

3.4 Aboriginal archaeology assessment

Proposed Gullen Range Wind Farm Archaeological Assessment

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A report to ngenvironmental on behalf of Epuron Pty Ltd



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1. SUMMARY

1.1 Introduction

New South Wales Archaeology Pty Ltd was commissioned by ngenvironmental on behalf of Epuron Pty Ltd in July 2007 to undertake an archaeological and heritage assessment of the proposed Gullen Range Wind Farm project area.

Epuron Pty Ltd proposes to develop a wind farm with up to 84 turbines on the Gullen Range for the purpose of electricity generation. The proposal area is situated on the Southern Tablelands of New South Wales in the Upper Lachlan Local Government Area.

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

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

1.2 Partnership with Aboriginal Communities

The field survey and assessment has been undertaken in partnership with Pejar Local Aboriginal Land Council (PLALC) and Onerwal Local Aboriginal Land Council (OLALC).

This assessment has been conducted in accordance with consultation process as outlined in the Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants (NSW DEC 2004).

1.3 Description of Impact

The proposed impact area is situated on a north-south trending ridge system which traverses four localities: Kialla (northern most locality), Bannister, Pomeroy and Gurrundah. All proposed impacts are situated within private grazing properties or crown road easements.

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

- Up to 84 wind turbines, each with three blades measuring up to 50 metres in length, and mounted on a tubular steel tower measuring up to 85 metres high;
- Electrical connections between wind turbines using a combination of underground cabling and overhead concrete pole power lines;
- Underground communication cabling;
- A substation and transmission connection linking the wind turbines to the existing TransGrid 330kV transmission system which passes across the proposal site;
- Temporary construction facilities, site compounds, storage areas and batching plants;
- Access roads for installation and maintenance of wind turbines; and
- An onsite control room and equipment storage facility.

The individual components of the project are situated within four broad development areas (*Kialla, Bannister, Pomeroy and Gurrundah*) which allows for flexibility in ultimate design and layout; flexibility is required to allow for the management of issues which might arise in relation to ongoing assessments including biodiversity, archaeology, geology, wind regime, wind turbine availability and transmission connection design issues. The Kialla and Bannister development areas are joined to encompass the northern section of the site.

The proposed works entail ground disturbance and accordingly the project has the potential to cause impacts to any Aboriginal objects which may be present within the zones of direct impact. Impacts will be confined to cleared areas currently utilised for grazing and cultivation, and existing road easements; where possible existing access roads will be used for site access. Electrical connections and communications cabling will generally be installed within access roads. Impact areas can be considered as being small and discrete in area.

The total area encompassed by the development envelope measures approximately 1400 hectares and direct impacts are proposed for a low proportion of that area. The total impact area may measure as much as 91.5 hectares and this is calculated to be c. 6.5% of the total development envelopes area. Accordingly more that

93% of the ground surfaces in the proposal area will not sustain impacts with the concomitant result that the majority of the archaeological resource will be exempt from development impacts.

1.4 Objectives and Methods

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

The investigation has included both a literature review and field survey. Field work was undertaken in August and September 2007. The field survey was focused on investigating broad development envelopes and these were subject to a comprehensive survey.

Indigenous

The approach to archaeological recording in the current study has been a ‘nonsite’ methodology: the elementary unit recorded is an artefact (described as artefact locales) rather than a site. It is assumed that stone artefacts will be distributed across the landscape in a continuum with significant variations in artefact density and nature in different landform elements. While cultural factors will have informed the nature of land use, and the resultant artefact discard, environmental variables are those which can be utilised archaeologically in order to analyse archaeological variability across the landscape.

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

The New South Wales National Parks and Wildlife Service has prepared a draft document which provides a series of guidelines regarding the assessment and management of Aboriginal cultural heritage in New South Wales. This report has been prepared in accordance with these draft guidelines (NSW NPWS 1997).

Additionally the study has been conducted in accordance with the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (NSW DEC July 2005). The Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation have been prepared specifically for development applications assessed under Part 3A of the Environmental Planning and Assessment Act 1979.

Non-Indigenous

The non-indigenous component of this assessment has been conducted with reference to literature relating to the European occupation area, a review of Parish maps and a field inspection aimed at locating historical items, features or potential archaeological sites.

The NSW Department of Urban Affairs and Planning and the NSW Heritage Office have produced guidelines for preparing archaeological and heritage assessments as set out in Archaeological Assessment Guidelines 1996 and Heritage Assessments 1996. Where relevant this report has been prepared in accordance with these guidelines and those most recently defined as a result of the 1998 amendments to the NSW Heritage Act 1977.

1.5 Previous Archaeological Work and Recorded Sites

A review of previous archaeological investigations in the area has been undertaken in order to provide an analytical context to the assessment.

A search of the New South Wales Department of Environment and Climate Change (the NSW DECC) Aboriginal Heritage Information Management System (AHIMS) has indicated that there are no previously recorded sites located within the proposed impact area (AHIMS #19576: 24th July 2007).

Searches have also been undertaken of historical databases including the NSW Heritage Inventory; no Non-Indigenous items are listed for the proposed impact area on any heritage databases.

1.6 Survey Coverage and Results

Kialla

Indigenous

The Kialla development envelope has been divided into 26 Survey Units. Based on a consideration of the environmental context, the Kialla survey area is predicted to contain stone artefacts in low or very low densities only.

The Kialla development envelope surveyed during this assessment measured approximately 458.8 hectares in area. Ground exposures inspected are estimated to have been 14.3 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 2.9 hectares. Effective Survey Coverage (ESC) is therefore calculated to have been 0.6% of the Kialla development envelope; this is a very low ESC although it is typical of what is encountered in grassed paddocks.

A total of ten stone artefacts were recorded across six different artefact locales in the Kialla development envelope. The low number of artefacts recorded during the survey is assessed to be a reasonably true and reliable reflection of the artefactual nature of the proposal area. The predicted model of Aboriginal occupation indicates that the area would have been used for low levels of occupation that probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard. Furthermore, while the overall ESC is very low it is worth noting that only ten stone artefacts were recorded across almost three hectares of archaeological visibility, which would indicate a predicted artefact density in the order of less than five artefacts per hectare. Accordingly, the Kialla development envelope is assessed to be of low Indigenous archaeological potential and sensitivity.

Non-Indigenous

Two Non-Indigenous heritage site complexes have been recorded in the Kialla development envelope. One complex consists of the remains of a house and associated sheep yards and dip. The other consists of two structures, one being a stone house and the other its associated barn. These heritage items are situated outside areas of proposed impact.

Bannister

Indigenous

The Bannister development envelope has been divided into 18 Survey Units. Based on a consideration of the environmental context, the Bannister survey area is predicted to contain stone artefacts in low or very low densities only.

The Bannister development envelope surveyed during this assessment measured approximately 533.8 hectares in area. Ground exposures inspected are estimated to have been 30.5 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 9.6 hectares. Effective Survey Coverage is therefore calculated to have been 4.25% of the Bannister development envelope.

A total of 34 stone artefacts were recorded in the Bannister development envelope. These artefacts were recorded in ten different artefact locales. As discussed above with regard to the Kialla study area, the predicted model of Aboriginal occupation for the Bannister development envelope indicates that the area would have been used for low levels of occupation that probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard. Furthermore, given that only 34 stone artefacts were recorded over an estimated 9.6 hectares of archaeological visibility it is calculated that the overall artefact density would be in the order of less than five artefacts per hectare. Accordingly, the Bannister development envelope is assessed to be of low Indigenous archaeological potential and sensitivity.

Non-Indigenous

Two Non-Indigenous heritage site complexes have been recorded in the Bannister development envelope. One site is an old dump and the other a complex consisting of the remains of a house and shed. These heritage items are situated outside areas of proposed impact.

Pomeroy

Indigenous

The Pomeroy development envelope has been divided into 19 Survey Units. Based on a consideration of the environmental context, the Pomeroy survey area is predicted to contain stone artefacts in low or very low densities only.

The Pomeroy development envelope surveyed during this assessment measured approximately 189.05 hectares in area. Ground exposures inspected are estimated to have been 23.25 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 17.7 hectares. Effective Survey Coverage is therefore calculated to have been 9.4% of the Pomeroy development envelope; this is a relatively good level of coverage for a survey in a pastoral context. The elevated levels of ESC within this study area can be attributed to the fact that the soils were often relatively shallow and the areas of bare earth inspected thus displayed a higher archaeological visibility with relatively good exposure of potential artefact bearing deposits.

A total of 118 stone artefacts were recorded across 27 different artefact locales in the Pomeroy development envelope. While this appears to equate to a significantly higher incidence of stone artefacts than that which was encountered in the other development envelopes, the differing levels of archaeological visibility largely explain it. That is, given that the ESC at Pomeroy was substantially higher than that encountered at Kialla and Bannister, it is to be expected that a greater number of artefact recordings would result. To that end, it is worth noting that the calculated artefact density, based on estimated archaeological visibility, is of a similar order to the other survey areas and equates to around six or seven stone artefacts per hectare. This corresponds to a very low artefact density; it is in keeping with the predicted model of Aboriginal landuse, which indicates that the area would have been used for low levels of occupation that probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard. Accordingly, the low number of artefacts recorded during the survey is assessed to be a reasonably true and reliable reflection of the artefactual nature of the proposal area and the Pomeroy development envelope is assessed to be of low Indigenous archaeological potential and sensitivity.

Non-Indigenous

No Non-Indigenous heritage items were recorded in the Pomeroy development envelope.

Gurrundah

Indigenous

The Gurrundah development envelope has been divided into 18 Survey Units. Based on a consideration of the environmental context, the Gurrundah survey area is predicted to contain stone artefacts in low or very low densities only.

The Gurrundah development envelope surveyed during this assessment measured approximately 260.75 hectares in area. Ground exposures inspected are estimated to have been 68.15 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 36.61 hectares. Effective Survey Coverage is therefore calculated to have been 14% of the Gurrundah development envelope. This is a relatively high ESC that is the result of skeletal soils and erosion scours that have afforded very good levels of visibility into potential artefact bearing deposits.

A total of 33 stone artefacts were recorded across seven different artefact locales in the Gurrundah development envelope. The low number of artefacts recorded during the survey is assessed to be a reasonably true and reliable reflection of the artefactual nature of the proposal area. The predicted model of Aboriginal occupation indicates that the area would have been used for low levels of occupation that probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard. Furthermore, given that only 33 stone artefacts were recorded across almost 37 hectares of archaeological visibility, it is calculated that the overall artefacts density is in the order of less than one artefact per hectare. This is an extremely low artefact density that corresponds to an almost negligible artefactual presence. Accordingly, the Gurrundah development envelope is assessed to be of low Indigenous archaeological potential and sensitivity.

Non-Indigenous

One Non-Indigenous heritage item has been recorded in the Gurrundah development envelope. This item is an old crank start tractor. This heritage item is situated outside areas of proposed impact.

Summary

Aboriginal objects in the form of stone artefacts have been recorded in a number of locales across each of the four development envelopes. It is predicted that additional stone artefacts are likely to be present in either low or very low density in a subsurface context across the majority of the proposal area. The development of the Gullen Range wind farm project will therefore result in impacts on both recorded stone artefact locales and subsurface artefact distributions within many of the defined Survey Units.

However the proposed impacts will occur in small and discrete areas within the development envelopes. Therefore impacts to stone artefact distributions will be partial rather than comprehensive: Given that approximately 93% of the development will not be subject to ground disturbing impacts the majority of the archaeological resource in the proposal area will be excluded from impact.

It is concluded that the proposed Gullen Range wind farm will result in minor impacts to the Aboriginal archaeological resource.

1.7 Statutory Context

Part 3A of the Environmental Planning and Assessment Act 1979

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

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

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

1.8 Significance Assessment

All of the artefact locales recorded in the course of this survey correspond to low to very low density artefact distributions that are assessed to be reasonably accurate reflections of the archaeological status of the individual development envelopes. Low density stone artefact scatters are a very common site type across the Goulburn and Crookwell region; they afford relatively limited research potential, particularly in instances where soil deposits are shallow and/or disturbed. Accordingly, the recorded artefact locales are assessed to be of low local scientific significance. Further details of the scientific significance of individual Aboriginal artefact locales are provided in Tables 14, 15, 16 and 17 in Section 11 of this report.

1.9 Mitigation and Management Strategies

In the course of this project a total of 50 Aboriginal artefact locales were recorded across 24 Survey Units, a further 57 Survey Units had no artefact recordings at all. While effective survey coverage varied enormously across Survey Units and between development envelopes, the overall survey results indicated low to very low artefact distributions, which are in keeping with the predicted model of Aboriginal landuse for the landforms and environmental context of the study areas. Where artefact locales were recorded they usually contained low artefact numbers, even when ground exposure and archaeological visibility were relatively high. The low density artefact distributions encountered across the development envelopes are assessed to be a reasonably true and reliable reflection of the artefactual nature of the proposal area; they are assessed to be of low local

scientific significance. As such there are no archaeological constraints that would act to preclude the proposed wind farm development.

Details of the archaeological sensitivity, suitable management strategies and accompanying rationale for each survey unit are outlined in Tables 18, 19, 20 and 21 in Section 12 of this report.

1.10 Recommendations

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

- No further archaeological research is considered to be necessary or warranted in regard to the proposed Gullen Range Wind Farm project.
- The stone artefacts recorded in the proposal area do not surpass any scientific significance thresholds which would act to preclude the construction of the proposed wind farm.

Pejar LALC has recommended that they would like to collect artefacts prior to impacts (see Appendix 1). This is an appropriate level of impact mitigation.

- None of the recorded Non-Indigenous heritage items are located in areas that will be impacted by the proposed wind farm.

Acknowledgements

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

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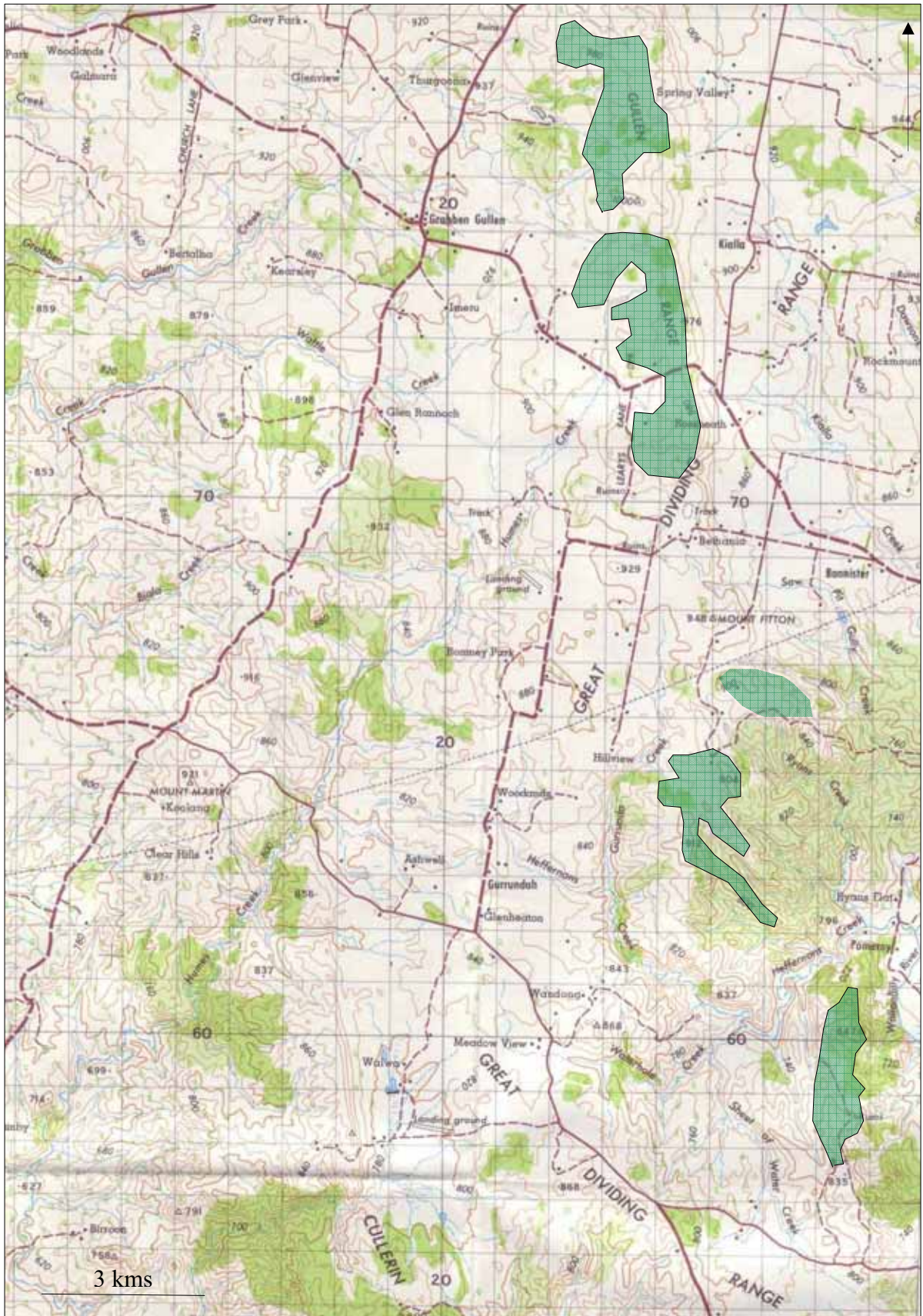


Figure 1. Location of the Gullen Range wind farm development envelope. The individual localities are labelled (Gunning Sheet 8728 (edition 1) Series R 651 1:100,000 topographic map).

2. INTRODUCTION

2.1 Introduction

New South Wales Archaeology was commissioned by ngenvironmental on behalf of Epuron Pty Ltd in July 2007 to undertake an archaeological assessment of the proposed Gullen Range wind farm. The Gullen Range wind farm is located approximately six kilometres south of Crookwell and to the east and southeast of Grabben Gullen (Figure 1).

The impact areas are defined as four clusters named according to the locality in which they fall. These localities are defined as follows: Kialla (situated six kilometres south of Crookwell), Bannister, Pomeroy and Gurrundah. The maximum distance between the northern most area and the southern most area measures approximately 22 kilometres. The areas in which the turbines are proposed are private properties which are currently utilised for cattle and sheep grazing.

The proposal is to develop a wind farm with up to 84 turbines to supply electricity to the grid. The proposal is comprised of the construction, operation and decommissioning of the following components:

- Up to 84 wind turbines, each with three blades measuring up to 50 metres in length, and mounted on a tubular steel tower measuring up to 85 metres high;
- Electrical connections between wind turbines using a combination of underground cabling and overhead concrete pole power lines;
- Underground communications cabling;
- A substation and transmission connection linking the wind turbines to the existing TransGrid 330kV transmission system which passes across the proposal site;
- Access roads for installation and maintenance of wind turbines; and
- An onsite control room and equipment storage facility.

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

The proposed wind farm is defined as a Major Project under Part 3A of the Environmental Planning and Assessment Act 1979. The Director General, Department of Planning has issued requirements for the preparation of an Environmental Assessment in which it is stated that an archaeological/cultural heritage assessment is required to be prepared which addresses the potential impact of the proposal on Aboriginal heritage values and items.

In accordance with the NSW NPWS guidelines for archaeological reporting (NSW NPWS 1997) and the NSW DEC Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (NSW DEC 2005) this report aims to document:

- The Aboriginal consultation process undertaken for the project and the involvement in the project of the Aboriginal community;
- A description of the proposal and whether or not it has the potential to result in impacts to Aboriginal cultural heritage;
- A description of the impact history of the proposal area;
- The methodology implemented during the study;
- The landscape and natural resources of the study area in order to establish background parameters;
- A review of archaeological and relevant literature and heritage listings on the NSW DECC Aboriginal Heritage Information Management System;
- A synthesis of local and regional archaeology;
- A review of Non-Indigenous history of the proposal area and the results of relevant heritage database searches;
- A predictive model of Aboriginal object type and location relevant to the proposal area;
- The cultural and archaeological sensitivity of the landforms subject to proposed impacts;
- The field survey results;
- The significance of Aboriginal objects;
- An assessment of the impact of the proposal on Aboriginal objects and places;
- A description and justification of the proposed outcomes and alternatives; and

- A series of recommendations based on the results of the investigation.

The field work component of this project has been conducted by Julie Dibden, Andrew Pearce, Rebecca Parkes, Georgia Stannard, Phillip Roberts (NSW Archaeology Pty Ltd), David Pope (Pejar Local Aboriginal Land Council), Melissa Merritt and Anthony Merritt, (Onerwal Local Aboriginal Land Council). This report has been written by Julie Dibden.

3. PARTNERSHIP WITH THE ABORIGINAL COMMUNITY

The NSW DECC requires proponents to undertake consultation with the Aboriginal community “...as an integral part of the impact assessment” process (NSW DEC 2004). When administering its approval functions under the NPW Act the NSW DECC requires applicants to have consulted with the Aboriginal community about the Aboriginal cultural heritage values (cultural significance) of Aboriginal objects and place present in the area subject to development (NSW DEC 2004).

The NSW DECC has formalised the process of Aboriginal consultation with the introduction in late 2004 of the Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants (IGACC) (NSW DEC 2004).

Fulfilment of the consultation requirements as outlined in the IGACC document has been undertaken as follows:

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 24th July 2007 has been supplied to the following bodies:

- Pejar Local Aboriginal Land Council;
- Onerwal Local Aboriginal Land Council;
- Native Title Services;
- Upper Lachlan Shire Council; and
- The NSW Department of Environment and Conservation (now NSW Department of 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 27th July 2007 edition of the Crookwell Gazette.

Pejar Local Aboriginal Land Council registered a written interest in this project. Accordingly a study methodology was sent to Pejar LALC.

The proposal area is situated within both the Pejar Local Aboriginal Land Council and Onerwal Local Aboriginal Land Council boundaries. Accordingly representatives of both Land Councils participated in the field assessment. A draft copy of this report has been provided to each of these Local Aboriginal Land Councils. Pejar LALC responded with comments on the draft report that have been incorporated into the recommendations of this final report.

4. DESCRIPTION OF IMPACT

The information contained in this section of the report is provided in accordance with the NSW NPWS (1997) guidelines for archaeological survey reporting. A full description of the proposal and its potential impact on the landscape and heritage resource is described below. This information includes a summary of the impact history of the study area.

4.1 Impact History

The impacts relating to the Gullen Range wind farm are situated on farm land and also in road easements. The impact history of the area is therefore related to farming activities and road construction. Some additional albeit minor previous impacts are related to small scale mining activities. The Non-Indigenous history of landuse of the local area is documented in Section 8 of this report and therefore is only briefly referred to here.

Land clearance commenced in the region with its occupation by early settlers during the mid 1800s and has continued into the recent past. Following clearance the arable land was utilised for various farming pursuits including potato and wheat cropping and more recently for pasture improvement related to sheep and cattle grazing. Other more localized impacts included building and fence construction.

Land clearance and agricultural activities 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 moved, resulting in some loss of their original depositional context (both spatially and vertically).

4.2 Proposed Impacts

The proposal entails the construction, operation and eventual decommissioning of the following:

- Up to 84 wind turbines, each with three blades measuring up to 50 metres in length, and mounted on a tubular steel tower measuring up to 85 metres high;
- Electrical connections between wind turbines using a combination of underground cabling and overhead concrete pole power lines;
- Underground communications cabling;
- A substation and transmission connection linking the wind turbines to the existing TransGrid 330kV transmission system which passes across the proposal site;
- Access roads for installation and maintenance of wind turbines; and
- An onsite control room and equipment storage facility.

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

- Turbines

The proposed wind turbine envelopes are shown below in Figures 2 and 3.

Turbines will possess three blades measuring up to 50 metres in length mounted on a tubular steel tower measuring up to 85 metres in height.

The ground disturbance associated with each turbine will include the construction of reinforced concrete footings excavated to a maximum size of 15 x 15 metres.

A hardstand area adjacent to the turbine footings which could measure up to 40 x 22 metres is required for a crane. A delivery area for the various components is also necessary. In most cases it is anticipated that the turbine access track could be used as a delivery area.

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

- Electrical Connections

The onsite electrical works will include on-site power reticulation cabling (underground and overhead) at either 22,000V or 33,000V linking the four groups of turbines (Kialla, Bannister, Pomeroy and Gurrundah) and the turbines to a Substation. Underground cabling is proposed between the turbines, with overhead cabling proposed in some 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 and where possible the trench routes will follow access tracks, with short spur connections to each turbine.

Overhead cabling would require an easement of ca. 40 metres wide and is proposed to be erected on 17- 20 metres high single wood or concrete poles spaced 150 - 300 metres apart, with spans avoiding all wet areas. Postholes would be 1.5 - 2 metres deep and ca. 0.5 metres in diameter.

- Substation

A substation is required to convert power from onsite reticulation voltage of 22kV or 33kV to a transmission voltage of 330kV suitable to connect to the TransGrid transmission system.

The substation is indicated to occupy an area measuring ca. 200 x 150 metres. The substation will be fenced and the ground covered with crushed rock and partly by concrete pads for equipment, walkways and cable covers.

- On-site Control and Facilities Building

An on-site Control and Facilities Building which will house instrumentation, control and communications equipment is proposed. The building will measure up to 25 x 15 metres and will be built on a concrete slab. Control and communications cabling is also required to extend from the Control and Facilities Building to each turbine and to the site Substation. The control cabling will be installed using the same method and route as the power cabling.

