involve clearing of an area approximately 5 metres in diameter.

Substation

A single 33kv/132kV substation will be installed near the centre of the project. Two substation sites were considered by the EA and allowed for by the consent but only one will be adopted. The substation will be connected to an existing 132kV line to the north of the project by a new section of 132kV transmission line as shown in Appendix 2 of the Consent. The substation would occupy an area measuring up to 250 x 250 metres. The substation would be fenced and the ground covered with crushed rock and partly by concrete pads for equipment, walkways and cable covers.

Construction Compounds

Several construction compounds and site office facilities are proposed. These would each measure several hectares.

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 would measure up to 25 x 15 metres and would be built on a concrete slab or pile footings. 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, most likely in the same trenches.

6.2 Type of Harm

The proposed works would entail ground disturbance and, accordingly, the construction of the wind farm has the potential to cause impacts to any Aboriginal areas, places or objects which may be present within the zones of direct impact.

Impacts will be located on land currently utilised for sheep grazing. Previous land use has resulted in relatively significant environmental impacts and a generally degraded landscape. European activated geomorphological processes and other natural processes associated with land degradation, will have caused significant prior impacts to Aboriginal objects within the proposal area.

However, irrespective of prior impacts the proposed works entail ground disturbance and accordingly the project has the potential to cause additional impacts to any Aboriginal objects which may be present within the individual components of the proposal. The nature of impacts relating to each Aboriginal object locale is set out in the table below.

Table 8 Impact Assessment.

Survey Unit	Type of harm	Degree of harm	Consequence of harm
SU1 including: SU1/L1 SU1/L2 SU1/L3	Direct Direct Direct Direct	Partial	Partial loss of value

Survey Unit	Type of harm	Degree of harm	Consequence of harm
SU1/L4 SU1/L5 SU1/L6	Direct Direct Direct		
SU2 including: SU2/L1 SU2/L2 SU2/L3 SU2/L4 SU2/L5	Direct near near near near Direct	Partial	Partial loss of value
SU3 including: SU3/L1 SU3/L2 SU3/L3 SU3/L4	Direct Direct Direct Direct Direct	Partial	Partial loss of value
SU4 No known objects	n/a		
SU5 including: SU5/L1 SU5/L2 SU5/L3	Direct Direct Direct Direct	Partial	Partial loss of value
SU6 including: SU6/L1 SU6/L2 SU6/L3 SU6/L4 SU6/L5 SU6/L6	Direct Nil Nil Nil Nil Near No	Partial	Partial loss of value
SU7 including: SU7/L1 SU7/L2 SU7/L3 SU7/L4	Direct Direct Direct Direct Direct	Partial	Partial loss of value
SU8 No known objects	n/a		
SU9 including: SU9/L1	Direct near	Partial	Partial loss of value
SU10 No known objects	Nil		
SU11 including: SU11/L1 SU11/L2	Nil Nil Nil		
SU12 No known objects	Nil		
SU13 No known objects	Nil		
SU14 No known objects	Direct	Partial	Partial loss of value
SU15 including: SU15/L1	Direct Direct	Partial	Partial loss of value

Survey Unit	Type of harm	Degree of harm	Consequence of harm
SU15/L2 SU15/L3	Direct Direct		
SU16 including: SU16/L1 SU16/L2 SU16/L3	Direct Direct Direct Direct	Partial	Partial loss of value
SU17 including: SU17/L1 SU17/L2 SU17/L3 SU17/L4 SU17/L5 SU17/L6	Direct Direct Direct Near Direct Direct Direct	Partial	Partial loss of value
SU18 including: SU18/L1 SU18/L2	Direct Near Direct	Partial	Partial loss of value
SU19 including: SU19/L1 SU19/L2	Direct Nil Direct	Partial	Partial loss of value
SU20 including: SU20/L1 SU20/L2 SU20/L3 SU20/L4	Direct Nil Direct Nil Nil	Partial	Partial loss of value
SU21 including: SU21/L1 SU21/L1	Nil Nil Nil		
SU22 No known objects	Direct	Partial	Partial loss of value
SU23 including: SU23/L1 SU23/L2	Direct Nil Direct		
SU24 including: SU24/L1 SU24/L2 SU24/L3 SU24/L4 SU24/L5 SU24/L6 SU24/L7 SU24/L8 SU24/L9 SU24/L10 SU24/L11 SU24/L12 SU24/L13 SU24/L14 SU24/L15	Direct Direct Direct Direct Near Near Nil Near Nil Nil Nil Nil Nil Nil Nil Nil	Partial	Partial loss of value
SU25 including:	Direct	Partial	Partial loss of