4.3 Potential Impacts

Given that the proposed works entail ground disturbance the project has the potential to cause impacts to any Aboriginal objects which may be present within the zones of direct impact. It is noted that impacts will be confined to cleared areas currently utilised for grazing and cultivation; where possible existing access roads will be used and where necessary these will be upgraded. Electrical connections will generally be installed within access roads. Impacts can be summarised as small and discrete in area.

The total area encompassed by the development envelope measures approximately 1400 hectares and direct impacts are proposed for a low proportion of that area. The total impact area may measure as much as 91.5 hectares (see Table 1 below) and this is calculated to be c. 6.54% of the total area. Accordingly more than 93% of the ground surfaces in the proposal area will not sustain impacts with the concomitant result that the majority of the archaeological resource in the envelope will be exempt from development impacts.

	Quantity or length	Dimensions	Total area (hectares)	Description of existing land
Turbine footing	84 turbines	15 x 15m	1.89	Pasture
Access and crane stand	84 turbines	40 x 22m	7.39	Pasture
Access and spur roads onsite	45.0km	8m	36.00	Existing tracks and Pasture
External site access	4.6km	8m	3.68	Existing road/road easement, pasture
Underground powerline cabling onsite	45.0km	2m	0.00	Predominantly located within access roads
Overhead powerline cabling/easement	13.0km	20m	26.00	Existing tracks and pasture
Substation	1 substation	200 x 150m	3.00	Pasture
Control building	1 control room	25 x 15m	0.04	Pasture
Concrete batch plant	2 concrete batch plants	100 x75m	1.50	Pasture
Construction compound, staging and storage	4 areas	3 ha	12.00	Pasture
Total impact area			91.50 hectares (6.54%)	
Development envelope area			1400 hectares	

Table 1. Breakdown of the different components of the proposal and the area of land which will be impacted (supplied by client).

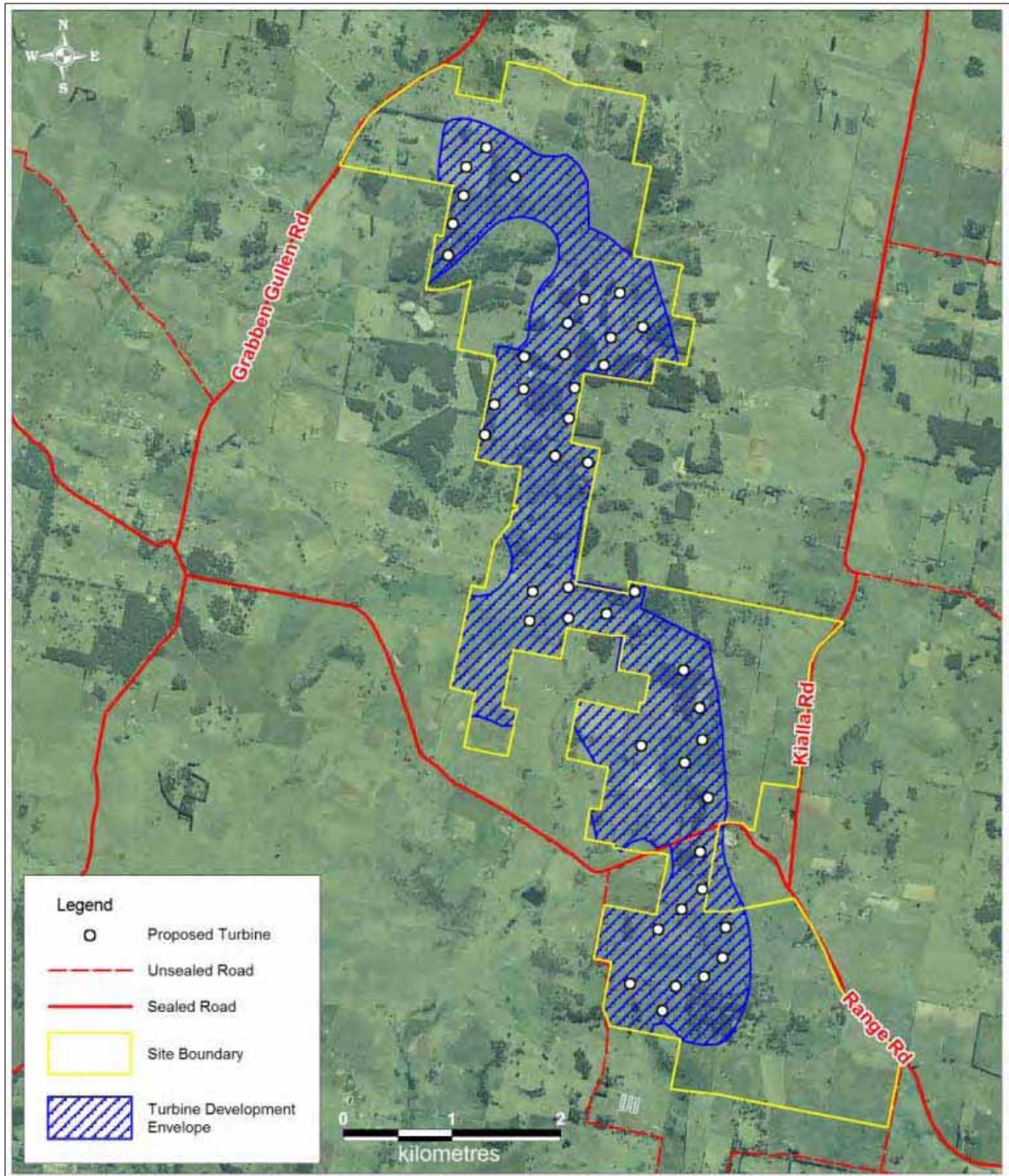


Figure 2. Kialla and Bannister development envelopes (supplied by client).

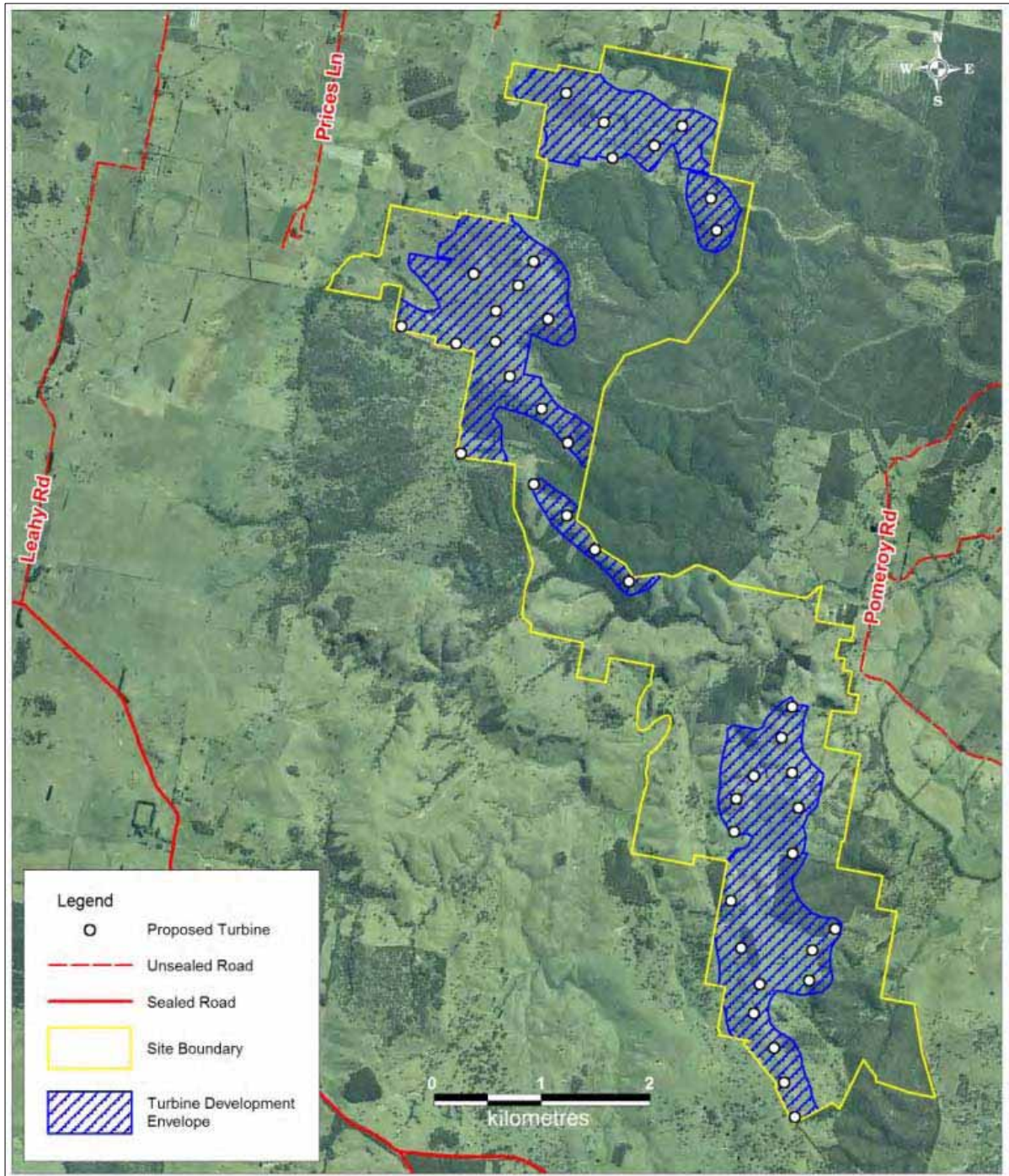


Figure 3. Location of Pomeroy and Gurrundah development envelopes (supplied by client).

5. STUDY METHODOLOGY

This archaeological study has included the following components:

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

5.1 Literature Review

Background research has been conducted to determine if known Aboriginal objects and Non-Indigenous items are located in the proposal area and to assist in the construction of a relevant model of site type and location.

The following information sources were accessed for this study:

- NSW DECC Aboriginal Heritage Information Management System
- Relevant archaeological reports held in the NSW DECC Cultural Heritage Unit
- Historical sources and databases
- Relevant topographic maps

5.2 Field Survey and Methodology

The field survey was designed to encompass all areas of proposed impacts as defined by four turbine envelopes, but inclusive of additional components such as roads and transmission lines located outside each envelope. Field survey entailed a foot survey and was undertaken by seven people. Survey coverage is described in Section 9 of this report.

The field survey was aimed at locating Aboriginal objects and Non-Indigenous items. An assessment was also made of prior land disturbance, survey coverage variables (ground exposure and archaeological visibility) and the potential archaeological sensitivity of the land.

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

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

the landscape. Given that artefacts are continuous in distribution and not discrete ‘site’ occurrences artefact distribution is better conceptualised in continuous terms.

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

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

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

Field survey was designed to assess the archaeological sensitivity of the entire proposal area. The survey methodology entailed walking parallel transects across individual archaeological terrain units with each surveyor situated ca. 10 – 20 m apart. Each terrain unit was surveyed until the entire area had been systematically inspected. This methodology enabled direct visual inspection of as much of the ground surface of each Survey Unit as practicable.

5.3 Survey Coverage Variables

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

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

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

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

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

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

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

6. LANDSCAPE CONTEXT

A consideration of the landscape is necessary in archaeological work in order to characterise and predict the nature of Aboriginal occupation across the land (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 that are known and understood within the context of social and cultural practice.

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

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

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

6.1 Topography, geology and vegetation

The district around Crookwell is mountainous (sic), and the scenery generally bold, and some of it very fine; but even the tops of the ranges and on the slopes - and of course always in the valleys - there is splendid land, while around there is an immensity of country most of which is probably not worth taking up, though there is undoubtedly some that will yet, as the population increases, be cleared and turned to account (By the Scout: The Sydney Mail Saturday November 20, 1886)

The proposed Gullen Range Wind Farm is situated to the east and south east of the village of Grabben Gullen on the Southern Tablelands of New South Wales. The wind farm site extends for an overall distance of approximately 22 kilometres along the Gullen Range. The nearest town is Crookwell located at six kilometres to the north of the Kialla development envelope. Goulburn is located approximately 18 kilometres to the east.

The turbines are proposed to be installed on the generally broad, undulating ridge of the Gullen Range. The highest elevation at the site is approximately 1000 metres. The landform elements located within the zones of proposed impact include ridge and spur crests, simple slopes and drainage depressions.

The Gullen Range on which the turbines are proposed is a broad plateau which is undulating and possesses slopes which vary between relatively flat to moderate gradient. The land falls to the east as simple slopes which vary between moderate to steep gradients.

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

The majority of the development envelope is cleared and currently utilised for grazing. Much of the land has been pasture improved. Prior to European land clearance the proposal area would have been covered with woodland tree species and can accordingly be characterised as a woodland resource zone. The immediate local area possesses limited biodiversity; the proposal area is situated away from a confluence of resource zones. Accordingly the area would have been utilised by Aboriginal people for a limited range of activities which may have included hunting and gathering and travel through country. Such activities are likely to have resulted in low levels of artefact discard distributed in a spatially dispersed rather than focused manner. The nature of stone artefacts discarded can be expected to have been correspondingly limited in terms of artefact diversity and complexity.

Summary

The impact areas relating to the proposed Gullen Range Wind Farm are situated primarily on the Gullen Range plateau. The area is subject to high wind speeds and according such an environment is unlikely to have been a favoured area for Aboriginal occupation.

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

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

7. ARCHAEOLOGICAL CONTEXT - INDIGENOUS

7.1 Social geography

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

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

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

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

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. Pleistocene occupation sites are however few with the majority of recorded sites dating from the mid to late Holocene. It is nevertheless reasonable to assume that the Goulburn/Crookwell area was occupied and utilised by Aboriginal people from the late Pleistocene onwards.

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 the extent of group territories at the time of European arrival.

Tindale (1974) determined that the area of present-day Goulburn was situated at the boundary of two tribes – the Gandangara to the north and the Ngun(n)awal to the south. Tribal boundaries are derived principally from linguistic evidence and a virtually identical correspondence in word lists recorded from both the Ngun(n)awal and Gandangara languages has been observed (Eades 1976:6). Because of this there remains conjecture as to which of these two groups actually occupied the region in which the study area is situated at the time of European settlement.

Smith (1992) suggests that the current location of Goulburn fell within the territory of the Gandangara and was in effect an intersection of boundaries and a 'cross roads' for at least six Gandangara 'bands', including the Burra Burra, Tarlo, Wollondilly, Cookmai, Parramarrago and Pajong (Smith 1992: 45). According to Smith's research (1992: 5) at least one of these 'bands', the Burra Burra, had strong links with the Gandangara of the O'Connell Plains south of Bathurst and may have occupied a traditional range extending as far south as Lake George. Reference to Smith's (1992) map indicates that the proposal area is situated between the Burra Burra band area (to the north) and Pajong band area (to the south).

The paucity of reliable ethno-historic sources for this early period of European settlement also means that an estimate of the pre-European Aboriginal population of the district cannot confidently be established. By the time any dependable observations were made small pox, influenza and the effects of European settlement had

devastated the local Aboriginal populations. The number of Aborigines estimated to occupy the Goulburn Plains in 1827 was 45 (Smith 1992: 22). It is variously estimated that by the last years of the 1840s the local Aboriginal population had been reduced to 25 individuals (Smith 1992: 30) or less than 20 (Lance and Koettig 1986:13). This is a slight number when one considers that in 1839 Aborigines are said to have outnumbered Europeans by 10 to 1 at the first Goulburn horse races to be held. Unfortunately the number of Europeans who attended the outing is not noted in this account.

Prior to European occupation the Aboriginal people of the area practiced a hunting and gathering economy. The study area is situated within both Onerwal and Pejar Local Aboriginal Land Council areas.

7.2 Previously Recorded Sites

A search of the NSW DECC Aboriginal Heritage Management Information System has been conducted (AHIMS # 19576 – 24th July 2007). There are no previously recorded Aboriginal objects in the proposal area as listed on the AHIMS register. The AHIMS register only includes sites which have been reported to NSW DECC. Accordingly, this search cannot be considered to be an actual or exhaustive inventory of Aboriginal sites situated within the local area. Generally, sites are only recorded during targeted surveys undertaken in either development or research contexts. It can be expected that additional sites will be present within the local area but that to date they have not been recorded and/or reported to NSW DECC.

The most common Aboriginal object recordings in the region are distributions of stone artefacts. Rare site types include rock shelters, scarred trees, quarry and procurement sites, burials, stone arrangements, carved trees and traditional story or other ceremonial places. The distribution of each site type is related to variance in topography and ground surface geology.

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

7.3 Archaeology – The local area

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

Koettig (1983) surveyed the proposed highway by-pass route, to the south and east of Goulburn. Twenty two sites were located, all of which were surface scatters of stone artefacts situated within 200 metres of watercourses, but distributed over a variety of landform units. Fifty four percent were located on slopes, 23% on ridges and 23% along creeks or river flats. Most of the artefacts scatters were distributed at low density but one site (G17) located on a low sandbar on the eastern bank of the Mulwaree River near its junction with Gundry Creek was found to be a high density site with stratified deposit. Koettig (1983) recovered 650 artefacts from test pits, and when Paton (1990) later excavated that section of the site threatened by the construction of the freeway (about 15%), 15,000 artefacts were revealed. Of these less than 1% were formal tool types, 85% were of quartz and the next most frequent raw material was silcrete (10%).

Lance (1984) surveyed the route of a proposed pipeline between Sooley Dam and Rossi Weir on the Wollondilly River, finding a single quartz flake adjacent to Sooley Creek in conditions of reduced exposure.

Dallas (1985) conducted a survey of the Cullerin Range Bypass which extended between Breadalbane and Gunning for a distance of 31 kilometres. A total of 7 artefact scatters were recorded, six of which were found to the east of the Cullerin Range. During a subsequent survey of a realignment of the route conducted by Koettig and Silcox (1985) an additional 7 sites were recorded. However, these sites were thought to most probably represent a near continuous artefact distribution rather than individual sites. These latter sites were situated on elevated ground and close to a creekline in zones of high visibility. All of the sites recorded during these surveys, except for one near Breadalbane, contained small artefact numbers. Silcox (1993a) summarised the results of these two surveys indicating that in the local area open campsites are generally situated on slopes adjacent to water but were also found on creek flats and ridges.

Koettig (1986) carried out an excavation of one of the sites (CR14) on the Bypass route which was situated on a small knoll overlooking a creekline. An extensive assemblage of mostly quartz artefacts was retrieved with material occurring in variable density across the site. Both quartz and silcrete were found to have been worked by both direct percussion and bipolar flaking techniques.

Lance and Koettig (1986) compiled an Aboriginal Resources Planning Study for the City of Goulburn. Using ethnographic, environmental, archaeological and sampled field survey data, an Aboriginal site location model for the Goulburn area was proposed. Four landform zones were designated (major watercourses, undulating hills and plains, hill tops and built-up areas), and each assigned an archaeological sensitivity and site significance rating. The most common site-type within the Goulburn region was found to be stone artefact scatters situated within the undulating hills and plains zone and predominantly on basal slopes adjacent to watercourses.

Silcox (1988) conducted a survey at a reopened slate quarry at Chatsbury. Three surface scatters of stone artefacts were located (C1 – 33 artefacts; C2 - 25 artefacts; C3 – 23 artefacts) with quartz being the dominant raw material, and silcrete, chert, acid volcanic and ‘other’ also present. These sites were all located within 50m of the Tarlo River, on lower slopes. The characteristic landform of the area consisted of prominent rounded hills with moderate to steep slopes and sloping valley floors. The survey area was situated at the junction of the Tarlo River and Kings Creek. Site C1 was located on a gentle to moderate slope leading down to the original course of the Tarlo River (the river having been diverted when the original mine operated). Site C2 was located on the lower slopes of a spur ridge adjacent to the river. Site C3 was found along a steep eroding bank of Kings Creek. Silcox (1988) identified several potential campsite locations, and it was determined that excavation should be carried out at two of these (CA & CB). CA was an area of moderately sloping land on both sides of the original course of the Tarlo River. Location CB consisted of an expanse of flat ground bordering the west bank of the original Tarlo River.

Test excavations were subsequently carried out (Silcox 1989) at both locations near to the river, but only 5 artefacts were recovered. The 5 artefacts that were recovered from excavation were all from the uphill end of location CA. The absence of subsurface material from the majority of the test locations was explained to be the result of a real absence of past activity on the sites.

Fuller (1989) conducted a further archaeological investigation of Aboriginal site location within the Goulburn area, and in so doing explored and developed Lance and Koettig’s (1986) model. Locating 17 artefact scatters and 5 isolated finds during field survey, it was found that the majority of sites were small low density scatters of less than 10 artefacts. However, at one site (GC5) more than 100 artefacts were located, while at another (GC4) an estimated 1000 artefacts were scattered over an area measuring 1 km². Quartz, chert and silcrete were the most common stone from which artefacts were made. Fuller’s analysis largely supported Lance and Koettig’s (1986) model and added further refinement with regard to the landform unit ‘undulating hills and plains’ (discussed further below).

Silcox (1991) conducted a field survey and test excavation at a proposed storm flow detention pond in Goulburn, adjacent to the Wollondilly River. The area was situated on an extensive elevated surface overlooking the wide floodplain. No artefacts were found and this was attributed to thick grass cover producing low levels of ground visibility. Subsequent subsurface testing recovered 97 artefacts from a total of 30 pits (Silcox 1991). Artefacts were found to be present in low numbers; density ranged between 36/m² and 1.5/m². The stone artefact assemblage was dominated by quartz (78%) with silcrete representing the next most common raw material.

Williams (1992) surveyed archaeologically sensitive areas located on a proposed Optus cable route between Goulburn and Campbelltown. In the Goulburn district he conducted both surface survey and subsurface testing in the vicinity of G17, the site previously located by Koettig (1983) adjacent to the Mulwaree River and later reinvestigated by Paton (1990). While no artefacts were located on the western side of the river, some were recovered from surface survey and deposits at G17. Examination of Koettig’s (1983) site G19/20 led to the relocation of 53 of 191 artefacts originally recorded at that site.

Australian Archaeological Survey Consultants (1993) surveyed some 5 kilometres of a proposed Telstra optical fibre cable route between Goulburn and ‘The Forrest’, and located 3 very low density artefact scatters, 4 isolated finds and a possible scarred tree.

Silcox (1993a) carried out test excavations at a proposed ironstone mine access road near Breadalbane. While no sites had been identified in a previous survey (Silcox 1992), two areas of potential archaeological sensitivity were noted, one on a gentle slope and the other on a flattish saddle at the end of a ridge. The excavation work conducted at these two locations retrieved 4 artefacts from a total of 57 pits at the site situated on the gentle slope. None were found at the site situated on the broad flatfish saddle.

Effenberger (1994) conducted a survey of the new Goulburn racecourse, an area of 93 ha, and located 2 isolated finds.

Silcox (1995) surveyed the route of a proposed power line and Telstra radio base at Sunnyside, some 14 kilometres south west of Goulburn. Two artefact scatters and one isolated find were located. Site S1, an extensive but low density scatter calculated to be comprised of at least 2,500 lithic artefacts, was situated on a low, broad spur ridge at the base of a major ridge system some 3.75 kilometres west of the Mulwaree River and 100 m from a tributary creekline. S2 consisted of 4 artefacts distributed across an area of 50 m on the opposite side of the tributary creekline.

Stuart (1995) carried out a survey for proposed effluent irrigation areas east of Goulburn and near to the Wollondilly River. Two small artefact scatters and 2 isolated finds were located, both of which were situated in Lance and Koettig's (1986) high potential 'zone 1', which in this instance was near to the Wollondilly River.

Kuskie (1996) surveyed the proposed site of a rural residential development on Lots 2-4 DP835933, just south west of the Goulburn township. One small artefact scatter and 1 isolated find were recorded. The scatter was located in the middle of a lower slope, 150m east of a minor drainage line, and consisted of two silcrete flakes.

Navin Officer Heritage Consultants (2000) conducted an archaeological assessment for the raising of Sooley Dam, 5.5 kilometers north west of Goulburn, as part of the Goulburn Water Supply Augmentation Project. The survey encompassed low hills and gently undulating land in areas on both sides of creeks subsequently inundated by Lake Sooley. The area was assessed to be of low archaeological potential. No Aboriginal sites or areas with archaeological sensitivity were recorded.

Dominic Steele Consulting Archaeology (2003) conducted a survey in relation to the proposed Goulburn Sewerage Augmentation works within Goulburn itself, in the areas of Ross Street, Gorman Road and sections of Kenmore Hospital. The proposal area was situated predominantly on flat and/or undulating elevated land overlooking the Wollondilly River. The area was found to have been significantly disturbed by European development. One scarred tree was relocated, 2 possible scarred trees identified, and 1 quartz flake located. It was assessed that the proposal had low potential to cause impacts to subsurface deposits of significance.

Navin Officer Heritage Consultants (2003) carried out a survey for the proposed Pictura Tourist Complex on the lower catchment of the Run of Waters Creek south of Goulburn. The study area is situated on a broad low gradient ridge and adjoining low to moderate gradient mid and upper slopes. A 1st to 2nd order tributary stream traversed one corner of the 37.8 ha property. One low density artefact scatter was found situated on a broad, low gradient spur top over 700 m from the watercourse, and consisting of one chert flake and one silcrete flaked piece.

Dibden (2004a and 2004b) carried out a survey of the Greenwich Park subdivision area situated northwest of Goulburn. A large number artefact scatters were recorded on spur crests, spur side slopes and drainage depression/spur side slope interface landforms in conditions of very good archaeological visibility. Artefact density which was calculated according to effective archaeological visibility was found to be extremely low.

Saunders (2007) conducted a survey in response to two subdivision proposals at Parkesbourne near to the Pomeroy development envelope. The Pomeroy Road study area consisted of long, low gradient basal slopes along the Wollondilly River and was accordingly considered to be of high archaeological sensitivity. The Gurrundah Road study area consisted low gradient basal spur slopes, flats and drainage lines in a broad sheltered valley; this area was also predicted to be of high archaeological potential. Twelve stone artefact scatters were recorded in the study areas. The majority of artefacts were made from silcrete (58%) with quartz comprising 28 %. Chert, quartzite and volcanics were found in low frequencies.

At Pomeroy Road the results indicated that sites can be expected to occur within 200 metres of the Wollondilly River and that artefacts may be expected to occur at low density away from the river. At the Gurrundah Road study area the results indicated that sheltered valleys possessing low gradient spurs overlooking drainage lines were similarly ideal camp site locations in which a range of activities were undertaken (Saunders 2007).

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

At Crookwell Jo McDonald Cultural Heritage Management (1998) conducted salvage excavation at the proposed Crookwell wind farm. Excavating a total of 25 1 m x 1 m squares, 2,154 stone artefacts were retrieved, with this find interpreted as '...indicating a single limited encampment where one (or several) person(s) knapped a limited range of raw materials (silcrete, chalcedony and quartz) to produce a set of

distinctive tools...’ including 10 complete *Pejar Points*. The site was located on a secondary spur with a westerly aspect and was situated at ca. 1 km from Middle Creek.

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

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

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

Dibden (2006a) conducted the archaeological assessment of the proposed Cullerin Wind Farm situated east of Gunning. The impact area at Cullerin was located primarily on the high, exposed ridge crest of Cullerin Range. Based on the environmental context including high wind speeds, low biodiversity values and absence of reliable water the impact area was assessed to have been utilised for low levels of Aboriginal occupation and hence to be of low archaeological sensitivity. This prediction was confirmed by the survey results; four locales containing stone artefacts were recorded and calculations based on an analysis of effective survey coverage indicated that artefact density was low across the impact area.

Dibden (2006b) conducted the archaeological assessment of the proposed Conroys Gap Wind Farm situated southwest of Yass. The impact area at Conroys Gap was located primarily on the high, exposed ridge crests of Black Range. Based on the environmental context including high wind speeds, limited natural resources and absence of reliable water the impact area was assessed to have been utilised for low to very low levels of Aboriginal occupation and hence to be of low archaeological sensitivity. This prediction was confirmed by the survey results; nine locales containing stone artefacts were recorded and calculations based on an analysis of effective survey coverage indicated that artefact density was low across the impact area.

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

7.4 Predictive Model of Site Type and Location

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

Lance and Koettig (1986) developed a predictive model for Aboriginal site location around Goulburn City based on four defined environmental zones – major watercourses, undulating hills and plains, hill tops and built-up areas. This model was later tested and refined by Fuller (1989) who conducted surface surveys of these

zones. Areas of good exposure and natural erosion were targeted however no subsurface investigation was involved.

Fuller (1989) recorded 17 open artefact scatters and 5 isolated finds during this survey. These sites were found across all environmental zones as previously defined by Lance and Koettig (1986), including those indicated as less archaeologically sensitive. Eleven of the 17 open sites were recorded in Lance and Koettig's (1986) 'Zone 2: Undulating hills and plains', predicted in their model to be of low archaeological sensitivity, including GC4 and GC5, estimated by Fuller (1989) to contain over 1,000 and 100 artefacts respectively. Nine of the 11 sites located in the 'undulating hills and plains' zone were situated on mid-slope landform units.

From the results of this survey Fuller (1989) produced a subsequent augmented model of predicted Aboriginal site location in the Goulburn City region, based on a combination of: - proximity to watercourses; the nature of those watercourses; elevation; and steepness of slope. Fuller's (1989) conclusion was that Aboriginal occupation in the Goulburn area appeared to be concentrated to a large extent around utilization of the resources of the Mulwaree and Wollondilly Rivers, although the presence of other lesser watercourses distributed at intervals throughout the region meant that land usage was not limited to these major rivers.

Subsequent surveys carried out in the broader region, cited above, have to a large extent borne out Fuller's (1989) findings. Consequently, a predictive model for Aboriginal sites in the Southern Tablelands informs that Aboriginal sites will be found across a broad spectrum of topographic units such as slopes, hilltops, ridges, spurs and watercourse flats (Silcox 1991), and according to Lance & Koettig (1986) and Fuller (1989), within close proximity to watercourses. Koettig (1983) has identified that larger sites will be contiguous with major streams, while lesser sites will be associated with low order watercourses.

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

Stone Artefacts

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

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

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

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

Grinding Grooves

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

Burials sites

Burial sites have been recorded within the wider region. Fuller (1989) refers to historical records which indicate that hill tops were used by Aborigines in the Goulburn and surrounding districts for the location of burial sites and ceremonial grounds. Fuller (1989) suggests that most of these sites have been destroyed by erosion and disturbance since European occupation. Additionally, Fuller indicates that due to the acidic soils throughout the region bone preservation is likely to be poor.

This site type is rarely located during field survey. It is possible that burials may be present in the study area although their detection is less likely.

Rock Shelter Sites

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

Scarred and Carved Trees

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

Bark removal by European people through the entire historic period and by natural processes such as fire blistering and branch fall make the identification of scarring from a causal point of view very difficult. Accordingly, given the propensity for trees to bear scarring from natural causes their positive identification is impossible unless culturally specific variables such as stone hatchet cut marks or incised designs are evident and rigorous criteria in regard to tree species/age/size and its specific characteristics in regard to regrowth is adopted.

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

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

Stone Quarry and Procurement Sites

A lithic quarry is the location of an exploited stone source (Hiscock & Mitchell 1993:32). Sites will only be located where exposures of a stone type suitable for use in artefact manufacture occur. Several siliceous stone outcrops occur in the proposal area and accordingly there is some potential for quarries to be recorded during the study.

8. ARCHAEOLOGICAL AND HERITAGE CONTEXT – NON-INDIGENOUS

8.1 Historical Context

European Exploration and Settlement

The first Europeans to explore the Southern Highlands were John Wilson, John Price and Roe, who in 1798 made their way to the area of present day Mittagong (Bayley 1975). Later in that same year Wilson proceeded further south, reaching as far as Towrang near the Goulburn Plains.

However it was not until 1814 that Hamilton Hume started to explore the country to the south of the established colony more fully. On this first expedition he traveled through the region which later became known as Argyle. Hume revisited this area several times over the following years and in 1818 returned with a party that included the Deputy Surveyor James Meehan. On this journey Hume's party arrived at Lake Bathurst on 3 March, after which Meehan traveled north-west with a smaller party and reached that area now called the Mulwaree Chain of Ponds with its extensive rolling plains (Taylor 1987). Other subsequent exploration parties to the district were led by Throsby – 1818, Throsby-Smith – 1820, Wild – 1820, and Kearns – 1822 (Navin Officer Heritage Consultants 2003:8). When these groups reported that the countryside in the Argyle region was most suitable for the purposes of grazing, the area was quickly occupied by cattlemen (Bayley 1975).

Several forays were then made to the Bathurst district from the Southern Highlands. Throsby left Wingecarribee in 1819 with three white men, one Aboriginal guide and two interpreters. They passed through the Taralga area and crossed the Abercrombie River southwest of Mount Werong. A further trip was made by Meehan a year later, making his way southwest from the Wingecarribee to the junction of the Paddys and Wollondilly River. They then traveled due west to the headwaters of the Wollondilly within the vicinity of Crookwell. Meehan camped at Grabben Gullen where he reported a light frost on the morning of April 25 1820. He then continued on to Bathurst via Orange and Wellington (Bayley 1975).

Later, following European settlement of the area, the Durack, Costello and Tully families made their famous trek to Queensland from Grabben Gullen, eventually reaching as far as the Kimberly (Bayley 1975).

Alienation of Lands and early European Settlement

When New South Wales was settled as a British Colony in 1788 all lands became the property of the Crown. A major component of the colonial process was the creation and maintenance of spatial order (Jeans 1966:205). The alienation of land was controlled at the discretion of the colonial government, initially under direction of the Colonial office in London. Grants, in the first instance, were offered to officers and civil servants as both reward and incentive to relocate. This was later extended after Governor Phillip was instructed to grant land for farming to discharged soldiers, free settlers and convicts who had served their term (Shaw 1970:11).

As the population and demand for land increased, measures were adopted by both the government and settlers to enable the spread of settlement and an increase in agricultural production. With a further increase in the population of settlers and livestock numbers after 1800, the demand for land continued to grow.

In 1822 J. T. Bigge filed his Report to the Commissioner of Inquiry into the State of the Colony of New South Wales. Bigge had been dispatched to the Colony in 1819 by the British government to establish, among other things, if the Colony was achieving its aims as a penal settlement and to consider its development and commercial viability. Bigge recommended an increase in land grants, but only to those who could contribute to an increase in pastoral production (Molony 1988:45). Assigned convict labour was intended to assist with the maintenance of pastoral properties granted under such a system.

Governor Macquarie continued to grant land to cater for the needs of increasing livestock numbers. Although alienation was not allowed without survey, by 1821 about 340,000 acres of land grants could not be located as their issue had outpaced the ability of surveyors to accurately determine their placement (Perry 1965:44). The three-man survey department was not able to cope with the demands made on it and the number of uncompleted surveys of the country beyond the immediate vicinity of Sydney began to mount. In an attempt to address this situation the colonial authorities declared in 1825 that the area to be settled would be divided into nineteen counties and their parishes. In what became known as the 'Limits of Location' temporarily restricted land around Sydney was granted to these first nineteen counties in 1826. The southern boundary of these nineteen counties was the latitude of Batemans Bay (Ellis 1997:27).

The Goulburn Plains were found to be attractive land for European grazing purposes as they were extensive, lightly timbered, had an abundance of native grasses, and the water provided by the Chain of Ponds appeared to be permanent. The granting of land in the district of Argyle was first promised to the public in 1822, and the township of Goulburn was established in 1824. However, settler expansion by land hungry graziers into these newly discovered districts south of Sydney was rapid, taking place before official grants were sanctioned. In part this was driven by the harsh droughts of 1825 and 1828, and vast expanses of uncultivated land were simply taken up by these first graziers without endorsement from the governing authorities (Navin Officer Heritage Consultants 2003:8).

In order to allow occupation of new lands, to satisfy demand and to maintain some control on the spread of settlement, the government introduced ‘tickets of occupation’ in 1827 in order to allow graziers rights over the lands they occupied (Carter 1994:9-10). These were replaced in 1828 by grazing licences. From that time, through a variety of means, there was a spread of both official and unofficial settlement, and Crown Lands began to be broken up into smaller portions.

Grants and sales, either directly or at auction, permitted the alienation of land. However demand outstripped supply. ‘Squatters’ began to occupy large tracts of land outside the settled districts beyond the control of the colonial government (Cannon 1988:9, Carter 1994:10-12). In order to wrest back control, various regulations were introduced to allow land to be leased or licensed for a fee to depasture stock. Sales as a result of improvements to land occurred later, along with sales at auction for a set minimum price per acre. Access to and availability of land, along with insufficient capital for many prospective landowners restricted expansion. The majority of suitable land remained in the hands of a wealthy few.

By 1850 settlement had spread throughout New South Wales and Victoria (Shaw 1970:45) at which time 3,000 squatters had the use of over 70 million acres of Crown Land (Jeans 1966:212). It was during this period that political support increased for small rural landholders. Support came from a number of groups, including:

- land owners seeking to restrict the squatters and capitalise on their own investments;
- tenant farmers seeking access to rural land;
- successful gold-miners with capital to invest in land;
- independent shopkeepers who resented the squatters use of Sydney wholesalers; and
- agitated politicians fearful of the growing power of the ‘squattocracy’.

In 1861 Sir John Robertson, the Minister of Lands, introduced legislation (Crown Lands Occupation Act 1861 and Crown Lands Alienation Act 1861) to allow selection of land by any person under certain conditions, at a set price of one pound per acre. One quarter of the purchase price was required up front, with the balance deferred as long as certain conditions were met. This legislation set minimum and maximum sizes for portions as well as orientation and boundary proportions. Selection could also take place prior to survey. The intention of this legislation was to allow access to land on fair and easy terms and promote closer settlement throughout the colony. Despite these intentions, the legislation failed in that loopholes and indiscriminate practices allowed the original landholders to maintain control of much of their original ‘runs’ (Carter 1994:21). By 1874 “... deserted farms are everywhere visible to the traveller ...” (Jeans 1972:213). Nevertheless, the policy of closer settlement continued and by the 1890s large land holdings had gradually given way to a myriad of smaller farms. As a result of World War I, the first half of the twentieth century saw Soldier Settlement land programs in place throughout Australia.

The modern landscape not only reflects a sequence of occupation and activity through a number of phases of ownership, improved technology and changing farm management practices, but also the evidence of legislative and administrative controls governing alienation and land use.

The Study Area

The land around Crookwell was located within the 19 Counties where settlement was permitted under Governor Macquarie. Squatting commenced and according to Bayley (1975) the names of many of these earliest *settlers* was not recorded. Bayley (1975) indicates that men were placed in outposts in the area before 1828. The Crookwell River was named in that year, possibly by William Stephenson, a convict from Crookhall in the County of Durham, England (Bayley 1975).

The name of the Bannister locality refers to Saxe Bannister, a former Attorney-General of Sydney, who while in England was granted 2,560 acres in 1838 after having occupied it for ten years (Bayley 1975). The first grants were largely used for grazing cattle on fenceless runs. Later fallen timber was used to make fences (Bayley 1975). By the late 1870s chock and log fencing commenced (Willis no date).

In 1843 Crookwell was known as Oaks station, though there were no houses up to that time (Bakers Australian Atlas 1848 in Bayley 1975). When the site of Crookwell appeared on the Georgiana County map it was called Kiama and was marked as a village reserve. The map also shows tracts of land held by Bradley, McAlister, Larkham, McPherson, Benjamin and Moses, Bray and Oakes. The Argyle map shows Bannister and Dickson on land at Gullen, Muckle and Darvall at Pejar, and Lithgow and others along the Wollondilly. In King County it shows Oakes occupying several lots, and at Grabben Gullen, Haywood, Richardson, Stephenson with 1,038 acres (Bayley 1975).

In 1849 Surveyor Armstrong visited the area with a government party and subsequently reported that small farms already occupied with homesteads were being offered for sale (Bayley 1975). The earliest buildings were constructed of slab walls and bark roofs. Horses roamed wild and were rounded up in big droves in which 500 – 600 head were mustered and then sold for their hides and boiled down for fat and bones; the flesh was fed to pigs (Bayley 1975).

Binda became the administrative centre of the district and police were stationed there. By 1852 a Post Office was established with mail runs delivered on horseback; initially once a week and by 1859 twice a week. At Grabben Gullen, a Roman Catholic Church was completed in about 1865.

Bayley (1975) records that there are very few references to Aborigines within the early European records relating to the district. However it is clear that Aboriginal people continued to reside in the area after Europeans settled. The Sydney Morning Herald on 18 January 1851 reported 100 ‘blacks’ headed by the king of the Lachlan tribe appearing near Binda to retaliate against the Crookwell blacks who allegedly had murdered some of their tribe. The Lachlan blacks were armed and made their way to the station of F. Oaks, where they ‘obliged’ the hut keeper to give up his rations. Rations were also taken from a road crew. The incident was resolved peacefully and the group returned to Carcoar (Bayley 1975).

The diary of James Ritchie (in Willis no date) provides valuable information regarding the transformation of the district during the late 1800s. Ritchie was born in Ireland in 1861 and immigrated to Australia in 1862. He arrived at Fullerton in 1868 where his father became stock supervisor on Fullerton Station. James’s earliest recollection went back to 1870. At that time he describes the whole district as ‘open’, meaning that it was possible to travel in any direction without coming across a fence. Each homestead possessed a small cultivation paddock, cleared except for stumps and enclosed by log fencings or perhaps a split fence. As well, there was usually a ‘bush’ paddock enclosed by a dog-leg fence used for saddle horses. Slip rails were used instead of gates. Sheep were shepherded and this was usually the work of old men. Cattle roamed without fencing and wild horses were numerous.

As the century progressed houses on farms were still generally made from slab and bark, however a few stone houses were beginning to be constructed (Willis no date). The bark roofs were unsatisfactory and needed to be replaced often. At this time glass windows were rare. When runs were divided up and smaller landholdings purchased the shepherds were no longer necessary. The country at this time was uncleared, but clearing by ring barking and then fencing later ensued. Kangaroos, wallabies, *native bears* (koalas), possums, native cats, tiger cats, kangaroo rats and *flying squirrels* (gliders etc) were numerous, and these animals were often killed for sport (Willis no date).

Wheat and potatoes were grown by nearly every household for family consumption. Large wooden ploughs were drawn by bullocks and hand made harrows were used for cultivation. Ritchie remembered that crops were usually good because sheep were shepherded and were used to manure the ground by sheep-folding; *that is* camping the sheep on crop land in folds made of portable hurdles. Crops were reaped by hand, and thrashing and winnowing were also done manually. Grain was trampled by bullocks and horses. Ritchie recalled that machines were introduced shortly after, with the first thrashing machines being worked by horsepower. At this time each householder had one or more 30 or 40 acre blocks purchased from the government at auction (Willis no date).

Roads were initially unsealed and horses were not shod, so that the sight of a shod horse hoof print in the road generally indicated the presence of policemen. By the 1870s native animals were still prevalent, wild horses became less numerous and domesticated horses started to be used for ploughing. Conditional purchase commenced during this period and attempts were made to secure runs already held; dummying was common. Houses continued generally to be constructed of slab and bark; though a few were being built in stone. Roads started to be metaled (Willis no date).

By the 1880s the runs were mostly enclosed and shepherds entirely dispensed with. Ringbarking and clearing continued. Wild horses were by that time gone. Possum shooting for profit commenced and by the end of the

decade was both profitable and popular. Kangaroo and Wallaby drives commenced, almost leading to their extermination. As many as 500 animals would be yarded or shot by a hunting party in one day. Hares appeared in about 1880 and by the middle of the decade were considered to be a pest. They were kept in check by drives; the Stock Board paid 2d per scalp (Willis no date). Houses were still made of slab but improvements to buildings included use of galvanized iron for roofing, glass windows and board floors (Willis no date).

By the 1890s all the best land was taken up and land clearance continued. Fencing was completed and all runs were enclosed. Native bears, native cats and kangaroo rats had disappeared. The bee-moth destroyed most of the bees (their hives had been plentiful in the bush). Hares were still plentiful; the bounty was still being paid and drives continued (Willis no date). Rabbits appeared in the mid nineties and despite Pastures Board offering 2d per scalp bonus they continued to increase and overran the district. The sweet briar was also overrunning the district at an alarming rate, however it was kept in check by the rabbits that also contributed to the disappearance of the hare (Willis no date). By the late 1880s the Scout reporting to the Sydney Mail referred to the desire of the local farmers to possess more substantial structures and that good solid stone or brick houses were springing up (anon 2002).

Wheat growing was almost discontinued due to the rabbit and hare plagues and also because of low prices. Hay was grown and now households had a stable for their horse which they now used more formally for draughting. Horses by then were generally shod and the bullock dray was superseded by the wagon and sulkies began to be used. All good land carried no green timber by this time; while clearing increased the carrying capacity of the land Ritchie (in Willis no date) recognized the mistake in removing all timber. The bee moth had disappeared and bees nest had returned in small numbers in the bush. Starlings first appeared about 1906.

Sarah Kennedy (in Willis no date) recalls growing up at Kialla. She was born in 1885 at Kennedyville, Kialla (Kialla was also known as Gullen in those days). She recalls that at that time there were 7 or 8 farms in the Kialla district: One thrashing machine serviced the area and was shared by the farms. Harvesting was a communal effort; every one worked for each other and as one farm was finished they would move on to the next. Like Ritchie, Sarah Kennedy recalled the hare drives in the area.

Sarah Kennedy remembered cricket as being their “real entertainment”. The district clubs included Binda, Fullerton, Crookwell, Kialla, Bannister and Rockdale. There were problems, in that the cricket pitch was in the Haywood’s paddock but when Haywood died it was bought by the Gays and cricket was not played there again.

At Kialla a one-round public school constructed of rubble stone was built in 1873. The Methodist church was built of stone and opened in 1871. Isaac Churchill was one of the earliest settlers in the 1830s. The Anglican Church of St George was built of blue stone and opened in 1904 (Bayley 1975).

At Grabben Gullen a brick public school, which is still standing was built in 1891, one of the teachers being Thomas Dibden. This school replaced an earlier school which had opened in 1869 as a half time school sharing a teacher with Crookwell (Bayley 1975). At this time Grabben Gullen also possessed a store and hotel.

Mining and Bushranging

The mineral wealth of the area was not great and mining was never a major endeavour in the area. Gold was found at the head of the Wollondilly in 1851, and later on the Abercrombie and at Tuena. The Tuena Creek diggings were mined over four or so years until the gold ran out. Small amounts of gold were removed from the Crookwell River three or four miles from Crookwell in 1872. Bayley (1975) argues that in the 1850s and 60s gold encouraged bushranging and by the end of the 1850s *robbery under arms* became prevalent in the district. The Binda Police, already considered to be deficient, found controlling the bandits difficult (Bayley 1975).

The bushrangers Ben Hall, Gilbert and Dunn were visitors to the area where they enjoyed the enforced hospitality and harbour of the local settlers. The trio attended the Christmas dance at Binda in 1864. They first called at the local Flagstaff Store and forced the proprietors, the Morris’s, to dress and attend the ball. At the dance they bailed up the party goers to caution them and then joined in the revelry. Near the end of the night they learnt that Morris was plotting to capture them. They duly proceeded to the store and burnt it to the ground.

The Crookwell Iron Mine operated during the 1940s at Back Creek, situated 5.5 miles from Crookwell. The mining operation was conducted by the Australian Iron and Steel company. The creek bed was lowered so that the mine could operate and a railway loading dump was installed in the Crookwell goods yard. Three hundred

tons of ore was removed daily from the site between 1941 and 1945 and dispatched by iron ore special trains to Port Kembla (Bayley 1951).

Agriculture

By 1860 wheat became the staple agricultural product in the district and a number of flour mills still stand and attest to this important element of the local history. “The farms around the settlement of the district waved with gold on every hand. Crookwell, Binda, Gullen, Bannister and Wheeo rustled with waving wheatfields” (Bayley 1975).

Soil was originally broken up with potato crops and then planted with crops such as oats and barley. As Ritchie recalled (see above) in the early years grain was threshed by trampling with horses; by the 1870s threshing machines were introduced to the district and were used collectively between a number of farms. The wheat was cut by hand with sickles and fed into the machine; the clean grain was then delivered into bags for transportation (Bayley 1975).

By the 1880s between 300 and 400 farms were located within a 15 mile radius of Crookwell. Four flour mills serviced these farms, two at Crookwell, one each at Laggan and Binda; 15 threshing machines operated in the district (Bayley 1975). Laggan had previously been the centre for wheat milling, however by 1871 a mill was opened at Crookwell. Crookwell supplied wheat flour to Sydney. A second mill (Cox’s Mill) was built in 1881. Flour was transported by wagon to Goulburn and thereafter by train to Sydney. The first mill closed near to the end of the nineteenth century and the second closed in 1908. Cox’s mill was later converted to a freezing works for rabbits (Bayley 1975).

Sheep were used by early settlers for *stooling* their wheat. A flock of sheep was placed for a short time in a paddock of young wheat. The sheep ate the top of the plant causing many stalks to grow, thereby increasing the number of ears and consequently production. Cattle on the grazing paddocks ate off the tall grass which the sheep would only eat when short (Bayley 1975). By the turn of the 20th century sheep raising began to replace wheat production (Bayley 1975). Nevertheless, cattle were important, and by 1899 it was estimated that there were 37,000 head in the district. Cattle were driven to Goulburn for trucking to Sydney by rail or driven overland to centres in Victoria. Wool prices declined during the 1930s and some farmers found dairying more lucrative; butter production became important in the area (Bayley 1975). By the 1950s wool prices rose and cream supplies to the butter factory in Crookwell declined; butter production ceased with the closure of the factory in 1956 (Bayley 1975). For a short while after the butter factory operated as a cheese factory, before becoming a freezing works for rabbits and poultry.

The butter factories had been established around the district in the 1890s at localities such as Grabben Gullen and Kialla (Bayley 1979). In order to grow their dairy cattle over winter farmers prepared silage for winter feed; former wheat paddocks were given over to clover. At Grabben Gullen the butter factory was opened in 1897 with seven suppliers. The factory produced 17 cwt of butter per week (Bayley 1979). The Kialla factory was established in 1892 with W Kennedy as secretary (one of the pioneers who settled in the area in 1854). Kennedy grew potato varieties including Darkskins, Brownell, Beauties and Magnum Bonums. After the factory opened he milked Jersey-Shorthorn crosses which did well in the winter conditions. Fifteen tons of butter was produced each month at the Kialla Factory. However, the smaller butter factories closed in due course as changing laws relating to factories and butter manufacture were introduced, combined with the introduction of modern factory facilities (Bayley 1979). The Crookwell factory became the central butter manufacturing plant.

Honey production was important in the area for the first half of the 20th century; at the height of a season up to five to six trucks of honey were dispatched from Crookwell Railway each week (Bayley 1975). When John Willis imported a brick making machine from England in 1911 the Willis’s Brookland Brick kilns supplied bricks to the local area and beyond (Bayley 1975). Potatoes and fruit came to assume an important role in the district and Crookwell became renowned as a potato growing area (Bayley 1975). In the 1950s Crookwell became the premier certified seed potato growing area in the state (Bayley 1975).