Survey Unit	Type of harm	Degree of harm	Consequence of harm
SU25/L1	Direct		value
SU2a No known objects	n/a	Partial	Partial loss of value
SU24a	Direct	Partial	Partial loss of value
SU26 No known objects	n/a	Partial	Partial loss of value
SU27 No known objects	n/a	Partial	Partial loss of value
SU6a including: SU6a/L1	Direct Direct	Partial	Partial loss of value
SU26a No known objects	n/a	Partial	Partial loss of value
SU4a No known objects	n/a	Partial	Partial loss of value
SU7a including: SU7a/L1	Direct Direct	Partial	Partial loss of value
SU7b No known objects	n/a	Partial	Partial loss of value
SU14a including: SU14a/L1	Direct Near	Partial	Partial loss of value
SU15a No known objects	n/a	Partial	Partial loss of value
SU19a No known objects	n/a	Partial	Partial loss of value
SU1a No known objects	n/a	Partial	Partial loss of value
SU18a No known objects	n/a	Partial	Partial loss of value
SU17a including: SU17a/L1 SU17a/L2 SU17a/L3	Direct Direct Near Near	Partial	Partial loss of value
SU17b including: SU17b/L1	Direct Direct	Partial	Partial loss of value
SU28 No known objects	n/a	Partial	Partial loss of value
SU29 including: SU29/L1	Direct Direct	Partial	Partial loss of value
SU30 including: SU30/L1 SU30/L2 SU30/L3	Direct Direct Direct Direct	Partial	Partial loss of value
SU31 No known objects	n/a	Partial	Partial loss of value
SU32 No known objects	n/a	Partial	Partial loss of value

7. MITIGATION AND MANAGEMENT STRATEGIES

The aim of this study has been to identify Aboriginal objects and Non-Indigenous items and to predict the archaeological potential within each Survey Unit, to assess site significance and thereafter, to consider the potential impact of the proposal upon this heritage.

In the following section a variety of strategies that can be considered for the mitigation and management of development impact to Aboriginal objects, Non-Indigenous items and Survey Units (including those without Aboriginal object recordings) are listed and discussed.

7.1 Management and Mitigation Strategies

Further Investigation

The 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 subsurface 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 high density artefactual material and when the Effective Survey Coverage achieved during a survey of a project area is low due to ground cover, vegetation etc. In certain situations subsurface investigation provides a necessary level of surety in regard to the archaeological status of a place so that informed management decisions can be duly made.

A strategy of subsurface test excavation is pro-active and enables the proponent to properly understand the nature of archaeological deposits prior to development activity occurring. However no Survey Units have been identified in the proposal area to warrant further archaeological investigation in order to formulate appropriate management and mitigation strategies. Based on a consideration of the predictive model of site type applicable to the environmental context in which impacts are proposed the archaeological potential of the proposed impact areas does not warrant further investigation.

The ridges in which the turbines and their associated impacts will be located contain eroded and skeletal soils as a result of high levels of erosion; generally these soils have low potential to contain intact and/or stratified archaeological deposit. Given the skeletal nature of these soils the potential to physically conduct subsurface excavation is limited. Furthermore, the ridges generally are not predicted to contain artefact density which would warrant test excavation.

Elsewhere in locations which contain deeper soil deposits such as landforms located in the lower valley contexts a number of additional factors have been taken into consideration to determine whether or not further investigation is necessary. Proposed impacts in these landforms are small scale, discrete and generally linear impacts (road access, transmission line construction etc); accordingly impacts are low. In addition, it is considered that in regard to the archaeology itself, subsurface testing is unlikely to produce results different to predictions made in respect of the subsurface potential of these landforms. Accordingly a program of subsurface testing is not considered to be necessary or warranted in regard to the proposal.

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 impact usually takes the form of partial impacts only (ie conservation of part of an Aboriginal object locale or Survey Unit, and limiting the extent of impacts) and/or salvage in the form of further research and archaeological analysis prior to impacts. Such a management strategy is generally appropriate when Aboriginal objects are assessed to be of moderate or high significance to the scientific and/or Aboriginal community and when avoidance of impacts and hence full conservation is not feasible. Salvage can include the surface collection or subsurface excavation of Aboriginal objects and subsequent research and analysis.