During the 1950s pasture improvement became widespread throughout the district. Subterranean clover and applications of super phosphate became accepted as the key to pasture improvement. Super was applied from flat topped trucks and also aerially; farms were cleared of trees in paddocks and flight paths. In the 1950s the spread of myxomatosis through the rabbit population contributed to the control of erosion and the improvement of pastures (Bayley 1975).

Wind Farms

The first fully commercial wind farm was constructed in the Crookwell Shire by Pacific Power in conjunction with Great Southern Energy in 1998 (Pacific Power no date). The Crookwell Wind Farm has played an important role in demonstrating the commercial viability of sustainable energy generation. The Wind Farm is also promoted as a local tourist attraction.

8.2 Historical Register searches

The NSW State Heritage Register

A search of the NSW State Heritage Register has revealed that there are no heritage items in the proposal area.

Upper Lachlan Local Environment Plan 2004

A search of the Upper Lachlan LEP 2004 has revealed that there are no heritage items in the proposal area.

The Register of the National Estate

A search of the *Register of the National Estate* has revealed that there are no heritage items in the proposal area.

9. SURVEY RESULTS

9.1 Kialla Results

Kialla - Survey Units

The Kialla development envelope has been divided into 26 Survey Units. These Survey Units are described in Table 2; their location is shown in Figure 4.

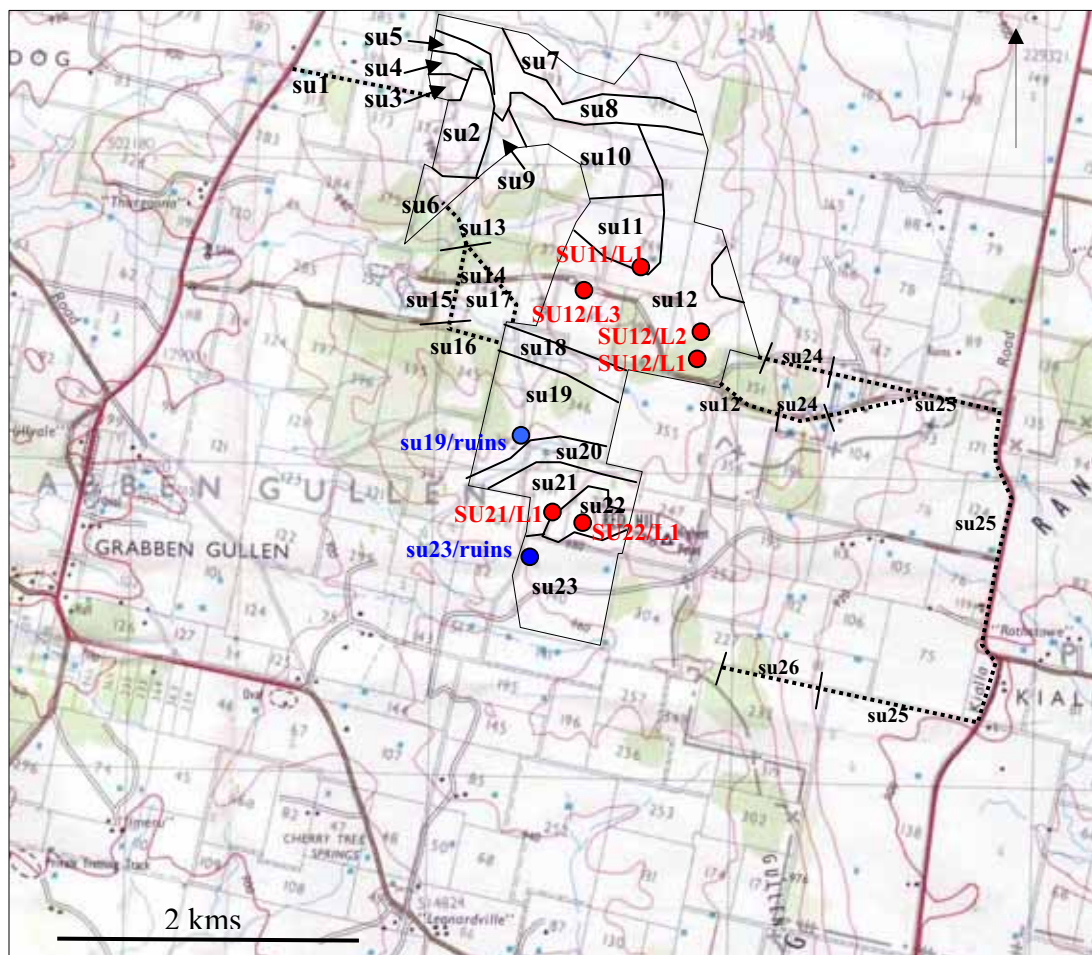


Figure 4. Location of Survey Units and recorded artefact locales in the Kialla development envelope; Red = Indigenous artefact locales; Blue = Non-Indigenous heritage items; Dashed lines indicate proposed transmission line or road access (Dalton 8728 – 1 & 1V 1st ed. 1:50,000 topographic map).

Survey Unit	Landform element	Vegetation	Geology/soils	Landuse impacts	Proposed Impacts
SU1 (Plate 1)	Simple slope; Aspect to west; 3-5° gradient	Improved pasture	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing; vehicle usage	Part Kialla development envelope and access road from Grabben Gullen Road
SU2	Spur crest; Aspect: open; 0-3° gradient	Improved pasture; thick bracken in south	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing	Kialla development envelope
SU3 (Plate 2)	Spur crest; Aspect: west; 0-2° gradient	Improved pasture	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing; pushed up piles of rocks	Kialla development envelope and access road from Grabben Gullen Road

Survey Unit	Landform element	Vegetation	Geology/soils	Landuse impacts	Proposed Impacts
SU4	Simple slope; Aspect to north; 4-6° gradient	Improved pasture	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing; pushed up piles of rocks; dams	Kialla development envelope (nil impacts proposed)
SU5	Simple slope; Aspect to south; 3-6° gradient	Improved pasture; sparse scattered trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing; dams	Kialla development envelope (nil impacts proposed)
SU6 (Plate 3)	Spur crest; Aspect: south; 6-7° gradient	Grass; thick bracken; regrowth wattle in south	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing; stone quarrying	Kialla development envelope
SU7 (Plate 4)	Simple slope; Aspect to north; 6-7° gradient	Grass; bracken; sparse scattered trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing; dams	Kialla development envelope (nil impacts proposed)
SU8 (Plate 5)	Ridge crest; Aspect: open; 0-2° gradient	Grass; thick bracken in eastern end; stands of trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing	Kialla development envelope
SU9	Spur crest; Aspect: south; 5-7° gradient	Grass; bracken; sparse scattered trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing	Kialla development envelope
SU10	Simple slope; Aspect to southwest; 4-7° gradient	Grass; bracken; sparse scattered trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing; dams	Kialla development envelope
SU11	Simple slope; Aspect to southwest; 4-7° gradient	Grass; improved pasture; bracken; sparse scattered trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing; dams	Kialla development envelope
SU12 (Plate 6)	Ridge crest; Aspect: open; 0-2° gradient	Improved pasture; stands of trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing	Kialla development envelope
SU13	Simple slope/drainage depression interface	Improved pasture; stands of trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing	Kialla transmission line
SU14	Ridge crest; Aspect: open; 0-2° gradient	Stands of trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing	Kialla transmission line
SU15	Drainage depression Aspect: west; 0-1° gradient	Grass; tussocks	Brown silty loam	Original clearance; grazing; fencing	Kialla transmission line
SU16	Simple slope/drainage depression interface	Grass; stands of trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing	Kialla transmission line
SU17	Simple slope	Improved pasture; stands of trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing	Kialla transmission line

Survey Unit	Landform element	Vegetation	Geology/soils	Landuse impacts	Proposed Impacts
SU18 (Plate 7)	Drainage depression Aspect: west; 0-1° gradient	Grass; tussocks	Brown silty loam	Original clearance; grazing; fencing	Kialla development envelope
SU19	Ridge crest; Aspect: open; 0-2° gradient	Improved pasture; stands of trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing	Kialla development envelope
SU20	Drainage depression Aspect: west; 0-1° gradient	Grass; tussocks; stands of trees	Brown silty loam??	Original clearance; grazing; fencing; dams	Kialla development envelope
SU21	Simple slope; Aspect: northwest; 2-4° gradient	Grass, tussocks; bracken; stands of trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing; dams	Kialla development envelope
SU22	Ridge crest; Aspect: open; 0-2° gradient	Stands of trees	Basalt occurring as cobbles; red/brown silty loam	Original clearance; grazing; fencing	Kialla development envelope
SU23 (Plate 8)	Simple slope; Aspect: south; 2-3° gradient	Grass	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing	Kialla transmission line
SU24	Simple slope; Aspect: east; 12-16° gradient	Grass; trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing; farm access	Kialla transmission line; access road
SU25	Flat; Aspect: open; 0-2° gradient	Grass; road side trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; cultivation; grazing; fencing; Kialla Road construction.	Kialla transmission line; access road
SU26	Simple slope; Aspect: east; 15-18° gradient	Grass; trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; grazing; fencing	Kialla transmission line

Table 2. Kialla Survey Unit Descriptions.



Plate 1. Kialla Survey Unit 1 (Crown Road) looking west from Survey Unit 4.



Plate 2. Kialla Survey Unit 3 looking west from north end of Survey Unit 2.



Plate 3. Kialla Survey Unit 6 looking south from stone quarry.



Plate 4. Kialla Survey Unit 7 looking 60° from Survey Unit 8.



Plate 5. Kialla Survey Unit 8 looking 90°.



Plate 6. Kialla Survey Unit 12 looking south.



Plate 7. Kialla Survey Unit 18 looking east.



Plate 8. Kialla Survey Unit 23 looking south from Survey Unit 22.

Kialla - Survey Coverage

The Kialla development envelope surveyed during this assessment measured approximately 458.825 hectares in area (Table 3). Ground exposures inspected are estimated to have been 14.3415 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 2.9575 hectares. Effective Survey Coverage is therefore calculated to have been 0.6% of the Kialla development envelope.

Survey Units	Area	Estimated Ground Exposure	Estimated Archaeological Visibility %	Net Effective Exposure	Effective Survey Coverage	Artefact Recordings	Predicted Artefact Density
1	10000	3000	80	2400	24	nil	very low
2	150000	7500	20	1500	1	nil	low
3	43750	4375	15	656.25	1.5	nil	low
4	45000	4500	20	900	2	nil	very low
5	50000	2500	10	250	0.5	nil	very low
6	150000	1500	10	150	0.1	nil	very low
7	300000	15000	10	1500	0.5	nil	very low
8	300000	30000	40	12000	4	nil	low
9	70000	700	10	70	0.1	nil	low
10	360000	3600	10	360	0.1	nil	very low
11	202500	4050	15	607.5	0.3	1	very low
12	1240000	24800	10	2480	0.2	3	low
13	4000	200	5	10	0.25	nil	very low
14	5000	500	80	400	8	nil	low
15	2000	0	0	0	0	nil	very low
16	7000	700	30	210	3	nil	low
17	4000	40	10	4	0.1	nil	very low
18	120000	1200	10	120	0.1	nil	very low
19	360000	3600	10	360	0.1	nil	low
20	150000	7500	5	375	0.25	nil	very low
21	275000	13750	15	2062.5	0.75	1	low
22	165000	3300	15	495	0.3	5	low
23	455000	9100	15	1365	0.3	nil	very low
24	14000	1500	80	1200	8.6	nil	very low
25	94000	500	20	100	0.1	nil	low

Survey Units	Area	Estimated Ground Exposure	Estimated Archaeological Visibility %	Net Effective Exposure	Effective Survey Coverage	Artefact Recordings	Predicted Artefact Density
26	12000	0	0	0	0	nil	very low
Total	4588250 sq m	143415 sq m		29575.3 sq m	0.6 % ave.	10	

Table 3. Kialla: Survey Coverage Data.

Kialla – Survey Results: Indigenous

A total of six locales containing stone artefacts were recorded within the Kialla survey area during this study. These sites are listed in Table 4 and further described below; their location is shown on Figure 4.

Name	Grid reference AMG Hand GPS Aust 66		Landform	Description	Impacts
Kialla Survey Unit 11/ Locale 1	723371e	6177336n	Simple slope	1 stone artefact	Kialla development envelope
Kialla Survey Unit 12/ Locale 1	723730e	6176754n	Ridge crest	1 stone artefact	Kialla development envelope
Kialla Survey Unit 12/ Locale 2	723774e	6176980n	Ridge crest	1 stone artefact	Kialla development envelope
Kialla Survey Unit 12/ Locale 3	722981e	6177178n	Ridge crest	1 stone artefact	Kialla development envelope
Kialla Survey Unit 21/ Locale 1	722813e	6175705n	Simple slope	1 stone artefact	Kialla development envelope
Kialla Survey Unit 22/ Locale 1	723006e	6175641n	Ridge crest	5 stone artefacts	Kialla development envelope

Table 4. Summary of stone artefact recordings in the Kialla development area.

Kialla Survey Unit 11/Locale 1

grid reference: Hand GPS (Aust 66): 723371e; 6177336n

This recording consists of one stone artefact found on a simple slope in Survey Unit 11 (Plate 9). The site location has a westerly aspect and a gradient of 3°. Soils in the area are a silty loam with a high shattered shale and quartz content. The area has been cleared, ploughed and pasture improved. The artefact is situated at ca. 40 m south of a farm dam. The area is situated at ca. 550 m away from an ephemeral, 1st order water course.

The artefact is situated in a grassed paddock and was located in a sheep track. The area of exposure measured ca. 6 square metres. Ground exposure in that area is estimated to be 80 % with approximately 80 % of that exposure assessed to be archaeological visibility.

The artefact recorded is described as follows:

- Dark grey distal flake portion measuring 15 x 20 x 7 mm.

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

This artefact recording is situated within the Kialla development envelope and may therefore be subject to impacts relating to the wind farm proposal.



Plate 9. Kialla Survey Unit 11/Locale 1 looking south.

Kialla Survey Unit 12/Locale 1

grid reference: Hand GPS (Aust 66): 723730e; 6176754n

This recording consists of one stone artefact found on an amorphous, broad ridge crest in Survey Unit 12 (Plate 10). The site location has an open aspect and is relatively flat. Soils in the area are a silty loam with a high shattered shale and quartz content. The area is a clearing in forest which has been ploughed and pasture improved. The area is situated at ca. 500 m away from a 1st order, ephemeral water course.

The artefact is situated on the ground surface of a bare earth exposure. Ground exposure in the area is low (<5%).

The artefact recorded is described as follows:

- Grey silcrete flake piece measuring 50 x 35 x 17 mm.

It is probable that additional artefacts are present across Survey Unit 12, however it is predicted that any additional artefacts will be present in low numbers and density.

This artefact recording is situated within the Kialla development envelope and may therefore be subject to impacts relating to the wind farm proposal.



Plate 10. Kialla Survey Unit 12/Locale 1 looking 20°. Pink flag denotes artefact location.

Kialla Survey Unit 12/Locale 2

grid reference: Hand GPS (Aust 66): 723774e; 6176980n

This recording consists of one stone artefact found on an amorphous, broad ridge crest in Survey Unit 12 (Plate 11). The site location has an open aspect and is relatively flat. Soils in the area are a silty loam with a high shattered shale and quartz content. The area has been cleared, ploughed and pasture improved. The area is situated at ca. 500 m away from a 1st order, ephemeral water course.

The artefact is situated in a sheep track exposure. The area of exposure measured ca. 10 square metres. Ground exposure in that area is estimated to be 80 % with approximately 80 % of that exposure assessed to be archaeological visibility.

The artefact recorded is described as follows:

- Red silcrete proximal flake portion measuring 7 x 11 x 2 mm.

It is probable that additional artefacts are present across Survey Unit 12, however it is predicted that artefacts will be present in low numbers and density.

This artefact recording is situated within the Kialla development envelope and may therefore be subject to impacts relating to the wind farm proposal.



Plate 11. Kialla Survey Unit 12/Locale 2 looking 120°. Arrow denotes artefact location.

Kialla Survey Unit 12/Locale 3

grid reference: Hand GPS (Aust 66): 722981e; 6177178n

This recording consists of one stone artefact found on an amorphous, broad ridge crest in Survey Unit 12 (Plate 12). The site location has an open aspect and is relatively flat. Soils in the area are a silty loam with a high shattered shale and quartz content. The area has been cleared, ploughed and pasture improved. The area is situated at ca. 500 m away from a 1st order, ephemeral water course.

The artefact is situated in a bare earth exposure 2.5 m south of a farm road and ca. 40 m east of a stock grid.

The artefact recorded is described as follows:

- Brown quartzite proximal flake portion measuring 28 x 28 x 10 mm.

It is probable that additional artefacts are present across Survey Unit 12, however it is predicted that artefacts will be present in low numbers and density.

This artefact recording is situated within the Kialla development envelope and may therefore be subject to impacts relating to the wind farm proposal.



Plate 12. Kialla Survey Unit 12/Locale 3 looking east. Arrow denotes artefact location.

Kialla Survey Unit 21/Locale 1 grid reference: Hand GPS (Aust 66): 722813e; 6175705n

This recording consists of one stone artefact found on a simple slope in Survey Unit 21. The site location has a northerly aspect and gradient of 3°. Soils in the area are a red/brown silty loam derived from basalt. The area has been cleared, ploughed and pasture improved. The area is situated at ca. 400 m away from a 1st order, ephemeral water course.

The artefact is situated in a bare earth exposure in a laneway between deer fences. The area of exposure measured ca. 300 square metres. Ground exposure in that area is estimated to be 80 % with approximately 90 % of that exposure assessed to be archaeological visibility.

The artefact recorded is described as follows:

- Brown silcrete proximal flake portion measuring 12 x 18 x 7 mm.

It is probable that additional artefacts are present across Survey Unit 21, however it is predicted that artefacts will be present in low numbers and density.

This artefact recording is situated within the Kialla development envelope and may therefore be subject to impacts relating to the wind farm proposal.

Kialla Survey Unit 22/Locale 1 grid reference: Hand GPS (Aust 66): 723006e; 6175641n

This recording consists of five stone artefacts found on a ridge crest in Survey Unit 22 (Plate 13). The site location has an open aspect and gradient of 1°. Soils in the area are a red/brown silty loam derived from basalt. The area has been cleared, ploughed and pasture improved. The area is situated at ca. 600 m away from a 1st order, ephemeral water course.

The artefacts are situated in bare earth exposure associated with a track and recent mechanical excavation. The area of exposure measured ca. 1000 square metres. Ground exposure in that area is estimated to be 95 % with approximately 70 % of that exposure assessed to be archaeological visibility.

The artefacts recorded are described as follows:

- White quartz flake fragment measuring 12 x 8 x 3 mm;
- Grey chert flake piece measuring 16 x 14 x 6 mm;
- Grey chert flake piece measuring 18 x 13 x 6 mm;
- Grey chert flake measuring 17 x 9 x 7 mm;
- Black chert flake measuring 13 x 17 x 6 mm.

It is probable that additional artefacts are present across Survey Unit 21, however it is predicted that artefacts will be present in low numbers and density.

This artefact recording is situated within the Kialla development envelope and may therefore be subject to impacts relating to the wind farm proposal.



Plate 13. Kialla Survey Unit 22/Locale 1 looking 240°.

Kialla – Survey Results: Non-Indigenous

Two Non-indigenous heritage complexes were recorded in the Kialla development envelope. These items are described further below; their location is shown on Figure 6.

Kialla - Survey Unit 19 Ruins

grid reference: Hand GPS (Aust 66): 722598e; 6176208n

This site is situated in Survey Unit 19 and consists of a number of structures including rocks and brickwork rubble of a house with a non-indigenous tree (Plate 14) and a small set of sheep yards (Plate 15) including wooden fencing delineating a number of small yards, concrete sheep dip and drying pen. The sheep dip measures ca. 4.5 m long and the associated drying pen is ca. 3 x 3.5 m in area. While situated within the Kialla development envelope these structures will not be impacted by the wind farm construction.



Plate 14. Kialla Survey Unit 19 Ruins – remains of old house.



Plate 15. Kialla Survey Unit 19 Ruins – remains of yards and sheep dip; photo taken from house ruins looking 231°.

Kialla - Survey Unit 23 Ruins

grid reference: Hand GPS (Aust 66): 722653e; 6175386n

This site is situated in Survey Unit 23 and consists of two structures, both of which are substantially intact (Plate 16). A number of non-indigenous tree planting are also present. The complex consists of a domestic dwelling and barn, the latter possessing a large oven.

The external wall of the domestic structure is comprised of coursed basalt cobbles; the building consists of two rooms; internal walls are wattle and daub. The external walls and roof of the barn are corrugated iron. The chimney of the oven is made of coursed basalt cobbles.

While situated within the Kialla development envelope these structures will not be impacted by the wind farm construction.

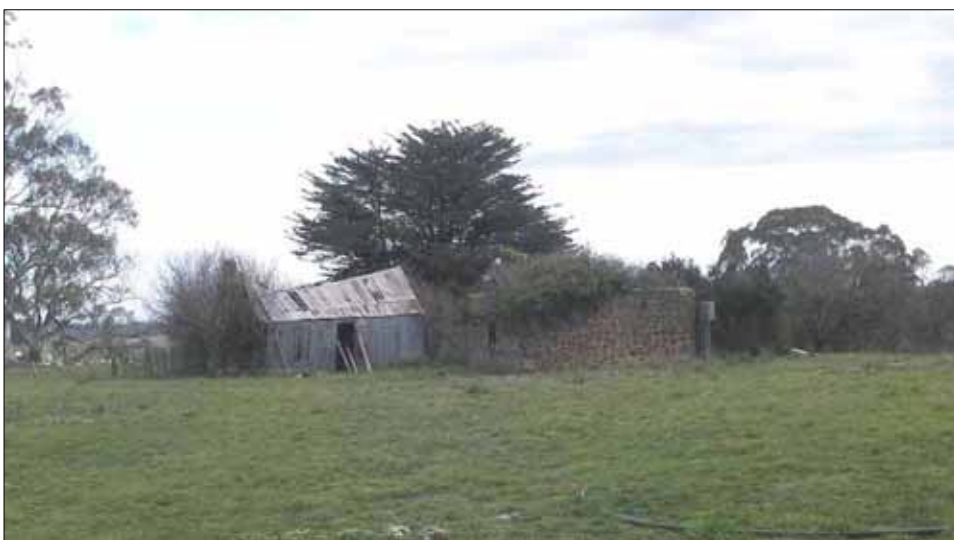


Plate 16. Kialla Survey Unit 23 Ruins.

9.2 Bannister Results

Bannister - Survey Units

The Bannister development envelope has been divided into 18 Survey Units. These Survey Units are described in Table 5; their location is shown in Figure 5.

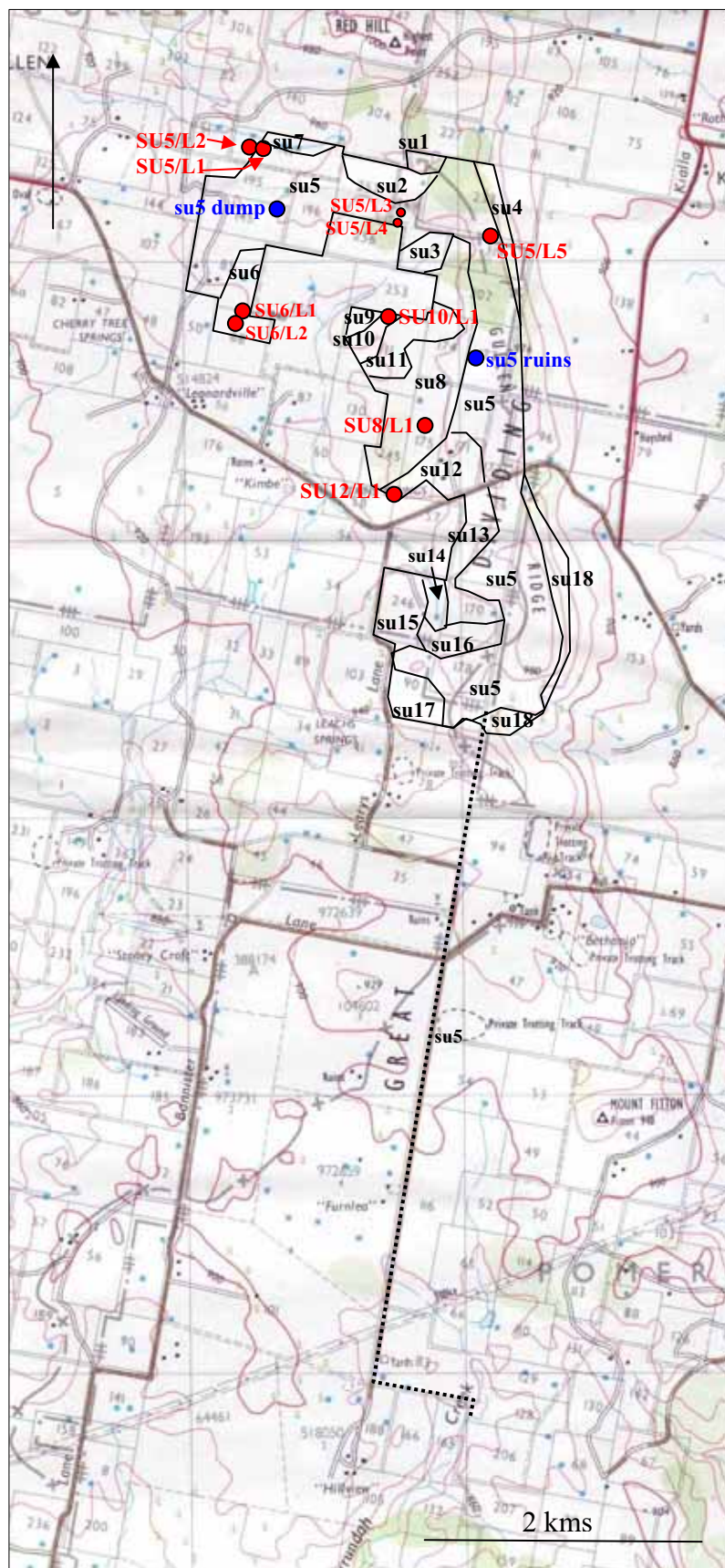


Figure 5. Location of Survey Units and recorded artefact locales in the Bannister development envelope; Red = Indigenous artefact locales; Blue = Non-Indigenous heritage items; Dashed line indicates proposed transmission line (Dalton 8728 – 1 & 1V 1st ed. 1:50,000 topographic map).