Some of the recorded Aboriginal object locales and/or discrete areas within wider Survey Units (including those which are predicted to contain subsurface archaeological deposit) are assessed to be of low/moderate or moderate archaeological significance. Accordingly it is generally recommended that limiting the extent of impacts to these locales, if at all feasible, should be given consideration.

For many Aboriginal object locales and/or discrete areas within wider Survey Units avoidance of impacts is unlikely to be feasible. Accordingly, it is recommended a strategy of impact mitigation is appropriate.

It is proposed that where necessary an appropriate overall impact mitigation strategy would be a program of salvage archaeological excavation and analysis.

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, in situations where conservation is simply not feasible and when mitigation is not warranted.

Given the nature and density of the majority of artefact locales recorded in the proposal area and the low scientific significance rating they been accorded, unmitigated impacts would be appropriate if impacts are proposed.

7.2 Management Options

The table below summarises the management and mitigation strategies considered to be relevant to proposal area. Management and mitigation strategies are addressed in relation to all Survey Units recorded during the study (noting that not all Survey Units contain Aboriginal object locales) and where relevant individual locales located within each Survey Unit. The assessed archaeological significance of each Aboriginal object locale is listed given that site significance forms the basis for rationalizing the proposed management strategy. The recommended management strategy listed for each Survey Unit and Aboriginal object locale is selected from the various management options as discussed above in Section 6.1. Finally the rationale behind each recommendation is outlined, taking into consideration the nature of the Aboriginal object and its archaeological significance rating.

Table 9 Recommended management strategies relating to Survey Units and Aboriginal object locales in the Coppabella Hills. Note - some Survey Units and Aboriginal object locales are outside the current impact area.

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
SU1	-	Generally very low/low	-	No constraints **Unmitigated impacts**	Generally very low/low artefact density in survey unit; generally no excavation potential across survey unit
SU1	L1	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU1	L2	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU1	L3	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU1	L4	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU1	L5	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU1	L6	negligible	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU2	-	Generally very low/low	-	Generally no constraints except for SU2/L2 and SU2/L4 (see below)	Generally very low/low artefact density in survey unit; generally no excavation potential across survey unit
SU2	L1	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
					to be low.
SU2	L2	low	Low local scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low/moderate. Excavation potential on ridges rare; therefore of archaeological value.
SU2	L3	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU2	L4	low	Low local scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low/moderate. Excavation potential on ridges rare; therefore of archaeological value.
SU2	L5	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU3	-	Generally very low/low	-	Generally no constraints except for SU3/L2 (see below)	Generally very low/low artefact density in survey unit; generally no excavation potential across survey unit
SU3	L1	low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU3	L2	low	Low local scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low/moderate. Excavation potential on ridges rare;

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
					therefore of archaeological value.
SU3	L3	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU3	L4	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU4	Nil	very low	n/a	No constraints **Unmitigated impacts**	Very low/negligible artefact density.
SU5	-	generally very low/low	-	No constraints **Unmitigated impacts**	Generally very low/low artefact density in survey unit; generally no excavation potential across survey unit
SU5	L1	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU5	L2	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU5	L3	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU6	-	generally very low/low	-	No constraints **Unmitigated impacts**	Generally very low/low artefact density in survey unit; generally no excavation potential across survey unit
SU6	L1	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU6	L2	very low	Low local scientific	No constraints **Unmitigated impacts**	Very low density artefact distribution.

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
			significance		Archaeological significance assessed to be low.
SU6	L3	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU6	L4	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU6	L5	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU6	L6	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU7	-	generally very low/low	-	No constraints **Unmitigated impacts**	Generally very low/low artefact density in survey unit; generally no excavation potential across survey unit
SU7	L1	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU7	L2	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU7	L3	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU7	L4	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
SU8	Nil	very low	n/a	No constraints **Unmitigated impacts**	Very low artefact density.
SU9	-	generally very low/low	-	No constraints **Unmitigated impacts**	Generally very low/low artefact density in survey unit; generally no excavation potential across survey unit
SU9	L1	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU10	Nil	negligible	n/a	No constraints **Unmitigated impacts**	Very low/negligible artefact density.
SU11	-	generally low	-	No constraints **Unmitigated impacts**	Generally low artefact density in survey unit
SU11	L1	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU11	L2	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU12	Nil	very low	n/a	No constraints **Unmitigated impacts**	Very low artefact density; generally no excavation potential across survey unit.
SU13	Nil	negligible	n/a	No constraints **Unmitigated impacts**	Very low/negligible artefact density.
SU14	Nil	very low	n/a	No constraints **Unmitigated impacts**	Very low artefact density; generally no excavation potential across survey unit.
SU15	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU15	L1	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
					significance assessed to be low.
SU15	L2	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU15	L3	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU16	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU16	L1	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU16	L2	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU16	L3	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU17	-	generally low moderate	-	**Mitigated impacts**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU17	L1	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU17	L2	low moderate	Potentially moderate scientific	**Mitigated impacts: Incorporate within research program**	Predicted low/moderate artefact density.

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
			significance	**including excavation; however avoid disturbance to as much of area as practicable**	Archaeological significance potentially moderate.
SU17	L3	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU17	L4	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU17	L5	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU17	L6	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU18	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU18	L1	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU18	L2	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
					significance assessed to be low.
SU19	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU19	L1	very low	Low local scientific significance	No constraints **Unmitigated impacts**	Very low density artefact distribution. Archaeological significance assessed to be low.
SU19	L2	low moderate	Low local scientific significance	No constraints **Unmitigated impacts**	Low moderate density artefact distribution however highly disturbed; no excavation potential. Archaeological significance assessed to be low.
SU20	-	generally very low	-	Generally no constraints except for SU20/L1, SU20/L2 & SU20/L3 (see below)	Generally very low artefact density in survey unit; generally no excavation potential across survey unit.
SU20	L1	low moderate	Low/moderate local scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low/moderate. Excavation potential on ridges rare; therefore of archaeological value.
SU20	L2	low	Low local scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low. Excavation potential on ridges rare; therefore of archaeological value.
SU20	L3	low moderate	Low/moderate local scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid**	Predicted low moderate artefact density. Archaeological significance

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
				disturbance to as much of area as practicable	potentially low/moderate. Excavation potential on ridges rare; therefore of archaeological value.
SU20	L4	low	Low local scientific significance	No constraints **Unmitigated impacts**	Low density artefact distribution. Archaeological significance assessed to be low.
SU21	-	generally very low	-	Generally no constraints except for SU21/L1 & SU21Ll2 (see below)	Generally very low artefact density in survey unit; generally no excavation potential across survey unit.
SU21	L1	low moderate	Low/moderate local scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Low moderate density artefact distribution. Archaeological significance assessed to be low.
SU21	L2	low moderate	Low/moderate local scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low moderate artefact density. Archaeological significance potentially low/moderate. Excavation potential on ridges rare; therefore of archaeological value.
SU22	Nil	low	n/a	No constraints **Unmitigated impacts**	Low artefact density.
SU23	-	generally low	-	Generally no constraints except for SU23/L1 & SU23Ll2 (see below)	Generally very low artefact density in survey unit; generally no excavation potential across survey unit.
SU23	L1	low	Low local scientific significance	**Mitigated impacts: Incorporate within research program including excavation**	Predicted low artefact density. Excavation potential; therefore of archaeological value.

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
SU23	L2	low	Low local scientific significance	**Mitigated impacts: Incorporate within research program including excavation**	Predicted low artefact density. Excavation potential; therefore of archaeological value.
SU24	-	generally low moderate	-	**Mitigated impacts**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L1	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L2	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L3	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L4	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L5	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
				practicable	
SU24	L6	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L7	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L8	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L9	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L10	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L11	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L12	low	Potentially	**Mitigated impacts:**	Predicted

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
		moderate	moderate scientific significance	**Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L13	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L14	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU24	L15	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU25	-	generally very low	-	**Mitigated impacts: Incorporate area NE of SU25/L1 within research program including excavation; however, avoid disturbance to as much of area as practicable**	Predicted very low artefact density, generally except for small flat NE of SU25/L1 predicted to be moderate density
SU25	L1	low	Low local scientific significance	No constraints **Unmitigated impacts But see SU25 above**	Predicted low/moderate artefact density. Archaeological significance potentially moderate. Highly disturbed
SU2a	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
					excavation potential across survey unit.
SU24a	-	generally very low	-	**Mitigated impacts: Incorporate within research program including excavation at NW end; however avoid disturbance to areas close to creek if feasible**	Predicted low/moderate artefact density in areas close to creek. Archaeological significance potentially moderate in areas close to creek.
SU26	-	Negligible	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU27	-	Negligible/ generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU6a	-	generally very low	-	Generally no constraints except for SU6a/L1 (see below)	Generally very low artefact density in survey unit; generally no excavation potential across survey unit .
SU6a	L1	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU26a	-	Negligible	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU4a	-	Negligible	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU7a	-	generally very low	-	Generally no constraints except for SU7a/L1 (see below)	Generally very low artefact density in survey unit; generally no excavation potential across