Survey Unit	Landform element	Vegetation	Geology/soils	Landuse impacts	Proposed Impacts
SU1	Knoll on ridge crest; Aspect: open; 0-3° gradient	Stands of trees; grass in clearing; bracken	Basalt; quartz occurring as sparse cobbles; brown silty loam	Original clearance; grazing; fencing	Bannister development envelope
SU2 (Plate 17)	Simple slope; Aspect: 170°; 3-6° gradient	Stands of trees; improved pasture; bracken	Basalt; basalt and quartz occurring as sparse cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing	Bannister development envelope
SU3	Drainage depression; Aspect to south west; 0-2° gradient	Improved pasture	Shale/sandstone and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing	Bannister development envelope (nil impacts proposed)
SU4 (Plate 18)	Simple slope; Aspect: 30°; 6-8° gradient	Stands of trees; improved pasture; bracken	Basalt; basalt and quartz occurring as sparse cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing	Bannister development envelope
SU5	Ridge crest (broad, undulating-amorphous); Aspect: open; 0-3° gradient	Improved pasture; stands of trees	Shale/sandstone (some meta.) and quartz occurring as cobbles and outcrops; brown silty loam	Original clearance; ploughing; grazing; fencing	Bannister development envelope including transmission line to Pomeroy along Learys Road
SU6	Drainage depression; Aspect to south; 0-2° gradient	Improved pasture	Basalt and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing; dam	Bannister development envelope
SU7	Drainage depression; Aspect to west; 0-2° gradient	Improved pasture	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing; dams	Bannister development envelope
SU8	Simple slope; Aspect: west; 2-3° gradient	Improved pasture; trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing; dams	Bannister development envelope
SU9	Ridge crest; Aspect: north; 0-2° gradient	Improved pasture; stands of trees	Shale and quartz occurring as cobbles and outcrops; brown silty loam	Original clearance; ploughing; grazing; fencing	Bannister development envelope
SU10	Simple slope; Aspect: east; 4-6° gradient	Improved pasture	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing	Bannister development envelope
SU11	Drainage depression; Aspect to south; 0-1° gradient	Improved pasture; tussock	Brown silty loam	Original clearance; artificial drainage; ploughing; grazing; rock piles; fencing; dams	Bannister development envelope
SU12	Simple slope; Aspect: south; 6-8° gradient	Stands of trees; improved pasture; domestic trees	Shale and quartz occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; fencing; driveway; domestic and rural structure	Bannister development envelope (however impacts likely to be minimal given house etc in this area)

Survey Unit	Landform element	Vegetation	Geology/soils	Landuse impacts	Proposed Impacts
SU13	Simple slope; Aspect: west; 6-12° gradient	Improved pasture; tussocks; scattered trees	Basalt occurring as cobbles in isolate patches; red/brown silty loam	Original clearance; ploughing; grazing; contouring; fencing; dams	Bannister development envelope
SU14	Drainage depression; Aspect to north; 1-3° gradient	Improved pasture; tussock; willows	Basalt occurring as sparse cobbles; brown silty loam	Original clearance; artificial drainage; grazing; fencing; dams	Bannister development envelope (nil impacts proposed)
SU15	Spur crest; Aspect to north; 1-3° gradient	Improved pasture; scattered trees	Basalt occurring as sparse cobbles; brown silty loam also some meta	Original clearance; grazing; fencing; rock removal; dams; overhead power;	Bannister development envelope
SU16	Simple slope; Aspect: north; 4-6° gradient	Improved pasture; scattered trees	Basalt occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; rock removal; fencing; overhead power	Bannister development envelope
SU17	Simple slope; Aspect: southwest; 3-5° gradient	Improved pasture; scattered trees; tussocks; bracken	Basalt occurring as cobbles; brown silty loam	Original clearance; ploughing; grazing; rock removal; fencing; overhead power	Bannister development envelope (nil impacts proposed)
SU18	Simple slope; Aspect: east; 15° gradient	Pasture; scattered trees	Basalt occurring as cobbles; brown silty loam	Original clearance; grazing; fencing	Bannister development envelope

Table 5. Bannister Survey Unit Descriptions.



Plate 17. Bannister Survey Unit 2 looking 220°.



Plate 18. Bannister Survey Unit 4 looking north.

Bannister - Survey Coverage

The Bannister development envelope surveyed during this assessment measured approximately 533.8 hectares in area (Table 6). Ground exposures inspected are estimated to have been 30.452 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 9.61075 hectares. Effective Survey Coverage is therefore calculated to have been 4.25% of the Bannister development envelope.

Survey Units	Area	Ground Exposure	Estimated Archaeological Visibility %	Net Effective Exposure	Effective Survey Coverage	Artefacts Recordings	Predicted Artefact Density
1	39000	780	10	78	0.2	nil	low
2	175000	1750	5	87.5	0.05	nil	very low
3	70000	42000	80	42008	60.0	nil	low
4	10000	500	60	300	3	nil	very low
5	2780000	139000	20	27800	1	15	low
6	169000	1690	10	169	0.1	5	low
7	60000	3000	10	300	0.5	nil	low
8	625000	31250	30	9375	1.5	5	low
9	25000	1250	15	187.5	0.75	nil	low
10	60000	3000	15	450	0.75	7	low
11	390000	19500	15	2925	0.75	nil	very low
12	165000	16500	40	6600	4	2	very low
13	135000	6750	10	675	0.5	nil	very low
14	40000	800	5	40	0.1	nil	very low
15	150000	7500	10	750	0.5	nil	very low
16	105000	5250	5	262.5	0.25	nil	very low
17	140000	14000	15	2100	1.5	nil	very low
18	200000	10000	20	2000	1	nil	very low
Total	5338000 sq m	304520 sq m		96107.5 sq m	4.25 % ave.	34	

Table 6. Bannister: Survey Coverage Data.

Bannister – Survey Results: Indigenous

A total of ten locales containing stone artefacts were recorded within the Bannister survey area during this study. These sites are listed in Table 7 and further described below; their location is shown on Figure 5.

Name	Grid reference AMG Hand GPS Aust 66		Landform	Description	Impacts
Bannister Survey Unit 5/Locale 1	722579e	6174795n	Ridge crest	9 stone artefacts	Bannister development envelope
Bannister Survey Unit 5/Locale 2	722419e	6174832n	Ridge crest	1 stone artefact	Overhead transmission: Kialla to Bannister
Bannister Survey Unit 5/Locale 3	723594e	6174377n	Ridge crest	1 stone artefact	Bannister development envelope
Bannister Survey Unit 5/Locale 4	723578e	6174286n	Ridge crest	1 stone artefact	Bannister development envelope (<i>impacts unlikely: in dam</i>)
Bannister Survey Unit 5/Locale 5	724235e	6174173n	Ridge crest	3 stone artefacts	Bannister development envelope
Bannister Survey Unit 6/Locale 1	722473e	6173661n	Drainage depression/Simple slope interface	1 stone artefact	Bannister development envelope
Bannister Survey Unit 6/Locale 2	722359e	6173567n	Drainage depression/Simple slope interface	4 stone artefacts	Bannister development envelope
Bannister Survey Unit 8/Locale 1	723764e	6172876n	Simple slope	5 stone artefacts	Bannister development envelope
Bannister Survey Unit 10/Locale 1	723467e	6173604n	Simple slope	7 stone artefacts	Bannister development envelope
Bannister Survey Unit 12/Locale 1	723521e	6172349n	Simple slope	2 stone artefacts	Bannister development envelope

Table 7. Summary of stone artefact recordings in the Bannister development area.

Bannister Survey Unit 5/Locale 1 grid reference: Hand GPS (Aust 66): 722579e; 6174795n

This recording consists of nine stone artefacts found on a broad ridge crest in Survey Unit 5 (Plate 19). The site location has an aspect to the west and a gradient of 1°. Soils in the area are a brown silty loam. The area has been cleared, ploughed and pasture improved. The artefacts are situated in bare earth exposures. The locale is situated approximately 50 m south of a 1st order drainage line.

The artefacts were located in an area measuring 30 x 20 m. Ground exposure was estimated to be 30% with 5% of that exposure assessed to be archaeological visibility.

The artefacts recorded are described as follows:

- White silcrete flake measuring 35 x 25 x 11 mm;
- Grey silcrete flake piece measuring 58 x 37 x 20 mm (with 20% terrestrial cortex);
- Translucent quartz flake measuring 20 x 10 x 4 mm;
- Black chert blade flake measuring 27 x 10 x 5 mm;
- Black chert flake measuring 14 x 12 x 3 mm;
- Yellow quartzite core measuring 27 x 42 x 29 mm (1 platform; 8 scars);
- Grey silcrete flake measuring 58 x 38 x 12 mm;
- White quartz flake measuring 27 x 20 x 10 mm;
- White quartz core measuring 40 x 36 x 20 mm (1 platform; 3 scars).

It is probable that additional artefacts are present across Survey Unit 5, however it is predicted that artefacts will be present in low numbers and density.

This artefact recording is situated within the Bannister development envelope and may be subject to impacts relating to the wind farm proposal.



Plate 19. Bannister Survey Unit 5/Locale 1 looking south east.

Bannister Survey Unit 5/Locale 2 grid reference: Hand GPS (Aust 66): 722419e; 6174832n

This recording consists of one stone artefact found on a broad ridge crest in Survey Unit 5 (Plate 20). The site location has an aspect to the west and a gradient of 1°. Soils in the area are a brown silty loam. The area has been cleared, ploughed and pasture improved. The locale is situated approximately 50 m south of a 1st order drainage line.

The artefact is situated in a bare earth exposure.

The artefacts recorded are described as follows:

- White quartzite flaked piece measuring 48 x 36 x 19 mm.

It is probable that additional artefacts are present across Survey Unit 5, however it is predicted that artefacts will be present in low numbers and density.

This artefact recording is situated outside the Bannister development envelope however it may be subject to impacts relating to overhead transmission.



Plate 20. Bannister Survey Unit 5/Locale 2 looking east.

Bannister Survey Unit 5/Locale 3 grid reference: Hand GPS (Aust 66): 723594e; 6174377n

This recording consists of one stone artefact found on a broad ridge crest in Survey Unit 5 (Plate 21). The site location has a southerly aspect and a gradient of 1°. Soils in the area are a brown silty loam. The area has been cleared, ploughed and pasture improved. The locale is situated approximately 400 m north of a 1st order drainage line.

The artefact is situated in a sheep track. The area of exposure measured ca. 80 square metres. Ground exposure in that area is estimated to be 80 % with approximately 40 % of that exposure assessed to be archaeological visibility.

The artefact is described as follows:

- Brown silcrete flaked piece measuring 47 x 35 x 30 mm.

It is probable that additional artefacts are present across Survey Unit 5, however it is predicted that artefacts will be present in low numbers and density.

This artefact recording is situated within the Bannister development envelope and may be subject to impacts relating to the wind farm proposal.



Plate 21. Bannister Survey Unit 5/Locales 3 and 4 (the latter in the dam wall) looking south.

Bannister Survey Unit 5/Locale 4 grid reference: Hand GPS (Aust 66): 723578e; 6174286n

This recording consists of one stone artefact found on a broad ridge crest in Survey Unit 5 (Plate 21). The site location has an aspect to the south and a gradient of 1°. Soils in the area are a brown silty loam. The area has been cleared, ploughed and pasture improved. The artefact is situated within a dam wall. The locale is situated approximately 350 m north of a 1st order drainage line.

The artefact recorded is described as follows:

- White quartz proximal flake portion (Hertzian initiation) measuring 18 x 17 x 6 mm.

It is probable that additional artefacts are present across Survey Unit 5, however it is predicted that artefacts will be present in low numbers and density.

This artefact recording is situated within the Bannister development envelope. However given that it is situated in a farm dam is unlikely to be subject to impacts relating to the wind farm proposal.

Bannister Survey Unit 5/Locale 5 grid reference: Hand GPS (Aust 66): 724235e; 6174173n

This recording consists of three stone artefacts found on a broad ridge crest in Survey Unit 5 (Plate 22). The site location has an aspect to 30° and a gradient of 3°. Soils in the area are a brown silty loam with a relatively high shale/quartz content. The area has been cleared, ploughed and pasture improved. The artefact is situated

immediately adjacent to a boundary fence. The area is situated at ca. 1000 m away from any 1st order water courses.

The artefacts are situated in a grassed paddock and were located in bare earth exposures in an area measuring 3 x 2m. The wider area of exposure measured ca. 50 square metres. Ground exposure in that area is estimated to be 30 % with approximately 60 % of that exposure assessed to be archaeological visibility.

The artefacts recorded are described as follows:

- Grey silcrete core fragment measuring 30 x 45 x 20 mm;
- Grey silcrete flake fragment measuring 32 x 25 x 10 mm;
- Translucent quartz flake fragment measuring 17 x 17 x 5 mm.

It is probable that additional artefacts are present across Survey Unit 5, however it is predicted that artefacts will be present in low numbers and density.

This artefact recording is situated within the Bannister development envelope and may therefore be subject to impacts relating to the wind farm proposal.



Plate 22. Bannister Survey Unit 5/Locale 5 looking west.

Bannister Survey Unit 6/Locale 1 grid reference: Hand GPS (Aust 66): 722473e; 6173661n

This recording consists of one stone artefact found on a drainage depression/simple slope interface in Survey Unit 6 (Plate 23). The site location has a south westerly aspect and a gradient of 2°. Soils in the area are a red/brown silty loam. The area has been cleared, ploughed and pasture improved. The artefact is situated at ca. 10 m north of a fence. The area is situated at ca. 20 m away from a 1st order water course which appears to be spring fed.

The artefact is situated in a grassed paddock and was located in an erosion exposure.

The artefact recorded is described as follows:

- Brown silcrete flake piece measuring 36 x 35 x 15 mm.

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

This artefact recording is situated within the Bannister development envelope and may therefore be subject to impacts relating to the wind farm proposal.



Plate 23. Bannister Survey Unit 6/Locale 1 looking 30°: flag denotes artefact location.

Bannister Survey Unit 6/Locale 2 grid reference: Hand GPS (Aust 66): 722359e; 6173567n

This recording consists of four stone artefacts found on a drainage depression/simple slope interface in Survey Unit 6 (Plate 24). The site location has a south westerly aspect and a gradient of 2°. Soils in the area are a red/brown silty loam. The area has been cleared, ploughed and pasture improved. The artefact is situated at ca. 4 m north of a fence. The area is situated at ca. 50 m away from a 1st order water course which appears to be spring fed.

The artefacts are situated in a grassed paddock and were located in bare earth exposures in an area measuring 5 x 7 m. In the wider area ground exposure is estimated to be 5% with 20% of that exposure assessed to be archaeological visibility.

The artefacts recorded are described as follows:

- Grey silcrete flake measuring 24 x 28 x 7 mm;
- Grey chert core measuring 50 x 80 x 55 mm (very poor quality; multiple platforms);
- Volcanic flake piece measuring 34 x 17 x 29 mm;
- Brown silcrete flake measuring 33 x 53 x 20 mm.

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

This artefact recording is situated within the Bannister development envelope and may therefore be subject to impacts relating to the wind farm proposal.



Plate 24. Bannister Survey Unit 6/Locale 2 looking 120°.

Bannister Survey Unit 8/Locale 1 grid reference: Hand GPS (Aust 66): 723764e; 6172876n

This recording consists of five stone artefacts found on a simple slope in Survey Unit 8. The site location has a westerly aspect and a gradient of 1°. Soils in the area are a brown silty loam. The area has been cleared, ploughed and pasture improved. The artefacts are situated immediately north of a fence. The area is situated at ca. 700 m away from a 1st order water course.

The artefacts are situated in a grassed paddock and were located in bare earth exposures over an area measuring 40 m x 3 m. In the wider area ground exposure is estimated to be 40% with 60% of that exposure assessed to be archaeological visibility.

The artefacts recorded are described as follows:

- Translucent quartz flake measuring 50 x 35 x 15 mm;
- Grey silcrete flake fragment measuring 23 x 35 x 10 mm;
- White quartz flake measuring 16 x 12 x 4 mm;
- White quartz medial flake portion measuring 9 x 8 x 3 mm;
- White quartz core fragment measuring 35 x 23 x 15 mm.

It is probable that additional artefacts are present across Survey Unit 8, however it is predicted that artefacts will be present in very low numbers and density.

This artefact recording is situated within the Bannister development envelope and may therefore be subject to impacts relating to the wind farm proposal.

Bannister Survey Unit 10/Locale 1 grid reference: Hand GPS (Aust 66): 723467e; 6173604n

This recording consists of seven stone artefacts found on a simple slope in Survey Unit 10 (Plate 25). The site location has an easterly aspect and a gradient of 5°. Soils in the area are a brown silty loam. The area has been cleared, ploughed and pasture improved. The artefacts are situated immediately south of a boundary fence. The area is situated at ca. 100 m away from a 1st order water course.

The artefacts are situated in a grassed paddock and were located in bare earth exposures in an area measuring 40 x 40m. In the wider area ground exposure is estimated to be 5% with 40% of that exposure assessed to be archaeological visibility.

The artefacts recorded are described as follows:

- White quartz flake fragment measuring 26 x 26 x 12 mm;
- Brown silcrete core measuring 70 x 80 x 55 mm (1 Platform; 2 scars);
- White quartz flake fragment measuring 34 x 23 x 10 mm;
- White quartz flake piece measuring 30 x 24 x 15 mm;
- White quartz flake piece measuring 34 x 23 x 11 mm;

- White quartz core measuring 30 x 55 x 34 mm (1 Platform; 2 scars);
- White quartz flake piece measuring 32 x 34 x 12 mm.

It is probable that additional artefacts are present across Survey Unit 10, however it is predicted that any additional artefacts will be present in very low numbers and density.

This artefact recording is situated within the Bannister development envelope and may therefore be subject to impacts relating to the wind farm proposal.



Plate 25. Bannister Survey Unit 10/Locale 1 looking 90°.

Bannister Survey Unit 12/Locale 1 grid reference: Hand GPS (Aust 66): 723521e; 6172349n

This recording consists of two stone artefacts found on a simple slope in Survey Unit 12 (Plate 26). The site location has a southerly aspect and a gradient of 3°. Soils in the area are a brown silty loam. The area has been cleared, ploughed and pasture improved. The artefacts are situated in a gateway between paddocks. The area is situated at ca. 400 m away from a 1st order water course.

The artefacts are situated in a grassed paddock and were located in bare earth exposures in a gateway in an area measuring 12 x 2 m. Over an area measuring some 75 square metres ground exposure is estimated to be 6% with 60% of that exposure assessed to be archaeological visibility.

The artefacts recorded are described as follows:

- White quartz flake fragment measuring 18 x 35 x 12 mm;
- ? Rhyolite tuff flake measuring 40 x 27 x 8 mm (weathered patina).

It is probable that additional artefacts are present across Survey Unit 12, however it is predicted that artefacts will be present in very low numbers and density.

This artefact recording is situated within the Bannister development envelope and may therefore be subject to impacts relating to the wind farm proposal.



Plate 26. Bannister Survey Unit 12/Locale 1 looking 90°.

Bannister – Survey Results: Non-Indigenous

Two Non-indigenous heritage complexes were recorded in the Bannister development envelope. These items are described further below; their location is shown on Figure 5.

Bannister - Survey Unit 5 Dump grid reference: Hand GPS (Aust 66): 722598e; 6176208n

This feature is situated in Survey Unit 5 (*Leonard property*) and consists of a scatter of objects present in a pile of stone including glass, tins and pots. The glass indicates an age of use as late 19th or early 20th century. The pile of stone is heaped up as a result of farming practices (Wayne Leonard pers. comm.).

While situated within the Bannister development envelope this feature will not be impacted by the wind farm construction.

Bannister - Survey Unit 5 Ruins grid reference: Hand GPS (Aust 66): 722598e; 6176208n

This site complex is situated in Survey Unit 5 (*Banfield property*) and consists of a number of structures including a house, fireplace, shed and a number of non-indigenous trees.

The small house has three rooms and appears to have had two periods of construction; an earlier corrugated iron clad 2 room dwelling with a roughly coursed basalt fireplace and a later addition of a fibro clad room.

The shed is constructed of poles and clad with corrugated iron. It currently contains numerous pieces of old machinery.

The remnants of an old chimney is situated between the house and shed. It is associated with a pile of building rubble (wood and so on) which may have been associated with the chimney.

The structures are likely to relate to late 19th and early to mid 20th century settlement of the area.

While situated within the Bannister development envelope these structures will not be impacted by the wind farm construction.

9.3 Pomeroy Results

Pomeroy - Survey Units

The Pomeroy development envelope has been divided into 19 Survey Units. These Survey Units are described in Table 8; their location is shown in Figure 6.

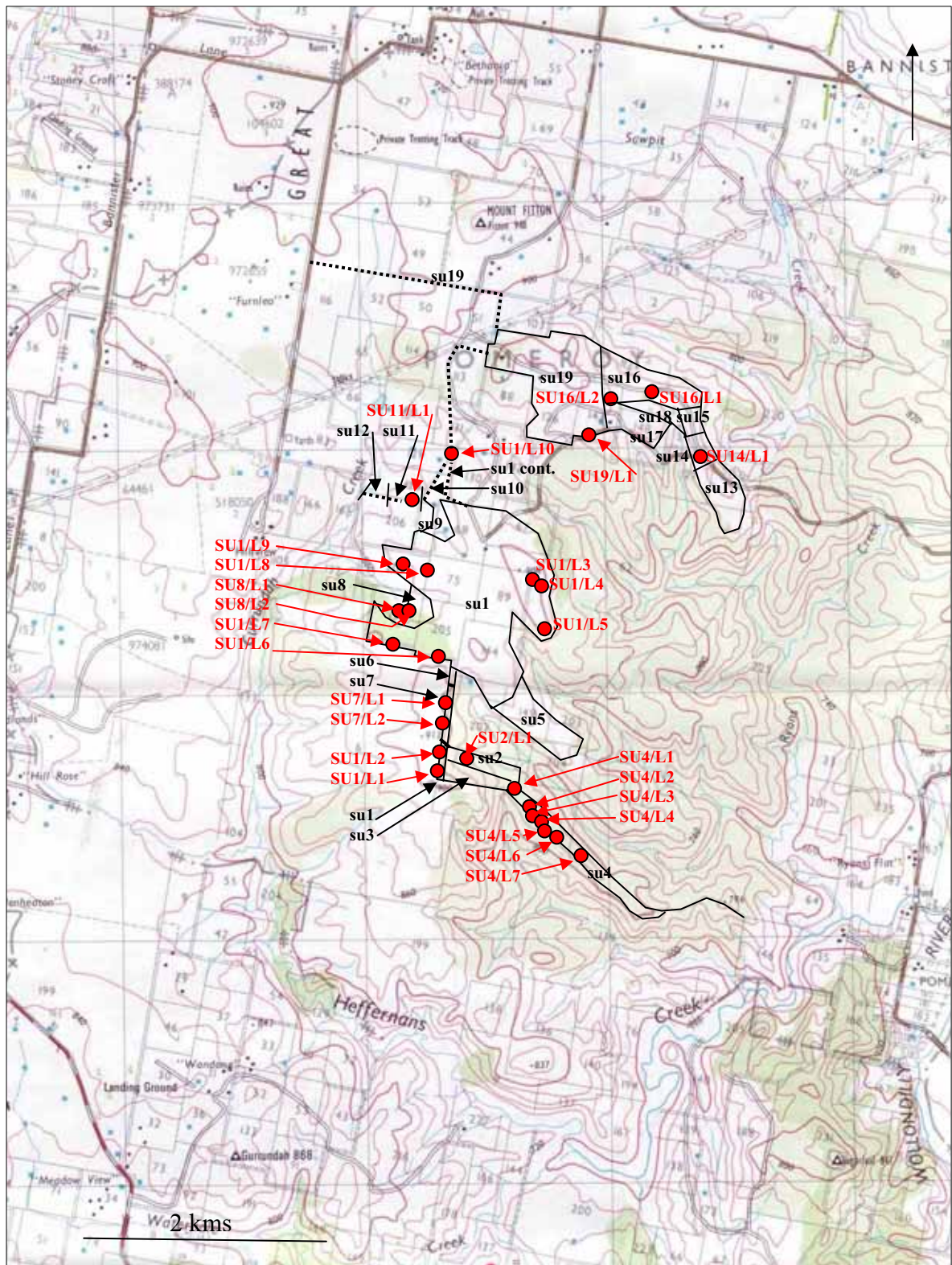


Figure 6. Location of Survey Units and recorded artefact locales in the Pomeroy development envelope; Red = Indigenous artefact locales; Dashed line indicates proposed transmission line (Dalton 8728 – 1 & 1V 1st ed. 1:50,000 topographic map).