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
					survey unit.
SU7a	L1	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU7b	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU14a	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU14a	L1	low	Low local scientific significance	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; generally no excavation potential across survey unit.
SU15a	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU1a	-	negligible	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU18a	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU19a	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; no excavation potential across survey unit.
SU17a	-	generally low moderate	-	**Mitigated impacts**	Predicted low/moderate artefact density. Archaeological

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
					significance potentially moderate.
SU17a	L1	low	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low.
SU17a	L2	low	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low.
SU17a	L3	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low/moderate.
SU17b	-	generally low	-	No constraints **Unmitigated impacts**	Generally low artefact density in survey unit; limited excavation potential across survey unit.
SU17b	L1	low	Low local scientific significance	No constraints **Unmitigated impacts**	Generally low artefact density in survey unit; limited excavation potential across survey unit.
SU28	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; limited excavation potential across survey unit.
SU29	-	generally low moderate	-	**Mitigated impacts Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.

SU	Locale	Predicted Density	Significance	Recommended management strategy	Rationale
SU29	L1	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low/moderate.
SU30	-	generally low moderate	-	**Mitigated impacts Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low/moderate artefact density. Archaeological significance potentially moderate.
SU30	L1	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low/moderate.
SU30	L2	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low/moderate.
SU30	L3	low moderate	Potentially moderate scientific significance	**Mitigated impacts: Incorporate within research program including excavation; however avoid disturbance to as much of area as practicable**	Predicted low artefact density. Archaeological significance potentially low/moderate.
SU31	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; limited excavation potential across survey unit.
SU32	-	generally very low	-	No constraints **Unmitigated impacts**	Generally very low artefact density in survey unit; limited excavation potential across survey unit.

8. RECOMMENDATIONS

The following recommendations are made on the basis of:

- A consideration of the relevant legislation.
- The results of the investigation as documented in this report.
- Consideration of the type of development and the nature of proposed impacts.

Management and mitigation strategies are outlined and justified in Section 12 of this report. The following recommendations are provided in summary form:

- As a form of mitigation of overall construction impact to the archaeological resource within the proposal area it is proposed that a salvage program of archaeological excavation and analysis be undertaken in a sample of impact areas prior to construction (see Table 9 in Section 7).

  The development of an appropriate salvage project should be undertaken in consultation with an archaeologist, the relevant Aboriginal communities and the NSW OEH.

- No Survey Units have been identified in the proposal area to warrant further archaeological investigation such as subsurface test excavation; the Effective Survey Coverage achieved during the field survey was relatively high and can be considered to have been generally adequate for the purposes of determining the archaeological status of the proposed impact areas.

- None of the Survey Units in the proposal area have been assessed to surpass archaeological significance thresholds which would act to entirely preclude proposed impacts.

- The majority of the Aboriginal object locales recorded are very low or low density distributions of stone artefacts. The archaeological significance of these locales is assessed to be low. Accordingly a management strategy of unmitigated impact is considered to be appropriate.

- A number of the Aboriginal object locales and/or discrete areas within Survey Units are assessed to be of low/moderate or moderate archaeological significance. Accordingly, in regard to these areas it is generally recommended that limiting the extent of impacts to these locales, if at all feasible, should be given consideration.

In regard to these locales it is recommended that a salvage program of subsurface excavation be undertaken as a form of Impact Mitigation.

- It is recommended that additional archaeological assessment is conducted in any areas which are proposed for impacts that have not been surveyed during the current assessment. It is predicted that significant Aboriginal objects can occur anywhere in the landscape and accordingly if present they need to be identified and impact mitigation strategies implemented prior to impacts.

- The proponent should, in consultation with an archaeologist, develop a Cultural Heritage Management Protocol, which documents the procedures to be followed for impact mitigation. The development of an appropriate Cultural Heritage Management Protocol should be undertaken in consultation with an archaeologist, the relevant Aboriginal communities and the NSW OEH.

- Personnel involved in the construction and management phases of the project should be trained in procedures to implement recommendations relating to cultural heritage where necessary.

- Cultural heritage should be included within any environmental audit of impacts proposed to be undertaken during the construction phase of the development.

9. REFERENCES

Austral Archaeology Pty Ltd 2005 *Archaeological Test Excavation at Proposed Gunning Wind Farm NSW, Test Excavation Report*. Prepared for Connell Wagner PPI.

Austral Archaeology Pty Ltd 2008 *Aboriginal Archaeological and Cultural heritage Assessment Gunning Wind Farm NSW Additional Assessment Report*. Prepared for ACCIONA Energy.

Bayley, W. A. 1973 *Yass Municipal Centenary History*, Yass Municipal Council, Yass.

Boot, P. 1994 Recent Research into the Prehistory of the Hinterland of the South Coast of New South Wales. In Sullivan, M, Brockwell, S. and Webb, A. (eds) *Archaeology in the North: Proceedings of the 1993 Australian Archaeological Association Conference*. NARU: Darwin.

Boot, P. personal communication February 2009.

Branagan, D. and G. Packham 2000 *Field Geology of New South Wales*. NSW Department of Mineral Resources: Sydney.

Carlos, G. 2008 A short history of Yass Tramway, *Yass Tribune* http://yass.yourguide.com.au/news/local/news/general/a-short-history-of-yass-tramway/1335550.aspx?storypage=0 (accessed 27th November 2008)

DPWS Heritage Design Services 2001, *Greater Burrinjuck Dam Precinct Heritage Assessment*, report for State Water.

Dean-Jones, P. 1990 *Report of an archaeological survey of a proposed hard rock quarry near Gunning*.

Dibden, J. 2005a *Proposed Residential Subdivision at the Bermagui Country Club. Archaeological Subsurface Test Excavation. S87 Permit # 2144*. Report to Paynter Dixon Golf Pty Ltd.

Dibden, J. 2005b *Proposed Wind Farm – Snowy Plains Subsurface Test Excavation s87 Permit # 2199*. A report to Taurus Energy.

Dibden, J. 2005c *Proposed Residential Subdivision Moruya Subsurface Test Excavation*. A report to Patent Developments.

Dibden, J. 2006a *Taurus Energy Proposed Wind Farm – Cullerin, via Goulburn Aboriginal Archaeological Assessment*. A report to nghenvironmental.

Dibden, J. 2006b *Taurus Energy Proposed Wind Farm –Conroys Gap, via Yass Aboriginal Archaeological Assessment*. A report to nghenvironmental.

Dibden, J. 2009. Proposed Yass Wind Farm Archaeological and Cultural Heritage Assessment. A report to Epuron.

Dibden, J. 2011 Drawing in the Land: Rock-art in the Upper Nepean, Sydney Basin. Unpublished PhD thesis; Australian national University.

Dibden, J. 2013a Rye Park Wind Farm. Aboriginal Cultural Heritage Assessment. A report to Epuron Pty Ltd.

Dibden, J. 2013b Bango Wind Farm. Aboriginal Cultural Heritage Assessment. A report to Wind Prospect CWP Pty Ltd.

Dibden, J. 2013c Proposed Yass Valley Wind Farm Archaeological and Heritage Assessment Addendum (revised) – Transmission Line

Dorrough, J., A Yen, V. Turner, S. Clark, J. Crosthwaite and J. Hirth 2004 Livestock grazing management and biodiversity conservation in Australian temperate grassy landscapes. *Australian Journal of Agricultural Research*. Vol 55; pp 279 – 295.

Dunnell, R. 1993 The Notion Site in J. Rossignol and L. Wandsnider eds *Space, Time and Archaeological Landscapes*. New York: Plenum, pgs 21-41.

Eades, D. 1976 *The Dharawal and Dhurga Languages of the New South Wales South Coast*. Canberra: Australian Institute of Aboriginal Studies.

Flood, J. 1980 *The Moth Hunters*. Australian Institute of Aboriginal Studies: Canberra.

Flood, J. 1995 *Archaeology of the Dreamtime* (Revised ed.) Angus and Robertson, Sydney.

Flood, J., David, B., Magee, J. & English, B. 1987 Birrigai: A Pleistocene Site in south-eastern highlands. *Archaeology in Oceania*. 22: 9-26.

Harden Murrumburrah District Historical Association, n.d. *Brief history of the Harden Murrumburrah district*, Harden.

Heritage Council of New South Wales 2008 *Levels of Heritage Significance* Heritage Office, NSW Department of Planning, Sydney.

Heritage Office and Department of Urban Affairs and Planning 1996 *Regional histories: regional histories of New South Wales* Department of Urban Affairs and Planning, Sydney.