Survey Unit	Landform element	Vegetation	Geology/soils	Landuse impacts	Proposed Impacts
SU1	Ridge crest (undulating); Aspect: open; 0-5° gradient	Improved pasture; isolated stands of trees and regenerating bush; tussocks	Variable either basalt or shale; soils variable from skeletal to deep loams;	Original clearance; grazing; fencing; dams	Pomeroy development envelope
SU2	Simple slope; Aspect: East; 6-8° gradient	Grass, tussocks and sparse shrubs;	Shale and quartz present as shatter; skeletal soils	Original clearance; grazing	Pomeroy development envelope; access track and transmission line
SU3	Simple slope; Aspect: North; 18° gradient	Grass; tussocks; regenerating bush	Shale and quartz present as shatter; skeletal soils	Original clearance; grazing	Pomeroy development envelope; nil impacts proposed
SU4	Ridge crest (undulating); Aspect: Generally open; 0-4° gradient	Grass; tussocks; regenerating bush	Shale and quartz present as shatter; outcrops of quartz bedrock; skeletal soils	Original clearance; grazing; access track	Pomeroy development envelope
SU5	Spur crest (undulating); Aspect: 120°; 2-4° gradient	Grass; tussocks	Basalt; outcrops of large quartz boulders and basalt cobbles	Original clearance; ploughing; possible mechanical removal of rabbit burrows	Pomeroy development envelope
SU6	Drainage depression; Aspect: East; 2° gradient	Grass; scattered trees	Uncertain	Original clearance; possible ploughing and grazing	transmission line and road access
SU7	Simple slope; Aspect: East; 6° gradient	Regrowth woodland; grass and tussocks	Variable either basalt or shale; soils variable from skeletal to deep loams; high shale and quartz shatter in areas	Original clearance; fence construction	Pomeroy development envelope; transmission line road access
SU8	Drainage depression; Aspect: West; 2-4° gradient	Scattered trees; improved pasture	Shale	Original clearance; ploughing; dam construction	Pomeroy development envelope; nil impacts proposed
SU9	Drainage depression; Aspect: 300°; 2-3° gradient	Improved pasture	Basalt	Original clearance; ploughing; dam construction	Pomeroy development envelope; transmission line
SU10	Simple slope; Aspect: West; 4° gradient	Improved pasture	Basalt	Original clearance; ploughing	Pomeroy development envelope; road access
SU11	Spur crest; Aspect: open; 0-4° gradient	Improved pasture; scattered trees	Shale and quartz; high levels of shatter	Original clearance; ploughing	transmission line
SU12	Simple slope; Aspect: West; 18° gradient	Improved pasture; scattered trees	Shale and quartz; high levels of shatter	Original clearance; ploughing	transmission line
SU13	Spur crest; Aspect: open; 2-5° gradient	Scattered trees; grass and tussock	Basalt with basalt cobbles	Original clearance	Pomeroy development envelope
SU14	Spur crest saddle; Aspect: open; 2-5° gradient	Scattered trees; grass; tussock	Shale; silty loam	Original clearance; grazing; fencing	Pomeroy development envelope

Survey Unit	Landform element	Vegetation	Geology/soils	Landuse impacts	Proposed Impacts
SU15	Spur crest; Aspect: 150°; 12° gradient	Scattered trees; grass and tussocks	Shale with high shatter; skeletal soil	Original clearance; grazing	Pomeroy development envelope
SU16	Spur crest (undulating); Aspect: open; 0-4° gradient	Scattered trees; grass and tussocks	Shale with high shatter; skeletal soil	Original clearance; grazing	Pomeroy development envelope
SU17	Spur crest; Aspect: East; 1-4° gradient	Scattered trees; grass and tussocks; some areas of improved pasture	Basalt; Basalt cobbles	Original clearance; grazing; some ploughing; formed access track	Pomeroy development envelope
SU18	Drainage depression; Aspect: East; 1-4° gradient	Scattered trees; grass and tussocks; some areas of improved pasture	Shale; colluvial soil	Original clearance; grazing; some ploughing; dam	Pomeroy development envelope
SU19	Ridge crest (undulating); Aspect: Generally open; 0-4° gradient	Grass; tussocks; regenerating bush	Shale and quartz present as shatter; outcrops of quartz and conglomerate bedrock	Original clearance; grazing; access track	Pomeroy development envelope; transmission line

Table 8. Pomeroy Survey Unit Descriptions.

Pomeroy - Survey Coverage

The Pomeroy development envelope surveyed during this assessment measured approximately 189.05 hectares in area (Table 9). Ground exposures inspected are estimated to have been 23.25 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 17.7 hectares. Effective Survey Coverage is therefore calculated to have been 9.4% of the Pomeroy development envelope.

Survey Units	Area	Ground Exposure	Estimated Archaeological Visibility %	Net Effective Exposure	Effective Survey Coverage	Artefact Recordings	Predicted Artefact Density
1	720000	36000	50	18000	2.5	54	low
2	93000	18600	80	14880	16	16	low
3	25000	10000	90	9000	36	nil	very low
4	127500	102000	90	91800	72	16	very low
5	160000	8000	60	4800	3	nil	low
6	2000	100	30	30	1.5	nil	very low
7	4000	800	40	320	8	4	very low
8	60000	6000	30	1800	3	12	low
9	10000	0	0	0	0	nil	very low
10	16000	0	0	0	0	nil	very low
11	4000	1600	90	1440	36	1	very low
12	4000	800	80	640	16	nil	very low
13	60000	600	10	60	0.1	nil	very low
14	15000	3000	90	2700	18	6	very low
15	10000	4000	90	3600	36	nil	very low
16	80000	24000	90	21600	27	3	very low
17	150000	1500	20	300	0.2	nil	low
18	50000	500	10	50	0.1	nil	very low
19	300000	15000	40	6000	2	6	low
Total	1890500 sq m	232500 sq m		177020 sq m	9.4 % ave.	118	

Table 9. Pomeroy: Survey Coverage Data

Pomeroy – Survey Results: Indigenous

A total of twenty seven locales containing stone artefacts were recorded within the Pomeroy survey area during this study. These sites are listed in Table 10 and further described below; their location is shown on Figure 6.

Name	Grid reference AMG Hand GPS Aust 66		Landform	Description	Impacts
Pomeroy Survey Unit 1/Locale 1	724603e	6163407n	Ridge crest	2 stone artefacts	Pomeroy development envelope
Pomeroy Survey Unit 1/Locale 2	724629e	6163547n	Ridge crest	7 stone artefacts	Pomeroy development envelope
Pomeroy Survey Unit 1/Locale 3	725409e	6164924n	Ridge crest	1 stone artefact	Pomeroy development envelope
Pomeroy Survey Unit 1/Locale 4	725498e	6164875n	Ridge crest	1 stone artefact	Pomeroy development envelope (<i>impacts unlikely</i>)
Pomeroy Survey Unit 1/Locale 5	725490e	6164545n	Ridge crest	7 stone artefacts	Pomeroy development envelope
Pomeroy Survey Unit 1/Locale 6	724618e	6164294n	Ridge crest	7 stone artefacts	Pomeroy development envelope
Pomeroy Survey Unit 1/Locale 7	724250e	6164300n	Ridge crest	19 stone artefacts	Pomeroy development envelope
Pomeroy Survey Unit 1/Locale 8	724551e	6165021n	Ridge crest	1 stone artefact	Pomeroy development envelope (<i>nil impacts proposed</i>)
Pomeroy Survey Unit 1/Locale 9	724335e	6165056n	Ridge crest	4 stone artefacts	Pomeroy development envelope (<i>nil impacts proposed</i>)
Pomeroy Survey Unit 1/Locale 10	724801e	6165991n	Ridge crest	5 stone artefacts	Transmission line and road access
Pomeroy Survey Unit 2/Locale 1	724833e	6163437n	Simple slope	16 stone artefacts	Pomeroy development envelope; access track transmission line
Pomeroy Survey Unit 4/Locale 1	725190e	6163232n	Ridge crest	7 stone artefacts	Pomeroy development envelope
Pomeroy Survey Unit 4/Locale 2	725336e	6163095n	Ridge crest	2 stone artefacts	Pomeroy development envelope
Pomeroy Survey Unit 4/Locale 3	725361e	6163002n	Ridge crest	1 stone artefact	Pomeroy development envelope
Pomeroy Survey Unit 4/Locale 4	725411e	6162933n	Ridge crest	1 stone artefact	Pomeroy development envelope
Pomeroy Survey Unit 4/Locale 5	725452e	6162916n	Ridge crest	1 stone artefact	Pomeroy development envelope
Pomeroy Survey Unit 4/Locale 6	725578e	6162847n	Ridge crest	3 stone artefacts	Pomeroy development envelope
Pomeroy Survey Unit 4/Locale 7	725745e	6162678n	Ridge crest	1 stone artefact	Pomeroy development envelope
Pomeroy Survey Unit 7/Locale 1	724723e	6164013n	Simple slope	3 stone artefacts	Transmission line and road access
Pomeroy Survey Unit 7/Locale 2	724674e	6163749n	Simple slope	1 stone artefact	Transmission line and road access
Pomeroy Survey Unit 8/Locale 1	724307e	6164681n	Drainage depression	11 stone artefacts	Pomeroy development envelope (<i>nil impacts proposed</i>)
Pomeroy Survey Unit 8/Locale 2	724345e	6164707n	Drainage depression	1 stone artefact	Pomeroy development envelope (<i>nil impacts proposed</i>)
Pomeroy Survey Unit 11/Locale 1	724375e	6165544n	Spur crest	1 stone artefact	Transmission line
Pomeroy Survey Unit 14/Locale 1	726807e	6165912n	Spur crest	6 stone artefacts	Pomeroy development envelope

Name	Grid reference AMG Hand GPS Aust 66		Landform	Description	Impacts
Pomeroy Survey Unit 16/Locale 1	726453e	6166445n	Spur crest	1 stone artefact	Pomeroy development envelope
Pomeroy Survey Unit 16/Locale 2	726073e	6166418n	Spur crest	2 stone artefacts	Pomeroy development envelope
Pomeroy Survey Unit 19/Locale 1	725898e	6166093n	Ridge crest	6 stone artefacts	Pomeroy development envelope

Table 10. Summary of stone artefact recordings in the Pomeroy development area.

A total of ten artefact locales were recorded in Survey Unit 1. It should however be noted that these recordings coincide with a relatively extensive survey unit in which skeletal soils with corresponding high levels of archaeological visibility were sometimes encountered. As a whole, in an Aboriginal land use context, it is predicted that this Survey Unit would have been utilised for very low levels of occupation which probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard. The results of the archaeological survey conform to this prediction and are discussed below in Section 9.5

Pomeroy Survey Unit 1/Locale 1 grid reference: Hand GPS (Aust 66): 724603e; 6163407n

This recording consists of two stone artefacts found on a small basalt knoll on broad ridge crest in Survey Unit 1. The site location has an open aspect and a gradient of 1-2°. Soils in the area are very rocky with basalt cobbles and boulders. The area has been cleared. The artefacts are situated in bare earth exposures and were located in an area measuring 5 x 2 m.

The artefacts recorded are described as follows:

- White quartz flake measuring 22 x 18 x 8 mm;
- Translucent quartz flaked piece measuring 16 x 8 x 3 mm.

It is predicted that any additional artefacts are likely to be present in low density. The site has some potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 1/Locale 2 grid reference: Hand GPS (Aust 66): 724629e; 6163547n

This recording consists of seven stone artefacts found on a broad ridge crest in Survey Unit 1. The site location has an easterly aspect and a gradient of 2°. The artefacts are situated in bare earth exposures in an area measuring 30 x 30 m.

The artefacts recorded are described as follows:

- Grey silcrete flake measuring 34 x 36 x 12 mm;
- Unidentifiable material flake fragment measuring 32 x 26 x 7 mm;
- Unidentifiable material flake measuring 36 x 33 x 10 mm;
- Unidentifiable material flake measuring 23 x 18 x 3 mm;
- Grey chert proximal flake fragment measuring 15 x 26 x 7 mm;
- Grey chert flake measuring 23 x 18 x 3 mm;
- Quartzite pebble manuport; broken; measuring 70 x 35 x 30 mm.

It is predicted that any additional artefacts are likely to be present in low density. The site has some potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 1/Locale 3 grid reference: Hand GPS (Aust 66): 725409e; 6164924n

This recording consists of one stone artefact found on a broad ridge crest in Survey Unit 1. The site location has an open aspect and a gradient of 2°. The ridge crest has been cleared. Soils are rocky and shallow. The artefact is situated in a bare earth exposure.

The artefact recorded is described as follows:

- Grey chert flaked piece measuring 25 x 20 x 10 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Given the rocky and shallow nature of the soil the site has negligible potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 1/Locale 4 grid reference: Hand GPS (Aust 66): 725498e; 6164875n

This recording consists of one stone artefact found on a broad ridge crest in Survey Unit 1. The site location has a south easterly aspect and a gradient of 3°. The ridge crest has been cleared. Soils are rocky and shallow. The artefact is situated in a drainage diversion channel leading to a dam.

The artefact recorded is described as follows:

- Red chert flake measuring 25 x 12 x 4 mm.

It is predicted that any additional artefacts are likely to be present in very low density. The site has negligible potential to contain intact subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope but is unlikely to be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 1/Locale 5 grid reference: Hand GPS (Aust 66): 725490e; 6164545n

This recording consists of seven stone artefacts found on slightly elevated knoll on a broad ridge crest in Survey Unit 1. The site location has an open aspect and a gradient of 2°. The area is very rocky with high levels of quartz and shale shatter and cobbles. The artefacts are situated in bare earth exposures in an area measuring 35 x 10 m.

The artefacts recorded are described as follows:

- Grey chert flake fragment measuring 24 x 10 x 10 mm;
- White quartz flake measuring 9 x 8 x 3 mm;
- White quartz proximal flake portion measuring 18 x 13 x 4 mm;
- White quartz proximal flake portion measuring 17 x 16 x 7 mm;
- White quartz flake fragment measuring 18 x 12 x 8 mm;
- White quartz flake piece measuring 16 x 10 x 9 mm;
- Red chert flake measuring 30 x 41 x 17 mm.

It is predicted that any additional artefacts are likely to be present in very low density. The site has low potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 1/Locale 6 grid reference: Hand GPS (Aust 66): 724618e; 6164294n

This recording consists of seven stone artefacts found on a broad ridge crest in Survey Unit 1. The site location has a northerly aspect and a gradient of 2°. The area is very rocky with high levels of quartz and shale shatter and cobbles. The artefacts are situated in bare earth exposures in an area measuring 60 x 50 m.

The artefacts recorded are described as follows:

- Grey chert flake measuring 20 x 23 x 11 mm;
- Brown silcrete flaked piece measuring 15 x 10 x 2 mm;
- Grey silcrete proximal flake portion measuring 8 x 9 x 2 mm;
- Grey silcrete flaked piece measuring 34 x 26 x 10 mm;
- Grey silcrete flake fragment measuring 15 x 22 x 4 mm;
- Grey chert flaked piece measuring 34 x 24 x 13 mm;
- Grey chert flaked piece measuring 36 x 19 x 9 mm.

It is predicted that any additional artefacts are likely to be present in very low density. The site has low potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 1/Locale 7 grid reference: Hand GPS (Aust 66): 724250e; 6164300n

This recording consists of 19 stone artefacts found on a slope of a broad ridge crest in Survey Unit 1 (Plate 27). The site location has a north easterly aspect and a gradient of 4°. The area is very rocky with high levels of quartz shatter and cobbles. The artefacts are situated in bare earth exposures in an area measuring 150 x 30 m.

The artefacts recorded are described as follows:

- Translucent quartz flake measuring 21 x 23 x 8 mm;
- Brown silcrete flaked piece measuring 45 x 45 x 13 mm;
- Brown silcrete flaked piece measuring 10 x 10 x 2 mm;
- Brown silcrete flaked piece measuring 27 x 22 x 15 mm;
- Grey silcrete flaked piece measuring 30 x 28 x 6 mm;
- Grey chert distal flake portion measuring 18 x 24 x 7 mm;
- Grey chert flake measuring 58 x 25 x 10 mm;
- Brown silcrete proximal flake portion measuring 15 x 18 x 6 mm;
- Red silcrete flaked piece measuring 32 x 22 x 19 mm;
- Red silcrete flake measuring 13 x 16 x 4 mm;
- White quartz single platform core measuring 16 x 40 x 25 mm;
- Brown silcrete proximal flake portion measuring 18 x 9 x 2 mm;
- Red silcrete flake measuring 21 x 29 x 8 mm;
- Grey chert flaked piece measuring 25 x 16 x 10 mm;
- Grey chert flaked piece measuring 35 x 20 x 15 mm;
- Grey chert flaked piece measuring 18 x 13 x 6 mm;
- Grey chert flake measuring 34 x 20 x 6 mm;
- Grey chert flaked piece measuring 22 x 15 x 4 mm;
- Grey chert bifacial core measuring 62 x 52 x 30 mm.

It is predicted that any additional artefacts are likely to be present in very low density. The site has low potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.



Plate 27. Survey Unit 1/Locale 7 looking east.

Pomeroy Survey Unit 1/Locale 8 grid reference: Hand GPS (Aust 66): 724551e; 6165021n

This recording consists of one stone artefact found on a broad ridge crest in Survey Unit 1. The site location has an open aspect and a gradient of 2°. The ridge crest has been cleared. The artefact is situated in a bare earth exposure.

The artefact recorded is described as follows:

- Grey chert flaked piece measuring 12 x 15 x 9 mm.

It is predicted that any additional artefacts are likely to be present in very low density.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 1/Locale 9 grid reference: Hand GPS (Aust 66): 724335e; 6165056n

This recording consists of 4 stone artefacts found on a slightly elevated knoll on a broad ridge crest in Survey Unit 1. The site location has an easterly aspect and a gradient of 4°. The artefacts are situated in bare earth exposures associated with a large sheet erosion scour.

The artefacts recorded were located in an area measuring 20 x 15 m and are described as follows:

- Grey chert flaked piece measuring 40 x 30 x 18 mm;
- Grey chert bifacial core measuring 45 x 43 x 32 mm;
- Brown silcrete flaked piece measuring 25 x 10 x 11 mm;
- Grey chert flake measuring 20 x 13 x 4 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Given the erosional context the site has low potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 1/Locale 10 grid reference: Hand GPS (Aust 66): 724801e; 6165991n

This recording consists of 5 stone artefacts found on a broad ridge crest in Survey Unit 1 (Plate 28). The site location has an open aspect and a gradient of 2°. The artefacts are situated on a farm track and in adjacent bare earth exposures under trees.

The artefacts were located in an area measuring 60 x 20 m.

The artefacts recorded are described as follows:

- Brown chert medial flake portion measuring 17 x 23 x 6 mm;
- Grey silcrete flake measuring 27 x 25 x 5 mm;
- Brown silcrete flaked piece measuring 16 x 12 x 5 mm;
- Brown chert flake measuring 18 x 20 x 5 mm;
- Grey silcrete flaked piece measuring 13 x 20 x 8 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Any corresponding subsurface deposit is predicted to be present in low density.

This artefact recording is situated within a proposed road and overhead transmission access in the Pomeroy development area and may be subject to impacts relating to the wind farm proposal.



Plate 28. Survey Unit 1/Locale 10 looking north.

Pomeroy Survey Unit 2/Locale 1 grid reference: Hand GPS (Aust 66): 724833e; 6163437n

This recording consists of 16 stone artefacts found on a small bench on a simple slope in Survey Unit 2 (Plate 29). The site location has an easterly aspect and a gradient of 6°. Soils in the area are skeletal. The artefacts are situated in bare earth exposures.

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

The artefacts were located in an area measuring 60 x 40 m.

The artefacts recorded are described as follows:

- Grey silcrete distal flake portion (with 5% terrestrial cortex) measuring 36 x 21 x 12 mm;
- Grey silcrete flake fragment measuring 25 x 15 x 7 mm;
- Grey silcrete proximal flake portion measuring 24 x 9 x 5 mm;
- Grey chert flaked piece measuring 25 x 20 x 14 mm;
- White quartz flake fragment measuring 30 x 18 x 11 mm;
- Grey chert flake measuring 15 x 24 x 10 mm;
- White quartz distal flake portion measuring 14 x 9 x 6 mm;
- Brown silcrete multiplatform core measuring 55 x 40 x 35 mm;
- Brown silcrete flaked piece measuring 16 x 15 x 12 mm;
- Brown silcrete flaked piece measuring 21 x 16 x 14 mm;

- Brown silcrete flake measuring 23 x 32 x 10 mm;
- White quartz flake fragment measuring 23 x 18 x 11 mm;
- Grey silcrete core fragment measuring 25 x 12 x 15 mm;
- Grey chert flake measuring 18 x 14 x 3 mm;
- White quartz flake measuring 20 x 11 x 9 mm;
- Grey chert flake measuring 17 x 23 x 11 mm.

It is predicted that any additional artefacts are likely to be present in low density. Given the skeletal nature of the soil the site has low potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

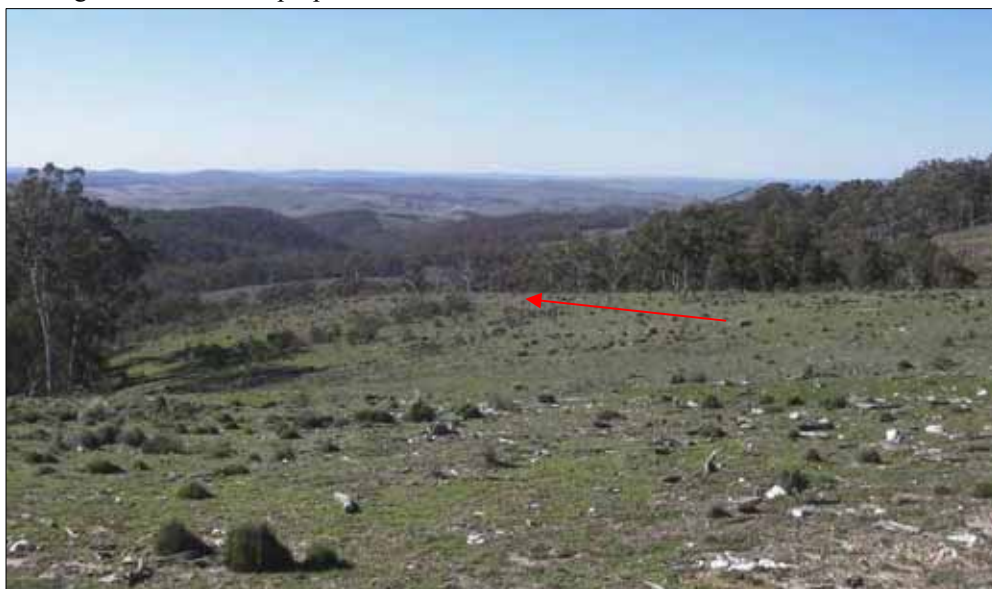


Plate 29. Survey Unit 2/Locale 1 looking 120° denoted by arrow.

Within Pomeroy Survey Unit 4 a total of seven artefact locales (equating to 16 artefacts) were recorded. It should however be noted that these recordings correspond to a Survey Unit with very high effective survey coverage (72 %), which indicates that the overall artefact density reflected by the survey results is very low. This is in keeping with the predicted model of Aboriginal land use as it is predicted that this area would have been utilised for very low levels of occupation which probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard.

Pomeroy Survey Unit 4/Locale 1 grid reference: Hand GPS (Aust 66): 725190e; 6163232n

This recording consists of seven stone artefacts found on a narrow ridge crest in Survey Unit 4 (Plate 30). The site location has an open aspect and a gradient of 0-1°. Soils in the area are skeletal. White quartz outcrops in the area. The area has been cleared. The artefacts are situated in a vehicle track and bare earth exposures.

The artefacts were located in an area measuring 80 x 20 m.

The artefacts recorded are described as follows:

- Brown silcrete distal flake portion with ventral scaler retouch along one margin; measuring 18 x 13 x 8 mm;
- Grey silcrete flaked piece measuring 29 x 23 x 13 mm;
- Red silcrete flake measuring 20 x 32 x 11 mm;
- Grey silcrete flaked piece measuring 18 x 14 x 10 mm;
- Brown chert flaked piece measuring 16 x 13 x 9 mm;
- White quartz flake measuring 15 x 12 x 8 mm;
- Translucent quartz flaked piece measuring 13 x 11 x 7 mm.

It is predicted that any additional artefacts are likely to be present in low density. Given the rocky and shallow nature of the soil the site has negligible potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.



Plate 30. Survey Unit 4/Locale 1 looking 290°.

Pomeroy Survey Unit 4/Locale 2 grid reference: Hand GPS (Aust 66): 725336e; 6163095n

This recording consists of two stone artefacts found on a narrow ridge crest in Survey Unit 4. The site location has an open aspect and a gradient of 0-1°. Soils in the area are skeletal. The ridge crest has been cleared. The artefacts are situated in bare earth exposures at two metres north east of a vehicle track.

The artefacts were located in an area measuring 1 x 1 m.