Hiscock, P. & Mitchell, S. 1993 *Stone Artefact Quarries and Reduction Sites in Australia: Towards a Type Profile*. AGPS: Canberra.

Irving, R. 1982 Reader's Digest book of historic Australian towns, Reader's Digest, Surry Hills.

Jeans, D. N. 1966 *A Historical Geography of New South Wales*. Reed Education: Sydney.

Jennings, J. and J. Mabbutt 1977 Physiographic outlines and regions. In: Jeans, D. (ed): *Australia: a Geography*. Sydney University Press; Sydney: PP 38 – 52.

Jo McDonald Cultural Heritage Management Pty Ltd 2003 *Archaeological Survey for an Aboriginal Heritage Assessment Gunning Wind Farm, Gunning, NSW*. Report prepared for Connell Wagner PPI.

Klaver, J. 1993 *Duplication of Hume Highway Carriageway and Bypass of Bookham, NSW. Archaeological Survey for Aboriginal Sites*. Report to Mitchell McCotter.

Koettig, M. 1986a *Survey for Aboriginal Sites Along the Proposed Water Pipeline Between Bowning and Yass*. Report to Public Works Department, New South Wales.

Koettig, M. 1986b *Test Excavations at Derringullen Creek Near Yass*. Report to Public Works Department, New South Wales.

Koettig, M. and R. Silcox 1983 *Survey for Archaeological Sites along the Proposed Yass By-Pass Route*. Report to NSW Department of Main Roads.

Knight, T. 2001 *Stepping Stones to the Sky Archaeological Perspectives on the Cultural Significance of the Weddin Mountains in Recent Prehistory*. Unpublished Master of Arts by Research Thesis. School of Archaeology and Anthropology Australian National University, Canberra.

Kuskie, P. 1992 *An Archaeological Assessment of the Proposed Route of Optus Commission's Fibre Optic Cable Between Cootamundra, NSW, and Hall, ACT*. Report to Landscan Pty Ltd.

Kuskie, P. 2000 *An Aboriginal Archaeological Assessment of the Proposed Mount Arthur North Coal Mine, Near Muswellbrook, Hunter Valley, New South Wales*. Unpublished report to Dames and Moore.

Lampert, R. 1971 *Burrill Lake and Currarong: Coastal Sites in Southern New South Wales*. Terra Australia 1 Department of Prehistory. ANU: Canberra.

Lunt, I., D. Eldridge, J. Morgan and G. Witt 2007 A framework to predict the effects of livestock grazing and grazing exclusion on conservation values in natural ecosystems in Australia. *Australian Journal of Botany*. Vol 55; No 4; pp 401 - 415.

Maher, B. 2003 *Binalong: beyond the limits*. Rev. Brian Maher, Canberra.

McDonald, R. Isbell, R, Speight, J. Walker, J. and M. Hopkins 1998 *Australian Soil and Land Survey Field Handbook*. CSIRO Australia.

Mission Australia 2000 *History in the Making: Yass, picture and memories*. Mission Australia, Canberra.

Navin, K. and K. Officer 1995 *Archaeological survey proposed extension to Bogo Quarry, South of Yass, NSW*. Report to David Hogg Pty Ltd.

Navin Officer Heritage Consultants 2001 *Yass 330/132kV Substation Reconstruction Project Archaeological Assessment*. Report to Pacific Power.

Newland, J. R. 1994 *The Goondah – Burrinjuck Railway*. Australian Railway Historical Society, St James, NSW.

Mulvaney, J. and J. Kamminga 1999 *Prehistory of Australia*. Allen and Unwin: St Leonards.

New South Wales National Parks and Wildlife Service. 1997 DRAFT *Aboriginal cultural heritage standards and guidelines kit*.

New South Wales Department of Environment and Conservation 2004 *Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants*.

New South Wales Department of Environment and Conservation 2005 DRAFT *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*.

New South Wales Heritage Office and Department of Urban Affairs 1996, *Heritage Assessments, NSW Heritage Manual*, HO/DUAP, Sydney.

New South Wales Heritage Office 2001 *Assessing Heritage Significance*, HO/DUAP, Sydney.

Oakley, B. 1995 *Archaeological investigation Optus Communications*. Report to Optus Communications.

Olley, J. and R. Wasson 2003 Changes in the flux of sediment in the Upper Murrumbidgee catchment, Southeastern Australia, since European settlement. *Hydrological Processes*. Vol 17; pp 3307 – 3320.

Ossa, P., Marshall, B. & Webb, C. 1995 New Guinea 2 cave: A Pleistocene site on the Snowy River, Victoria. *Archaeology in Oceania* 30(1):22-35.

OzArk Environment & Heritage Management P/L 2007 *Ecology and Heritage Assessment: Wagga Wagga – Yass Line 990 132 kV Transmission Line*. Report to International Environmental Consultants PL on behalf of TransGrid

Packard, P. 1984 *With a Pinch of Salt - The Archaeology of Saline-Seepage erosion in the Yass River Basin*. B. Litt thesis, The Australian National University, Canberra.

Packard, P. and P. Hughes 1983 *Stage 2 of an Archaeological Survey of the Murrumburrah-Yass Electricity Transmission Line*. Anutech report to NPWS.

Paton, R. 1993 *An archaeological survey of the proposed optical fibre cable route from Gunning to Dalton and Dalton to Flacknell Creek Road Turnoff, Southern Tablelands, NSW*. A report to Telecom Australia.

Pearson, M. 1981 *Seen Through Different Eyes: Changing Landuse and Settlement Patterns in the Upper Macquarie River Region of NSW from Prehistoric Times to 1860*. Unpublished PhD Thesis. Dept of Prehistory and Anthropology: The Australian National University.

Perry, T. M. 1965 *Australia's first frontier*. Melbourne University Press: Melbourne.

Seddon, J., A. Zerger, S Doyle and S Briggs 2007 The extent of dryland salinity in remnant woodland and forest within an agricultural landscape. *Australian Journal of Botany*. Vol. 55; No. 5; pp 533- 540.

Saunders, P. 2000 *Investigation of Dalton Open Campsite North and Yass River Open Campsite*. Report to Energy Australia.

Shaw, A. G. L. 1970 *The Economic Development of Australia*. Longman: London.

Shott, M. 1995 Reliability of Archaeological Records on Cultivated Surfaces: A Michigan Case Study. *Journal of Archaeological Field Archaeology*. Vol 22; pgs 475 – 490.

Silcox, R. and M. Koettig 1985 *Survey for Aboriginal and Historic Sites along the Proposed Alternative Yass By-Pass Route, N.S.W*. Report to DMR.

Silcox, R. and M. Koettig 1988 *Barton Highway Extension at Yass: Survey and Test Excavations on the Proposed Alternative Route*. Report to Kinhill Stearns Pty Ltd.

Southern Tablelands of NSW 2008 *Towns and villages: Yass*
http://www.argylecounty.com.au/towns/yass.html (accessed 27th November 2008)

White, I. 1986 *Dimensions of Wiradjuri An Ethnohistoric Study*. B. Litt thesis, The Australian National University, Canberra.

White, I. and S. Cane 1986 *An Investigation of Aboriginal Settlements and Burial Patterns in the Vicinity of Yass*. Report to the NSW NPWS, Queanbeyan.

Witter, D. 1980 *An Archaeological Pipeline Survey between Dalton and Canberra. Aboriginal and Historical* Resources Section, National Parks and Wildlife Service, Sydney, NSW.

Witter, D. 1981 *Archaeological Salvage Investigations on the Dalton to Canberra Pipeline*. Aboriginal and Historical Resources Section, National Parks and Wildlife Service, Sydney, NSW.

Witter, D. and P. Hughes 1983 *Stage 1 of an Archaeological Survey of the Murrumburrah-Yass and Murrumburrah-Wagga Wagga Electricity Transmission Lines*. Anutech report to NPWS.

Wandsnider, L and E. Camilli 1992 The Character of Surface Archaeological Deposits and Its Influence on Survey Accuracy. *Journal of Field Archaeology*. Vol. 19 pgs 169 - 188.

Wasson, R., R. Mazari, B Starr and G. Clifton 1998 The recent history of erosion and sedimentation on the Southern Tablelands of southeastern Australia: sediment flux dominated by channel incision. *Geomorphology* Vol: 24; pp 291 – 308.

Yass and District Historical Society 2008 *History and Timeline*.
http://www.yasshistory.org.au/history.htm (accessed 27th November 2008).

Yass Valley Council 2008 *Historic Yass* Valley
http://www.yass.nsw.gov.au/about/1573/1582.html (accessed 27th November 2008).

Young, M. (ed.), 2000 *The Aboriginal People of the Monaro*, NSW NPWS.