The artefacts recorded are described as follows:

- Brown silcrete proximal flake portion measuring 12 x 11 x 6 mm;
- Grey silcrete flaked piece measuring 21 x 16 x 9 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Given the rocky and shallow nature of the soil the site has negligible potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 4/Locale 3 grid reference: Hand GPS (Aust 66): 725361e; 6163002n

This recording consists of one stone artefact found on a narrow ridge crest in Survey Unit 4. The site location has an open aspect and a gradient of 0-1°. Soils in the area are skeletal. The ridge crest has been cleared. The artefacts are situated in a bare earth exposure at three metres east of a vehicle track.

The artefact recorded is described as follows:

- Grey chert core measuring 14 x 18 x 20 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Given the rocky and shallow nature of the soil the site has negligible potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 4/Locale 4 grid reference: Hand GPS (Aust 66): 725411e; 6162933n

This recording consists of one stone artefact found on a narrow ridge crest in Survey Unit 4 (Plate 31). The site location has an open aspect and a gradient of 0-1°. Soils in the area are skeletal. The ridge crest has been cleared. The artefacts are situated in a bare earth exposure at two metres northeast of a vehicle track.

The artefact recorded is described as follows:

- Grey silcrete flake measuring 18 x 9 x 9 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Given the rocky and shallow nature of the soil the site has negligible potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.



Plate 31. Survey Unit 4/Locale 4 looking 310°.

Pomeroy Survey Unit 4/Locale 5 grid reference: Hand GPS (Aust 66): 725452e; 6162916n

This recording consists of one stone artefact found on a narrow ridge crest in Survey Unit 4. The site location has a northeast aspect and a gradient of 2°. Soils in the area are skeletal. The ridge crest has been cleared. The artefacts are situated in a bare earth exposure at 10 metres northeast of a vehicle track.

The artefact recorded is described as follows:

- Grey quartz flake measuring 14 x 21 x 8 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Given the rocky and shallow nature of the soil the site has negligible potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 4/Locale 6 grid reference: Hand GPS (Aust 66): 725578e; 6162847n

This recording consists of three stone artefacts found on a narrow ridge crest in Survey Unit 4. The site location has a southerly aspect and a gradient of 2°. Soils in the area are skeletal. The ridge crest has been cleared. The artefacts are situated in a bare earth exposure immediately west of a vehicle track.

The artefacts were located in an area measuring 1 x 1 m.

The artefacts recorded are described as follows:

- White quartz flake measuring 13 x 12 x 6 mm;
- Volcanic flake measuring 24 x 16 x 10 mm;
- Grey chert flake measuring 16 x 10 x 8 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Given the rocky and shallow nature of the soil the site has negligible potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 4/Locale 7 grid reference: Hand GPS (Aust 66): 725745e; 6162678n

This recording consists of one stone artefact found on a narrow ridge crest in Survey Unit 4. The site location has an open aspect and a gradient of 0°. Soils in the area are skeletal. The ridge crest has been cleared. The artefacts are situated in a bare earth exposure immediately north of a vehicle track.

The artefact recorded is described as follows:

- Grey silcrete core measuring 10 x 19 x 14 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Given the rocky and shallow nature of the soil the site has negligible potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 7/Locale 1 grid reference: Hand GPS (Aust 66): 724723e; 6164013n

This recording consists of three stone artefacts found on a simple slope in Survey Unit 7. The site location has an easterly aspect and a gradient of 6°. Soils in the area are highly disturbed as a result of erosion. The ridge crest has been cleared for fencing and is covered with regrowth woodland. The artefacts are situated in bare earth exposures and erosion scours immediately east of a boundary fence.

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

The artefacts were located in an area measuring 90 x 5 m.

The artefacts recorded are described as follows:

- Grey silcrete flake measuring 18 x 15 x 5 mm;
- Grey chert flake measuring 30 x 15 x 8 mm;
- Red chert flake measuring 35 x 28 x 15 mm.

It is predicted that any additional artefacts are likely to be present in very low density. The site has potential to contain subsurface deposit which is likely to be disturbed and of very low density.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 7/Locale 2 grid reference: Hand GPS (Aust 66): 724674e; 6163749n

This recording consists of a stone artefact found on a simple slope in Survey Unit 7. The site location has an easterly aspect and a gradient of 6°. The ridge crest has been cleared for fencing and is covered with regrowth woodland. The artefact is situated in a large erosion scour immediately east of a boundary fence. The area contains high levels of quartz shatter.

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

The artefact recorded is described as follows:

- Brown silcrete flaked piece measuring 14 x 13 x 9 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Given the rocky and shallow nature of the soil the site has negligible potential to contain subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 8/Locale 1 grid reference: Hand GPS (Aust 66): 724307e; 6164681n

This recording consists of 11 stone artefacts found in a drainage depression in Survey Unit 8 (Plate 32). The site location has a westerly aspect and a gradient of 2°. Soils in the area are highly disturbed as a result of sheet erosion. The artefacts are situated in bare earth exposures and erosion scours.

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

The artefacts were located in an area measuring 10 x 10 m.

The artefacts recorded are described as follows:

- Grey silcrete flake measuring 20 x 20 x 4 mm;
- Grey chert flake measuring 20 x 15 x 3 mm;
- Grey chert flaked piece measuring 35 x 20 x 10 mm;
- Grey silcrete flaked piece measuring 20 x 13 x 5 mm;
- Brown silcrete flake measuring 30 x 30 x 12 mm;
- Brown chert flaked piece measuring 24 x 32 x 20 mm;
- Brown chert flake measuring 37 x 28 x 10 mm;
- Quartz flake measuring 40 x 15 x 8 mm;
- Brown silcrete flake measuring 14 x 10 x 5 mm;
- Grey chert flake measuring 15 x 17 x 3 mm;
- Grey chert flaked piece measuring 21 x 12 x 5 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Given the high levels of erosion the site has no potential to contain subsurface deposit.

This artefact recording is situated outside the Pomeroy development envelope and is unlikely to be subject to impacts relating to the wind farm proposal.



Plate 32. Survey Unit 8/Locale 1 looking 165°.

Pomeroy Survey Unit 8/Locale 2 grid reference: Hand GPS (Aust 66): 724345e; 6164707n

This recording consists of a stone artefact found in a drainage depression in Survey Unit 8. The site location has a westerly aspect and a gradient of 2°. The artefact is situated in an animal track.

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

The artefact recorded is described as follows:

- Translucent quartz flake measuring 23 x 19 x 7 mm.

It is predicted that any additional artefacts are likely to be present in very low density. The site has some potential to contain low density subsurface deposit.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 11/Locale 1 grid reference: Hand GPS (Aust 66): 724375e; 6165544n

This recording consists of a stone artefact found on a spur crest in Survey Unit 11. The site location has an open aspect and a gradient of 1°. The artefact is situated in a bare earth exposure.

The artefact recorded is described as follows:

- Grey chert flaked piece measuring 25 x 12 x 7 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Any corresponding subsurface deposit is predicted to be present in very low density.

This artefact recording is situated within a proposed overhead transmission easement in the Pomeroy development area and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 14/Locale 1 grid reference: Hand GPS (Aust 66): 726807e; 6165912n

This recording consists of six stone artefacts found in a saddle of a spur crest in Survey Unit 14. The site location has an open aspect and a gradient of 2°. The ridge crest has been cleared and is covered with regrowth

shrubs and woodland. The artefacts are situated in bare earth exposures and erosion scours immediately north of a fence.

The artefacts were located in an area measuring 1 x XX m.

The artefacts recorded are described as follows:

- Brown silcrete flake measuring 28 x 14 x 10 mm;
- Brown silcrete flake fragment measuring 12 x 9 x 3 mm;
- Brown silcrete flake measuring 42 x 10 x 9 mm;
- Brown silcrete flake fragment measuring 8 x 4 x 3 mm;
- Grey silcrete flaked piece measuring 19 x 17 x 11 mm;
- Red banded chert flake fragment measuring 13 x 12 x 9 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Any corresponding subsurface deposit is predicted to be present in very low density.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 16/Locale 1 grid reference: Hand GPS (Aust 66): 726453e; 6166445n

This recording consists of a stone artefact found on a spur crest in Survey Unit 16. The site location has an open aspect and a gradient of 2°. The artefact is situated in a bare earth exposure at approximately 10 m south of a farm track. The area is cleared and covered with grass and tussocks. Soils are shallow and very rocky with shale shatter.

The artefact recorded is described as follows:

- Grey chert flake measuring 23 x 27 x 15 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Any corresponding subsurface deposit is predicted to be present in very low density.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 16/Locale 2 grid reference: Hand GPS (Aust 66): 726073e; 6166418n

This recording consists of two stone artefacts found on a spur crest in Survey Unit 16. The site location has an easterly aspect and a gradient of 1°. The area has been cleared and is covered with grass. The artefacts are situated in an animal track and bare earth exposure.

The artefacts were located in an area measuring 30 x 1 m.

The artefacts recorded are described as follows:

- Grey chert proximal flake portion measuring 16 x 29 x 10 mm;
- Grey chert proximal flake portion measuring 15 x 27 x 8 mm.

It is predicted that any additional artefacts are likely to be present in very low density. Any corresponding subsurface deposit is predicted to be present in very low density.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.

Pomeroy Survey Unit 19/Locale 1 grid reference: Hand GPS (Aust 66): 725898e; 6166093n

This recording consists of six stone artefacts found on a broad ridge crest in Survey Unit 19 (Plate 33). The site location has an open aspect and a gradient of 1°. The area has been cleared and is covered with grass. Soils are shallow and very rock with high levels of shale shatter. The artefacts are situated in a farm track.

The artefacts were located in an area measuring 10 x 2 m.

The artefacts recorded are described as follows:

- Grey chert flaked piece measuring 45 x 45 x 20 mm;
- Grey chert flake fragment measuring 19 x 9 x 7 mm;
- Grey chert flake measuring 17 x 14 x 8 mm;
- Grey chert flaked piece measuring 15 x 12 x 3 mm;
- Grey chert flaked piece measuring 13 x 12 x 6 mm;
- Grey chert bifacial core measuring 52 x 50 x 25 mm.

It is predicted that any additional artefacts are likely to be present in low density. Any corresponding subsurface deposit is predicted to be present in very low density.

This artefact recording is situated within the Pomeroy development envelope and may be subject to impacts relating to the wind farm proposal.



Plate 33. Survey Unit 19/Locale 1 looking 60°.

9.4 Gurrundah Results

Gurrundah - Survey Units

The Gurrundah development envelope has been divided into 18 Survey Units. These Survey Units are described in Table 11; their location is shown in Figure 7.

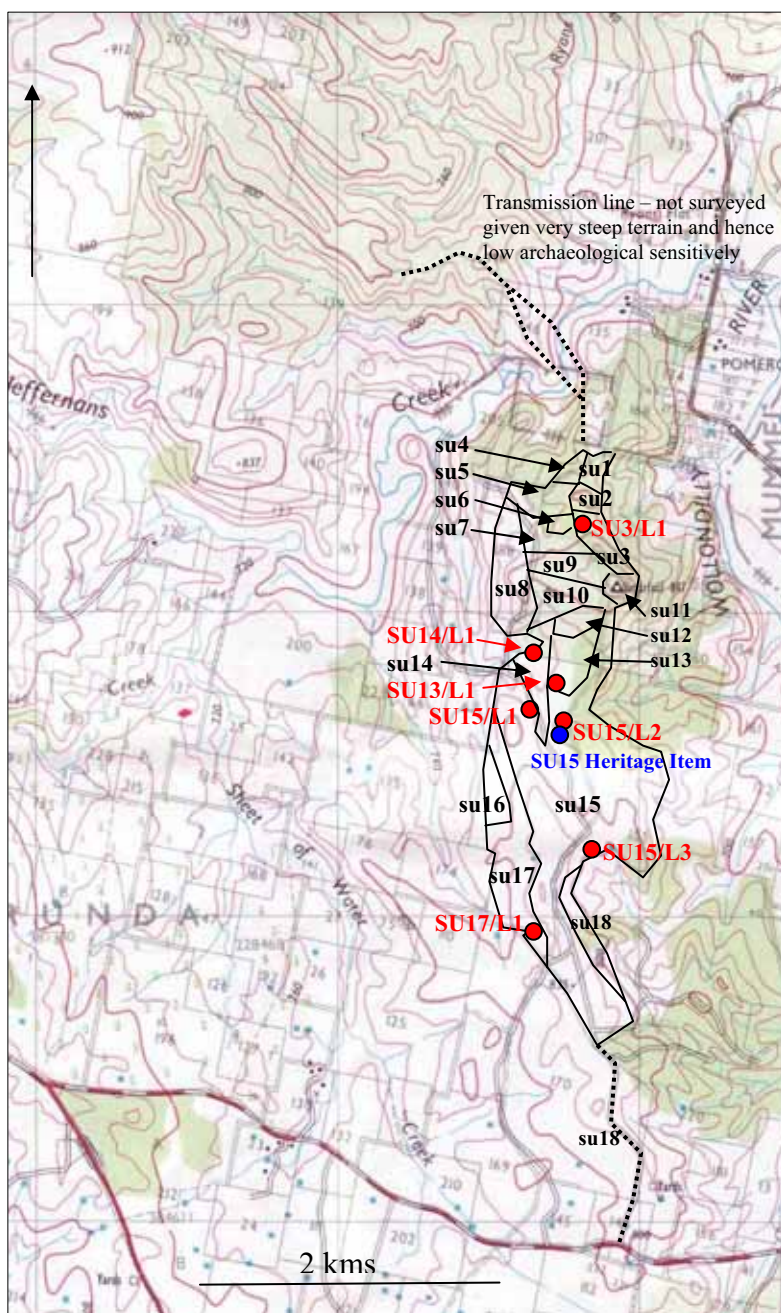


Figure 7. Location of Survey Units and recorded artefact locales in the Gurrundah development envelope; Red = Indigenous artefact locales; Blue = Non-Indigenous heritage items; Dashed line indicates proposed transmission line and/or road (Dalton 8728 – 1 & 1V 1st ed. 1:50,000 topographic map).

Survey Unit	Landform element	Vegetation	Geology/soils	Landuse impacts	Proposed Impacts
SU1	Ridge crest; Aspect: north; 8-18° gradient	Stands of trees; grass; tussocks	Shale/slate shatter; skeletal soil	Original clearance; grazing; fencing	Gurrundah development envelope
SU2	Knoll on ridge; Aspect: open; 3-6° gradient	Sparse grass; tussocks	Shale/slate shatter; skeletal soil	Original clearance; grazing; fencing	Gurrundah development envelope
SU3	Ridge crest; Aspect: north; 18° gradient	Sparse grass; tussocks	Shale/slate shatter; skeletal soil	Original clearance; grazing; fencing	Gurrundah development envelope
SU4	Simple slope; Aspect: 300°; 15-18° gradient	Stands of trees; grass; tussocks	Shale/slate shatter; skeletal soil	Original clearance; grazing; fencing	Gurrundah development envelope; nil impacts proposed
SU5	Spur crest; Aspect: west; 8-18° gradient	Sparse grass; tussocks; scattered trees	Shale/slate shatter; skeletal soil	Original clearance; grazing; fencing	Gurrundah development envelope; nil impacts proposed
SU6	Knoll on ridge; Aspect: open; 0-8° gradient	Sparse grass; tussocks	Shale/slate shatter; skeletal soil	Original clearance; grazing	Gurrundah development envelope; nil impacts proposed
SU7	Simple slope; Aspect: 300°; 12-16° gradient	Scattered trees; grass; tussocks	Shale/slate shatter; skeletal soil	Original clearance; grazing; fencing	Gurrundah development envelope
SU8	Ridge crest; Aspect: undulating thus variable; 8-12° gradient	Stands of trees; grass; tussocks	Shale/slate shatter; skeletal soil	Original clearance; grazing; fencing	Gurrundah development envelope
SU9	Spur crest; Aspect: west; 6-8° gradient	Sparse grass; tussocks	Shale/slate shatter; skeletal soil	Original clearance; grazing; fencing	Gurrundah development envelope
SU10	Simple slope; Aspect: 230°; 12-18° gradient	Scattered trees; grass; tussocks	Shale/slate shatter; skeletal soil	Original clearance; grazing; fencing	Gurrundah development envelope
SU11	Knoll on ridge; Aspect: open; 0-8° gradient	Sparse grass; tussocks	Shale/slate shatter; skeletal soil	Original clearance; grazing; trig; fencing	Gurrundah development envelope; nil impacts proposed
SU12	Spur crest; Aspect: 220°; 6-8° gradient	Sparse grass; tussocks; scattered trees	Shale/slate shatter; skeletal soil	Original clearance; grazing; fencing	Gurrundah development envelope
SU13	Simple slope; Aspect: 270°; 8-12° gradient	Scattered trees; grass; tussocks	Shale/slate shatter; skeletal soil	Original clearance; grazing; fencing	Gurrundah development envelope; nil impacts proposed
SU14	Drainage depression; Aspect: 270°; 3-6° gradient	Scattered trees; grass; tussocks; planted trees	Spare shale/slate; brown silty loam	Original clearance; grazing; fencing; dam	Gurrundah development envelope
SU15	Ridge crest; Aspect: undulating thus variable; 3-12° gradient	Stands of trees; grass; tussocks; improved pasture	Shale/slate shatter; brown silty loam	Original clearance; grazing; fencing; dams; yards	Gurrundah development envelope
SU16	Spur crest; Aspect: open; 0-4° gradient	Grass; improved pasture; bracken; scattered trees	Shale shatter and outcrops; quartz; thin silty loam	Original clearance; grazing; fencing	Gurrundah development envelope; nil impacts

Survey Unit	Landform element	Vegetation	Geology/soils	Landuse impacts	Proposed Impacts
					proposed
SU17	Simple slope; Aspect: 270°; 5-12° gradient	Scattered trees; grass; improved pasture; bracken	Shale shatter and outcrops; quartz; loam	Original clearance; ploughing; grazing; fencing	Gurrundah development envelope; nil impacts proposed
SU18	Simple slope; Aspect: 90°; >20° gradient	Scattered trees; grass; bracken; regenerating bush	Shale shatter and outcrops; quartz; loam	Original clearance; grazing; fencing	Gurrundah development envelope; nil impacts proposed

Table 11. Gurrundah Survey Unit Descriptions.

Gurrundah - Survey Coverage

The Gurrundah development envelope surveyed during this assessment measured approximately 260.75 hectares in area (Table 12). Ground exposures inspected are estimated to have been 68.15 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 36.61 hectares. Effective Survey Coverage is therefore calculated to have been 14% of the Gurrundah development envelope.

Survey Units	Area	Ground Exposure	Estimated Archaeological Visibility %	Net Effective Exposure	Effective Survey Coverage	Artefacts Recordings	Predicted Artefact Density
1	52500	21000	80	16800	32	nil	negligible
2	40000	16000	80	12800	32	nil	negligible
3	60000	30000	80	24000	40	2	very low
4	25000	7500	60	4500	18	nil	negligible
5	80000	32000	80	25600	32	nil	negligible
6	30000	12000	80	9600	32	nil	negligible
7	80000	32000	80	25600	32	nil	negligible
8	180000	18000	60	10800	6	nil	negligible
9	75000	22500	80	18000	24	nil	negligible
10	120000	12000	60	7200	6	nil	negligible
11	40000	32000	80	25600	64	nil	negligible
12	70000	7000	80	5600	8	nil	negligible
13	100000	10000	80	8000	8	2	low
14	80000	8000	80	6400	8	7	low
15	1295000	388500	40	155400	12	21	low
16	50000	10000	40	4000	8	nil	low
17	150000	15000	20	3000	2	1	very low
18	80000	8000	40	3200	4	nil	negligible
Total	2607500 sq m	681500 sq m		366100 sq m	14 % ave.	33	

Table 12. Gurrundah: Survey Coverage Data

Gurrundah – Survey Results: Indigenous

A total of seven locales containing stone artefacts were recorded within the Gurrundah survey area during this study. These sites are listed in Table 13 and further described below; their location is shown on Figure 7.

Name	Grid reference AMG Hand GPS Aust 66		Landform	Description	Impacts
Gurrundah Survey Unit 3/Locale 1	727606e	6160535n	Ridge crest	2 stone artefacts	Gurrundah development envelope

Name	Grid reference AMG Hand GPS Aust 66		Landform	Description	Impacts
Gurrundah Survey Unit 13/Locale 1	727494e	6159467n	Simple slope	2 stone artefacts	Gurrundah development envelope (unlikely to be impacted)
Gurrundah Survey Unit 14/Locale 1	727354e	6159732n	Drainage depression	7 stone artefacts	Gurrundah development envelope (unlikely to be impacted)
Gurrundah Survey Unit 15/Locale 1	727307e	6159367n	Ridge	15 stone artefacts	Gurrundah development envelope (unlikely to be impacted)
Gurrundah Survey Unit 15/Locale 2	727525e	6159248n	Ridge	2 stone artefacts	Gurrundah development envelope
Gurrundah Survey Unit 15/Locale 3	727702e	6158497n	Ridge	4 stone artefacts	Gurrundah development envelope (unlikely to be impacted)
Gurrundah Survey Unit 17/Locale 1	727282e	6157876n	Simple slope	1 stone artefact	Gurrundah development envelope (unlikely to be impacted)

Table 13. Summary of stone artefact recordings in the Gurrundah development area.

Gurrundah Survey Unit 3/Locale 1 grid reference: Hand GPS (Aust 66): 727606e; 6160535n

This recording consists of two stone artefacts found on a broad ridge crest in Survey Unit 3. The site location has an open aspect and a gradient of 3°. Soils in the area are skeletal. The area has been cleared. The artefacts are situated in a vehicle track and bare earth exposures.

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

The artefacts were located in an area measuring 25 x 2 m.

The artefacts recorded are described as follows:

- Basalt bifacially flaked artefact (bifacially flaked on both margins to a point) measuring 145 x 85 x 30 mm;
- Grey silcrete flake measuring 62 x 45 x 15 mm.

It is predicted that any additional artefacts will be present in very low density.

This artefact recording is situated within the Gurrundah development envelope and may be subject to impacts relating to the wind farm proposal.

Gurrundah Survey Unit 13/Locale 1 grid reference: Hand GPS (Aust 66): 727494e; 6159467n

This recording consists of two stone artefacts found on a simple slope in Survey Unit 13 (Plate 34). The site location has a north easterly aspect and a gradient of 6°. Soils in the area are gravely and skeletal. The artefacts are situated in bare earth exposures and sheep tracks.

The artefacts were located in an area measuring 5 x 1 m.

The artefacts recorded are described as follows:

- Pink chert flake measuring 33 x 23 x 7 mm;
- Grey chert flake measuring 39 x 27 x 7 mm.

It is predicted that any additional artefacts will be present in low density.

This artefact recording is situated within the Gurrundah development envelope.



Plate 34. Gurrundah Survey Unit 13/Locale 1 looking northeast.

Gurrundah Survey Unit 14/Locale 1 grid reference: Hand GPS (Aust 66): 727354e; 6159732n

This recording consists of seven stone artefacts found in a drainage depression in Survey Unit 14. The site location has a westerly aspect and a gradient of 2°. Soils in the area are silty colluvium. The area has been cleared. The artefacts are situated in bare earth exposures of sheet erosion.

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

The artefacts were located in an area measuring 30 x 30 m.

The artefacts recorded are described as follows:

- Brown silcrete flake measuring 32 x 41 x 7 mm;
- Black chert flake measuring 22 x 30 x 10 mm;
- Brown chert core fragment measuring 32 x 23 x 9 mm (with microblade scars);
- White quartz flake fragment measuring 12 x 8 x 4 mm;
- White quartz flake fragment measuring 9 x 6 x 3 mm;
- White quartz flake fragment measuring 13 x 11 x 7 mm;
- Grey silcrete core measuring 44 x 43 x 35 mm.

It is predicted that any additional artefacts will be present in low density.

This artefact recording is situated within the Gurrundah development envelope however given its location is unlikely to be subject to impacts relating to the wind farm proposal.

Gurrundah Survey Unit 15/Locale 1 grid reference: Hand GPS (Aust 66): 727354e; 6159732n

This recording consists of 15 stone artefacts found on a ridge crest in Survey Unit 15 (Plate 35). The site location has a northerly aspect and a gradient of 0-1°. Soils in the area are gravely silty loam.

The artefacts were located in an area measuring 40 x 30 m. The artefacts were recorded in sheep tracks, bare earth and vehicle track exposures. The site condition is assessed to be poor.

A sample of the artefacts observed is described as follows:

- White quartz flake measuring 25 x 20 x 10 mm;
- White quartz flake/blade measuring 32 x 14 x mm;
- Grey silcrete flake measuring 16 x 11 x 2 mm;
- Grey silcrete flake measuring 25 x 22 x 11 mm;
- Grey silcrete flake piece measuring 28 x 19 x 10 mm;
- Grey silcrete flake measuring 20 x 12 x 2 mm;
- Red quartzite flake measuring 25 x 10 x 5 mm;
- Grey silcrete distal flake portion measuring 15 x 14 x 4 mm;
- Grey silcrete flake measuring 21 x 8 x 6 mm;
- White quartz flake measuring 24 x 12 x 5 mm.

It is predicted that any additional artefacts will be present in low density.

This artefact recording is situated within the Gurrundah development envelope.



Plate 35. Gurrundah Survey Unit 15/Locale 1 looking 170°

Gurrundah Survey Unit 15/Locale 2 grid reference: Hand GPS (Aust 66): 727525e; 6159248n

This recording consists of two stone artefacts found on a ridge crest in Survey Unit 15 (Plate 36). The site location has an open aspect and a gradient of 3°. Soils in the area are skeletal.

The artefacts were located in an area measuring 1 x 1 m. The artefacts were recorded in sheep and vehicle track exposures. The site condition is assessed to be poor.

The artefacts recorded are described as follows:

- Grey silcrete flake measuring 19 x 18 x 7 mm;
- Grey silcrete core measuring 48 x 41 x 18 mm.

It is predicted that any additional artefacts will be present in low density.

This artefact recording is situated within the Gurrundah development envelope.



Plate 36. Gurrundah Survey Unit 15/Locale 2 looking south west.

Gurrundah Survey Unit 15/Locale 3 grid reference: Hand GPS (Aust 66): 727702e; 6158497n

This recording consists of four stone artefacts found on a ridge crest in Survey Unit 15 (Plate 37). The site location has an easterly aspect and a gradient of 5-6°. Soils in the area gravely clay.

The artefacts were located in an area measuring 40 x 3 m. The artefacts were recorded in sheep track and rill erosion exposures. The site condition is assessed to be poor.

The artefacts recorded are described as follows:

- Grey silcrete core fragment measuring 30 x 38 x 15 mm (3 platforms; 8 scars);
- Cream chert flake measuring 27 x 10 x 10 mm;
- Yellow/white quartz blade measuring 27 x 11 x 6 mm;
- White quartz proximal flake portion measuring 16 x 15 x 4 mm.

It is predicted that any additional artefacts will be present in low density.

This artefact recording is situated within the Gurrundah development envelope.



Plate 37. Gurrundah Survey Unit 15/Locale 3 looking 130°. Note existing wind mast.

Gurrundah Survey Unit 17/Locale 1 grid reference: Hand GPS (Aust 66): 727282e; 6157876n

This recording consists of one stone artefact found on a simple slope in Survey Unit 17. The site location has a westerly aspect and a gradient of 2°. Soils in the area a silty loam.

The artefact was recorded in an area of gully erosion below a dam. The site condition is assessed to be poor.

The artefact is described as follows:

- Pebble with pecking on half of both faces extended to a semi ground edge (possible hatchet preform). The item measures 145 x 95 x 30 mm (Plate 38).

It is predicted that any additional artefacts will be present in low density.

This artefact recording is situated within the Gurrundah development envelope however, the location it is unlikely to be impacted by the proposal.



Plate 38. Pebble artefact in Gurrundah Survey Unit 15/Locale 3.

Gurrundah – Survey Results: Non-Indigenous

One Non-indigenous heritage item was recorded in the Gurrundah development envelope. This item is described further below; its location is shown on Figure 8.

Gurrundah - Survey Unit 15 Farm machinery grid reference: Hand GPS (Aust 66): 727501e; 6159210n

This heritage item is situated in Survey Unit 15 (Plate 39). The item is an Ingersoll Rand crank start tractor in fair condition. A patent date on the engine block reads “Patented Nov 13 1923 # 99002B”.

While situated within the Gurrundah development envelope this item will not be impacted by the wind farm construction.



Plate 39. Gurrundah Survey Unit 15 heritage item.

9.5 Discussion

Indigenous

Kialla

The Kialla development envelope surveyed during this assessment measured approximately 458.8250 hectares in area. Ground exposures inspected are estimated to have been 14.3415 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 2.9575 hectares. Effective Survey Coverage (ESC) is therefore calculated to have been 0.6% of the Kialla development envelope; this is a very low ESC although it is typical of what is encountered in grassed paddocks.

A total of ten stone artefacts were recorded across six different artefact locales in the Kialla development envelope. The low number of artefacts recorded during the survey is assessed to be a reasonably true and reliable reflection of the artefactual nature of the proposal area. The predicted model of Aboriginal occupation indicates that the area would have been used for low levels of occupation that probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard. Furthermore, while the overall ESC is very low it is worth noting that only ten stone artefacts were recorded across almost three hectares of archaeological visibility, which would indicate a predicted artefact density in the order of less than five artefacts per hectare. Accordingly, the Kialla development envelope is assessed to be of low Indigenous archaeological potential and sensitivity.

Bannister

The Bannister development envelope surveyed during this assessment measured approximately 533.8 hectares in area. Ground exposures inspected are estimated to have been 30.452 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 9.6107 hectares. Effective Survey Coverage is therefore calculated to have been 4.25% of the Bannister development envelope.

A total of 34 stone artefacts were recorded in the Bannister development envelope. These artefacts were recorded in ten different artefact locales. As discussed above with regard to the Kialla study area, the predicted model of Aboriginal occupation for the Bannister development envelope indicates that the area would have been used for low levels of occupation that probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard. Furthermore, given that only 34 stone artefacts were recorded over an estimated 9.6 hectares of archaeological visibility it is calculated that the overall artefact

density would be in the order of less than five artefacts per hectare. Accordingly, the Bannister development envelope is assessed to be of low Indigenous archaeological potential and sensitivity.

Pomeroy

The Pomeroy development envelope surveyed during this assessment measured approximately 189.05 hectares in area. Ground exposures inspected are estimated to have been 23.25 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 17.7 hectares. Effective Survey Coverage is therefore calculated to have been 9.4% of the Pomeroy development envelope; this is a relatively good level of coverage for a survey in a pastoral context. The elevated levels of ESC within this study area can be attributed to the fact that the soils were often relatively shallow and the areas of bare earth inspected thus displayed a higher archaeological visibility with relatively good exposure of potential artefact bearing deposits.

A total of 118 stone artefacts were recorded across 27 different artefact locales in the Pomeroy development envelope. While this appears to equate to a significantly higher incidence of stone artefacts than that which was encountered in the other development envelopes, the differing levels of archaeological visibility largely explain it. That is, given that the ESC at Pomeroy was substantially higher than that encountered at Kialla and Bannister, it is to be expected that a greater number of artefact recordings would result. To that end, it is worth noting that the calculated artefact density, based on estimated archaeological visibility, is of a similar order to the other survey areas and equates to around six or seven stone artefacts per hectare. This corresponds to a very low artefact density; it is in keeping with the predicted model of Aboriginal landuse, which indicates that the area would have been used for low levels of occupation that probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard. Accordingly, the low number of artefacts recorded during the survey is assessed to be a reasonably true and reliable reflection of the artefactual nature of the proposal area and the Pomeroy development envelope is assessed to be of low Indigenous archaeological potential and sensitivity.

Gurrundah

The Gurrundah development envelope surveyed during this assessment measured approximately 260.75 hectares in area. Ground exposures inspected are estimated to have been 68.15 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 36.61 hectares. Effective Survey Coverage is therefore calculated to have been 14% of the Gurrundah development envelope. This is a relatively high ESC that is the result of skeletal soils and erosion scours that have afforded very good levels of visibility into potential artefact bearing deposits.

A total of 33 stone artefacts were recorded across seven different artefact locales in the Gurrundah development envelope. The low number of artefacts recorded during the survey is assessed to be a reasonably true and reliable reflection of the artefactual nature of the proposal area. The predicted model of Aboriginal occupation indicates that the area would have been used for low levels of occupation that probably included intermittent hunting and gathering activities conducted away from base camp locations, movement through country and so on. Such landuse is predicted to have resulted in a corresponding low level of artefact discard. Furthermore, given that only 33 stone artefacts were recorded across almost 37 hectares of archaeological visibility, it is calculated that the overall artefacts density is in the order of less than one artefact per hectare. This is an extremely low artefact density that corresponds to an almost negligible artefactual presence. Accordingly, the Gurrundah development envelope is assessed to be of low Indigenous archaeological potential and sensitivity.

Summary

Aboriginal objects in the form of stone artefacts have been recorded in a number of locales across each of the four development envelopes. It is predicted that additional stone artefacts are likely to be present in either low or very low density in a subsurface context across the majority of the proposal area. The development of the Gullen Range wind farm project will therefore result in impacts on both recorded stone artefact locales and subsurface artefact distributions within many of the defined Survey Units.

However the proposed impacts will occur in small and discrete areas within the development envelopes. Therefore impacts to stone artefact distributions will be partial rather than comprehensive: Given that approximately 93% of the development envelope will not be subject to ground disturbing impacts the majority of the archaeological resource in the proposal area will be excluded from impact.

It is concluded that the proposed Gullen Range wind farm will result in minor impacts to the Aboriginal archaeological resource.

Non-Indigenous

Kialla

Two Non-Indigenous heritage site complexes have been recorded in the Kialla development envelope. One site complex consists of the remains of a house and associated sheep yards and dip. The other consists of two structures, one being a stone house and the other its associated barn. These heritage items are situated outside areas of proposed impact.

Bannister

Two Non-Indigenous heritage site complexes have been recorded in the Bannister development envelope. One site is an old dump and the other a complex consisting of the remains of a house and shed. These heritage items are situated outside areas of proposed impact.

Pomeroy

No Non-Indigenous heritage items were recorded in the Pomeroy development envelope.

Gurrundah

One Non-Indigenous heritage item has been recorded in the Gurrundah development envelope. This item is an old crank start tractor. This heritage item is situated outside areas of proposed impact.

Summary

None of the recorded Non-Indigenous heritage items will be impacted by the proposed wind farm project. It is unlikely that additional unidentified heritage items exist within any of the proposed impact areas at Kialla, Bannister, Pomeroy and Gurrundah.

10. STATUTORY CONTEXT

The Environmental Planning and Assessment Act 1979

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

Part 3A of the Environmental Planning and Assessment Act 1979

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

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

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

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

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

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

development includes an activity within the meaning of Part 5.

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

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

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

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

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

- a permit under section 87 or a consent under section 90 of the *National Parks and Wildlife Act 1974*;
- an approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*.

11. SIGNIFICANCE ASSESSMENT

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

11.1 Significance Assessment Criteria

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

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

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

Aboriginal cultural significance

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

Archaeological value

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

Representativeness

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

Educational value

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

Aesthetic value

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

11.2 Significance Value of the Aboriginal Objects in the Study Area

All of the artefact locales recorded in the course of this survey correspond to low to very low density artefact distributions that are assessed to be reasonably accurate reflections of the archaeological status of the individual development envelopes. Low density stone artefact scatters are a very common site type across the Goulburn and Crookwell region, they afford relatively limited research potential, particularly in instances where soil deposits are shallow and/or disturbed.

The scientific significance of the recorded Aboriginal artefact locales in the Gullen Range wind farm project area are listed below in Tables 14, 15, 16 and 17:

Kialla

Name	Significance	Criteria
Kialla Survey Unit 11/Locale 1: 1 stone artefact; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Kialla Survey Unit 12/Locale 1 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Kialla Survey Unit 12/Locale 2 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Kialla Survey Unit 12/Locale 3 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Kialla Survey Unit 21/Locale 1 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Kialla Survey Unit 22/Locale 1 5 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit

Table 14. Scientific significance of Aboriginal objects recorded in the Kialla development envelope during the survey.

Bannister

Name	Significance	Criteria
Bannister Survey Unit 5/Locale 1 9 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Bannister Survey Unit 5/Locale 2 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit

Name	Significance	Criteria
Bannister Survey Unit 5/Locale 3 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Bannister Survey Unit 5/Locale 4 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Bannister Survey Unit 5/Locale 5 3 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Bannister Survey Unit 6/Locale 1 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Bannister Survey Unit 6/Locale 2 4 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Bannister Survey Unit 8/Locale 1 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Bannister Survey Unit 10/Locale 1 7 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Bannister Survey Unit 12/Locale 1 2 stone artefacts; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit

Table 15. Scientific significance of Aboriginal objects recorded in the Bannister development envelope during the survey.

Pomeroy

Name	Significance	Criteria
Pomeroy Survey Unit 1/Locale 1 2 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Pomeroy Survey Unit 1/Locale 2 7 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit

Name	Significance	Criteria
Pomeroy Survey Unit 1/Locale 3 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Pomeroy Survey Unit 1/Locale 4 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Pomeroy Survey Unit 1/Locale 5 7 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Pomeroy Survey Unit 1/Locale 6 7 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Pomeroy Survey Unit 1/Locale 7 19 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Pomeroy Survey Unit 1/Locale 8 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Pomeroy Survey Unit 1/Locale 9 4 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Pomeroy Survey Unit 1/Locale 10 5 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Pomeroy Survey Unit 2/Locale 1 16 stone artefacts; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 4/Locale 1 7 stone artefacts; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 4/Locale 2 2 stone artefacts; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 4/Locale 3 1 stone artefact; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit

Name	Significance	Criteria
Pomeroy Survey Unit 4/Locale 4 1 stone artefact; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 4/Locale 5 1 stone artefact; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 4/Locale 6 3 stone artefacts; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 4/Locale 7 1 stone artefact; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 7/Locale 1 3 stone artefacts; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 7/Locale 2 1 stone artefact; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 8/Locale 1 11 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Pomeroy Survey Unit 8/Locale 2 1 stone artefact; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Pomeroy Survey Unit 11/Locale 1 1 stone artefact; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 14/Locale 1 6 stone artefacts; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 16/Locale 1 1 stone artefact; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Pomeroy Survey Unit 16/Locale 2 2 stone artefacts; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit

Name	Significance	Criteria
Pomeroy Survey Unit 19/Locale 1 6 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit

Table 16. Scientific significance of Aboriginal objects recorded in the Pomeroy development envelope during the survey.

Gurrundah

Name	Significance	Criteria
Gurrundah Survey Unit 3/Locale 1: 2 stone artefacts; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit
Gurrundah Survey Unit 13/Locale 1: 2 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Gurrundah Survey Unit 14/Locale 1: 7 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Gurrundah Survey Unit 15/Locale 1: 15 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Gurrundah Survey Unit 15/Locale 2: 2 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Gurrundah Survey Unit 15/Locale 3: 4 stone artefacts; Artefact density in wider Survey Unit predicted to be low	Low local scientific significance	Common Aboriginal object and site type Low educational value Low aesthetic value Low research potential: predicted low artefact density in Survey Unit
Gurrundah Survey Unit 17/Locale 1: 1 stone artefact; Artefact density in wider Survey Unit predicted to be 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 in Survey Unit

Table 17. Scientific significance of Aboriginal objects recorded in the Gurrundah development envelope during the survey.

12. MITIGATION AND MANAGEMENT STRATEGIES

The aim of this study has been to identify Aboriginal objects and to predict the archaeological potential of each Survey Unit, to assess site significance and thereafter, to consider the potential impact of the proposal upon this heritage. In the following sections a variety of strategies that can be considered for the mitigation and management of development impact to Aboriginal objects is listed and discussed.

12.1 Management and Mitigation Strategies

Further Investigation

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

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

Test excavation can be undertaken in a variety of ways including hand excavation, shovel pits, auger holes, mechanically excavated trenches or surface scrapes. Such a strategy is pro-active and enables the proponent to properly manage archaeological sites prior to development activity occurring.

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

Conservation

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

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

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

Mitigated Impacts

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

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

Unmitigated Impacts

Unmitigated Impacts to Aboriginal objects can be given consideration when they are assessed to be of low or low/moderate archaeological and cultural significance and otherwise in situations where conservation is simply not feasible.

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

12.2 Management options - Summary

In the course of this project a total of 50 Aboriginal artefact locales were recorded across 24 Survey Units, a further 57 Survey Units had no artefact recordings at all. While effective survey coverage varied enormously across Survey Units and between development envelopes, the overall survey results indicated low to very low artefact distributions, which are in keeping with the predicted model of Aboriginal landuse for the landforms and environmental context of the study areas. Where artefact locales were recorded they usually contained low artefact numbers, even when ground exposure and archaeological visibility were relatively high. The low density artefact distributions encountered across the development envelopes are assessed to be a reasonably true and reliable reflection of the artefactual nature of the proposal area; they are assessed to be of low local scientific significance. As such there are no archaeological constraints to the proposed wind farm development.

Details of the archaeological sensitivity, suitable management strategies and accompanying rationale for each survey unit are outlined below in Tables 18, 19, 20 and 21.

Kialla

Survey Unit	Aboriginal object recordings	Archaeological sensitivity	Recommended management strategy	Rationale
1	nil	Predicted to be very low: ESC relatively high yet no Aboriginal objects found confirming prediction	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts minor in area (access road on existing farm track)
2	nil	Predicted to be low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbines and access road)
3	nil	Predicted to be low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbine and access road)
4	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
5	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
6	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbine and access road)
7	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
8	nil	Predicted to be low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbines and access road)
9	nil	Predicted to be low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (access road)
10	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road)
11	1 artefact: SU11/L1	Predicted to be very low	No constraints No further archaeological investigation Unmitigated impacts	One stone artefact recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbines and access road)

Survey Unit	Aboriginal object recordings	Archaeological sensitivity	Recommended management strategy	Rationale
12	3 artefacts: SU12/L1 SU12/L2 SU12/L3	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts	Three stone artefacts recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbines and access road)
13	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (transmission line)
14	nil	Predicted to be low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (transmission line)
15	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (transmission line)
16	nil	Predicted to be low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (transmission line)
17	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (transmission line)
18	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (transmission line)
19	nil	Predicted to be low	No constraints No further archaeological investigation	No stone artefacts recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbines, access road and transmission line)
20	nil	Predicted to be very low	No constraints No further archaeological investigation	No stone artefacts recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road and transmission line)
21	1 artefact: SU21/L1	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts	One stone artefact recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbine, access road and transmission line)
22	5 artefacts: SU22/L1	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts	Five stone artefacts recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbine, access road and transmission line)
23	nil	Predicted to be very low	No constraints No further archaeological investigation	No stone artefacts recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road and transmission line)

Table 18. Recommended management strategies relating to Survey Units in Kialla development area.

Bannister

Survey Unit	Aboriginal object recordings	Archaeological sensitivity	Recommended management strategy	Rationale
1	nil	Predicted to be low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts minor in area (access road and turbine)
2	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbine and access road)
3	nil	Predicted to be low: ESC high yet no Aboriginal objects found confirming prediction	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; nil impacts proposed
4	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbine, access road and transmission line)

Survey Unit	Aboriginal object recordings	Archaeological sensitivity	Recommended management strategy	Rationale
5	15 artefacts: SU5/L1 SU5/L2 SU5/L3 SU5/L4 SU5/L5	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts	15 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbines, access road and transmission line)
6	5 artefacts: SU6/L1 SU6/L2	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts	5 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (access road)
7	nil	Predicted to be low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (access road and transmission line)
8	5 artefacts: SU8/L1	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts	5 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbines and access road)
9	nil	Predicted to be low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbine and access road)
10	7 artefacts: SU10/L1	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts	7 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbine and access road)
11	nil	Predicted to be very low	No constraints No further archaeological investigation	No stone artefacts recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road)
12	2 artefacts: SU12/L1	Predicted to be very low	No constraints No further archaeological investigation <i>Impacts to recorded artefacts unlikely</i>	2 stone artefacts recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road)
13	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road)
14	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
15	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbines and access road)
16	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbines and access road)
17	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
18	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (transmission line)

Table 19. Recommended management strategies relating to Survey Units in Bannister development area.

Pomeroy

Survey Unit	Aboriginal object recordings	Archaeological sensitivity	Recommended management strategy	Rationale
1	54 artefacts: SU1/L1 SU1/L2 SU1/L3 SU1/L4 SU1/L5 SU1/L6 SU1/L7 SU1/L8 SU1/L9 SU1/L10	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts	54 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (access road and turbine)
2	16 artefacts SU2/L1	Predicted to be very low	No constraints No further archaeological investigation Unmitigated impacts	16 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road and transmission line)
3	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
4	16 artefacts SU4/L1 SU4/L2 SU4/L3 SU4/L4 SU4/L5 SU4/L6 SU4/L7	Predicted to be very low	No constraints No further archaeological investigation Unmitigated impacts	16 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbine, access road and transmission line)
5	nil	Predicted to be low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbines, access road and transmission line)
6	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road and transmission line)
7	4 artefacts SU7/L1 SU7/L2	Predicted to be very low	No constraints No further archaeological investigation Unmitigated impacts	4 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road and transmission line)
8	12 artefacts: SU8/L1 SU8/L2	Predicted to be very low	No constraints No further archaeological investigation Unmitigated impacts <i>Impacts to recorded artefacts unlikely</i>	12 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
9	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (transmission line)
10	nil	Predicted to be very low	No constraints No further archaeological investigation	7 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road)
11	1 artefact SU11/L1	Predicted to be very low	No constraints No further archaeological investigation Unmitigated impacts	1 stone artefact recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (transmission line)
12	nil	Predicted to be very low	No constraints No further archaeological investigation	No stone artefacts recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (transmission line)
13	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbines and access road)

Survey Unit	Aboriginal object recordings	Archaeological sensitivity	Recommended management strategy	Rationale
14	6 artefacts SU14/L1	Predicted to be very low	No constraints No further archaeological investigation Unmitigated impacts	6 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road)
15	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road)
16	3 artefacts SU16/L1 SU16/L2	Predicted to be very low	No constraints No further archaeological investigation Unmitigated impacts	3 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbines and access road)
17	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbines and access road)
18	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
19	6 artefacts SU19/L1	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts	6 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; (substation, turbines and access road)

Table 20. Recommended management strategies relating to Survey Units in Pomeroy development area.

Gurrundah

Survey Unit	Aboriginal object recordings	Archaeological sensitivity	Recommended management strategy	Rationale
1	nil	Predicted to be very low: ESC relatively high yet no Aboriginal objects found confirming prediction	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts minor in area (access road and turbine)
2	nil	Predicted to be very low: ESC relatively high yet no Aboriginal objects found confirming prediction	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbine and access road)
3	2 artefacts SU3/L1	Predicted to be low: ESC relatively high - 2 Aboriginal objects only found confirming prediction	No constraints No further archaeological investigation Unmitigated impacts	2 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbine and access road)
4	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
5	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
6	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
7	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road)
8	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbines and access road)
9	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbine and access road)
10	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (turbine and access road)
11	nil	Predicted to be very low	No constraints No further archaeological investigation	No stone artefacts recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed

Survey Unit	Aboriginal object recordings	Archaeological sensitivity	Recommended management strategy	Rationale
12	nil	Predicted to be very low	No constraints No further archaeological investigation	No stone artefacts recorded; archaeological potential and sensitivity assessed to be very low; proposed impacts discrete and minor in nature (access road)
13	2 artefacts SU13/L1	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts <i>Impacts to recorded artefacts unlikely</i>	2 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; nil impacts proposed
14	7 artefacts SU14/L1	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts <i>Impacts to recorded artefacts unlikely</i>	7 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
15	21 artefacts SU15/L1 SU15/L2 SU15/L3	Predicted to be low	No constraints No further archaeological investigation Unmitigated impacts <i>Impacts to artefacts in Locales 1 and 3 unlikely</i>	21 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; proposed impacts discrete and minor in nature (turbines and access road)
16	nil	Predicted to be low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be low; nil impacts proposed
17	1 artefact SU17/L1	Predicted to be very low	No constraints No further archaeological investigation <i>Impacts to recorded artefact unlikely</i>	1 Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed
18	nil	Predicted to be very low	No constraints No further archaeological investigation	No Aboriginal objects recorded; archaeological potential and sensitivity assessed to be very low; nil impacts proposed

Table 21. Recommended management strategies relating to Survey Units in Gurrundah development area.

13. RECOMMENDATIONS

The following recommendations are made on the basis of:

- A consideration of the Part 3A amendment to the Environmental Planning and Assessment Act (see Section 10 Statutory Information).
- The results of the investigation as documented in this report.
- Consideration of the type of development proposed and the nature of proposed impacts.

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

- No further archaeological research is considered to be necessary or warranted in regard to the proposed Gullen Range Wind Farm project.
- The Aboriginal stone artefacts recorded in the proposal area do not surpass any scientific significance thresholds which would act to preclude the construction of the proposed wind farm.

Pejar LALC has recommended that they would like to collect artefacts prior to impacts (see Appendix 1). This approach is considered to be an appropriate level of impact mitigation.

- None of the recorded Non-Indigenous heritage items are located in areas that will be impacted by the proposed wind farm.

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Appendix 1: Correspondence from Pejar LALC

P

PEJAR LOCAL ABORIGINAL LAND COUNCIL

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8 February 2008

Epuron Pty Ltd
Level 11, 75 Miller St
NORTH SYDNEY NSW 2060

To Whom It May Concern:

Gullen Range Windfarm

In reference to the above proposal and Julie Dibdens Draft report dated September 2007, the Pejar LALC would like to make the following comments.

We disagree with the recommendations stated in the Archaeologists report:

Management and mitigation strategies are outlined and justified in Section 11 of this report. The following recommendations are provided in summary form:

- *No further archaeological research is considered to be necessary or warranted in regard to proposed Gullen Range Wind Farm project.*
- *The stone artefacts recorded in the proposal area do not surpass any scientific significance thresholds which would act to preclude the construction of the proposed wind farm.*

Accordingly, if impacts to any of the recorded stone artefact locales recorded in the proposal area are proposed unmitigated impacts are justified (see Section 11).

Our main concern with this is that the Artifacts are not considered scientific significant and will be impacted without further investigation. To us they are very significant, as are all our artifacts. That is why we feel very strongly about the protection of our Culture and Heritage for future generations, we always hope that major developers such as yourselves, will either help us to protect this heritage or agree that we may collect the Artifacts from being destroyed. The Artifacts that are collected are used for Educational purposes to help our children and the wider Community and organisations such as schools, Councils, etc.

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In recent times, many Windfarm developers have agreed with us on this issue. We sincerely hope that Epuron consider our feelings on this proposal and allow us to collect the recorded artifacts that are onsite.

If you would like to discuss this further, then please do not hesitate to contact me on the above numbers.

Yours sincerely



Delise Freeman
Chief Executive Officer

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